

# WORLD MALARIA REPORT 2014



WHO GLOBAL MALARIA PROGRAMME  
**WORLD MALARIA REPORT** 2014



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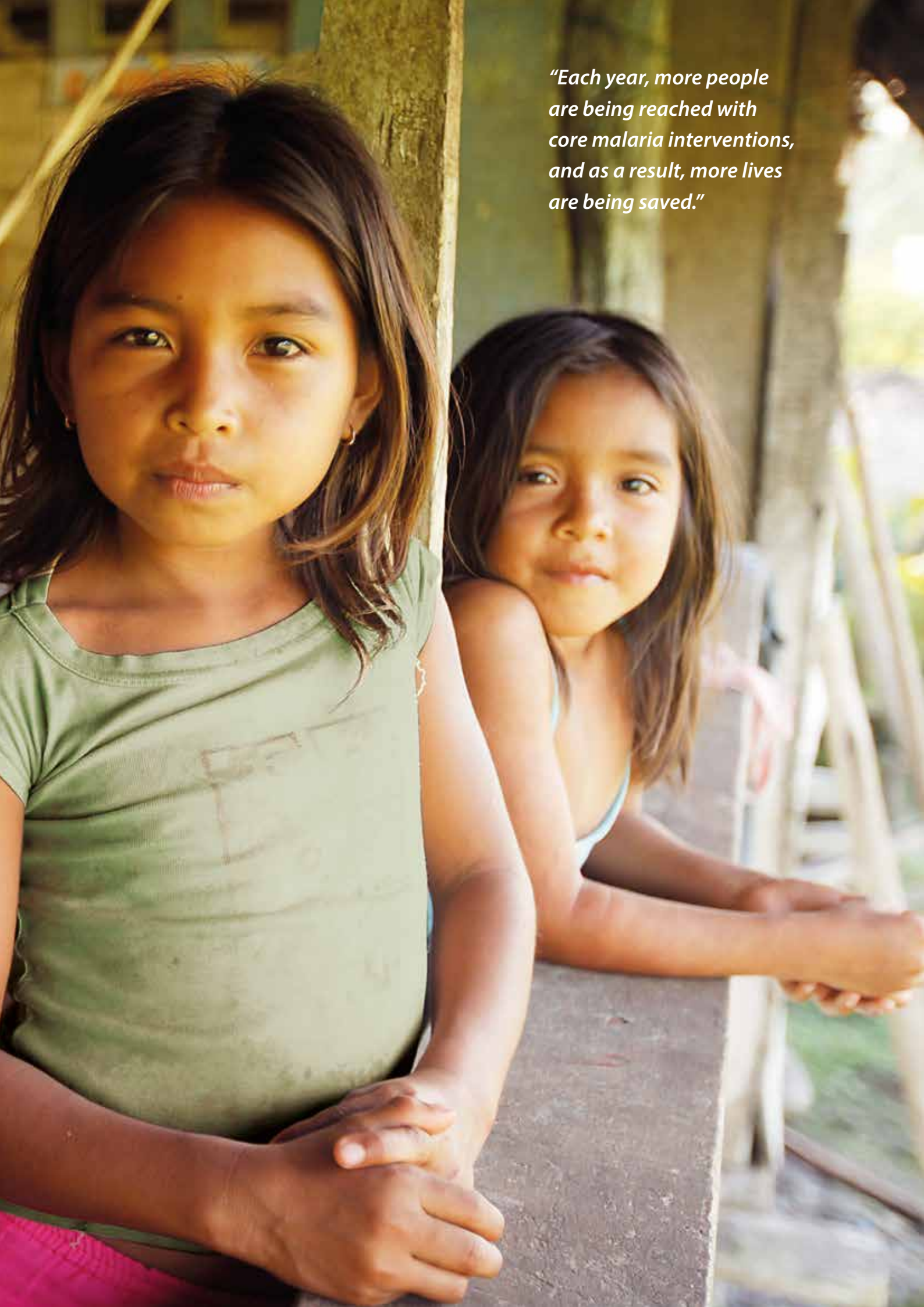
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*“Each year, more people are being reached with core malaria interventions, and as a result, more lives are being saved.”*

# Foreword



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

The findings in this year's *World Malaria Report* demonstrate that the world is continuing to make impressive progress in reducing

malaria cases and deaths. Each year, more people are being reached with core malaria interventions, and as a result, more lives are being saved. The malaria target under Millennium Development Goal 6 has been met, and 55 countries are on track to reduce their malaria burden by 75%, in line with the World Health Assembly's target for 2015.

In 2013, we saw a major expansion in the use of diagnostic testing and the deployment of artemisinin-based combination therapies (ACTs). For the first time, more diagnostic tests were provided at public health facilities in Africa than ACTs distributed, indicating a prominent shift away from presumptive treatment. Major progress has been documented in vector control as well: in 2014, a record number of long-lasting insecticidal nets were delivered to endemic countries in Africa.

The report shows that malaria mortality rates decreased by an impressive 47% between 2000 and 2013 globally, and by 54% in the WHO African Region. It also reveals that these trends are accompanied by a gradual and substantial reduction in parasite prevalence rates across Africa. This means that every year, fewer people get infected or carry asymptomatic infections – a sign that malaria interventions have an even larger impact than previously thought.

These tremendous achievements are the result of improved tools, increased political commitment, the burgeoning of regional initiatives, and a major increase in international and domestic financing. WHO is grateful for the engagement and long-standing commitment of the global health community, and inspired by the growing desire to accelerate efforts towards malaria elimination.

But we must not be complacent. Most malaria-endemic countries are still far from achieving universal coverage with life-saving malaria interventions; many biological and systemic challenges threaten to slow us down.

Available funding is far less than what is required to protect everyone at risk. An estimated 278 million people in Africa still live in households without a single insecticide-treated bed net, and about 15 million pregnant women remain without access to preventive treatment for malaria. Malaria is still responsible

for over 430 000 child deaths in Africa every year. Emerging drug- and insecticide-resistance continues to pose a major threat, and if left unaddressed, could trigger an upsurge in deaths.

The Ebola outbreak has had a devastating impact on basic health service delivery in the most severely affected countries, including the ability to control malaria. In Guinea, Liberia, and Sierra Leone, the collapse of health systems has affected all core malaria interventions and is threatening to reverse recent gains. WHO is working closely with countries and partners to prevent a worsening of the malaria situation and reduce the pool of fever cases.

This Ebola outbreak is a global tragedy that is rewriting the history of public health. It has served as a wake-up call for governments and the global development community, urging a major global rethink about the importance of strengthening health systems and building resilience.

All global health efforts will benefit from a strengthening of health systems, including efforts to control and eliminate malaria. Such investments will help us close the coverage gap, strengthen disease surveillance and research, and support the development and roll-out of new tools and approaches. They will make malaria and other public health responses more effective and more sustainable.

Recent progress in reducing the human suffering caused by malaria has shown us that, with adequate investments and the right mix of strategies, we can indeed make remarkable strides against this complicated enemy. We should act with urgency and resolve, and remain focused on our shared goal: to create a world in which no one dies of malaria, a world entirely clear of this scourge.

A handwritten signature in black ink, which appears to read 'M. Chan'. The signature is fluid and cursive.

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# ABBREVIATIONS

ABER	annual blood examination rate	LLIN	long-lasting insecticidal net
ACD	active case detection	MAP	Malaria Atlas Project
ACT	artemisinin-based combination therapy	MDG	Millennium Development Goal
AIDS	acquired immunodeficiency syndrome	MPAC	Malaria Policy Advisory Committee
AL	artemether-lumefantrine	MQ	mefloquine
ALMA	African Leaders Malaria Alliance	NMCP	national malaria control programme
AMFm	Affordable Medicine Facility–malaria	OECD	Organisation for Economic Co-operation and Development
ANC	antenatal care	<i>P.</i>	<i>Plasmodium</i>
API	annual parasite index	<i>PfPR</i>	<i>P. falciparum</i> parasite rate
AQ	amodiaquine	PMI	United States President’s Malaria Initiative
AS	artesunate	RBM	Roll Back Malaria
AT	atovaquone	RDT	rapid diagnostic test
CDC	United States Centers for Disease Control and Prevention	SMC	seasonal malaria chemoprevention
CIDA	Canadian International Development Agency	SP	sulfadoxine-pyrimethamine
Co-B	co-blister	SPR	slide positivity rate
DDT	dichloro-diphenyl-trichloroethane	TES	therapeutic efficacy studies
DFID	United Kingdom of Great Britain and Northern Ireland Department for International Development	UNICEF	United Nations Children’s Fund
DIPI	domestic investment priority index	USAID	United States Agency for International Development
EPI	Expanded Programme on Immunization	WHO	World Health Organization
FDC	fixed-dose combination		
G6PD	glucose-6-phosphate dehydrogenase		
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria		
GMAP	Global Malaria Action Plan		
GMP	Global Malaria Programme, WHO		
GPARC	Global Plan for Artemisinin Resistance Containment		
GPIRM	Global Plan for Insecticide Resistance Management		
IM	intramuscular		
IMF	International Monetary Fund		
IPTi	intermittent preventive treatment for infants		
IPTp	intermittent preventive treatment in pregnancy		
IQR	interquartile range		
IRS	indoor residual spraying		
ITN	insecticide-treated mosquito net		

## Abbreviations of WHO Regions and Offices

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

# KEY POINTS

The *World malaria report 2014* summarizes information received from 97 malaria-endemic countries and other sources, and updates the analyses presented in 2013. It assesses global and regional malaria trends, highlights progress made towards global targets, and describes opportunities and challenges in controlling and eliminating the disease. Most of the data presented in this report are for 2013.

## The public health challenge posed by malaria

Malaria transmission occurs in all six WHO regions. Globally, an estimated 3.3 billion people are at risk of being infected with malaria and developing disease, and 1.2 billion are at high risk (>1 in 1000 chance of getting malaria in a year). According to the latest estimates, 198 million cases of malaria occurred globally in 2013 (uncertainty range 124–283 million) and the disease led to 584 000 deaths (uncertainty range 367 000–755 000). The burden is heaviest in the WHO African Region, where an estimated 90% of all malaria deaths occur, and in children aged under 5 years, who account for 78% of all deaths.

## Expansion of malaria funding

International and domestic funding for malaria control and elimination totalled US\$ 2.7 billion in 2013. Although this represented a threefold increase since 2005, it is still significantly below the estimated US\$ 5.1 billion that is required to achieve global targets for malaria control and elimination. Total malaria funding will only match resource needs if international and domestic funders prioritize further investments for malaria control.

Overall, funding for countries in the WHO African Region accounted for 72% of the global total. Between 2005 and 2013, international disbursements for malaria for this region increased at an annual rate of 22%. During the same period, the average annual rate of increase for domestic funding in the region was 4%.

Globally, domestic funding for malaria was estimated to be US\$ 527 million in 2013. This represents 18% of the total malaria funding in 2013. In regions outside Africa, the annual rate of domestic funding has not increased in recent years.

## Progress in vector control

During the past 10 years, coverage with vector control interventions increased substantially in sub-Saharan Africa. In 2013, almost half of the population at risk (49%, range 44–54%) had access to an insecticide-treated mosquito net (ITN) in their household, compared to 3% in 2004. An estimated 44% (range

39–48%) of the population at risk were sleeping under an ITN in 2013, compared to 2% in 2004. Pregnant women and children were more likely than the general population to sleep under an ITN.

In terms of long-lasting insecticidal net (LLIN) delivery, 2014 has been the strongest year so far. A total of 214 million nets are projected to be delivered to countries in sub-Saharan Africa by the end of 2014, bringing the total number of LLINs delivered to that region since 2012 to 427 million.

Globally, 124 million people were protected from malaria through the use of indoor residual spraying. This represents 4% of the global population at risk. In the WHO African Region, 55 million people, or 7% of the population at risk, were protected. This has decreased from 11% in 2010; the decline is due to a withdrawal or downsizing of spraying programmes in some countries.

In sub-Saharan Africa, the proportion of the population protected by at least one vector control method has increased in recent years, and it reached 48% in 2013 (range 44–51%). Globally, 38 countries reported the use of larval control to complement core vector control methods.

Insecticide resistance in malaria vectors has been reported in 53 of 65 reporting countries around the world since 2010. Of these, 41 have reported resistance to two or more insecticide classes. The most commonly reported resistance is to pyrethroids, the most frequently used insecticide in malaria vector control.

WHO has established a system to track insecticide resistance globally, and recommends annual monitoring. In 2013, some 86 countries report undertaking insecticide resistance monitoring. However, only 42 of these countries provided WHO with resistance data for 2013, suggesting that many countries do not monitor insecticide resistance annually.

## Trends in the administration of preventive therapies

The proportion of women who receive intermittent preventive treatment in pregnancy (IPTp) for malaria has been increasing over time, although the levels remain below programme targets. IPTp has been adopted in 35 countries and 57% of pregnant women in those countries received at least one dose of IPTp in 2013. However, only nine of those countries have reported to WHO on the recommended number of three or more doses of IPTp, and within those countries, only 17% of pregnant women received three or more doses.

In most countries, attendance rates at antenatal care services are much higher than current levels of IPTp administration. This suggests that there are missed opportunities to expand access to this life-saving intervention.

The adoption and implementation of preventive therapies for children aged under 5 years and for infants has been slower than expected. As of 2013, six of the 16 countries recommended by WHO to adopt seasonal malaria chemoprevention for children aged under 5 years have done so. Only one country has adopted intermittent preventive treatment for infants, but has not yet implemented the treatment.

## Scaling up diagnostic testing

The proportion of patients suspected of having malaria who receive a malaria diagnostic test has increased substantially since 2010, when WHO recommended testing of all suspected malaria cases. In 2013, 62% of patients with suspected malaria in public health facilities in the WHO African Region received a diagnostic test, compared to 40% in 2010.

The total number of rapid diagnostic tests (RDTs) distributed by national malaria control programmes increased from fewer than 200 000 in 2005 to more than 160 million in 2013. Of these, 83% were delivered to countries in the WHO African Region. The quality of RDTs has improved substantially since the start of the RDT product testing programme in 2008. In the latest round of product testing, nearly all tested products met WHO standard of detection at parasite levels commonly seen in endemic areas.

In 2013, the number of patients tested by microscopic examination remained unchanged from the previous year, at 197 million. The global total of microscopic examinations is dominated by India, which accounted for over 120 million slide examinations in 2013.

In 2013, for the first time, the total number of diagnostic tests provided in the WHO African Region in the public health sector exceeded the number of artemisinin-based combination therapies (ACTs) distributed. This is an encouraging sign and, given that fewer than half of patients tested will require treatment, the ratio of diagnostic tests to ACTs should eventually reach two to one.

## Expanding access to treatment

By the end of 2013, ACTs had been adopted as national policy for first-line treatment in 79 of 88 countries where *Plasmodium (P.) falciparum* is endemic. Chloroquine was being used in 10 Central American and Caribbean countries where it remains efficacious.

The number of ACT courses procured from manufacturers – for both the public and private sectors – rose from 11 million in 2005 to 392 million in 2013. This increase has been largely driven by procurements for the public sector.

Public health facilities had enough ACT in 2013 to treat more than 70% of patients with malaria who presented for care.

However, the estimated proportion of all children with malaria who received ACTs was estimated at between 9–26%. This is because a substantial proportion of these patients do not seek care, and not all those who seek care receive antimalarial treatment.

## Antimalarial drug resistance

*P. falciparum* resistance to artemisinin has been detected in five countries of the Greater Mekong subregion: Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam. In many areas along the Cambodia–Thailand border, *P. falciparum* has become resistant to most available antimalarial medicines.

The number of countries that allow marketing of oral artemisinin-based monotherapies has declined rapidly. As of November 2014, only eight countries allow the marketing of oral monotherapies. However, 24 pharmaceutical companies, mostly in India, continue to market oral monotherapies.

Therapeutic efficacy studies remain the gold standard for guiding drug policy, and should be undertaken every 2 years. Studies of first- or second-line antimalarial treatments were completed in 66% of countries where *P. falciparum* efficacy studies were feasible.

## Gaps in intervention coverage

Despite impressive increases in malaria intervention coverage, it is estimated that, in 2013, 278 million of the 840 million people at risk of malaria in sub-Saharan Africa lived in households without even a single ITN, 15 million of the 35 million pregnant women did not receive even a single dose of IPTp, and between 56 and 69 million children with malaria did not receive an ACT. Poverty and low levels of education are significant determinants of lack of access to these essential services. More can be done to ensure all those at risk receive appropriate preventive measures, diagnostic testing and treatment.

## Changes in malaria incidence and mortality

### Reported malaria cases

Of the 106 countries that had ongoing malaria transmission in 2000, reported data in 66 were found to be sufficiently complete and consistent to reliably assess trends between 2000 and 2013.

Based on an assessment of trends in reported malaria cases, a total of 64 countries are on track to meet the Millennium Development Goal target of reversing the incidence of malaria.

Of these, 55 are on track to meet Roll Back Malaria and World Health Assembly targets of reducing malaria case incidence rates by 75% by 2015.

In 2013, two countries reported zero indigenous cases for the first time (Azerbaijan and Sri Lanka), and ten others succeeded in maintaining zero cases (Argentina, Armenia, Iraq, Georgia, Kyrgyzstan, Morocco, Oman, Paraguay, Turkmenistan and Uzbekistan). Another four countries reported fewer than 10 local cases annually (Algeria, Cabo Verde, Costa Rica and El Salvador).

The 55 countries that recorded decreases of >75% in case incidence accounted for only 13 million (6%) of the total estimated cases of 227 million in 2000. Only five countries with more than 1 million estimated cases in 2000 (Afghanistan, Bangladesh, Brazil, Cambodia, and Papua New Guinea) are projected to achieve a reduction of 75% or more in malaria case incidence. This is partly because progress has been faster in countries with lower numbers of cases, but also because of poorer quality surveillance data being submitted by countries with larger estimated numbers of cases, particularly in sub-Saharan Africa.

### Malaria infections

A new analysis of data reveals that the prevalence of malaria parasite infection, including both symptomatic and asymptomatic infections, has decreased significantly across sub-Saharan Africa since 2000. In sub-Saharan Africa, average infection prevalence in children aged 2–10 years fell from 26% in 2000 to 14% in 2013 – a relative decline of 46%.

Although declines in malaria parasite infection were seen across the African continent, they were particularly pronounced in Central Africa. Even with a large growth of populations in stable transmission areas, the number of infections at any one time across Africa fell from 173 million in 2000 to 128 million in 2013 – a reduction of 26% in the number of people infected.

### Estimated malaria cases and deaths

Globally, the estimated number of malaria cases decreased from 227 million in 2000 to 198 million in 2013. Taking into account the growth of the population at risk of malaria during this same period (25% globally and 43% in the WHO African Region), the estimated number of cases per 1000 population at risk showed a 30% decrease in case incidence worldwide and a 34% drop in the WHO African Region. If the rate of decline recorded over the past 13 years is maintained, then malaria case incidence is projected to fall by 35% globally and by 40% in the WHO African Region by 2015.

Between 2000 and 2013, estimated malaria mortality rates decreased by 47% worldwide and by 54% in the WHO African Region. They are estimated to have decreased by 53% in children aged under 5 years globally, and by 58% in the WHO African Region. If the annual rate of decrease that has occurred over the past 13 years is maintained, then by 2015 malaria mortality rates are projected to decrease by 55% globally, and by 62% in the WHO African Region. In children aged under 5 years, by 2015 they are projected to decrease by 61% globally and by 67% in the WHO African Region.

### Estimated malaria cases and deaths averted

It is estimated that, globally, 670 million fewer cases and 4.3 million fewer malaria deaths occurred between 2001 and 2013 than would have occurred had incidence and mortality rates remained unchanged since 2000. Of the estimated 4.3 million deaths averted between 2001 and 2013, 3.9 million (92%) were in children aged under 5 years in sub-Saharan Africa. These 3.9 million averted deaths accounted for 20% of the 20 million fewer under 5 deaths that would have occurred between 2001 and 2013 had under-5 mortality rates for 2000 applied for each year between 2001 and 2013. Thus, reductions in malaria deaths have contributed substantially to progress towards achieving the target for MDG 4, which is to reduce, by two thirds, the under-5 mortality rate between 1990 and 2015.

# KEY STATISTICS

## Since the year 2000

Average malaria infection prevalence declined **46%** in children aged 2–10, from 26% to 14% in 2013. The number of malaria infections at any one time dropped **26%**, from 173 million to 128 million in 2013. Malaria mortality rates have decreased by **47%** worldwide and by **54%** in the WHO Africa Region.

## In 2013

Only US\$ **2.7 billion** of the US\$ 5.1 billion required to achieve global malaria control and elimination targets were available through international and domestic funds.

**49%** of the at-risk population in sub-Saharan Africa had access to an ITN in their household. **44%** of the population at risk in sub-Saharan Africa were sleeping under an ITN, indicating that 90% of people used the nets available to them. **278 million** of the 840 million people at risk of malaria in sub-Saharan Africa lived in households without even a single ITN.

**57%** of pregnant women received at least one dose of IPTp, and **17%** received three or more doses in the nine reporting countries. **15 million** of the 35 million pregnant women did not receive a single dose of IPTp.

**197 million** patients worldwide were tested for malaria by microscopic examination. **62%** of patients with suspected malaria in the WHO African Region received a diagnostic test in public health facilities.

**70%** of malaria patients could be treated with ACTs distributed to public facilities in Africa; however, because not all children with fever are brought for care, less than 26% of all children with malaria received an ACT. **56–69 million** children with malaria did not receive an ACT.

**584 000** malaria deaths (range 367 000–755 000) occurred worldwide; 78% of malaria deaths occurred in children aged under 5 years. **528 000** malaria deaths (range 315 000–689 000), 90% of the global total, occurred in the WHO African Region.

## By 2015

If the annual rate of decrease over the past 13 years is maintained, malaria mortality rates are projected to decrease by **55%** globally and by **62%** in the WHO Africa Region. Malaria mortality rates in children aged under 5 years are projected to decrease by **61%** globally and **67%** in the WHO Africa Region.

# 1. INTRODUCTION

DATA WERE ASSEMBLED FROM 97 COUNTRIES AND TERRITORIES WITH ONGOING MALARIA TRANSMISSION, AND AN ADDITIONAL SIX COUNTRIES WORKING TO PREVENT REINTRODUCTION.

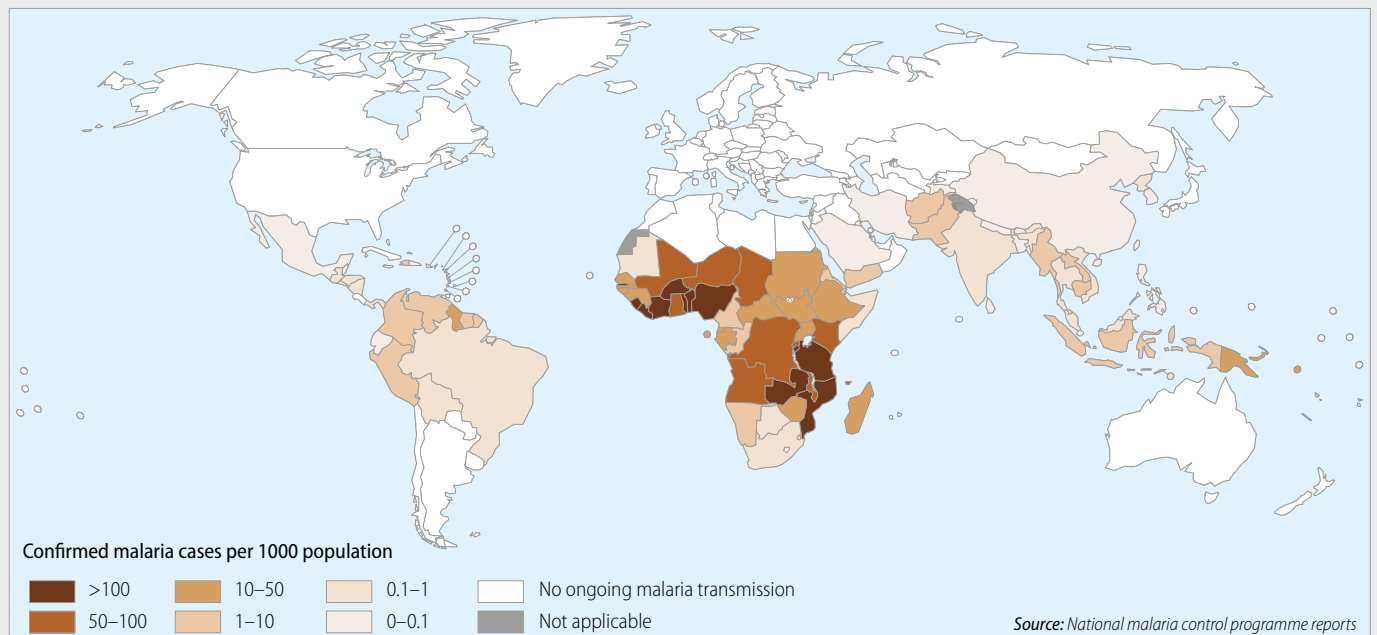
The *World malaria report 2014* summarizes the status of global efforts to control and eliminate malaria. The report is produced every year by the WHO Global Malaria Programme, with the help of WHO regional and country offices, ministries of health in endemic countries, and a broad range of other partners. Data for this year's report were assembled from 97 countries and territories with ongoing malaria transmission, and an additional six countries that are working to prevent reintroduction.

This section outlines the public health burden posed by malaria, the strategies that can be used to reduce that burden, and the goals, targets and indicators that have been set for 2015. The report then reviews global progress towards the goals and targets in relation to funding (Section 2), intervention coverage (Sections 3–7), and malaria cases and deaths (Section 8). The review is followed by **Regional profiles** that summarize trends in each WHO region. **Country profiles** are provided both for countries with ongoing malaria transmission and for those recently achieving zero local cases. Finally, **annexes** provide sources of data, details of the methodology used in the analysis, and tables containing country and regional data.

## 1.1 The public health challenge posed by malaria

**Malaria transmission occurs in all six WHO regions.** Globally, an estimated 3.3 billion people in 97 countries and territories are at risk of being infected with malaria and developing disease (Figure 1.1), and 1.2 billion are at high risk (>1 in 1000 chance of getting malaria in a year). According to the latest estimates, 198 million cases of malaria occurred globally in 2013 (uncertainty range 124–283 million) and the disease led to 584 000 deaths (uncertainty range 367 000–755 000), representing a decrease in malaria case incidence and mortality rates of 30% and 47% since 2000, respectively. The burden is heaviest in the WHO African Region, where an estimated 90% of all malaria deaths occur, and in children aged under 5 years, who account for 78% of all deaths.

Figure 1.1 Countries with ongoing transmission of malaria, 2013





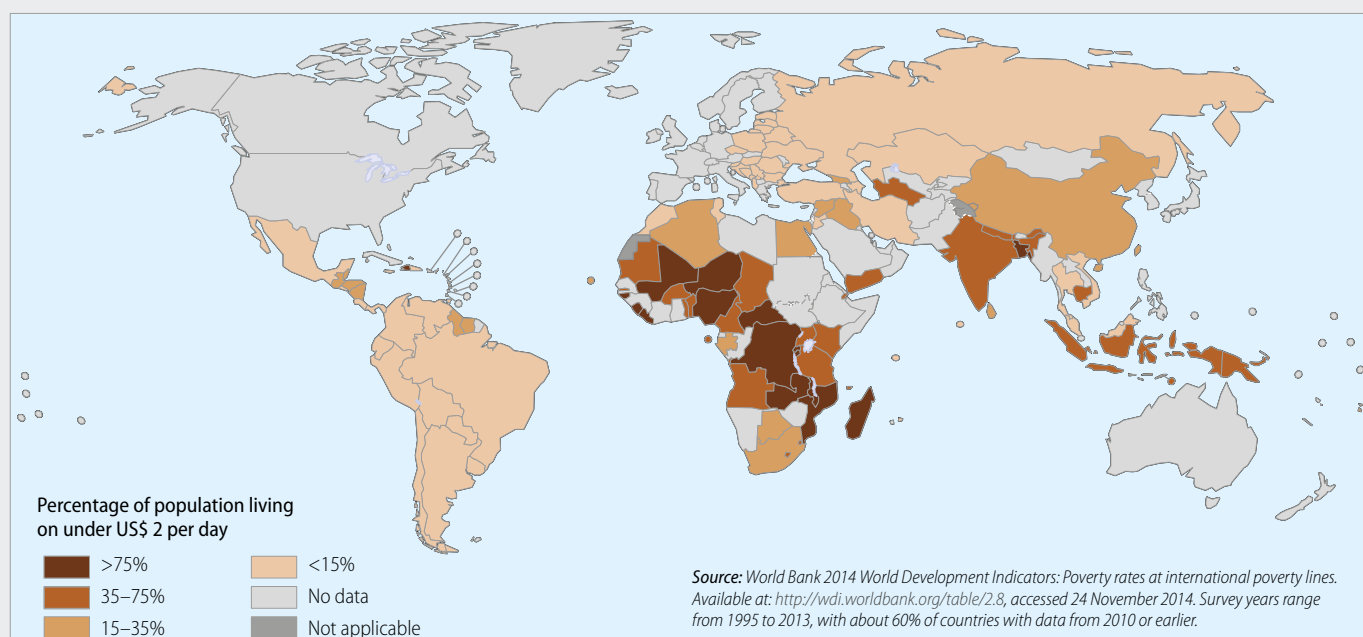
AN ESTIMATED 3.3 BILLION PEOPLE ARE AT RISK OF BEING INFECTED WITH MALARIA AND DEVELOPING DISEASE, AND 1.2 BILLION ARE AT HIGH RISK.

**Malaria exacts a heavy burden on the poorest and most vulnerable communities.** It primarily affects low- and lower-middle income countries (Figure 1.2). Within endemic countries, the poorest and most marginalized communities are the most severely affected, having the highest risks associated with malaria, and the least access to effective services for prevention, diagnosis and treatment. Thus, malaria control and ultimately its elimination is inextricably linked with health system strengthening, infrastructure development and poverty reduction.

**Malaria is caused by five species of the parasite belonging to the genus *Plasmodium*.** Four of these – *P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale* – are human malaria species, which are spread from one person to another by female mosquitoes of the genus *Anopheles*. There are about 400 different species of *Anopheles* mosquitoes, but only 30 of these are vectors of major importance. In recent years human cases of malaria have also been recorded due to *P. knowlesi* – a species that causes malaria among monkeys, and occurs in certain forested areas of South-East Asia.

***P. falciparum* and *P. vivax* malaria pose the greatest public health challenge.** *P. falciparum* is most prevalent on the African continent, and is responsible for most deaths from malaria. *P. vivax* has a wider geographic distribution than *P. falciparum* because it can develop in the *Anopheles* mosquito vector at lower temperatures, and can survive at higher altitudes and in cooler climates. It also has a dormant liver stage (known as a hypozoite) that enables it to survive for long periods as a potential reservoir of infection. The hypozoites can activate months later to cause a relapse. Although *P. vivax* can occur throughout Africa, the risk of infection with this species is quite low, because of the absence in many African populations of the Duffy gene, which produces a protein necessary for *P. vivax* to invade red blood cells. In many areas outside Africa, infections due to *P. vivax* are more common than those due to *P. falciparum*.

Figure 1.2 Percentage of population living on under US\$ 2 per day, 1995–2013



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MALARIA CAN BE PREVENTED AND CURED BY HIGHLY COST-EFFECTIVE INTERVENTIONS.

## 1.2 Strategies to control and eliminate malaria

**Malaria interventions are highly effective and affordable.** The main interventions – summarized here and discussed in detail in Sections 3–7 – comprise vector control (which reduces transmission by the mosquito vector from humans to mosquitoes and then back to humans), achieved using insecticide-treated mosquito nets (ITNs) or indoor residual spraying (IRS); chemoprevention (which prevents the blood stage infections in humans); and case management (which includes diagnosis and treatment of infections).

**ITNs are estimated to reduce malaria mortality rates by 55% in children under 5 years of age in sub-Saharan Africa (1).** Their public health impact is due to a reduction in malaria deaths and to reductions in child deaths from other causes that are associated with, or exacerbated by, malaria (e.g. acute respiratory infection, low birth weight and malnutrition). ITNs have been shown to reduce the incidence of malaria cases by 50% in a variety of settings (2). When the nets are used by pregnant women, they are also efficacious in reducing maternal anaemia, placental infection and low birth weight. Historical and programme documentation has established a similar impact for IRS, although randomized trial data are limited (3).

**Chemoprevention is particularly effective in pregnant women and young children.** Intermittent preventive treatment in pregnancy (IPTp) (i.e. administration of sulfadoxine-pyrimethamine [SP] during the second and third trimester of pregnancy) has been shown to reduce severe maternal anaemia (4), low birth weight (5) and perinatal mortality (6). Seasonal malaria chemoprevention (SMC) with amodiaquine plus SP (AQ+SP) for children aged 3–59 months could avert millions of cases and thousands of deaths in children living in areas of highly seasonal malaria transmission in Africa's Sahel subregion; SMC works by maintaining therapeutic antimalarial drug concentrations in the blood during periods of greatest malaria risk (7). Intermittent preventive treatment for infants (IPTi) with SP, delivered at routine childhood immunization clinics, provides protection in the first year of life against clinical malaria and anaemia; it reduces hospital admissions for infants with malaria and admissions for all causes (8).

**Confirmation of malaria infection directs care to those most in need, and for those in need, current medicines against malaria are highly effective.** In most malaria-endemic areas, less than half of patients with suspected malaria infection are actually infected with a malaria parasite. Parasitological diagnostic tests for malaria – examination of a blood smear by microscopy or rapid diagnostic test (RDT) – confirm infection in suspected cases of malaria, indicating which patients should be treated for malaria and for which patients another cause of fever should be sought. In relation to treatment, artemisinin-based combination therapy (ACT) treatment of uncomplicated *P. falciparum* malaria has been estimated to reduce malaria mortality in children aged 1–23 months by 99% (range: 94–100%), and in children aged 24–59 months by 97% (range: 86–99%) (9).

**WHO recommendations on the deployment of these interventions are continually reviewed and updated.** Current recommendations are summarized on the WHO website (10). WHO's evidence-based policy-setting work is supported by the Malaria Policy Advisory Committee (MPAC), established in 2011. The MPAC brings together some of the world's foremost experts on malaria, and is supported by technical expert groups and evidence review groups that focus on specific thematic areas. During 2014, WHO issued several new recommendations and guidance documents on malaria control and elimination (see **Box 1.1**).

### **Box 1.1 Recommendations and guidance documents issued by WHO in 2014**

#### **New guidance issued by WHO in line with MPAC recommendations**

In 2014, WHO produced revised guidance on vector control, including management of long-lasting insecticidal nets, alone and in combination with indoor residual spraying, tackling residual transmission and malaria diagnostics:

- *Guidance for countries on combining indoor residual spraying and long-lasting insecticidal nets (11)*
- *Recommendations on the sound management of old long-lasting insecticidal nets (12)*
- *Guidance note on the control of residual malaria parasite transmission (13)*
- *Policy recommendation on malaria diagnostics in low transmission settings (14,15).*

#### **Additional technical documents, evaluations and assessments**

WHO also produced or collaborated on other materials, including a new manual, modelling software, and updates on rapid diagnostic tests and artemisinin resistance:

- *From malaria control to malaria elimination: a manual for elimination scenario planning (16)*
- *Malaria Tools (malaria transmission modelling software) (17)*
- *Malaria rapid diagnostic test performance. Results of WHO product testing of malaria RDTs, Round 5 (18)*
- *Information note on recommended selection criteria for procurement of malaria rapid diagnostic tests (19)*
- *WHO updates on artemisinin resistance (20).*

MALARIA CONTROL IS ONE OF THE HIGHEST PRIORITIES ON THE INTERNATIONAL HEALTH AGENDA.

### 1.3 Global goals and targets for malaria

**Malaria control is critical to achieving the Millennium Development Goals (MDGs).** MDG 6 (to halt by 2015 and begin to reverse the incidence of malaria and other major diseases) specifically addresses malaria; malaria control also contributes to the achievement of other MDGs. Given that malaria accounted for an estimated 13% of post-neonatal child deaths globally in 2010, and 21% in sub-Saharan Africa (21), malaria control is also central to MDG 4 (to achieve a two thirds reduction in the mortality rate among children aged under 5 years between 1990 and 2015). Malaria efforts are additionally expected to contribute to achieving MDG 1 (eradicate extreme poverty and hunger), MDG 2 (achieve universal primary education), MDG 3 (promote gender equality and empower women), MDG 5 (improve maternal health) and MDG 8 (develop a global partnership for development).

**Malaria is the focus of World Health Assembly and Roll Back Malaria (RBM) targets.** In 2005, the World Health Assembly set as a target the reduction of malaria cases and deaths by 75% by 2015. In 2011, the RBM Partnership updated the objectives and targets that had been set out in the Global Malaria Action Plan in 2008 (22). The update shares the Assembly's objective of reducing malaria cases by 75% by 2015, but has a new and more ambitious objective to reduce malaria deaths to near zero by 2015 (see Table 1.1). A further objective is to eliminate malaria by the end of 2015 in 8–10 new countries (since 2008) and in the WHO European Region. The objectives of mortality and morbidity reduction are linked to targets for malaria intervention coverage.

**Indicators of progress provide a means to monitor the success of international control efforts in achieving these updated goals and targets.** A list of recommended indicators against each objective and target is shown in Table 1.1. Indicators that can be generated from household surveys are shown in bold. In some cases, the indicators generated by household surveys do not measure a target directly (e.g. all-cause under-5 mortality rate is not a direct measure of malaria mortality), but the indicator is in widespread use and has therefore been placed alongside the most appropriate RBM target.

**In 2015, WHO aims to launch a new technical strategy for 2016–2030.** Following a proposal by the MPAC in 2012, WHO began coordinating the development of a Global Technical Strategy for Malaria for the post-2015 period. This strategy will set milestones and goals for burden reduction and elimination beyond 2015. It has been developed in close collaboration with the RBM Partnership's Global Malaria Action Plan 2 (GMAP 2), which will focus on global advocacy, resource mobilization, partner harmonization and the engagement of non-health sectors for the implementation of the technical strategy.

**The WHO vision is for "A world free of malaria".** This can be achieved through country-by-country (and later regional) elimination of malaria infection, followed by global malaria eradication. Malaria *elimination* refers to the reduction of the incidence of infection to zero in a defined geographical area as a result of deliberate efforts. The official recognition of malaria-free status is granted by WHO once it has been proven beyond reasonable doubt that the chain of local human malaria transmission by *Anopheles* mosquitoes has been interrupted in an entire country for 3 consecutive years. Malaria *eradication* is the permanent reduction to zero of the worldwide incidence of infection caused by a particular malaria parasite species. Intervention measures will no longer be needed once eradication has been achieved.

**Table 1.1** Roll Back Malaria objectives, targets for 2015 and indicators for measuring progress (23)

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

Indicators derived from household surveys are in bold.

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

\*\* Universal access to and utilization is defined as every person at risk sleeping under a quality insecticide-treated net or in a space protected by indoor residual spraying and every pregnant woman at risk receiving a dose of IPTp at each ANC visit after the first trimester (in settings where IPTp is appropriate).

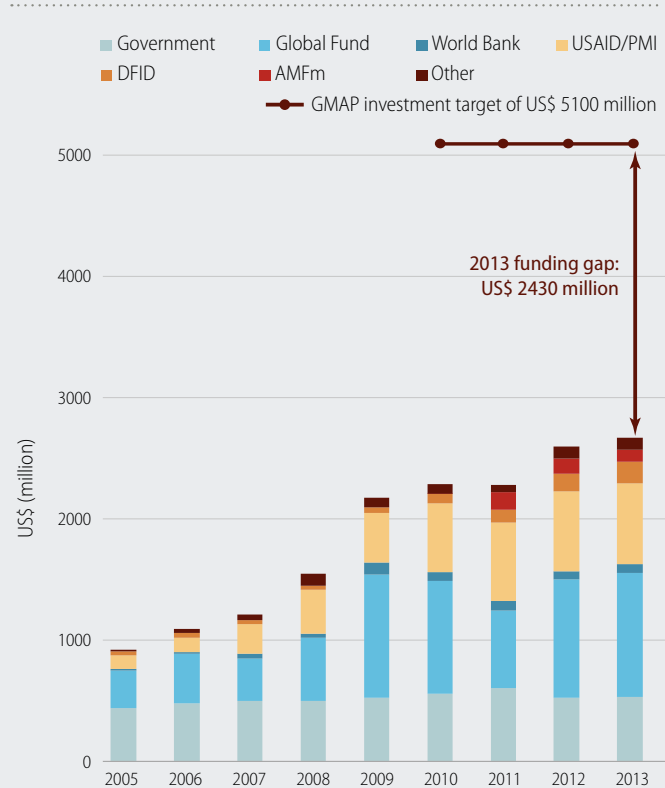
## 2. FINANCING FOR MALARIA PROGRAMMES

### 2.1 Growth in annual funding for malaria

Annual funding for malaria control and elimination totalled US\$ 2.7 billion in 2013, almost three times the amount spent in 2005. International investments represented 82% of total malaria funding in 2013 (Figure 2.1), totalling US\$ 2.18 billion. Domestic funding for malaria reached US\$ 527 million. However, domestic funding tallied here excludes expenditures for health-worker salaries and other shared costs of diagnosing and treating patients; therefore, it does not reflect the full contribution of endemic country governments to malaria control. Compared to 2012, total malaria funding in 2013 increased by 3%. Although the 2013 total exceeds that of any previous year, it represents just 53% of the annual estimated requirement of US\$ 5.1 billion<sup>1</sup> to attain international targets for malaria control and elimination (24).

**Growth of funding has been greatest in the WHO African Region, where the disease burden is greatest.** International investments grew at an annual average rate of 22% per year between 2005 and 2013 in the WHO African Region, compared to 15% across all other WHO regions (Figure 2.2). During the same period, domestic investments grew at an annual average rate of 4% in the WHO African Region, compared to 2% in other WHO regions. In 2013, the WHO African Region accounted for 72% of total malaria funding, compared to 50% in 2005; also, international investments accounted for 91% of the total investments in the WHO African Region, compared to 41% in other WHO regions. Funding for malaria has not grown in the other WHO regions since 2010.

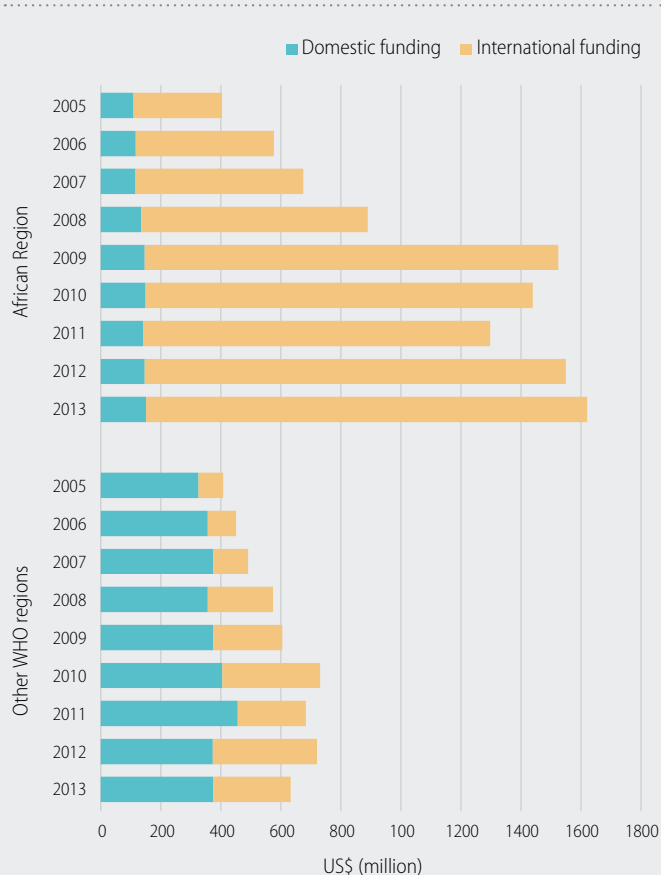
**Figure 2.1** Trends in total funding for malaria control and elimination 2005–2013, and 2013 estimated funding gap



AMFm, Affordable Medicine Facility–malaria; DFID, United Kingdom Department for International Development; Global Fund, Global Fund to Fight AIDS, Tuberculosis and Malaria; GMAP, Global Malaria Action Plan; PMI, United States President's Malaria Initiative; USAID, United States Agency for International Development

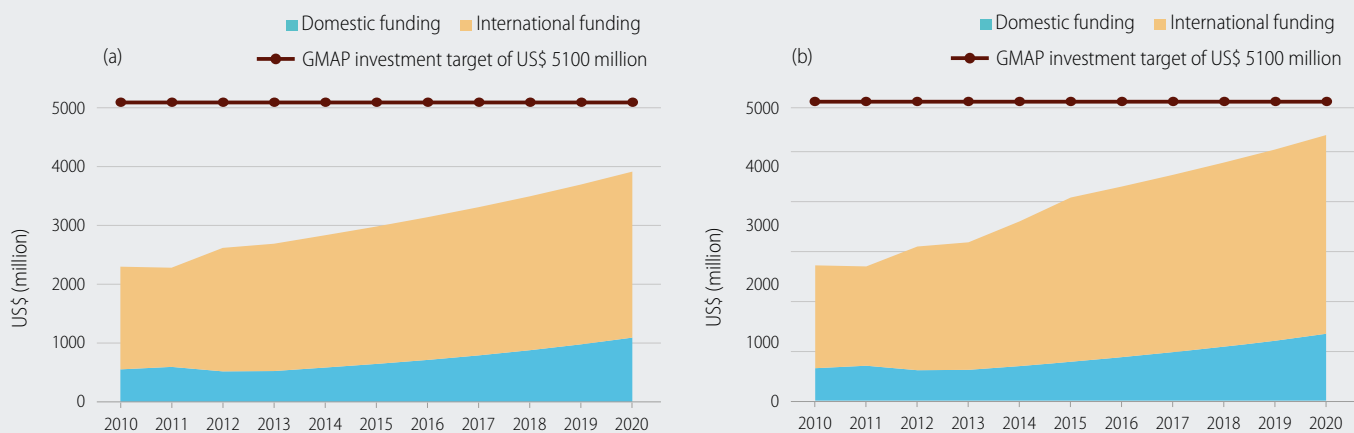
Source: National malaria control programmes; Global Fund, USAID and Centers for Disease Control and Prevention (CDC) websites; Organisation for Economic Co-operation and Development (OECD) creditor reporting system; and Roll Back Malaria 2008 GMAP

**Figure 2.2** Trends in domestic and international funding in the WHO African Region and other WHO regions, 2005–2013



Source: National malaria control programmes; Global Fund to Fight AIDS, Tuberculosis and Malaria and President's Malaria Initiative websites; OECD creditor reporting system; and Roll Back Malaria 2008 Global Malaria Action Plan

**Figure 2.3** Anticipated funding if a) domestic and international investments increase in line with total government expenditure growth estimated by the IMF for 2014–2020, and b) funders prioritize further investments in malaria control



GMAP, Global Malaria Action Plan; IMF, International Monetary Fund

Source: National malaria control programmes; Global Fund; PMI; OECD Development Assistance Committee database; International Monetary Fund forecast growth rates of government expenditures and revenue; and Roll Back Malaria 2008 GMAP

FUNDING GAPS CAN BE NARROWED IF GOVERNMENTS OF BOTH MALARIA-ENDEMIC AND DONOR COUNTRIES GIVE HIGHER PRIORITY TO INVESTMENTS IN MALARIA CONTROL.

## 2.2 Future funding directions

**Total malaria funding can increase significantly if investments increase in line with forecasted total government expenditures, and if domestic and international funders prioritize further investments for malaria control.** Two scenarios for future funding were explored to assess the prospects of achieving the targeted annual estimated requirement of US\$ 5.1 billion between 2014 and 2020.

- Scenario 1 assumes that domestic and international investments towards malaria control increase at the International Monetary Fund (IMF) forecast of total government expenditures for both endemic and donor countries. This scenario shows that total funding could reach US\$ 3.8 billion by 2020, but still results in an estimated annual resource gap of US\$ 1.3 billion in 2020 – equivalent to a cumulative funding gap of US\$ 13.3 billion for 2014–2020. The contribution of domestic funding to total global malaria funding would nevertheless increase from 20% in 2013 to 29% in 2020 (Figure 2.3a).
- Scenario 2 assumes that for international sources (i) malaria funding between 2013 and 2015 increases in line with a targeted expansion of total development budgets to an internationally agreed target of 0.7% of gross national income (GNI) by 2015 (25,26) and (ii) malaria funding from 2016 to 2020 continues to grow in line with the average IMF forecast of total government expenditures for donor countries over the same period. Scenario 2 also assumes that governments of endemic countries increase the priority they give to malaria funding, and assumes that governments that show a below average value of a domestic investment priority index (DIPI) for malaria (see Annex 1) increase their DIPI to the median level of endemic countries. Under this scenario, total funding for malaria control would increase to US\$ 4.3 billion by 2020, leaving an annual funding gap of US\$ 774 million in 2020, equivalent to a cumulative total funding gap of US\$ 10 billion for 2014–2020. Domestic funding would account for 26% of total malaria funding by 2020 (Figure 2.3b).

Under both scenarios, substantial additional funds would be mobilized for malaria control and elimination. However, the total amount available in 2020 would still fall short of the annual estimated US\$ 5.1 billion required to achieve international targets.

1. Excludes research and development (R&D) annual required investments estimated at US\$ 750–900 million.

## 3. VECTOR CONTROL FOR MALARIA

AN INCREASING PROPORTION OF THE POPULATION IN SUB-SAHARAN AFRICA IS PROTECTED BY ITNs.

### 3.1 Insecticide-treated mosquito nets

**Most malaria-endemic countries have adopted policies to promote universal access to ITNs.** WHO recommends that, in areas targeted for ITNs, all those at risk should be protected. Most of the 97 countries with ongoing malaria transmission distribute ITNs free of charge, and 85 distribute ITNs or LLINs to all age groups (Table 3.1). In 69 countries, ITNs are distributed to all age groups through mass campaigns. In the WHO African Region – which has the highest proportion of the population at high risk of malaria, and in which the characteristics of the malaria vectors in most areas make them amenable to intervention with ITNs – mass campaigns are supplemented by distribution of ITNs to pregnant women at antenatal care (ANC) clinics in 37 countries, and to infants through expanded programme on immunization (EPI) clinics in 29 countries.

**The proportion of the population with access to an ITN and sleeping under one has increased markedly in sub-Saharan Africa over the past 10 years.** Based on data from household surveys, and reports on ITNs delivered by manufacturers and distributed by national malaria control programmes (NMCPs), an estimated 49% (range 44–54%) of the population at risk had access to an ITN in their household in 2013, compared to 3% in 2004 (Figure 3.1a). An estimated 44% (39–48%) were sleeping under an ITN in 2013 compared to 2% in 2004. ITNs are used by a high proportion of those who have access to them (90%); therefore, the population sleeping under an ITN closely tracks the proportion with access to an ITN.

**Not all households have enough nets to protect all household members and achieve universal ITN access.** The proportion of households owning at least one ITN has increased markedly over the past decade, from 5% in 2004 to 67% (61–74%) in 2013 (Figure 3.1b). However, in 2013, only 29% (27–32%) of households had enough ITNs for all household members, limiting attainment of universal ITN access. Moreover, one third of households did not own even a single ITN. It is critical to reach all households with ITNs, and supply enough ITNs for all household members, to ensure that all those at risk are protected from malaria.

**Table 3.1** Adoption of policies for ITN programmes, by WHO region, 2013

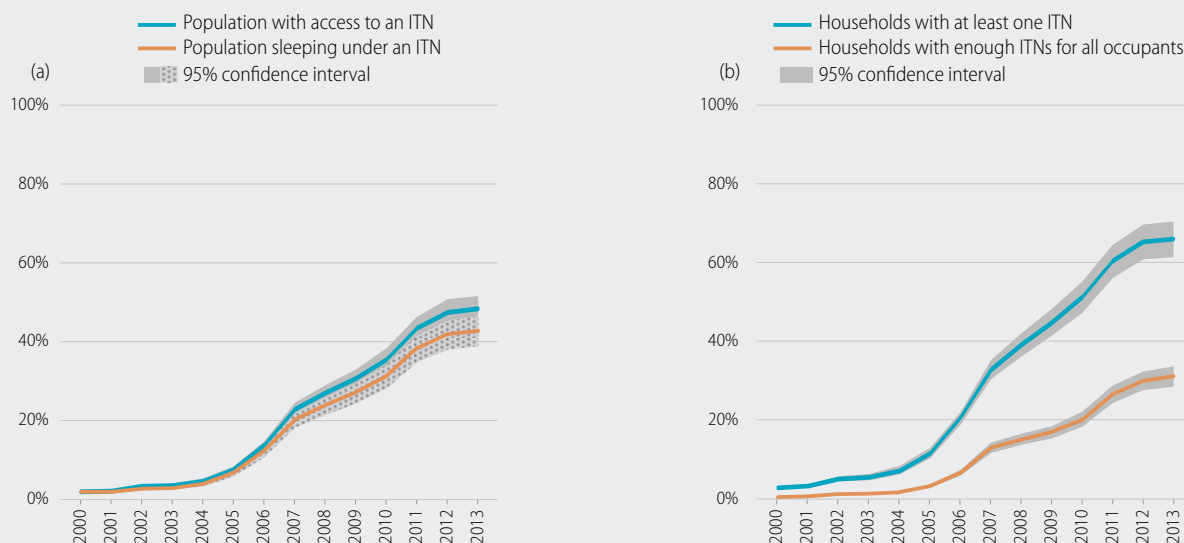
Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Total
ITNs/ LLINs are distributed free of charge	41	19	8	4	10	10	92
ITNs/ LLINs are sold at subsidized prices	14	1				2	17
ITNs/ LLINs are distributed to all age groups	38	18	7	3	10	9	85
ITNs/ LLINs are distributed through mass campaigns to all age groups	36	15	5		7	6	69
ITNs/ LLINs are distributed through antenatal clinics	37	3	3		4	5	52
ITNs/ LLINs are distributed through EPI clinics	29		2		1	1	33
<b>Countries/areas with ongoing malaria transmission</b>	<b>45</b>	<b>21</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>97</b>

AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EPI, Expanded Programme on Immunization; EUR, European Region; ITN, insecticide-treated mosquito net; LLIN, long-lasting insecticidal net; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: National malaria control programme reports



**Figure 3.1** a) Proportion of population with access to an ITN and proportion sleeping under an ITN, b) Proportion of households with at least one ITN and proportion of households with enough ITNs for all persons, sub-Saharan Africa, 2000–2013



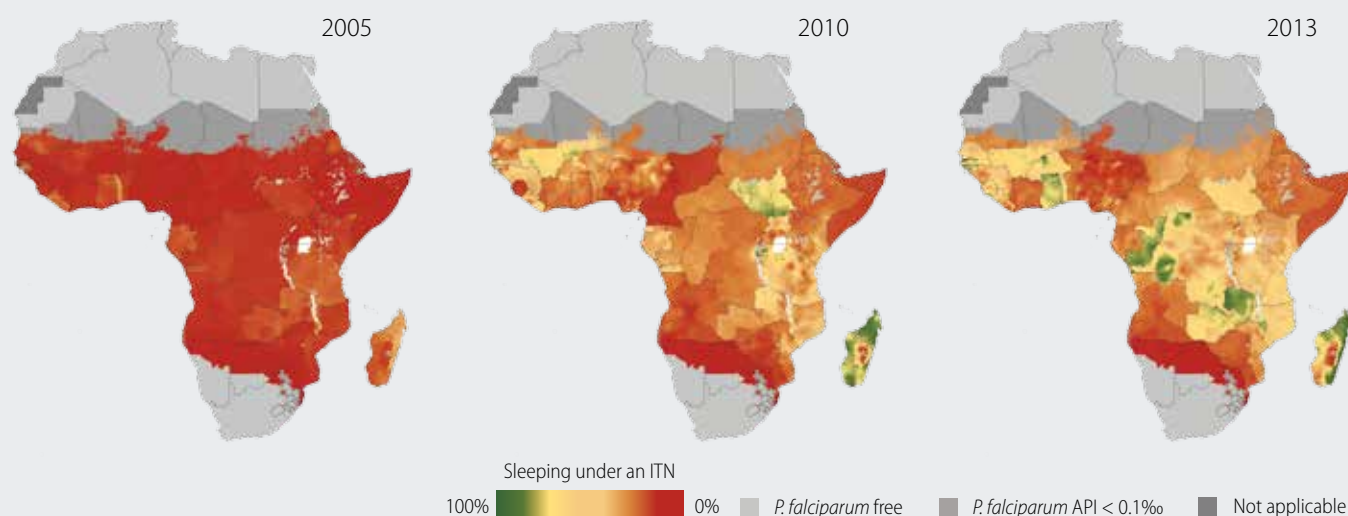
ITN, insecticide-treated mosquito net

Source: ITN coverage model from the Malaria Atlas Project (based at the University of Oxford)

IN 15 AFRICAN COUNTRIES OVER HALF THE POPULATION AT RISK WAS PROTECTED BY ITNs.

**Improvements in access to ITNs and their use vary considerably between different geographical areas.** In 2005, the proportion of the population sleeping under an ITN was generally low, with only six countries achieving coverage levels greater than 20% (Figure 3.2). Coverage remained low during the next several years, in particular in large countries with a high burden of malaria. By 2010, substantial progress had been made, although few areas had more than half of the population protected by ITNs. Progress in ITN coverage continued and, by 2013, in several high-transmission countries in West and Central Africa, over half the at-risk population was protected with ITNs. High ITN coverage is linked to mass campaigns, and in countries where campaigns have not occurred recently a lower proportion of the population is protected with ITNs.

**Figure 3.2** Proportion of population sleeping under an ITN, sub-Saharan Africa



ITN, insecticide-treated mosquito net

Source: Insecticide-treated mosquito net coverage model from Malaria Atlas Project

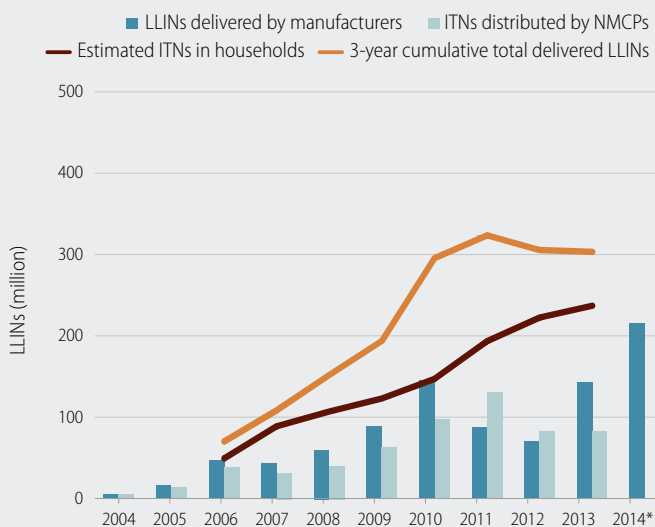
THE NUMBER OF LLINs DELIVERED TO COUNTRIES HAS INCREASED DRAMATICALLY OVER THE PAST 2 YEARS.

### 3.2 Delivery and distribution of nets

The number of LLINs delivered to sub-Saharan African countries and distributed by national programmes increased in 2013 and 2014. This increased procurement and distributions of nets has led to an increase in the proportion of the population sleeping under an ITN. In recent years, all distributed nets, and therefore most of the available nets, have been LLINs. Over 142 million LLINs were delivered to countries in sub-Saharan Africa by manufacturers in 2013; a total of 214 million are projected to be delivered in 2014, the largest number of LLINs ever delivered in one year (Figure 3.3). Adding these nets to the 70 million delivered in 2012, a cumulative total of 427 million will have been delivered to countries in sub-Saharan Africa between 2012 and 2014. However, a comparison of the estimated number of LLINs available in households with the reported number of net deliveries suggests that allocation of LLINs during distribution is not 100% efficient (because some households receive additional nets before their existing nets have expired); it also suggests that over half of distributed ITNs are lost from households within 24 months. Consequently, not all of the 427 million delivered nets were available in households in 2014.

Improvements in net distribution and LLIN durability could reduce the number of LLINs needed per year to achieve universal access. If allocations of nets to households were 100% efficient, and a higher proportion of distributed nets were retained in households after 3 years (e.g. if nets had a 3-year half-life), then deliveries of 200 million ITNs per year would be sufficient to give 90% of the population at risk access to an ITN in their household. However, with current distribution patterns and loss rates for nets, nearly 300 million ITNs would be needed per year for 90% of the population at risk to have access to an ITN in their household (Figure 3.4).

**Figure 3.3** Number of LLINs delivered, distributed and estimated in households, sub-Saharan Africa, 2004–2014

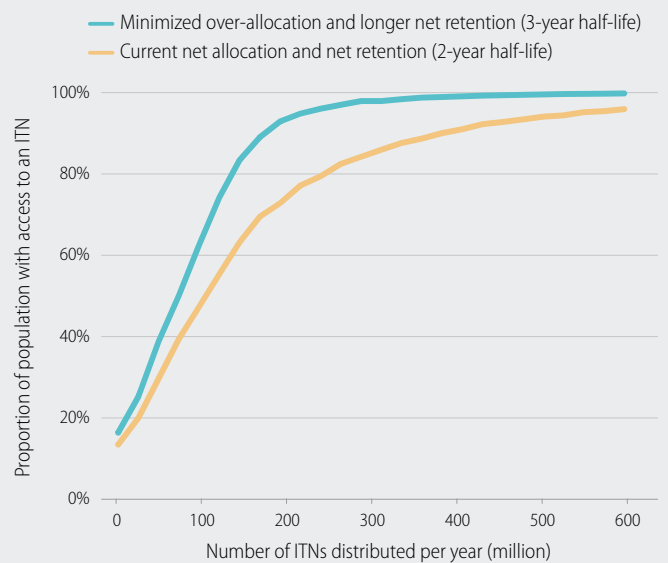


ITN, insecticide-treated mosquito net; LLIN, long-lasting insecticidal net; NMCP, national malaria control programme

\*LLIN deliveries in 2014 projected from the report for the third quarter of the year

Source: NMCP reports, Malaria Atlas Project and John Milliner (Milliner Global Associates)

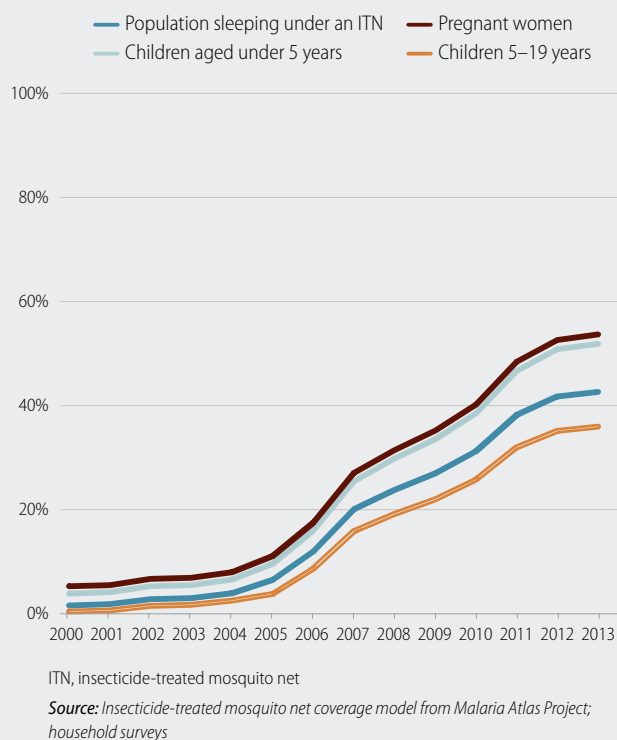
**Figure 3.4** Estimated proportion of population with access to an ITN compared to the number of ITNs distributed per year, by net allocation efficiency and net retention



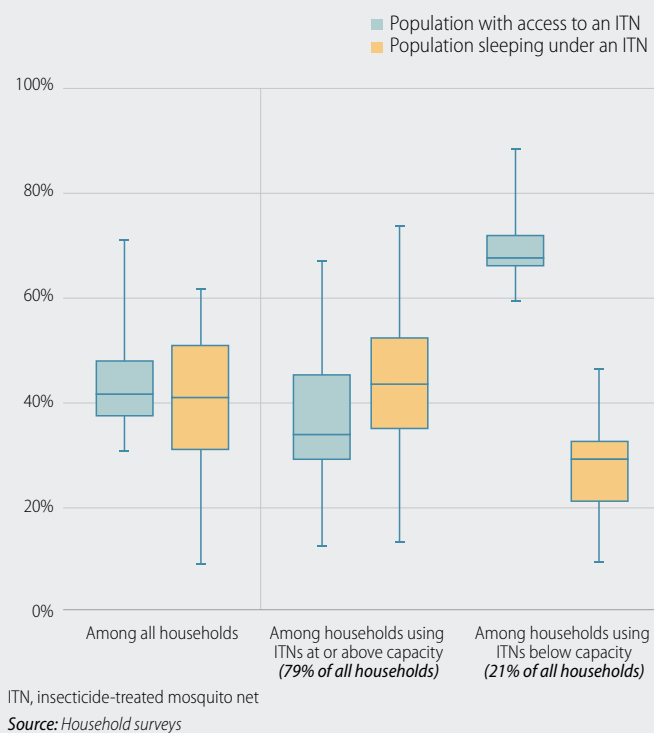
ITN, insecticide-treated mosquito net

Source: Insecticide-treated mosquito net coverage model from Malaria Atlas Project

**Figure 3.5** Proportion of population sleeping under an ITN, by selected subpopulations, sub-Saharan Africa, 2000–2013



**Figure 3.6** Proportion of population with access to an ITN and proportion sleeping under an ITN, by household use of available ITNs, 13 countries, sub-Saharan Africa, 2012–2013



COMMUNICATION ON ITN USE MAY NEED TO BE FURTHER TARGETED TO ENSURE FULL USE OF AVAILABLE NETS.

**Use of ITNs among vulnerable groups such as young children and pregnant women is higher than in the population as a whole.** Use of available nets by the population with access to them has been consistently high during the time that access to ITNs has been steadily increasing. Consequently, the proportion of children aged under 5 years and the proportion of pregnant women sleeping under an ITN has increased steadily over the past decade, and is even greater than the proportion of the population as a whole sleeping under a net (Figure 3.5). However, children aged 5–19 years are sleeping under ITNs at a lower rate than the population as a whole.

**Some households may need more than one net per two persons to ensure all household members are able to sleep under an ITN.** The high level of ITN use among the population with access to nets includes households using their available nets at or beyond the assumed capacity of two persons per net, and households using nets below their full capacity. Analysis of household surveys from 13 countries during 2012–2013 shows that, in a median of 79% (range 3–30%) households, the proportion of the population sleeping under an ITN was equal to or greater than the proportion with access to a net (Figure 3.6). In approximately 21% (range 70–97%) of households, nets were used below their capacity, with only 65% of the population with access to an ITN sleeping under one. Due to household sleeping arrangements, more than one net per two persons may be needed in these households to ensure all household members are protected by an ITN.

IRS IS USED BY MOST MALARIA-ENDEMIC COUNTRIES, BUT GENERALLY PROTECTS ONLY A SMALL PROPORTION OF THE POPULATION AT RISK.

### 3.3 Spraying and larval control for malaria

**IRS for vector control has been widely adopted.** It is applicable in many epidemiological settings, provided that policy and programming decisions take into account the operational and resource feasibility of IRS. For programmes conducting IRS, WHO recommends the spraying of at least 80% (ideally 100%) of houses, structures and units in the target area in any round of spraying. In areas where IRS is the main form of vector control, the insecticide used for IRS should be rotated annually to preserve the effectiveness of current compounds. IRS for vector control has been adopted as policy for the control of malaria in 90 countries worldwide, including 42 of 45 malaria-endemic countries in the WHO African Region (Table 3.2).

**The WHO African Region has the highest coverage rates for IRS, but the proportion of the at-risk population protected has decreased in recent years.** While national programmes may target different proportions of the at-risk populations for IRS, comparison of the number of persons protected by IRS among the total population at risk allows for comparison of the extent to which IRS is used across countries and regions. National programmes reported that 124 million people, representing 4% of the global population at risk, were protected by IRS in 2013, decreasing from more than 5% in 2010 (Figure 3.7). Aside from the WHO European Region, in which populations at risk are small, the WHO African Region had the highest proportion of the population at risk protected by IRS. That proportion increased substantially during 2006–2008, and reached 11% in 2010, but it decreased during 2010–2012; in 2013, 55 million people were protected, representing 7% of the population at risk. The recent regional decrease is accounted for by changes in a few countries, in particular Ethiopia, which accounted for 42% of the population protected by IRS in the region in 2013. The proportion of the population at risk protected by IRS did not change substantially in other regions.

**Pyrethroids were the primary class of insecticide used by countries implementing IRS.** Among 63 countries providing information on insecticides used for IRS, 53 reported using pyrethroids in 2013. Carbamates were used by 12 countries, and 13 countries reported using an organophosphate. Of the 48 countries that reported on insecticides used for the past 3 years, seven changed from use of a pyrethroid to a non-pyrethroid insecticide; changing to an insecticide class with a different mode of action is one component of a comprehensive insecticide resistance management programme (see Section 3.4).

**Larval control is used by 38 countries.** Larval control involves vector habitat modification and manipulation, larviciding and biological control.

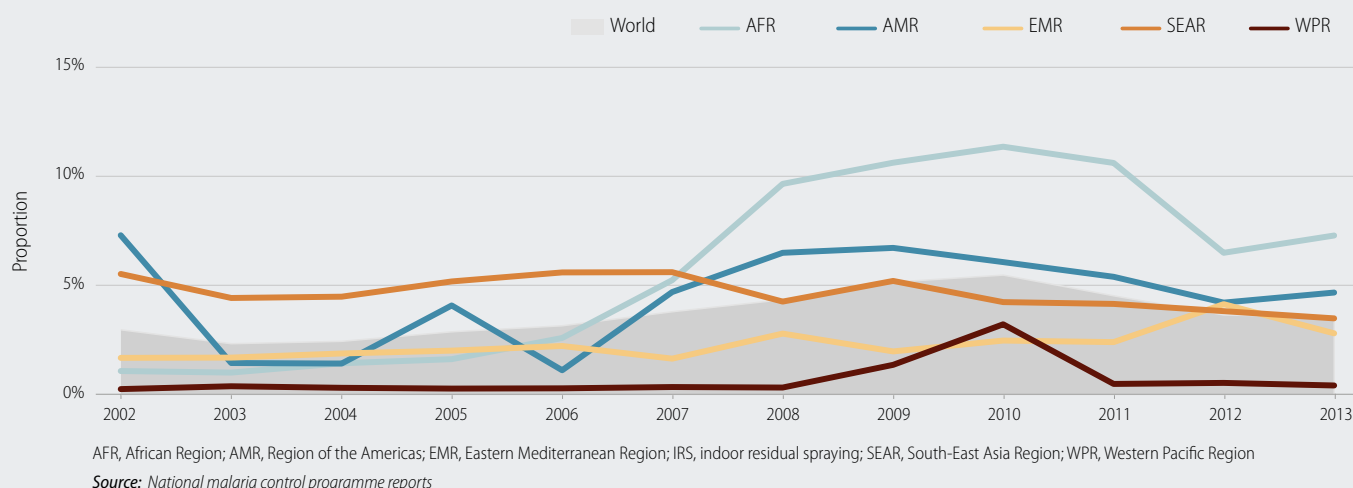
**Table 3.2** Adoption of policies for IRS programmes, by WHO region, 2013

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Total
IRS is recommended by malaria control programme	42	18	8	5	10	7	90
IRS is used for the prevention and control of epidemics	16	9	4		4	6	39
IRS and ITNs are used together for malaria control in at least some areas	31	13	4		6	7	61
DDT is used for IRS	9				1		10
Insecticide resistance monitoring is undertaken	41	16	9	5	7	8	86
<b>Number of countries/areas with ongoing malaria transmission</b>	<b>45</b>	<b>21</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>97</b>
<b>Number of countries/areas with ongoing <i>P. falciparum</i> transmission</b>	<b>44</b>	<b>18</b>	<b>8</b>		<b>9</b>	<b>9</b>	<b>88</b>

AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; DDT, dichloro-diphenyl-trichloroethane; EPI, Expanded Programme on Immunization; EUR, European Region; IRS, indoor residual spraying; ITN, insecticide-treated mosquito net; LLIN, long-lasting insecticidal net; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: National malaria control programme reports

**Figure 3.7** Proportion of population at risk protected by IRS, by WHO region, 2002–2013

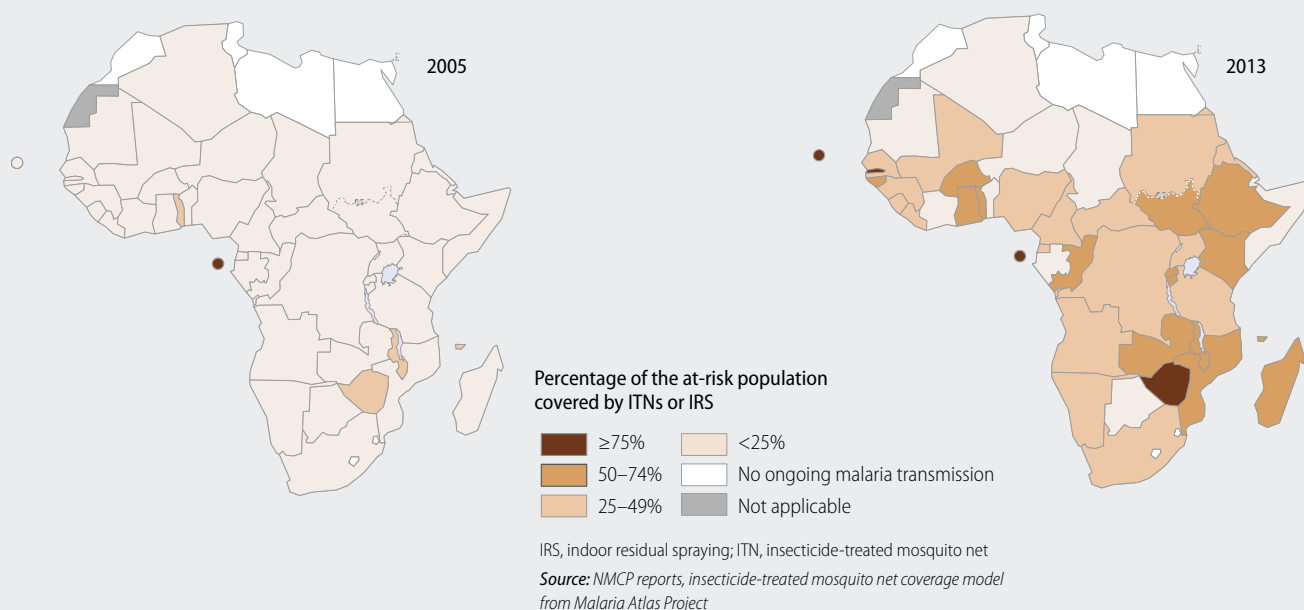


IN AFRICA, THE PROPORTION OF THE POPULATION PROTECTED BY AT LEAST ONE VECTOR CONTROL METHOD HAS INCREASED IN RECENT YEARS, AND WAS 48% (44–51%) IN 2013.

WHO recommends larviciding only in settings where mosquito breeding sites are few, fixed and findable, and where these sites are easy to identify, map and treat. In 2013, 38 countries provided information on the use of larval control. Use of vector habitat manipulation (temporary changes) was reported by 11 countries, habitat modification (long-lasting transformation) by 10; larval control through chemical larviciding by 27, and biological control by 28. These reports give an indication of the range of larval control methods employed, although the scale of the efforts was not quantified and their impact cannot easily be measured.

**The proportion of the population in sub-Saharan Africa protected by at least one of the core vector control interventions (ITNs and IRS) has increased substantially since 2000.** This increase is evident from combining information on the proportion of the population protected by IRS reported by NMCPs with the modelled estimates of the proportion of the population sleeping under an ITN (Figure 3.8). In 2013, nearly 50% of the population in sub-Saharan Africa was protected by at least one vector control intervention. More than 75% of the population at risk was protected by either ITNs or IRS in Cabo Verde, the Gambia, Sao Tome and Principe and Zimbabwe.

**Figure 3.8** Proportion of the population at risk protected by ITNs or IRS, in sub-Saharan Africa, 2005 and 2013



INSECTICIDE RESISTANCE MONITORING AND REPORTING ARE KEY COMPONENTS OF INSECTICIDE RESISTANCE MANAGEMENT STRATEGIES.

### 3.4 Insecticide resistance management

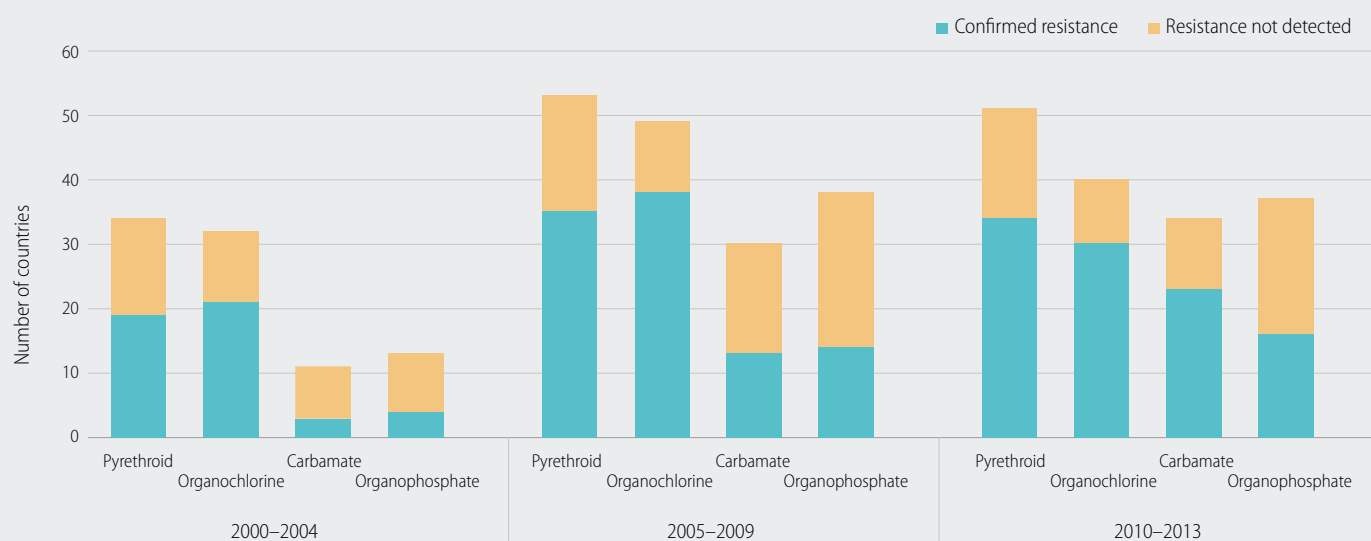
The effectiveness of vector control is threatened as malaria mosquitoes develop resistance to the insecticides used in ITNs and IRS. Current global malaria control efforts rely heavily on a single insecticide class: pyrethroids. This is the only class used in LLINs, and it is also applied in many IRS programmes (although three other insecticide classes are also used in IRS). Resistance of malaria vectors to insecticides has the potential to compromise the gains achieved through malaria vector control, and limit any further success.

Recognizing the threat posed by insecticide resistance, WHO released the *Global plan for insecticide resistance management in malaria vectors (GPIRM)* (27). The GPIRM emphasises five strategies: undertake resistance monitoring; implement insecticide resistance management strategies; fill knowledge gaps on mechanisms of insecticide resistance and the impact of resistance management; develop new vector control tools; and ensure that key enabling mechanisms are in place.

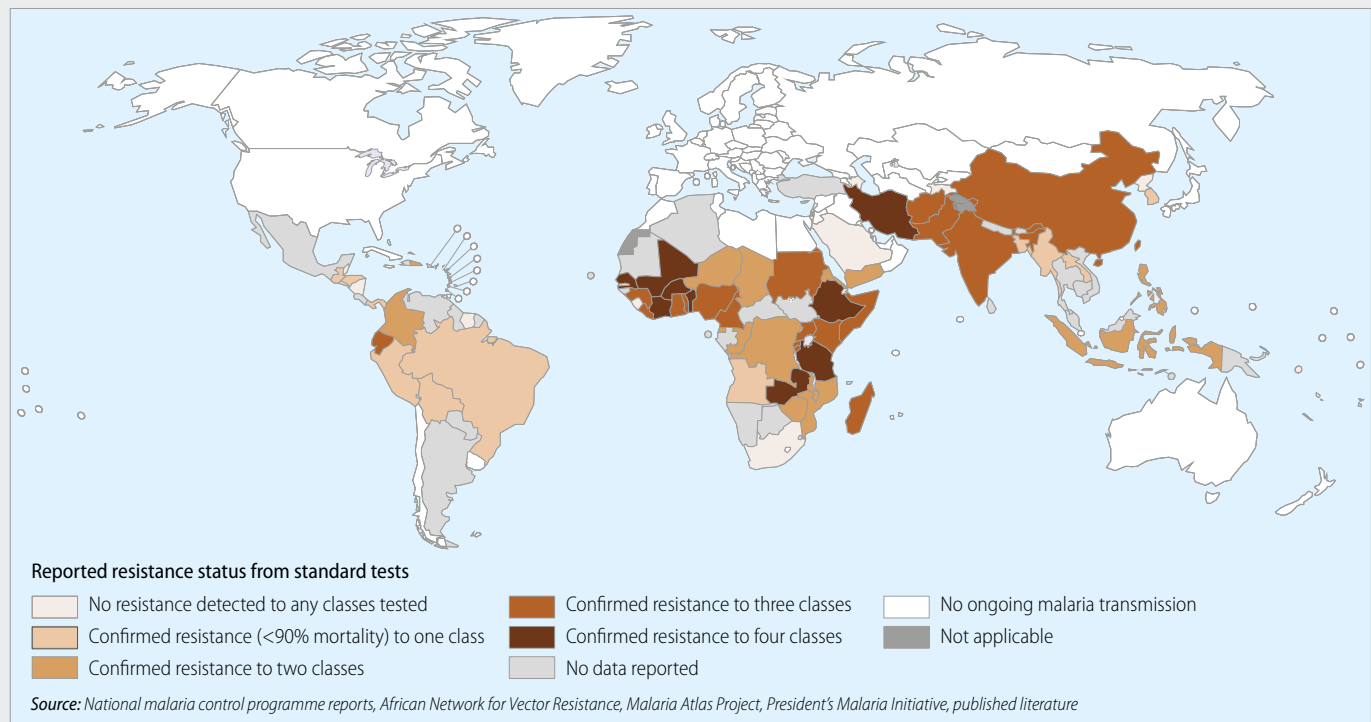
A system has been established to track insecticide resistance globally in line with the GPIRM. WHO is coordinating international reporting of resistance data using a standardized tool. Bioassay data have been reported by 81 countries. Challenges include a lack of consolidated data at the national level, incomplete reporting of available data, and limited information on resistance mechanisms.

Many countries using insecticides for vector control were not monitoring insecticide resistance in 2013. Among the 96 countries that reported adopting policies for vector control with ITNs or IRS in 2013, only 86 reported that monitoring of insecticide resistance is undertaken, and only 42 countries provided resistance data for 2013, suggesting that monitoring is not conducted annually, as recommended in the GPIRM (Figure 3.9). Monitoring activities have increased since 2000, particularly in the WHO African Region. Few countries consistently test all insecticides against all local species of malaria vectors at each monitoring site. Pyrethroids are the most commonly tested, because of their extensive use in LLINs and IRS.

**Figure 3.9** Number of countries reporting insecticide resistance monitoring results, by insecticide class and years of monitoring activity



Source: National malaria control programme reports, African Network for Vector Resistance, Malaria Atlas Project, President's Malaria Initiative, published literature

**Figure 3.10** Countries reporting resistance since 2010, by number of insecticide classes

SINCE 2010, INSECTICIDE RESISTANCE HAS BEEN REPORTED IN 53 COUNTRIES.

**Insecticide resistance, especially to pyrethroids, is widespread in malaria vectors.** Of the 65 countries reporting any monitoring data for 2010–2013, 53 reported resistance to at least one insecticide in one malaria vector from one collection site (Figure 3.10), and 41 countries reported resistance to two or more insecticide classes. Pyrethroid resistance was the most commonly reported (Figure 3.9); in 2013, two thirds of the countries monitoring this class reported resistance.

**Recommendations of the GPIRM are slowly being implemented at the country level.** In 2013, 14 of 63 countries reported the use of multiple insecticides of different classes for IRS. Seven countries that used pyrethroids for IRS in 2011 or 2012 used an alternative class with a different mode of action in 2013. In six cases this change was associated with a decline in IRS coverage, possibly due to the higher cost of the alternative. The GPIRM recommends that country programmes develop long-term plans for insecticide resistance monitoring and management that include full costing of activities. Development of these plans has only just begun: seven countries in the WHO African Region have such plans in place while there has been limited progress in development of plans in other WHO regions.

**International initiatives in support of GPIRM have commenced.** In 2013, WHO established a Vector Control Advisory Group to facilitate the development of new tools, approaches and technologies, and to shorten the process of bringing these to market. To improve affordability of existing and new tools, initiatives such as pooled procurements, improved global forecasting, long-term contracts and tax incentives are being explored. WHO is also supporting the development of comprehensive regional and national databases on insecticide resistance. Information will be used to inform locally appropriate vector control, guide policy for managing insecticide resistance and facilitate resource mobilization for implementation.

## 4. PREVENTIVE THERAPIES FOR MALARIA

THE PROPORTION OF PREGNANT WOMEN RECEIVING AT LEAST ONE DOSE OF IPTp INCREASED MARKEDLY FROM 2000–2007 AND AT A SLOWER PACE THEREAFTER.

**Malaria can have devastating consequences in pregnant women and in children. In areas of high transmission, WHO recommends targeting these high-risk groups with chemoprevention strategies.** Three safe and cost-effective strategies are available: IPTp with SP, delivered at each scheduled ANC visit after the first trimester; SMC with AQ+SP for children aged 3–59 months in areas of highly seasonal malaria transmission across the Sahel subregion; and IPTi with SP, delivered at the time of the second and third diphtheria–tetanus–pertussis (DTP) and measles vaccination. IPTi is only recommended in areas with moderate to high transmission (entomological inoculation rate  $\geq 10$ ), where resistance to SP is low, and where SMC is not concurrently implemented (28). WHO is also evaluating the results of clinical trials of vaccines to reduce malaria incidence in young children.

### 4.1 Chemoprevention in pregnant women

**Impressive increases in the proportion of pregnant women receiving IPTp have been limited by missed opportunities to deliver IPTp during ANC visits.** IPTp has been adopted in 34 countries in sub-Saharan Africa and in Papua New Guinea, in the WHO Western Pacific Region (Table 4.1). The proportion of pregnant women attending ANC clinics and the proportion receiving IPTp can be estimated from data reported by NMCPs and from household surveys. In data reported by NMCPs for 2013, a median 89% of pregnant women in 31 reporting countries attended ANC at least once, while 57% received at least one dose of IPTp among 30 reporting countries (Figure 4.1). A median of 43% of pregnant women received two doses of IPTp among 31 reporting countries, and 17% of all pregnant women received three or more doses of IPTp among nine reporting countries. The large difference between the proportion of women attending ANC clinics at least once and the proportion receiving the first dose of IPTp suggests a number of missed opportunities for delivery of IPTp at ANC clinics. The proportion of pregnant women receiving at least one dose of IPTp increased markedly from 2000–2007, and at a slower pace thereafter (Figure 4.2).

**Table 4.1** Adoption of policies for national chemoprevention, by WHO region, 2013

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Total
Intermittent preventive treatment in pregnancy	34	–	0	–	–	1	35
Intermittent preventive treatment for infants	1	–	–	–	–	–	1
Seasonal malaria chemoprevention	6	–	–	–	–	1	7
<b>Number of countries with ongoing malaria transmission</b>	<b>45</b>	<b>21</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>97</b>

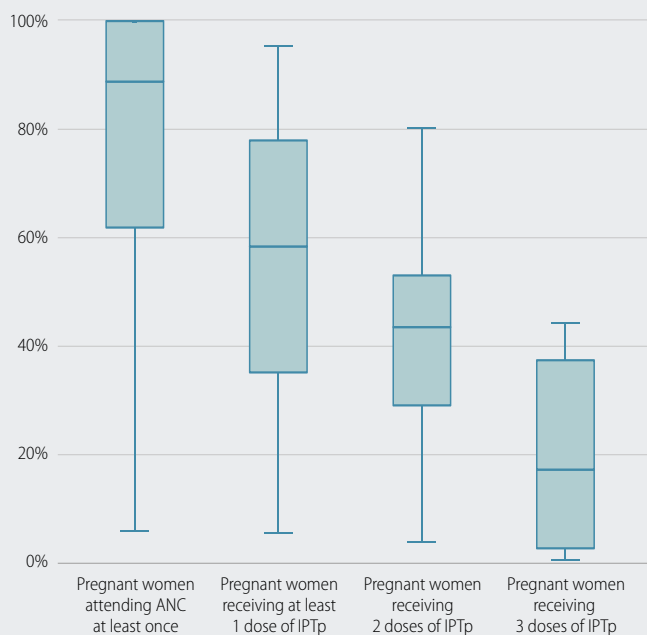
AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EPI, Expanded Programme on Immunization; EUR, European Region; ITN, insecticide-treated mosquito net; LLIN, long-lasting insecticidal net; SEAR, South-East Asia Region; WPR, Western Pacific Region

–, not applicable

Source: National malaria control programme reports

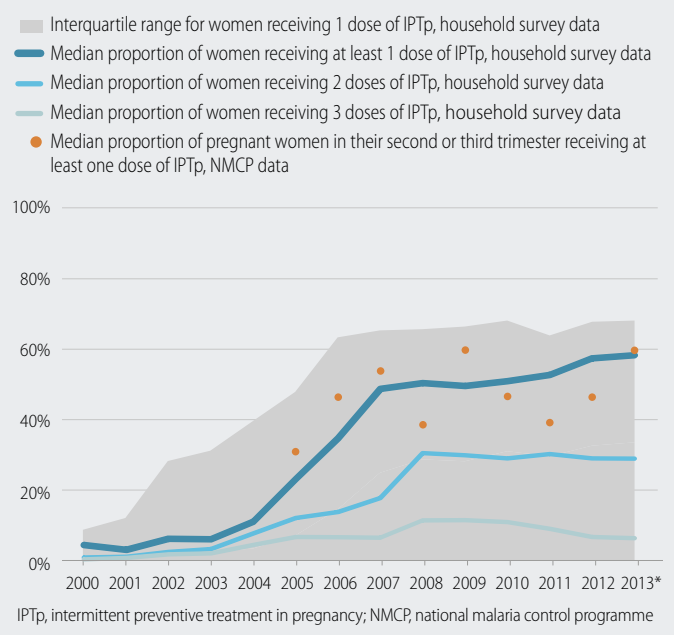


**Figure 4.1** Proportion of pregnant women attending ANC and proportion receiving IPTp, by dose, among sub-Saharan countries reporting, 2013



ANC, antenatal care; IPTp, intermittent preventive treatment in pregnancy  
 Source: National malaria control programme reports, UN population estimates

**Figure 4.2** Proportion of pregnant women receiving IPTp, by dose, by year of pregnancy in survey and by reporting year for NMCP, Africa, 2000–2013



IPTp, intermittent preventive treatment in pregnancy; NMCP, national malaria control programme  
 \* Median proportions using household data are based on six-year trend analyses  
 Source: Demographic health surveys, malaria indicator surveys, multiple indicator cluster surveys and other household survey data, NMCP reports, UN population estimates

INCREASES IN THE DELIVERY OF IPTp HAVE BEEN IMPRESSIVE, DESPITE MISSED OPPORTUNITIES FOR DELIVERY DURING ANC CLINIC VISITS.

## 4.2 Chemoprevention in children and infants

**Effective implementation of SMC requires adequate resources.** As of 2013, six of the 16 countries in which SMC may be appropriate – Chad, Congo, Mali, the Niger, Senegal and Togo – had adopted national SMC policies. An adequate drug supply and proper training is needed to distribute SP to the target population during the rainy season year after year. Recently, the financial resources needed to support SMC implementation have been mobilized, exemplified by an initiative to approve Global Fund grant proposals to support SMC implementation for the 2015–2017 rainy seasons across the Sahel subregion (29). Consequently, more countries may be able to implement SMC in the future.

**Adoption and implementation of IPTi has been slow.** Despite the WHO IPTi policy recommendation in 2010 (30) and the *IPTi Implementation field guide*, published in 2011 (31), only Burkina Faso has adopted IPTi as national policy, and the country has not begun implementation. Reasons for the slow progress are unclear, but may be related to the difficulty in coordinating an intervention across health programmes, the complexity of recommendations, and concerns about parasite resistance to SP.

**Four malaria vaccines are undergoing field trials.** As of July 2014, three candidate vaccines are in Phase 2B clinical trials and one has completed Phase 3, with a total 25 projects in the pipeline (32). The results from the 18-month follow-up Phase 3 clinical trial for RTS,S/AS01 were released in July 2014. The reduction in severe malaria incidence in vaccine recipients was 46% among children and 27% among infants who received all planned doses of RTS,S/AS01, compared to their control group counterparts (33). A WHO decision regarding a policy recommendation for use is expected in 2015, after review of the booster dose data, additional research, and expert consultations.

## 5. DIAGNOSTIC TESTING FOR MALARIA

THE PROPORTION OF SUSPECTED MALARIA CASES RECEIVING A DIAGNOSTIC TEST HAS INCREASED MARKEDLY SINCE THE 2010 INTRODUCTION OF WHO'S RECOMMENDATION TO TEST ALL SUSPECTED MALARIA CASES.

### 5.1 Adoption of 2010 recommendations from WHO

**Most malaria-endemic countries have adopted WHO's policy to test all patients with suspected malaria.** WHO recommends that all persons in all epidemiological settings with suspected malaria should be examined for evidence of infection with malaria parasites by either microscopy or RDT (34). This policy has been adopted by 96 of the 97 countries with ongoing malaria transmission, and diagnostic testing is free of charge in the public sector in 88 countries (Table 5.1). Combination RDTs, which can detect more than one species of *Plasmodium*, are available in the public sector in 40 of 47 countries endemic for both *P. falciparum* and *P. vivax*.

**The proportion of suspected malaria cases receiving a malaria diagnostic test has increased markedly since 2010, especially in Africa.** The proportion of suspected cases receiving a parasitological test in the public sector can be calculated from information on testing and malaria cases reported by NMCPs. The proportion of suspected cases tested is highest in the WHO Region of the Americas and the WHO European Region, followed by the WHO South-East Asia Region, the WHO Western Pacific Region and the WHO Eastern Mediterranean Region. The WHO African Region has seen the largest increase in the proportion of suspected cases tested, from 47% in 2010 – when WHO's recommendation to test all suspected malaria cases was introduced – to 62% in 2013 (Figure 5.1). The recent increase in testing in the WHO African Region is mainly due to an increase in the use of RDTs, which has doubled since 2010 and accounted for 52% of all cases tested in 2013. The reported testing rate may overestimate the true extent of diagnostic testing in the public sector, because it depends on factors that may be lacking, such as accurate reporting of presumed malaria cases. However, reporting bias, whereby countries with higher testing rates have a greater propensity to report, appears to be limited. In the WHO African Region, for example, the proportion of suspected cases tested among seven countries reporting consistently since 2001 was only slightly higher (67%) than the proportion among 31 countries reporting inconsistently since 2001 (60%).

**Table 5.1** Adoption of policies for malaria diagnosis, by WHO region, 2013

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Total
Patients of all ages should undergo diagnostic test	42	21	8	5	10	10	96
Malaria diagnosis is free of charge in the public sector	37	21	7	5	10	8	88
Combination RDTs are available in public sector	17	9	1		6	7	40
RDTs used at community level	26	8	3		7	5	49
<b>Number of countries/areas with ongoing malaria transmission</b>	<b>45</b>	<b>21</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>97</b>

AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EPI, Expanded Programme on Immunization; EUR, European Region; ITN, insecticide-treated mosquito net; LLIN, long-lasting insecticidal net; RDT, rapid diagnostic test; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: National malaria control programme reports

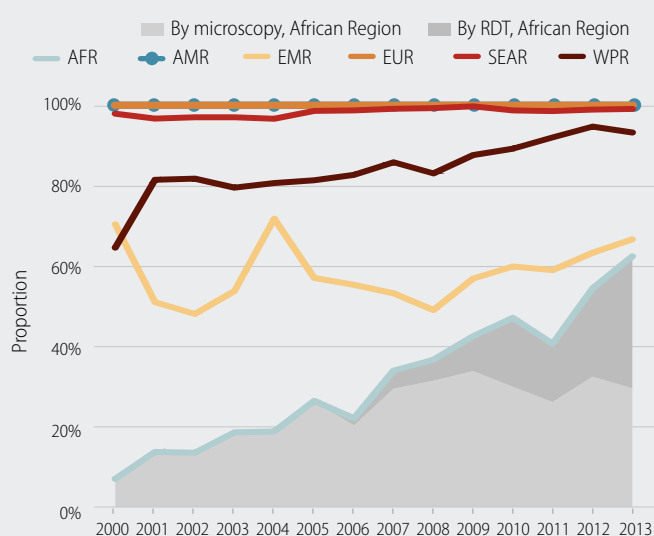
DESPITE IMPRESSIVE INCREASES IN DIAGNOSTIC TESTING, THE PRIVATE HEALTH SECTOR LAGS BEHIND THE PUBLIC SECTOR.

## 5.2 Testing in the private and public sector

The proportion of suspected cases receiving a diagnostic test is lower among patients seeking care in the private sector compared to the public sector. Data reported by NMCPs on the number of patients examined by microscopy or RDTs generally cover the public sector only. However, worldwide, about 40% of patients with suspected malaria seek treatment in the private sector (which includes private health facilities, pharmacies and other retail outlets). Information on the extent of parasitological testing in the private sector can be derived from household surveys. Among 41 household surveys conducted during 2009–2013, the proportion of children aged under 5 years who received a blood test for fever (a proxy for suspected malaria) was lower in the private sector (median across surveys 9%, interquartile range [IQR] 6–18%) than in the public sector (median across surveys 31%, IQR 17–43%) (Figure 5.2). Overall, a large proportion of children with fever in surveyed countries did not seek care (median 34%, IQR 29–38%), and therefore were not tested. Consequently, only a minority (median 17%, IQR 9–27%) of all febrile children received a parasitological test for malaria among countries surveyed during 2009–2013.

The extent of diagnostic testing for malaria in the public sector measured through a household survey is not directly comparable to that reported by NMCPs, in part because surveys are usually confined to children aged under 5 years, whereas NMCPs report on suspected cases in patients of all ages. However, in most surveys, the proportion of febrile children seeking care in the public sector who received a blood test fell within the range of suspected cases receiving a malaria diagnostic test as reported by NMCPs (Figure 5.2). Although only a few household surveys are conducted each year, the median proportion of febrile children receiving a diagnostic test was higher in the 16 surveys conducted during 2012–2013 (31%) than in the 17 surveys conducted during 2009–2010 (17%).

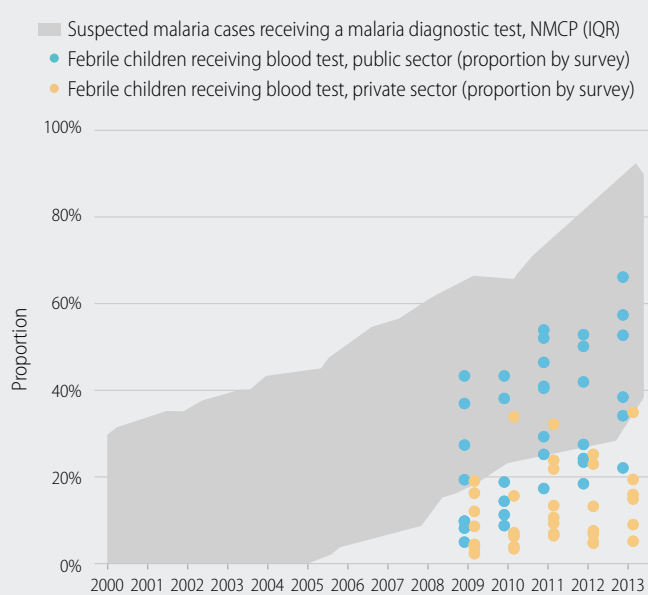
**Figure 5.1** Proportion of suspected malaria cases attending public health facilities that receive a diagnostic test, by WHO region, 2000–2013



AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; RDT, rapid diagnostic test; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: National malaria control programme reports

**Figure 5.2** Proportion of febrile children receiving a blood test, by health sector, in household surveys, and proportion of suspected malaria cases receiving a parasitological test in NMCP reports, sub-Saharan African countries with available data, 2000–2013



IQR, interquartile range; NMCP, national malaria control programme

Source: NMCP reports and household surveys

SALES AND DISTRIBUTIONS OF MALARIA RDTs HAVE INCREASED DRAMATICALLY IN THE PAST 5 YEARS.

### 5.3 Availability and quality of malaria diagnostic tests

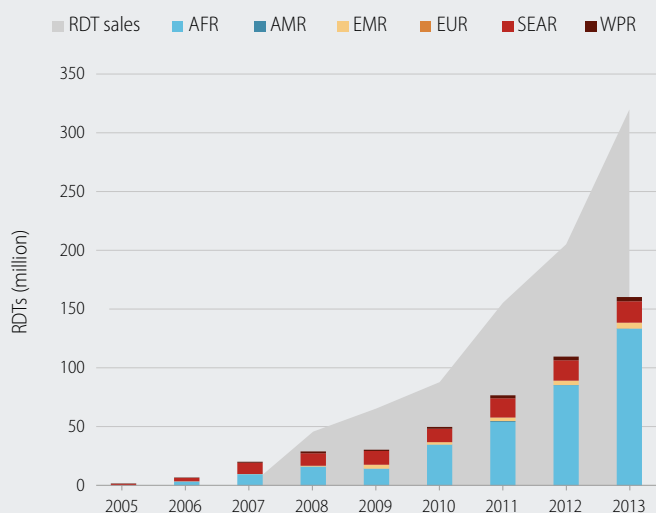
**Increased testing of suspected malaria cases is supported by a greater number of RDTs supplied by manufacturers and distributed by NMCPs.**

Sales of RDTs reported by manufacturers reached 319 million in 2013 (up from 46 million in 2008), of which 59% were for *P. falciparum*-specific tests and 39% for combination tests (i.e. those that can detect more than one species). RDT sales reported by manufacturers represent global totals for both the public and private sector. The reported number of RDTs distributed by NMCPs provides information on the numbers of RDTs distributed in the public sector only; however, it also provides information on where the tests are used. The total number of RDTs distributed by NMCPs increased rapidly, from fewer than 200 000 in 2005 to more than 160 million in 2013 (Figure 5.3). Most of the RDTs delivered in 2013 (83%) were used in the WHO African Region, followed by the WHO South-East Asia Region (11%) and the WHO Eastern Mediterranean Region (3%). These totals underestimate the total quantity of RDTs distributed, because data were missing from seven of the 44 countries in the WHO African Region with ongoing malaria transmission in 2013. There is also likely to be a time lag between sale, delivery and distribution. However, the upward trend in RDT distributions by NMCPs mirrors that of RDT sales reported by manufacturers.

**Increased testing of suspected malaria cases is due in part to a higher number of patients tested by microscopy, both in the WHO African Region and globally.**

The global total of 197 million microscopic examinations performed was dominated by India, which accounted for over 120 million slide examinations in 2013. The reported number of microscopic examinations in the WHO African Region increased from 33 million in 2010 to 50 million in 2013. Among 28 countries in Africa supplying information on microscopy consistently since 2010, 22 reported an increase in microscopic examinations performed in 2013 compared to 2010 (Figure 5.4).

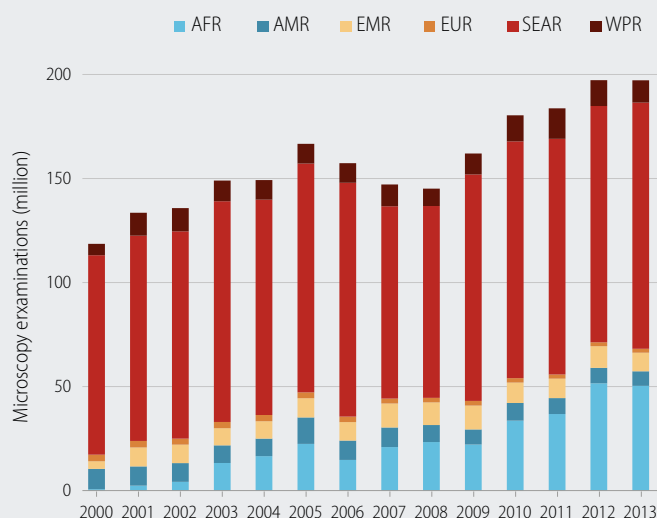
**Figure 5.3** Number of RDT sales to public and private sectors and number of RDTs distributed by NMCPs, by WHO region, 2005–2013



AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; NMCP, national malaria control programme; RDT, rapid diagnostic test; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: Data provided by manufacturers eligible for the WHO Foundation for Innovative New Diagnostics/ US Centers for Disease Control and Prevention Malaria Rapid Diagnostic Test Product Testing Programme

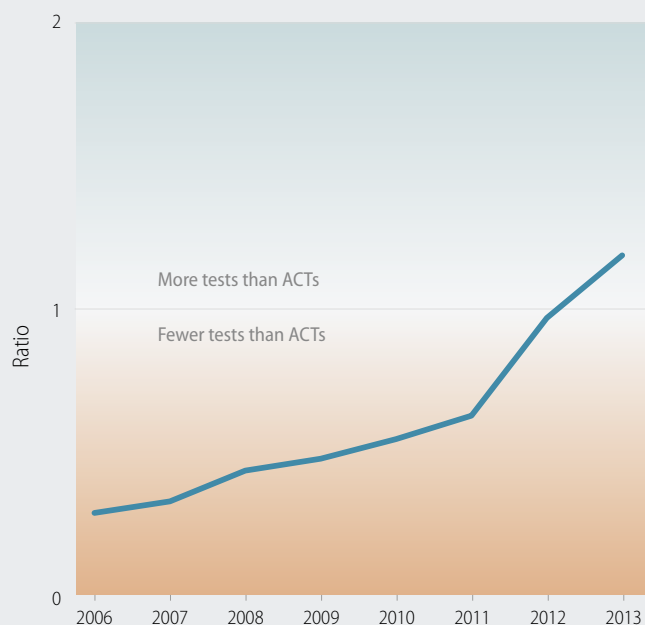
**Figure 5.4** Number of microscopic examinations performed for malaria, by WHO region, 2000–2013



AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: National malaria control programme reports

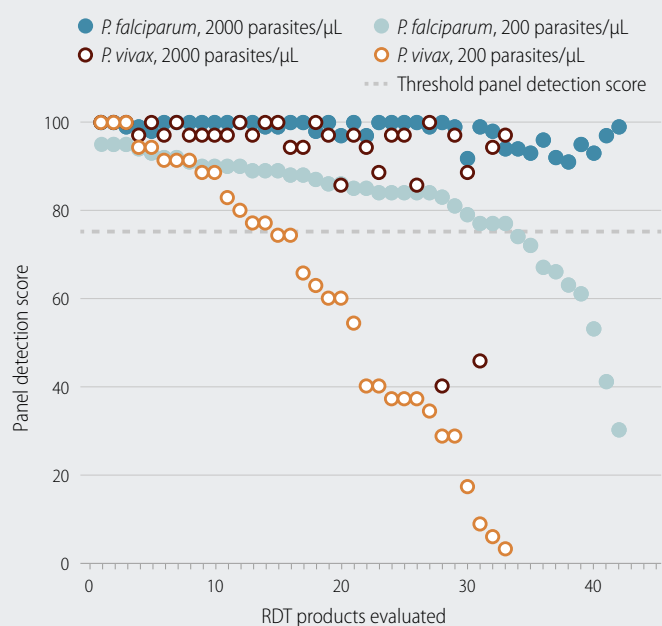
**Figure 5.5** Ratio of malaria diagnostic tests (RDTs and microscopy) provided to ACTs distributed by NMCPs, WHO African Region, 2006–2013



ACT, artemisinin-based combination therapy; NMCP, national malaria control programme; RDT, rapid diagnostic test

Source: NMCP reports

**Figure 5.6** Panel detection score of RDT products evaluated in Round 5 RDT product testing programme



RDT, rapid diagnostic test

Source: WHO 2014 (17)

THE NUMBER OF DIAGNOSTIC TESTS FOR MALARIA IN THE PUBLIC SECTOR IS OVERTAKING THE NUMBER OF ACTs DISTRIBUTED.

**In 2013, for the first time, the total number of diagnostic tests provided exceeded the number of ACTs distributed in the public sector in the WHO African Region (Figure 5.5).** This result is encouraging since most patients tested for malaria will not require treatment; hence, the number of diagnostic tests required should always exceed the number of treatments. Given that test positivity rates in most areas of Africa are below 50%, the ratio of diagnostic tests to ACTs should be at least two if all suspected cases of malaria receive a diagnostic test. Thus, while substantial progress has been made, there remains further scope to increase diagnostic testing through RDTs and microscopy, both in the public and private sector. Increased malaria diagnostic testing requires appropriate planning, budgeting and procurement. NMCPs and their supporting donors should aim to procure an appropriate number of RDTs and ACTs, in accordance with WHO procurement guidance (35).

**The quality of available RDTs continues to be high.** RDT product quality testing has been conducted since 2008 by WHO, the Foundation for Innovative New Diagnostics (FIND), the Special Programme for Research and Training in Tropical Diseases (TDR) and the Centers for Disease Control and Prevention (CDC). RDT products are assessed against samples of known malaria parasite species and density, with each product assigned a panel detection score that is based on the sensitivity and reliability of the results. Product quality testing undertaken in 2013 showed that most products had a high rate of detection of *P. falciparum* at parasite densities of 2000 parasites/µL; the same was true of most products for *P. vivax* (Figure 5.6). At low parasite densities (200 parasites/µL), 76% of *P. falciparum* products but only 42% of *P. vivax* products had acceptable panel detection scores. Work is ongoing to improve RDT quality control, including development of positive control wells that will help ensure test results are appropriately interpreted at the point of care.

## 6. MALARIA TREATMENT

ACTs ARE WIDELY USED FOR TREATMENT OF MALARIA, AND AN INCREASING PROPORTION OF MALARIA CASES ARE BEING TREATED WITH ACTs IN BOTH THE PUBLIC AND PRIVATE SECTORS.

### 6.1 Use of artemisinin-based combination therapy

**Most countries with *P. falciparum* malaria have adopted ACTs as a first-line treatment.** WHO recommends that uncomplicated *P. falciparum* malaria should be treated with an ACT (34). In areas where chloroquine is still effective, *P. vivax* malaria should be treated with this drug. Where resistance to chloroquine has been documented, *P. vivax* malaria should be treated with an appropriate ACT. To prevent relapses, both chloroquine and ACT should be combined with a 14-day course of primaquine, subject to consideration of the risk of haemolysis in patients with glucose-6-phosphate dehydrogenase (G6PD) deficiency. In areas where there is a threat of artemisinin resistance and in areas targeted for *P. falciparum* elimination, a single primaquine dose (0.25 mg/kg) should be given to all patients with confirmed *P. falciparum* on the first day of their ACT treatment. In 2013, ACTs had been adopted as national policy for first-line treatment in 79 of 87 countries where *P. falciparum* is endemic (Table 6.1); chloroquine is used in 10 Central American and Caribbean countries where it remains efficacious. A single dose of primaquine was being used for gametocidal treatment of *P. falciparum* cases in 39 low-transmission countries to further reduce malaria transmission. In 55 of 56 countries with transmission of *P. vivax* malaria, primaquine was being used for treatment of the hypnozoite stage of *P. vivax* malaria.

**The proportion of children in sub-Saharan Africa with *P. falciparum* malaria receiving an ACT has increased markedly since 2005, but remained below 20% in 2013.** Although household surveys only record whether a child has a fever, the results of RDTs performed at the time of the survey (to estimate parasite prevalence in children) can be used as a proxy for malaria parasite infection in the preceding 2 weeks. Data obtained from the same household survey can indicate whether the patient received an ACT. In sub-Saharan Africa, the estimated proportion of children aged under 5 years with confirmed *P. falciparum* malaria that received an ACT increased steadily from less than 5% in 2005, though it remains low, reaching a range of 9–26% in 2013 (Figure 6.1). Among children who were brought for care at public health facilities, the proportion with confirmed *P. falciparum* malaria who received ACT was higher than the overall total for sub-Saharan Africa, and ranged from 16 to 41% in 2013.

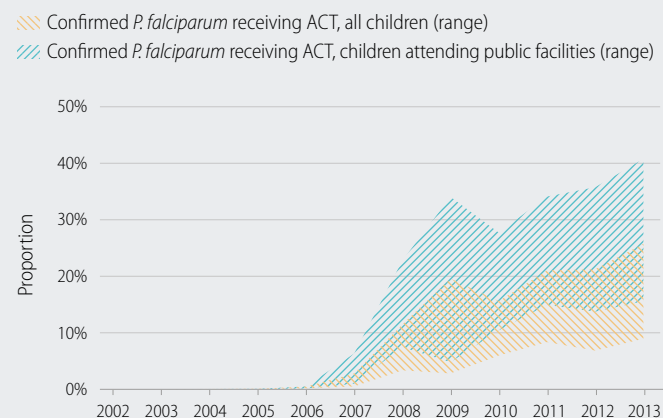
**Table 6.1** Adoption of policies for malaria treatment, by WHO region, 2013

Policy	AFR	AMR	EMR	EUR	SEAR	WPR	Total
ACT is used for treatment of <i>P. falciparum</i>	43	9	8	1	9	9	79
Pre-referral treatment with quinine/artemether IM/artesunate suppositories	40	4	5		5	3	57
Single dose primaquine used as gametocidal for <i>P. falciparum</i>	3	19	4	3	7	3	39
Primaquine is used for radical treatment of <i>P. vivax</i> cases	7	21	7	3	10	9	57
Directly observed treatment with primaquine is undertaken	4	12	2	5	3	4	30
G6PD test is recommended before treatment with primaquine	5		4		2	6	17
<b>Number of countries/areas with ongoing malaria transmission</b>	<b>45</b>	<b>21</b>	<b>8</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>97</b>
<b>Number of <i>P. falciparum</i> endemic countries/areas</b>	<b>44</b>	<b>17</b>	<b>8</b>	<b>0</b>	<b>9</b>	<b>9</b>	<b>87</b>
<b>Number of <i>P. vivax</i> endemic countries/areas</b>	<b>7</b>	<b>19</b>	<b>6</b>	<b>3</b>	<b>10</b>	<b>10</b>	<b>55</b>
<b>Number of countries/areas endemic for both <i>P. falciparum</i> and <i>P. vivax</i></b>	<b>6</b>	<b>17</b>	<b>6</b>	<b>0</b>	<b>9</b>	<b>9</b>	<b>47</b>

ACT, artemisinin-based combination therapy; AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; G6PD, glucose-6-phosphate dehydrogenase; IM, intramuscular; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: National malaria control programme reports

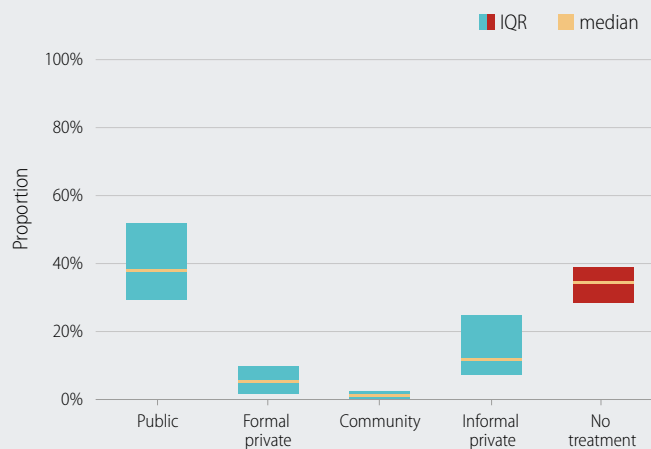
**Figure 6.1** Estimated proportion of children aged under 5 years with confirmed *P. falciparum* malaria who received ACTs, sub-Saharan Africa, 2002–2013



ACT, artemisinin-based combination therapy

Source: Household survey data modelled by Tulane University and University of California, San Francisco

**Figure 6.2** Proportion of febrile children presenting for treatment, by health sector, WHO African Region, 29 countries, 2000–2013



IQR, interquartile range

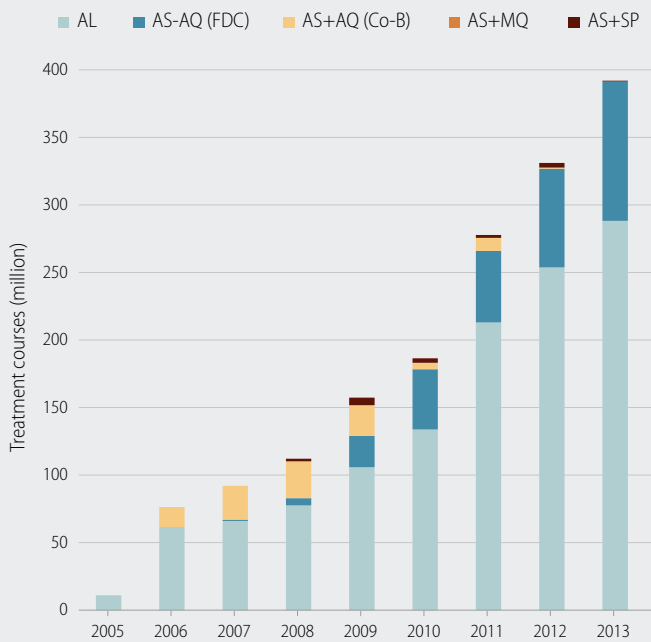
Source: Household surveys

THE PROPORTION OF CHILDREN WITH MALARIA RECEIVING AN ACT IN SUB-SAHARAN AFRICA IS LOW, PARTLY BECAUSE ONLY A SMALL PROPORTION SEEK CARE AT FORMAL HEALTH FACILITIES.

**The low proportion of children in sub-Saharan Africa with malaria receiving an ACT is due in large part to febrile children not being brought for care.** Information from household surveys conducted during the last decade in sub-Saharan Africa indicates that approximately 40% of children with fever do not present for treatment; also, of those who are brought for care, approximately 20% seek attention in the informal private sector (pharmacies and shops) where rates of malaria diagnostic testing are low and where ACT treatments are less likely to be available (Figure 6.2). Most children who are brought for care attend public health facilities, and a small proportion seek care in the formal private sector (clinics and other regulated facilities), where rates of malaria diagnostic testing and appropriate treatment are higher than in the informal private sector. Efforts to increase access to treatment in the community are ongoing, but only a small proportion of febrile children in sub-Saharan Africa seek care there. Access to malaria treatment and efforts to encourage caregivers to bring children to health-care facilities need to increase, to ensure all patients with malaria are appropriately treated.

**The increasing proportion of malaria cases treated with ACTs is supported by increased numbers of ACT treatment courses delivered by manufacturers.** The number of ACT treatment courses procured from manufacturers by both public and private sectors has increased greatly, rising from 11 million in 2005 to 392 million in 2013 (Figure 6.3). Artemether-lumefantrine (AL) accounts for the largest volume of ACTs procured (73% in 2013), followed by artesunate plus amodiaquine (26%). Fixed-dose combination ACTs, with the two medicines combined in the same tablet, are preferred because of improved patient adherence to the recommended regimen; such ACTs accounted for nearly 100% of all ACT sales. The increase in the number of ACTs procured in 2013 was largely due to increased procurements from the public sector.

**Figure 6.3** ACT deliveries from manufacturers to the public and private sectors, by drug and presentation, 2005–2013

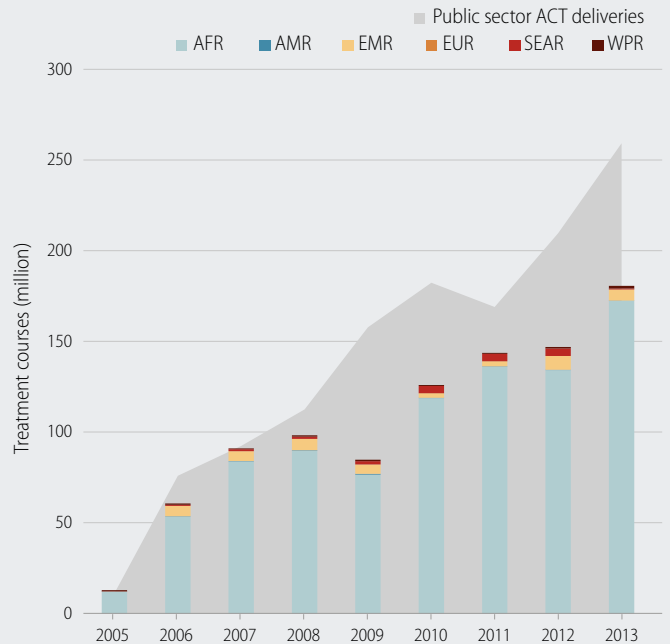


ACT, artemisinin-based combination therapy; AL, artemether-lumefantrine; AMFm, Affordable Medicine Facility–malaria; AQ, amodiaquine; AS, artesunate; Co-B, co-blister; FDC, fixed-dose combination; MQ, mefloquine; SP, sulfadoxine-pyrimethamine

**Source:** ACT deliveries (2005–2013\*), data provided by eight companies eligible for procurement by WHO/UNICEF.

\*2005–2009 data reflects public sector only; 2010–2013 data includes public sector plus AMFm (public and private sectors).

**Figure 6.4** Number of ACT treatment courses distributed by NMCPs, by WHO region, and ACT treatment courses delivered to the public sector, 2005–2013



ACT, artemisinin-based combination therapy; AFR, African Region; AMFm, Affordable Medicine Facility–malaria; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; NMCP, national malaria control programme; SEAR, South-East Asia Region; WPR, Western Pacific Region

**Source:** NMCP data and ACT deliveries (2005–2013\*), data provided by eight companies eligible for procurement by WHO/UNICEF.

\*2005–2009 data reflects public sector only; 2010–2013 data includes public sector plus AMFm (public and private sectors).

THE PROPORTION OF MALARIA CASES TREATED WITH ACTs IS INCREASING AS MANUFACTURERS DELIVER GREATER NUMBERS OF TREATMENT COURSES.

**Increasing quantities of ACTs are being distributed by ministries of health worldwide, and particularly in Africa.**

Manufacturer procurement data describes the total number and type of ACTs delivered, whereas the number of ACTs distributed reported by NMCPs provides information on where ACTs procured are deployed by the public sector. The number of ACTs distributed increased from 98 million in 2009 to 181 million in 2013 (Figure 6.4). The WHO African Region accounted for 172 million of 181 million treatments distributed worldwide in 2013. The totals reported by NMCPs do not match the number of ACTs delivered by manufacturers to the public sector, which totalled 259 million treatments in 2013. This discrepancy is reduced if ACT procurements from international donor reports for countries with missing NMCP data are taken into account, but more work is needed to understand differences between the sources of data.

**The number of ACTs distributed reported by NMCPs is progressively nearing the number of malaria patients attending public health facilities.**

The number of ACT treatments distributed, when compared to presumed and confirmed *P. falciparum* cases at public health facilities, has increased over time, reaching 70% in 2013 (IQR 51–88%) among 31 countries in the WHO African Region that reported sufficient information (Figure 6.5).

A similar calculation comparing the number of treatment courses of primaquine for radical treatment of *P. vivax* to the estimated number of *P. vivax* cases attending health facilities shows that, in 2013, more than half (18/32) of reporting programmes from all WHO regions distributed sufficient primaquine courses to treat all *P. vivax* cases.

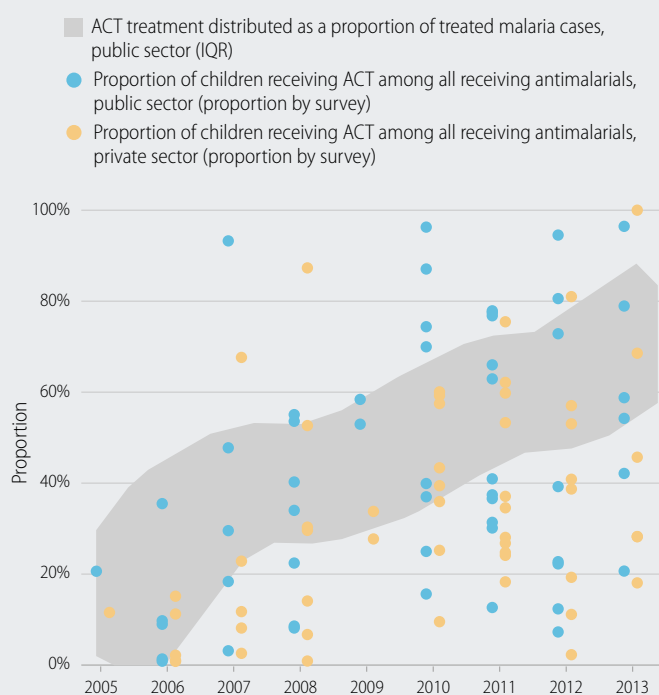


MALARIA TREATMENTS NEED TO BE BETTER DIRECTED TO TARGET PATIENTS WITH POSITIVE DIAGNOSTIC TEST RESULTS.

**ACTs have been progressively replacing other antimalarial treatments in both the public and private sectors.** Information on ACT treatments obtained from household surveys also provides information on malaria treatment received by febrile children seeking care in both the public and private health sectors, and among those who are not brought for care. The proportion of patients receiving ACTs, among all patients who received antimalarial medicines, has varied over time for patients receiving care in both the public and private sectors (Figure 6.5). In a substantial proportion of household surveys, the proportion of treated malaria patients receiving ACTs in the public sector falls within the range of that estimated through NMCP reports.

**Increased malaria diagnostic testing could help direct available ACTs to more patients with malaria parasite infection.** By considering the proportion of malaria patients that could be treated with distributed ACTs, the proportion of suspected malaria cases tested and the malaria test positivity rate, it is possible to estimate the number of ACT treatments received by those patients with or without confirmed malaria (Figure 6.6). For patients attending public health facilities, the estimated proportion of confirmed malaria cases receiving ACTs has increased steadily since 2005. At the same time, however, due to the large number of patients treated presumptively without a malaria diagnostic test, the proportion of patients without malaria receiving an ACT has also risen. If diagnostic testing were increased further, and providers adhered to the test results, the ACT treatments saved would be sufficient to treat the confirmed malaria cases that currently do not receive ACTs.

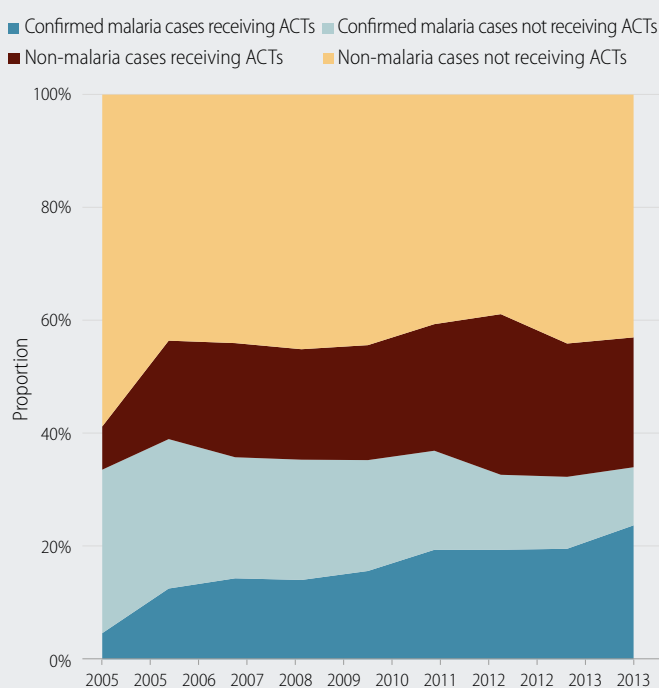
**Figure 6.5** Proportion of children receiving ACT among all receiving antimalarials, by public and private sector, in household surveys, and proportion of ACT treatment courses distributed as a proportion of treated malaria cases in public sector, from NMCP reports, sub-Saharan Africa, 2005–2013



ACT, artemisinin-based combination therapy; IQR, interquartile range; NMCP, national malaria control programme

Source: NMCP and household survey data

**Figure 6.6** Estimated ACT treatments received among malaria cases at public health facilities, WHO African Region, 2005–2013



ACT, artemisinin-based combination therapy

Source: NMCP

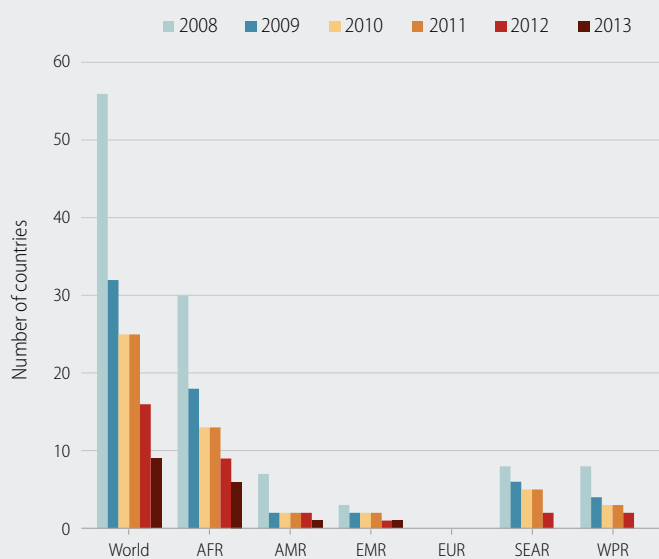
EFFECTIVE MANAGEMENT OF ANTIMALARIAL DRUG RESISTANCE INCLUDES BANNING MONOTHERAPIES, AND MONITORING ANTIMALARIAL EFFECTIVENESS REGULARLY.

## 6.2 Antimalarial drug resistance

**The number of countries that allow marketing of oral artemisinin-based monotherapy medicines has declined rapidly.** The use of such therapies threatens the long-term usefulness of ACTs, because it fosters the spread of resistance to artemisinin. WHO recommends that oral artemisinin-based monotherapies be withdrawn from the market and that marketing of these therapies should cease. The number of countries that allow the marketing of oral artemisinin-based monotherapies has dropped markedly since the World Health Assembly adopted a resolution supporting the ban in 2007 (Figure 6.7). As of December 2014, marketing of artemisinin-based monotherapies was allowed by only eight countries: Angola, Cabo Verde, Colombia, Equatorial Guinea, the Gambia, Sao Tome and Principe, Somalia (2 out of 3 zones) and Swaziland. Also, as of December 2014, 24 pharmaceutical companies, half located in India, continued to market oral artemisinin monotherapies.

**An increasing number of countries have conducted therapeutic efficacy studies (TES) for antimalarial medicines.** Such studies remain the gold standard for guiding antimalarial treatment policy and an increased proportion of countries conducting TES is encouraging. WHO recommends that studies of first- and second-line antimalarial medicines be conducted once every 2 years at sentinel sites within each country. For the most recent 2-year period with available information, studies of first- or second-line antimalarial treatments were completed in 46 of 70 (66%) countries where *P. falciparum* efficacy studies were feasible (i.e. there were enough cases to test), an increase from 58% of countries that conducted studies during 2008–2009 (Figure 6.8). The proportion of patients who are parasitaemic on day 3 of treatment is the indicator used during routine monitoring to identify suspected artemisinin resistance in *P. falciparum*. Recently, a molecular marker of artemisinin resistance was identified: specific mutations in the Kelch 13 (K13)-propeller domain were found to be associated with delayed parasite clearance. This may open new possibilities for tracking resistance to artemisinin.

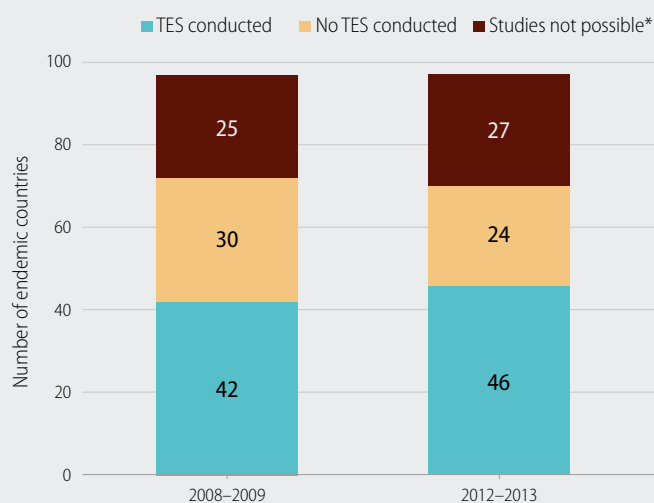
**Figure 6.7** Number of countries allowing marketing of oral artemisinin-based monotherapies by WHO region, 2008–2013



AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; SEAR, South-East Asia Region; WPR, Western Pacific Region

Source: [http://www.who.int/malaria/monotherapy\\_NDRAs.pdf](http://www.who.int/malaria/monotherapy_NDRAs.pdf)

**Figure 6.8** Status of therapeutic efficacy monitoring in countries with ongoing malaria transmission, 2008–2013

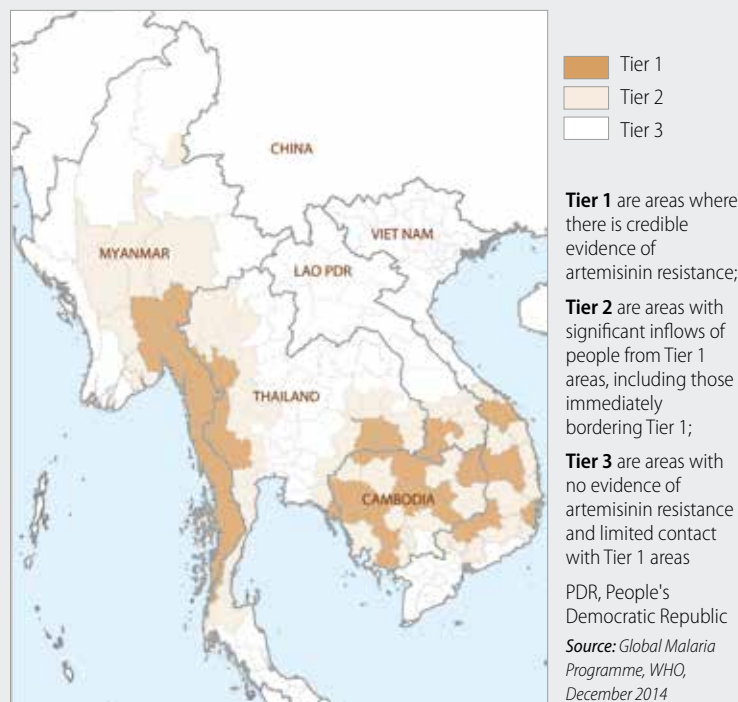


TES, therapeutic efficacy study

\*TES studies are impractical in countries with low malaria transmission or transmission of *P. vivax* only

Source: WHO Global Malaria Programme database on antimalarial therapeutic efficacy monitoring by country, November 2014

**Figure 6.9** Areas, or tiers, of differing risks of artemisinin resistance, South-East Asia, December 2014



RESISTANCE OF *P. FALCIPARUM* TO MULTIPLE ANTIMALARIAL MEDICINES HAS BEEN DETECTED IN AREAS AT THE BORDER OF CAMBODIA AND THAILAND.

**Resistance of *P. falciparum* to artemisinin has been detected in five countries in the Greater Mekong subregion.** Drug efficacy studies have detected resistance of *P. falciparum* to artemisinins in Cambodia, the Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam (Figure 6.9). Despite changes in parasite sensitivity to artemisinins in these countries, ACTs have generally remained clinically and parasitologically efficacious, provided the partner drug remains efficacious. Resistance in *P. falciparum* to most currently available antimalarial medicines has been detected in areas at the border of Cambodia and Thailand, complicating the choice of effective treatment for medical practitioners. *P. falciparum* resistance to artemisinins has not been detected outside of the Greater Mekong subregion. Reports of an increased proportion of day-3 positive patients after treatment with ACTs in TES conducted in two South American countries are still being investigated. Confirmed chloroquine resistance in *P. vivax*, which requires measurement of drug blood levels, has been detected in 10 countries; ACTs are now recommended for the treatment of chloroquine-resistant *P. vivax*.

**The identification of multidrug resistance, including artemisinin resistance, in the Greater Mekong subregion makes elimination of *P. falciparum* transmission in this region an important goal.** As a follow-up to the *Global plan for artemisinin resistance containment* (GPARC) (36), launched in 2011, WHO released the Emergency response to artemisinin resistance in the Greater Mekong subregion: A regional framework for action 2013–2015 (ERAR) (37) in 2013. The emergency plan provides further guidance for field implementation of the containment activities outlined in the GPARC. The confirmation of independent emergence of *P. falciparum* resistance to artemisinins in different locations in the Greater Mekong subregion, and the development of resistance to most available antimalarial medicines at the border between Cambodia and Thailand, highlight the importance of eliminating *P. falciparum* transmission in the region. Such elimination is considered technically and operationally feasible, and was endorsed as a goal by the MPAC in September 2014.

## 7. GAPS IN INTERVENTION COVERAGE

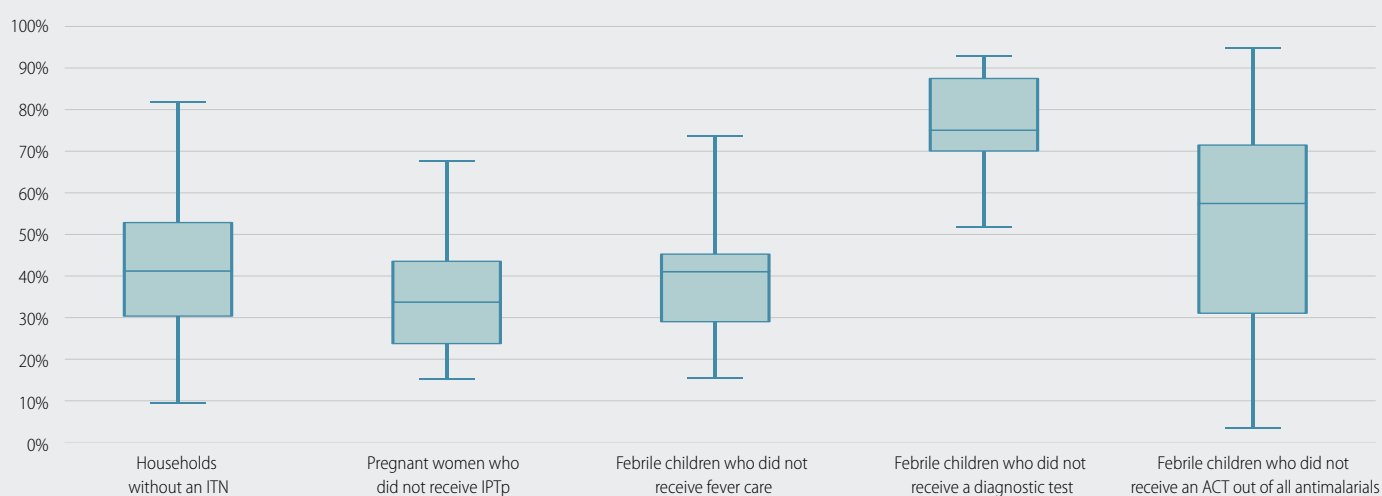
IN SUB-SAHARAN AFRICA IN 2013, AN ESTIMATED 278 MILLION PEOPLE LIVED IN HOUSEHOLDS WITHOUT AN ITN, 15 MILLION PREGNANT WOMEN DID NOT RECEIVE IPT<sub>p</sub>, AND 56–69 MILLION CHILDREN WITH MALARIA DID NOT RECEIVE AN ACT.

**Despite impressive increases in malaria intervention coverage, millions of people still do not receive the services they need.** Based on the results presented in Sections 3–6 of this report, it can be estimated that, in sub-Saharan Africa in 2013, some 278 million of the 840 million people at risk of malaria lived in households without an ITN, 15 million of the 35 million pregnant women at risk did not receive IPT<sub>p</sub>, and between 56 and 69 million of the 76 million children with malaria did not receive an ACT. Gaps in service coverage are evident in all countries that have NMCPs. To design programmes that can fill these gaps, it is important to have a good understanding of the factors responsible for low intervention coverage. Some insight can be gained by examining household surveys (which document the characteristics of people who do not receive services), and by decomposing the explained variance in regression models (which aim to identify the factors that are most strongly associated with gaps in service coverage) (see Annex 1).

**Poverty and low education are significant predictors of coverage gaps for ITNs, IPT<sub>p</sub>, fever care, diagnostic testing and receipt of ACTs.** Based on nationally representative household survey data for countries in sub-Saharan Africa, in 2011–2013, a median 41% of households did not have an ITN (IQR 30–53%, Figure 7.1). Being poor (i.e. in the lowest wealth quintile) was the most important predictor of living in a household without an ITN (Figure 7.2). Other important factors were the household not having a child aged under 5 years or a pregnant woman, being in a rural area, and having a head of household with no formal education.

Poverty was the strongest factor associated with being among the 33% of pregnant women that did not receive IPT<sub>p</sub> (IQR 23–43%) (Figure 7.2). Other factors that were significant were having previously given birth, being aged under 20 years, having no formal education or living in a rural area. For children that did not receive any care for fevers (median 41%, IQR 29–45%), strong predictors for not receiving care were being an older child (aged >1 year of age) or having a household head with no formal education. Predictors for not receiving a diagnostic test (75% of children with fever, IQR 70–87%) were living in a rural area and poverty, whereas the strongest predictor for not receiving an ACT (57% of children with fever, IQR 31–71%), was low educational attainment, followed by living in a rural area and being poor.

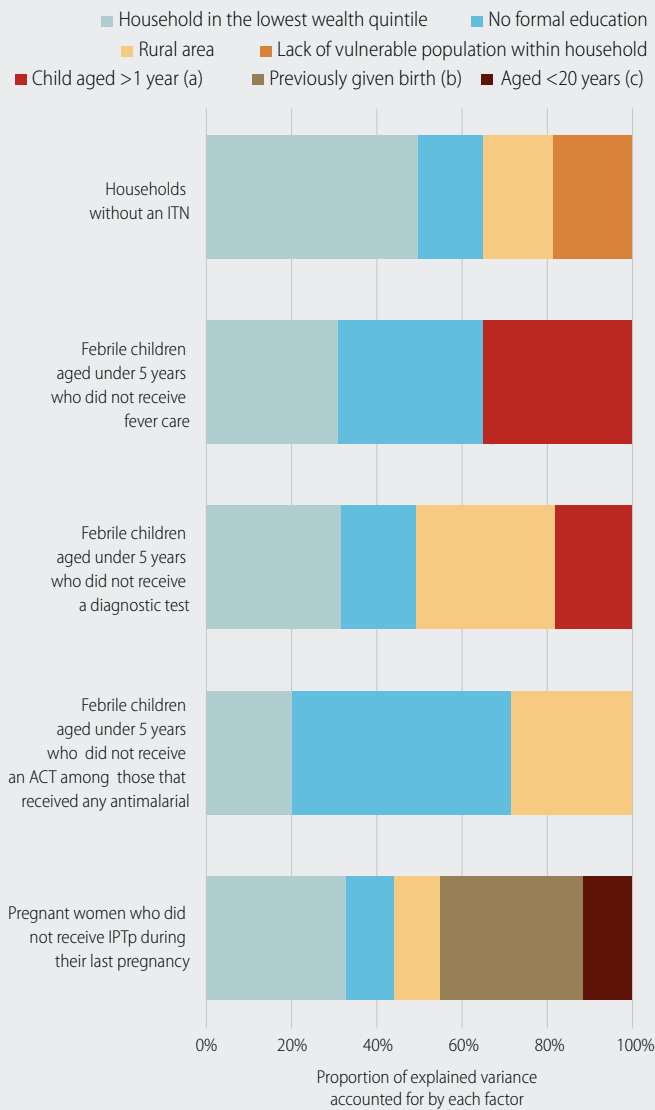
**Figure 7.1** Proportion of households, women or children not covered by interventions, 2011–2013



ACT, artemisinin-based combination therapy; IPT<sub>p</sub>, intermittent preventive treatment in pregnancy; ITN, insecticide-treated mosquito net

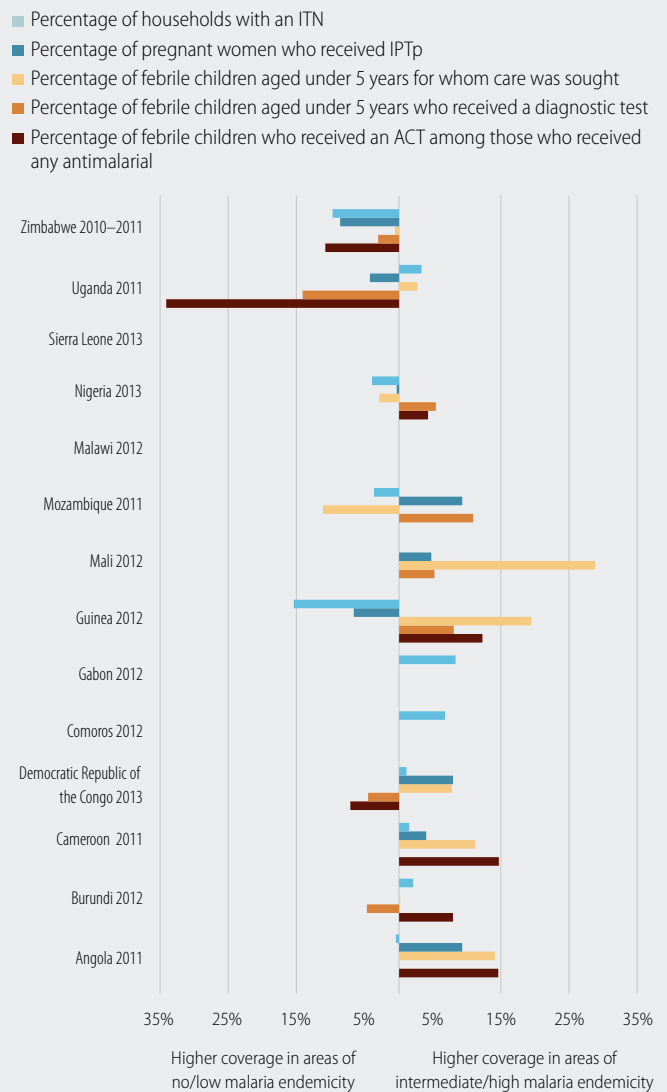
Source: Household surveys

**Figure 7.2** Factors associated with gaps in intervention coverage



a) only in household-level analysis; b) only in child-level analysis; c) only in woman-level analysis  
 ACT, artemisinin-based combination therapy; IPTp, intermittent preventive treatment in pregnancy; ITN, insecticide-treated mosquito net  
 Source: Household surveys

**Figure 7.3** Difference in intervention coverage between areas of intermediate to high malaria risk, and low to no malaria, 2011–2013



ACT, artemisinin-based combination therapy; IPTp, intermittent preventive treatment in pregnancy; ITN, insecticide-treated mosquito net  
 \*Missing bars indicate that there was no difference in coverage or that all of the households surveyed were from one endemicity level  
 Source: Household surveys

FOR SOME COUNTRIES AND INTERVENTIONS, THOSE LIVING IN AREAS OF HIGH OR INTERMEDIATE MALARIA RISK ARE LESS LIKELY TO HAVE MALARIA INTERVENTIONS THAN THOSE LIVING IN AREAS WITH LOW OR NO MALARIA RISK.

**Some of those without services live in the most endemic areas.**

The consequences of not having services can vary according to malaria endemicity, and it is particularly important to protect populations that have higher rates of morbidity and mortality. However, for some countries and interventions, those living in areas of high or intermediate malaria risk (parasite prevalence of  $\geq 5\%$  among children aged 2–9 years) are less likely to have malaria interventions than those living in areas with low or no malaria risk (parasite prevalence of  $< 5\%$  among children aged 2–9 years) (Figure 7.3). To build upon the impressive progress of the past decade, and reach populations not currently benefiting from interventions, it is important to identify and fill specific gaps in service coverage, particularly in areas with the highest malaria transmission intensity. Monitoring of malaria interventions should include not only a report of progress to date, but also an assessment of where future gains are possible.

## 8. TRENDS IN INFECTIONS, CASES AND DEATHS

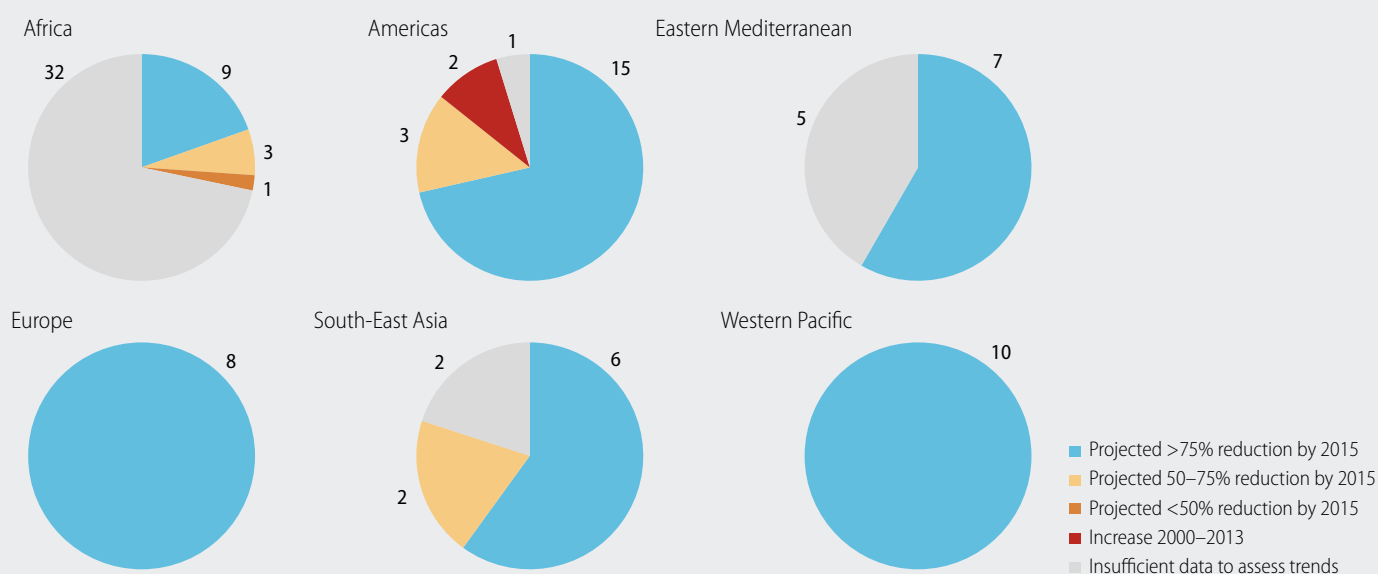
FIFTY-FIVE COUNTRIES ARE ON TRACK TO MEET RBM AND WORLD HEALTH ASSEMBLY TARGETS OF REDUCING MALARIA CASE INCIDENCE RATES BY 75% BY 2015.

### 8.1 Reported cases

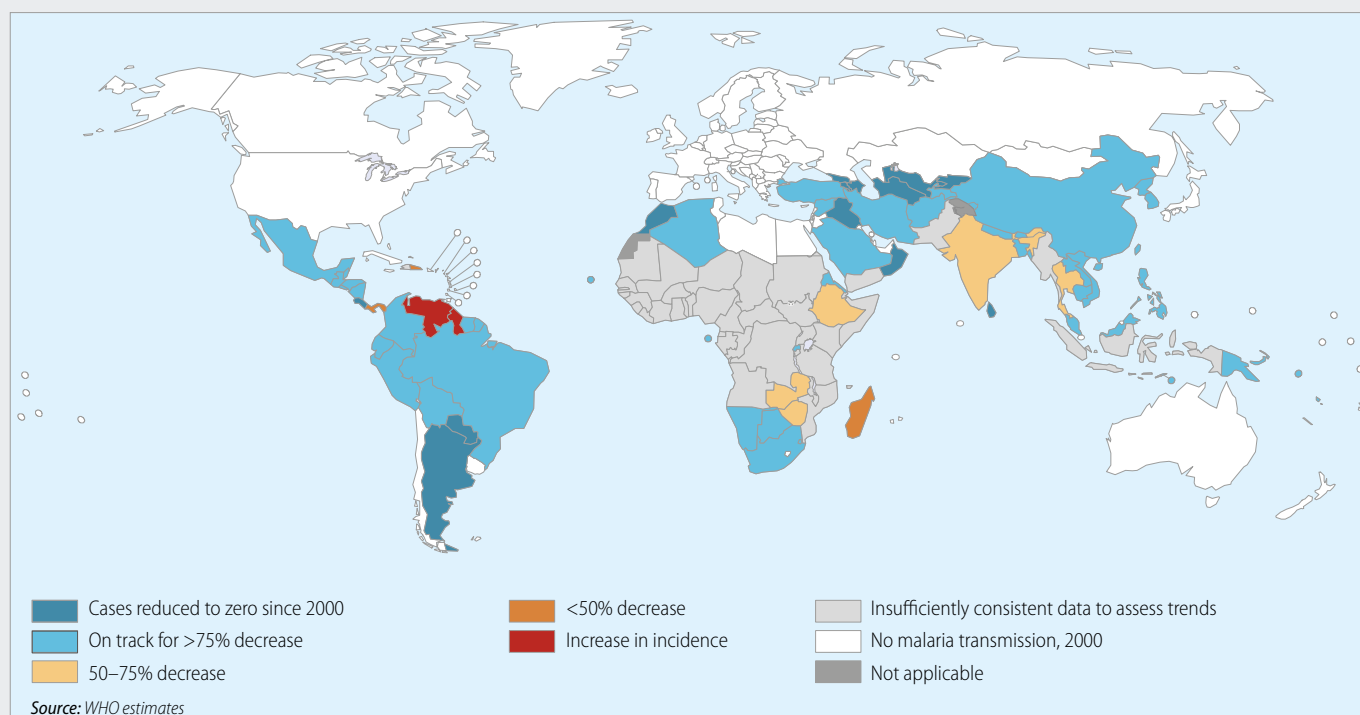
The reported number of confirmed malaria cases is a core indicator for tracking progress towards the MDGs and the World Health Assembly and RBM Partnership targets for 2015. For many high-burden countries in the WHO African Region, many patients do not receive a diagnostic test; hence, it is not possible to assess trends in confirmed cases. Instead, attempts are made to evaluate such trends using the reported numbers of malaria admissions (inpatient cases) and deaths. A description of the strategy used to analyse trends is provided in **Annex 1**. In brief, the strategy aims to exclude data-related factors (e.g. incomplete reporting or changes in diagnostic practice) as explanations for a change in the reported incidence of disease. If changes in diagnostic testing or reporting are large, then it may not be possible to draw inferences about trends in malaria. Of the 106 countries that had ongoing malaria transmission in 2000, 66 were judged to have submitted data that were sufficiently complete and consistent to reliably assess trends between 2000 and 2013.

Based on an assessment of trends in reported malaria cases, a total of 64 out of 106 countries with ongoing transmission of malaria in 2000 are meeting the MDG target of reversing the incidence of malaria. Of these 64 countries, 55 are on track to meet RBM and World Health Assembly targets of reducing malaria case incidence rates by 75% by 2015 (**Figures 8.1 and 8.2**, and **Regional profiles**). However, most of those 55 countries had low numbers of cases in 2000; in fact, they accounted for only 13 million (6%) of the total estimated cases of 227 million in 2000. Only five countries with more than 1 million estimated cases in 2000 (Afghanistan, Bangladesh, Brazil, Cambodia and Papua New Guinea) are projected to achieve a reduction in malaria case incidence of 75% or more. This is partly because progress has been faster in countries with lower numbers of cases, but also because countries with higher numbers of cases are less likely to submit sufficiently consistent data for assessing trends. In such countries, it is necessary to draw inferences about trends using studies of parasite prevalence (**Section 8.2**) or estimated numbers of cases (**Section 8.3**) rather than surveillance data.

**Figure 8.1** Number of countries with decreases (or increases) in reported malaria case incidence rates 2000–2013, by WHO region



Source: National malaria control programme data

**Figure 8.2** Projected changes in malaria incidence rates, by country, 2000–2015

## TWELVE COUNTRIES WITH TRANSMISSION OF MALARIA IN 2000 REPORTED ZERO INDIGENOUS CASES IN 2013.

**An increasing number of countries are moving towards elimination of malaria.** Among countries with malaria transmission in 2000, two reported zero indigenous cases for the first time (Azerbaijan and Sri Lanka in 2013), and ten others succeeded in maintaining zero cases (Argentina, Armenia, Iraq, Georgia, Kyrgyzstan, Morocco, Oman, Paraguay, Turkmenistan and Uzbekistan). Another four countries reported fewer than 10 local cases in that year (Algeria, Cabo Verde, Costa Rica and El Salvador). As of December 2014, 19 countries are in the pre-elimination or elimination phase, and seven in the prevention of malaria reintroduction phase (**Table 8.1**, see **Annex 1** for definitions of elimination and pre-elimination stages). Argentina and Kyrgyzstan have asked WHO to start the process for certifying their achievement of malaria elimination.

**Table 8.1** Classification of countries by stage of malaria elimination, December 2014

Region	Pre-elimination	Elimination	Prevention of reintroduction	Certified as malaria free since 2000
AFR	Cabo Verde	Algeria		
AMR	Belize Costa Rica Ecuador	El Salvador Mexico Paraguay	Argentina	
EMR		Iran (Islamic Republic of) Saudi Arabia	Egypt Iraq Oman Syrian Arab Republic*	Morocco – 2010 United Arab Emirates – 2007
EUR		Azerbaijan Tajikistan Turkey	Georgia Kyrgyzstan Uzbekistan	Turkmenistan – 2010 Armenia – 2011
SEAR	Bhutan Democratic People's Republic of Korea	Sri Lanka		
WPR	Malaysia	Republic of Korea		

AFR, African Region; AMR, Region of the Americas; EMR, Eastern Mediterranean Region; EUR, European Region; SEAR, South-East Asia Region; WPR, Western Pacific Region

\*Limited information is available from the Syrian Arab Republic

Source: National malaria control programme data

IN SUB-SAHARAN AFRICA, AVERAGE INFECTION PREVALENCE IN CHILDREN AGED 2–10 YEARS DECLINED BY 46% BETWEEN 2000 AND 2013.

## 8.2 Malaria infections in sub-Saharan Africa

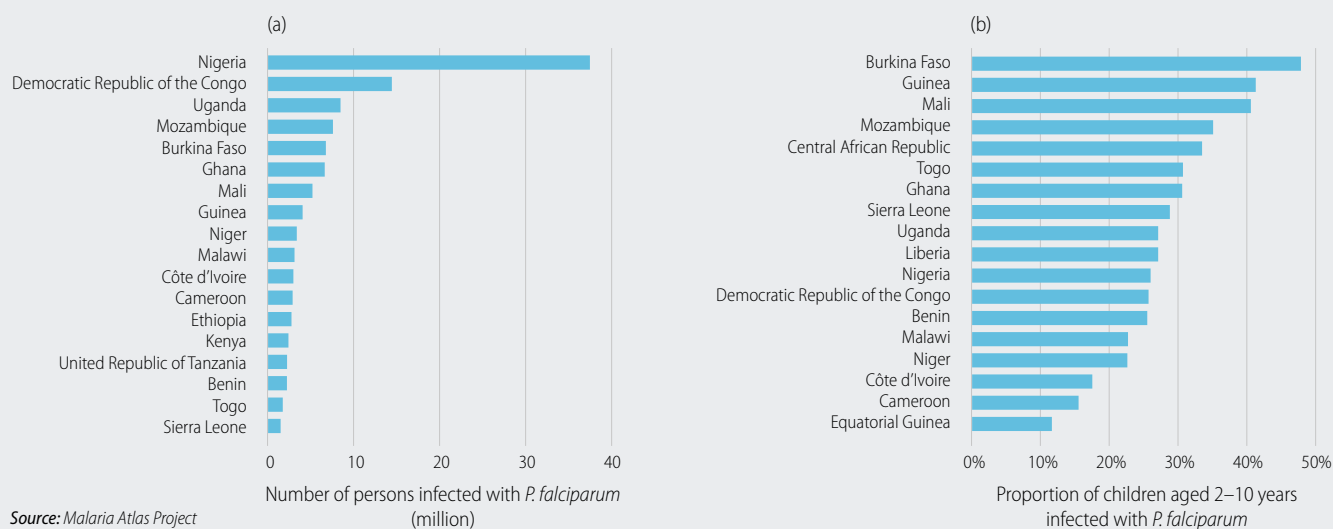
Because of the inadequacy of malaria case data from many sub-Saharan African countries, population infection prevalence can be used to enhance understanding of the level of malaria transmission and how it has changed over time. Nationally representative surveys of *P. falciparum* infection prevalence (or parasite rate, *PfPR*) are increasingly being undertaken in sub-Saharan Africa. Large numbers of surveys can be brought together in a geospatial model to facilitate mapping of *PfPR* and analysis of trends over time (see Annex 1). This modelling can help to estimate the proportion of the population at risk that are infected at any one time, and the total number of people infected.

During 2013, an estimated 128 million people were infected with *P. falciparum* in sub-Saharan Africa at any one time. In total, 18 countries account for 90% of infections in sub-Saharan Africa; 37 million infections (29%) arose in Nigeria and 14 million (11%) in the Democratic Republic of the Congo, the two countries with the highest numbers of infections (Figure 8.3a). These figures only include patent infections (i.e. those detectable using routine microscopy or rapid diagnostic tests). The numbers of low-density subpatent infections across Africa are considerably higher.

Infection prevalence varied greatly across Africa in 2013. Estimated rates of infection, standardized to children aged 2–10 years, were highest in West Africa, with countries in this region accounting for 7 of the 10 highest values of *PfPR*<sup>2–10</sup> (Figure 8.3b). In total, 15 endemic sub-Saharan African countries had an infection prevalence in children of above 20%, a further 16 countries of 5–20%, and 16 countries and areas of below 5%.

Infection prevalence fell dramatically in sub-Saharan Africa during the period 2000–2013. Across the African continent, average infection prevalence in children aged 2–10 years fell from 26% in 2000 to 14% in 2013 (and from 35% in 2000 to 18% in regions of stable transmission), a relative decline of 46% (Figure 8.4b). Even with a large growth in underlying populations, this resulted in a 26% drop in the number of people infected, from an average of 173 million concurrent infections in 2000 to 128 million in 2013 (Figure 8.4a). Falls were particularly pronounced in central Africa.

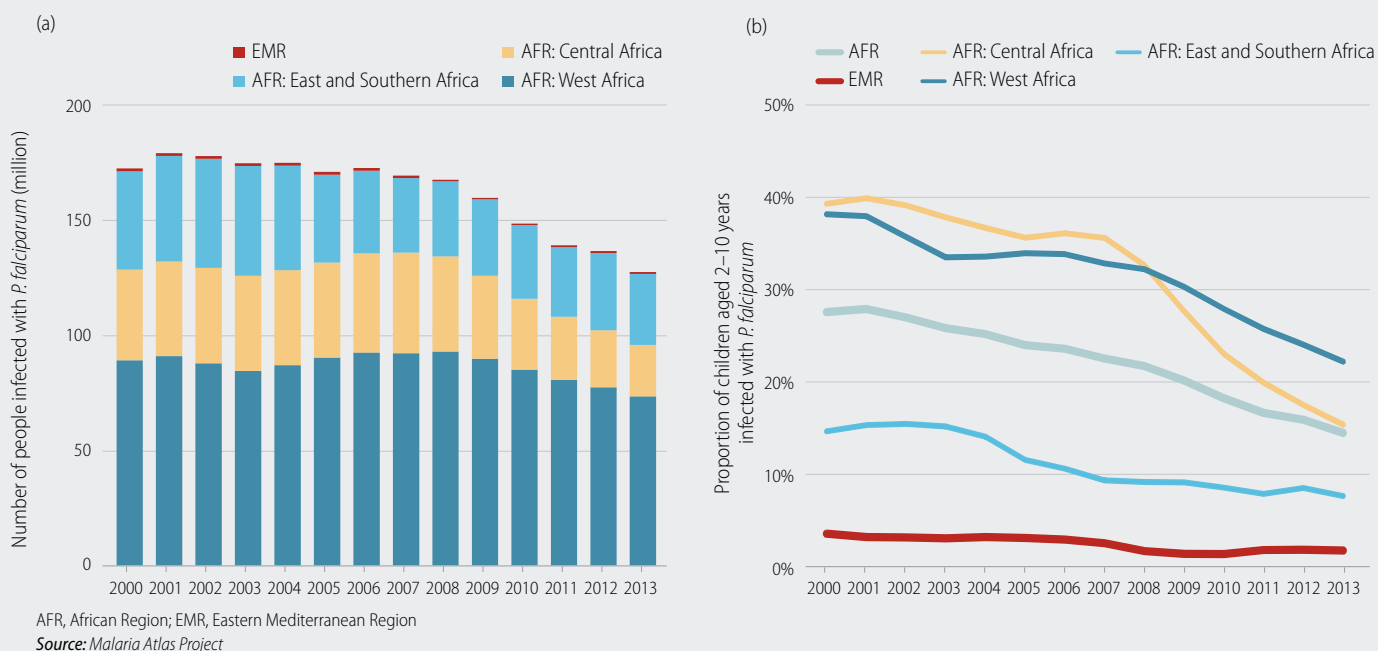
Figure 8.3 a) Countries accounting for 90% of the estimated number of *P. falciparum* infections in sub-Saharan Africa, 2013, ranked by number of infections in all ages, and b) countries ranked by the proportion of children aged 2–10 years infected with *P. falciparum*



Source: Malaria Atlas Project

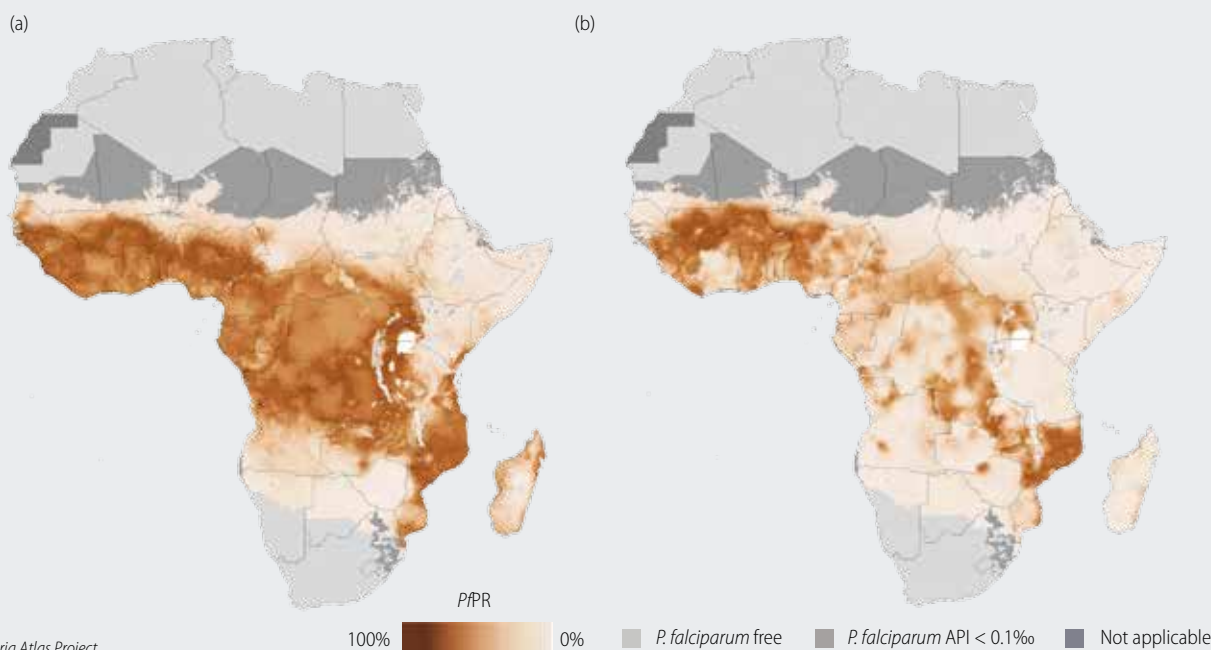


**Figure 8.4** Change in a) estimated number of *P. falciparum* infections in sub-Saharan Africa 2000–2013 and b) proportion of children aged 2–10 years infected with *P. falciparum* 2000–2013



**Eight sub-Saharan countries are estimated to have achieved declines of >75% in PfPR, and 14 countries achieved declines of >50% between 2000 and 2013.** The biggest absolute reductions in numbers of people infected were in high-burden countries with large populations and substantial PfPR declines. Despite population growth, Nigeria saw an estimated 20% decline in the average number of concurrent infections, from 47 million in 2000 to 37 million in 2013.

**Figure 8.5** Proportion of children aged 2–10 years infected with *P. falciparum*, comparison between a) 2000 and b) 2013



AN ESTIMATED 198 MILLION CASES OF MALARIA AND 584 000 MALARIA DEATHS OCCURRED IN 2013.

### 8.3 Estimated cases and deaths, 2013

As outlined in **Section 8.1**, because surveillance systems do not capture all malaria cases and deaths occurring in a country, and the data reported to WHO are not reliable for some countries, it is necessary to use estimates of cases or deaths occurring in countries to make inferences about trends in malaria cases and deaths globally. The methods for producing estimates either adjust the number of reported cases to take into account the estimated proportion of cases that are not captured by a surveillance system, or model the relationship between malaria transmission intensity and case incidence or mortality (the latter method is used for countries in sub-Saharan Africa with insufficient surveillance data). These estimates help to make numbers more comparable between countries, and fill gaps where data are missing. However, the estimates are limited in that they rely on relationships between variables that are uncertain, and draw upon data that may have been imprecisely measured, or project forward from data measured in previous years. Thus, estimates of the number of malaria cases or deaths are accompanied by a large degree of uncertainty, and inferences concerning trends are less certain than those made directly from high-quality surveillance data. In 2014, an evidence review group on malaria burden estimation advised WHO on what approaches to use to estimate the number of malaria cases and deaths. These recommendations are being adopted and will be fully implemented in the *World malaria report 2015*. For this report, the methods used are detailed in Annex 1.

**In 2013, an estimated 198 million cases of malaria occurred worldwide (95% uncertainty interval, 124–283 million).** Most of these cases (82%) were in the WHO African Region, followed by the WHO South-East Asia Region (12%) and the WHO Eastern Mediterranean Region (5%). About 8% of estimated cases globally are due to *P. vivax*, although outside the African continent this proportion increases to 47% (**Table 8.2a**).

**Table 8.2** Estimated number of a) malaria cases and b) malaria deaths by WHO region, 2013

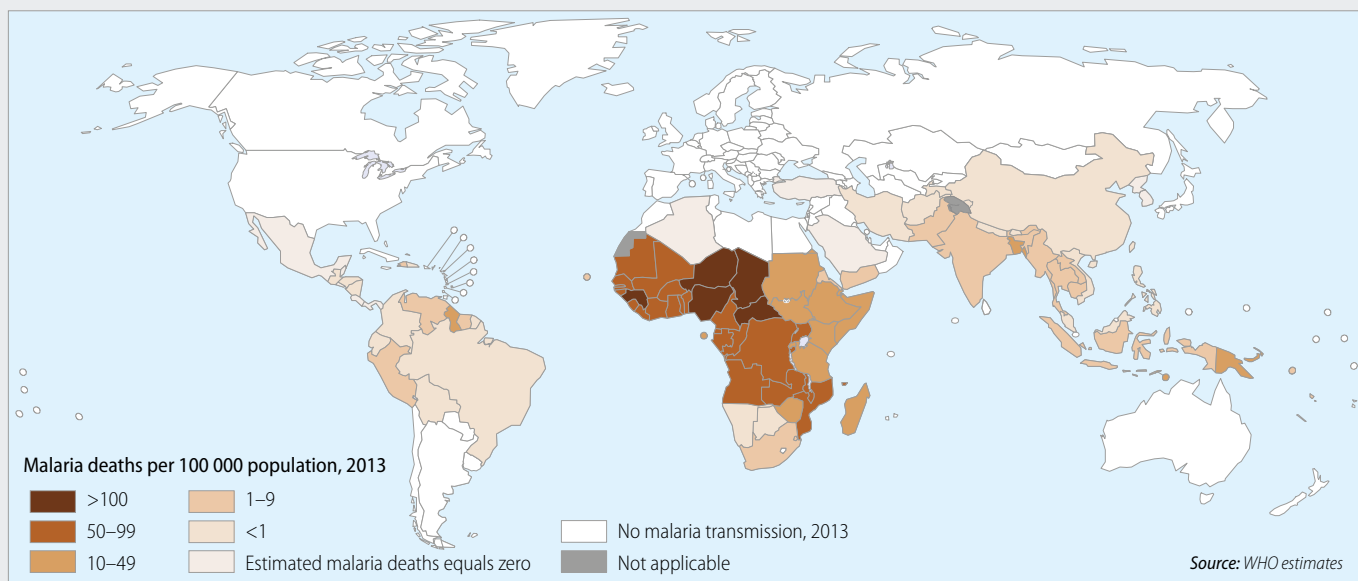
(a) Region	Estimated cases ('000s)			Estimated <i>P. vivax</i> cases ('000s)			<i>P. vivax</i> as % of total cases
	Estimate	Lower	Upper	Estimate	Lower	Upper	
Africa	163 000	90 000	243 000	1 400	1 000	1 700	1%
Americas	700	600	900	500	400	600	62%
Eastern Mediterranean	9 000	6 000	14 000	3 000	2 300	3 800	33%
Europe	2	2	2	2	2	2	43%
South-East Asia	24 000	17 000	36 000	11 000	7 000	17 000	44%
Western Pacific	1 000	1 000	2 000	200	100	400	16%
<b>World</b>	<b>198 000</b>	<b>124 000</b>	<b>283 000</b>	<b>15 800</b>	<b>11 900</b>	<b>22 000</b>	<b>8%</b>
Outside sub-Saharan Africa	30 000	22 400	41 500	14 200	10 200	20 300	47%

(b) Region	Estimated deaths			Estimated deaths <5			Deaths <5 as % of total
	Estimate	Lower	Upper	Estimate	Lower	Upper	
Africa	528 000	315 000	689 000	437 000	324 000	544 000	83%
Americas	800	500	1 200	220	190	290	28%
Eastern Mediterranean	11 000	5 000	23 000	3 900	3 000	4 900	40%
Europe	0	0	0	0	0	0	49%
South-East Asia	41 000	23 000	69 000	11 000	7 000	17 000	29%
Western Pacific	3 300	1 700	5 600	1 600	700	2 600	49%
<b>World</b>	<b>584 000</b>	<b>367 000</b>	<b>755 000</b>	<b>453 000</b>	<b>341 000</b>	<b>630 000</b>	<b>78%</b>
Outside sub-Saharan Africa	47 000	29 000	75 000	13 000	8 000	21 000	28%

Source: WHO estimates

Figure 8.6 Malaria deaths per 100 000 population, 2013

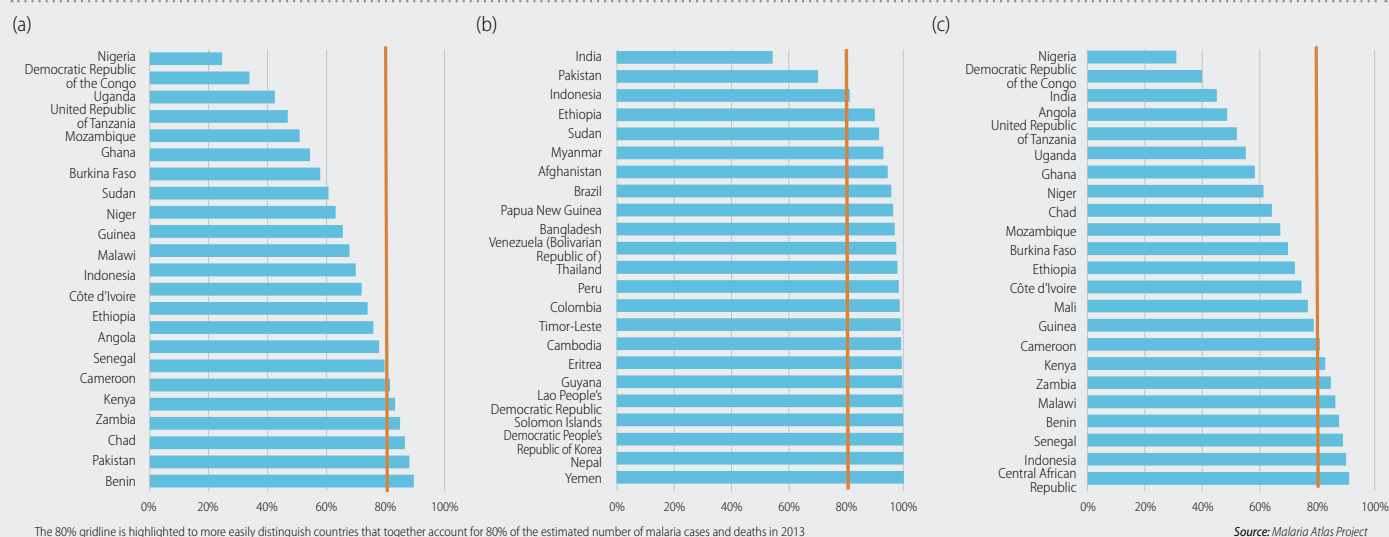


THE GLOBAL BURDEN OF MALARIA MORTALITY IS DOMINATED BY COUNTRIES IN SUB-SAHARAN AFRICA.

In 2013, there were an estimated 584 000 malaria deaths worldwide (95% uncertainty interval, 367 000–755 000) (Table 8.2b). It is estimated that most (90%) of these deaths were in the WHO African Region, followed by the WHO South-East Asia Region (7%) and the WHO Eastern Mediterranean Region (2%). About 453 000 malaria deaths (uncertainty interval, 341 000–630 000) were estimated to occur in children aged under 5 years, equivalent to 78% of the global total. An estimated 437 000 of deaths occurred in children aged under 5 years in the WHO African Region (uncertainty interval, 324 000–544 000).

About 80% of estimated malaria cases in 2013 occurred in just 18 countries, and 80% of deaths in 16 countries (Figures 8.3 and 8.4). For *P. vivax* cases, three countries (India, Indonesia and Pakistan) accounted for more than 80% of estimated cases. The global burden of mortality and morbidity was dominated by countries in sub-Saharan Africa: the Democratic Republic of the Congo and Nigeria together accounted for 39% of the global total of estimated malaria deaths and 34% of cases in 2013. International targets for reducing cases and deaths will not be attained unless considerable progress can be made in these two countries.

Figure 8.7 Cumulative proportion of the global estimated cases and deaths accounted for by the countries with the highest number of a) total cases, b) *P. vivax* cases and c) deaths in 2013



ESTIMATED MALARIA MORTALITY RATES DECREASED BY 53% BETWEEN 2000 AND 2013 IN CHILDREN AGED UNDER 5 YEARS.

## 8.4 Changes in estimated cases and deaths, 2000–2013

**The estimated number of malaria cases fell from 227 million in 2000 to 198 million in 2013 (Table 8.3a).** During the same period, the population at risk for malaria increased by 25% globally and by 43% in the WHO African Region. Consequently, the estimated number of cases per 1000 persons at risk of malaria, which takes into account population growth, showed a 30% reduction in case incidence globally between 2000 and 2013, and a 34% reduction in the WHO African Region. Decreases were greatest in the WHO European Region (100%), the WHO Region of the Americas (76%) and the WHO Western Pacific Region (69%). If the rate of decline that has occurred over the past 13 years is sustained, then malaria case incidence is projected to decrease by 35% globally and 40% in the WHO African Region by 2015.

**The estimated number of deaths fell in all regions between 2000 and 2013, although there was some fluctuation year by year (Table 8.3b).**

Malaria mortality rates (which take into account population growth over time) are estimated to have declined by 47% globally between 2000 and 2013 and by 54% in the WHO African Region (Figure 8.8b). In children aged under 5 years malaria mortality rates are estimated to have fallen by 53% globally and by 58% in the WHO African Region. If the annual rate of decrease that has occurred over the past 13 years is maintained, then by 2015, malaria mortality rates across all age groups will fall by 55% globally, and by 62% in the WHO African Region. In children aged under 5 years they are projected to decrease by 61% globally and by 67% in the WHO African Region by 2015.

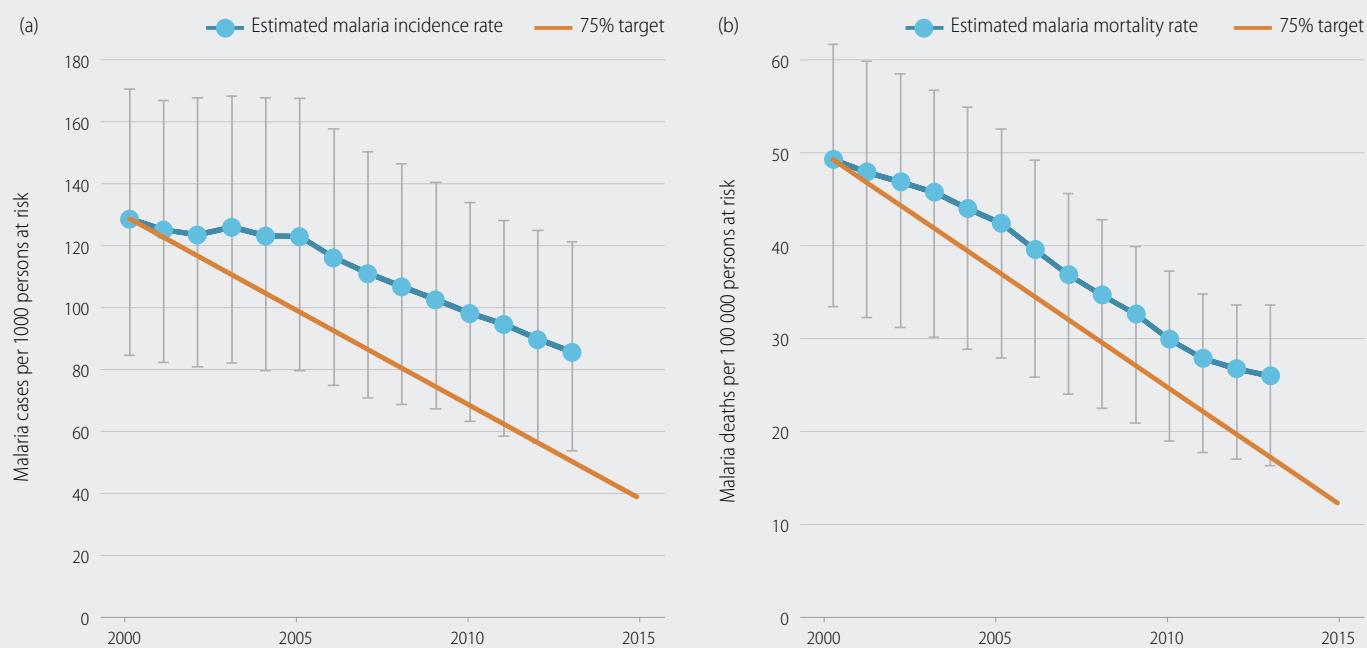
**Table 8.3** Estimated number of a) malaria cases and b) malaria deaths by WHO region, 2000, 2005, and from 2010 to 2013

(a) Number of cases (000's)	2000	2005	2010	2011	2012	2013
Africa	174 000	192 000	167 000	163 000	163 000	163 000
Americas	2 500	1 700	1 100	800	800	700
Eastern Mediterranean	14 000	10 000	9 000	11 000	10 000	9 000
Europe						
South-East Asia	33 000	34 000	28 000	28 000	27 000	24 000
Western Pacific	4 000	2 000	2 000	1 000	1 000	1 000
<b>World</b>	<b>227 000</b>	<b>240 000</b>	<b>207 000</b>	<b>203 000</b>	<b>202 000</b>	<b>198 000</b>
Lower bound	150 000	155 000	133 000	129 000	127 000	124 000
Upper bound	304 000	328 000	287 000	282 000	281 000	283 000

(b) Number of deaths	2000	2005	2010	2011	2012	2013
Africa	801 000	761 000	576 000	543 000	530 000	528 000
Americas	2 300	1 800	1 300	1 000	900	800
Eastern Mediterranean	17 000	13 000	12 000	13 000	12 000	11 000
Europe	3					
South-East Asia	53 000	50 000	46 000	44 000	43 000	41 000
Western Pacific	9 500	4 700	3 900	3 300	3 500	3 300
<b>World</b>	<b>882 000</b>	<b>830 000</b>	<b>639 000</b>	<b>605 000</b>	<b>590 000</b>	<b>584 000</b>
Lower bound	599 000	547 000	405 000	384 000	376 000	367 000
Upper bound	1 104 000	1 029 000	795 000	755 000	742 000	755 000

Source: WHO estimates

**Figure 8.8** Change in a) Estimated malaria case incidence rate, 2000–2013 and b) Estimated malaria mortality rate, 2000–2013

Source: WHO estimates

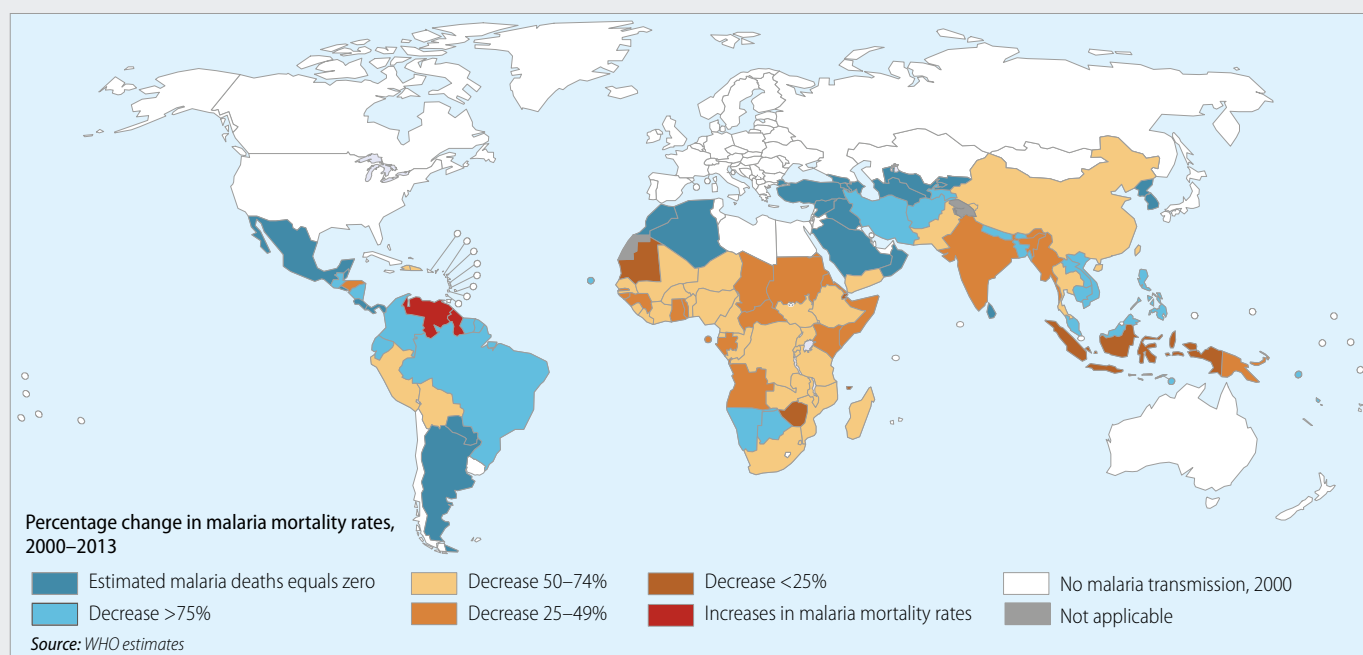
FIFTY-EIGHT COUNTRIES ARE PROJECTED TO ACHIEVE >75% REDUCTIONS IN ESTIMATED MALARIA MORTALITY RATES BY 2015.

Estimated numbers of cases for 2012 and previous years differ slightly from those reported in the *World malaria report 2013*, owing to the use of an updated ITN model in the calculation of case estimates in Africa, and the updating of previous datasets on reported cases. Similarly, estimated numbers of deaths differ slightly from those reported previously, owing to revisions to the under-5 mortality envelope by the UN Inter-agency Group for Child Mortality Estimation (38) (see **Annex 1**).

**The pace of decline in estimated malaria incidence and mortality rates was initially slow, but accelerated from 2005 (Figure 8.8b).** Considerable uncertainty is associated with the calculated reductions in incidence and mortality rates, since they are based on the estimated numbers of cases and deaths, which have wide uncertainty intervals. Nonetheless, it appears that the rate of decline in malaria incidence and mortality rates was initially slow but accelerated after 2005, and, for mortality, the rate from 2005 to 2010 was sufficiently fast to achieve a 75% reduction over 15 years (the plotted points are parallel to the target line in Figure 8.8). However, the decrease in malaria mortality rates was slower between 2011 and 2013. This more recent reduced rate of decline is associated with a reduced rate of increase in ITN coverage in sub-Saharan Africa in 2012 and 2013 (**Section 3.1**), a factor that is taken into account in estimates of cases and deaths. The number of ITNs distributed in sub-Saharan Africa in 2014 exceeded any previous year, and is expected to lead to increases in the rate of mortality decline in 2014 and 2015.

Of the 106 countries that had ongoing transmission in 2000, 58 are projected to achieve reductions in malaria mortality rates of >75% in 2015, or to maintain zero malaria deaths.

**Figure 8.9** Percentage change in malaria mortality rates, 2000–2013



REDUCTIONS IN MALARIA DEATHS HAVE CONTRIBUTED SUBSTANTIALLY TO PROGRESS TOWARDS ACHIEVING THE TARGET FOR MDG 4, WHICH IS TO REDUCE THE UNDER-5 MORTALITY RATE BY TWO THIRDS.

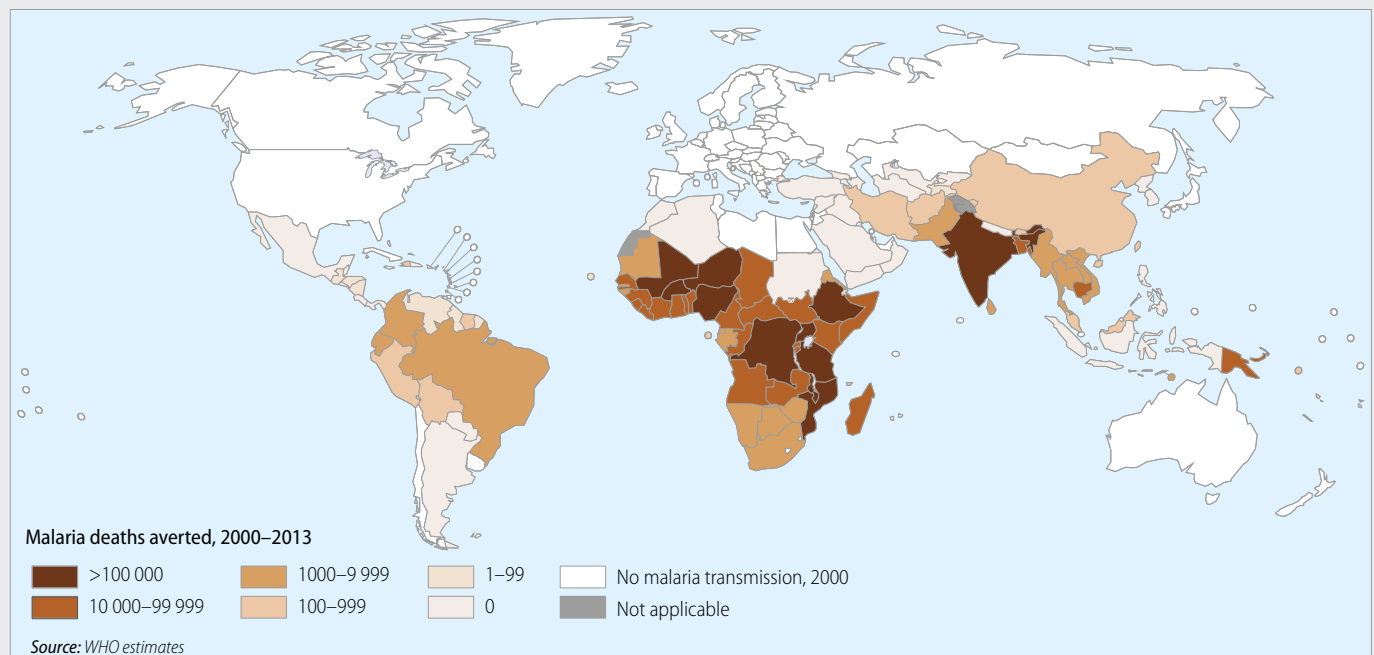
## 8.5 Estimated cases and deaths averted, 2001–2013

It is estimated that, globally, 670 million fewer cases and 4.3 million fewer malaria deaths occurred between 2001 and 2013 than would have occurred had incidence and mortality rates remained unchanged since 2000 (Table 8.4). Of the estimated 4.3 million deaths averted between 2001 and 2013, 3.9 million (92%) were in children aged under 5 years in sub-Saharan Africa. These 3.9 million averted deaths accounted for 20% of the 20 million fewer deaths that would have occurred in sub-Saharan Africa between 2001 and 2013 had under-5 mortality rates for 2000 applied for each year between 2001 and 2013. Thus, reductions in malaria deaths have contributed substantially to progress towards achieving the target for MDG 4 in sub-Saharan Africa, which is to reduce the under-5 mortality rate by two thirds between 1990 and 2015.

**Table 8.4** Estimated cases and deaths averted by reduction in incidence and mortality rates between 2001 and 2013

Region	Cases averted		Deaths averted		Deaths averted <5	
	2001–2013 (million)	Percentage of total	2001–2013 (million)	Percentage of total	2001–2013 (million)	Percentage of total
African	444	66%	3.93	92%	3.92	95%
Region of the Americas	19	3%	0.01	0%	0.00	0%
Eastern Mediterranean	72	11%	0.08	2%	0.04	1%
European	0.3	0%	0.00	0%	0.00	0%
South-East Asia	106	16%	0.17	4%	0.09	2%
Western Pacific	30	4%	0.08	2%	0.06	1%
<b>World</b>	<b>670</b>	<b>100%</b>	<b>4.28</b>	<b>100%</b>	<b>4.11</b>	<b>100%</b>

Source: WHO estimates

**Figure 8.10** Malaria deaths averted, 2001–2013

**Most of the malaria cases averted (66%) and lives saved (92%) have been in the WHO African Region (Table 8.4).** Larger percentage decreases in case incidence and mortality rates were seen in countries with the lowest estimated malaria burdens in 2000. However, although progress in reducing incidence and mortality rates has been faster in countries with smaller estimated numbers of malaria cases and deaths, this does not imply a lack of impact in higher burden countries. In fact, many cases and deaths were averted during 2001–2013 in countries with high malaria burdens. The ten countries with the highest estimated malaria burden in 2000 accounted for 57% of malaria cases and 68% of malaria deaths averted between 2001–2013.

Not all of the cases and deaths averted can be attributed to malaria interventions implemented by malaria programmes. Some progress is likely to be related to increased urbanization and overall economic development, which lead to improvements in housing and nutrition.

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# REGIONAL PROFILES

## African Region



### West Africa

Algeria  
Benin  
Burkina Faso  
Cabo Verde  
Côte d'Ivoire  
Gambia  
Ghana  
Guinea  
Guinea-Bissau

Liberia  
Mali  
Mauritania  
Niger  
Nigeria  
Senegal  
Sierra Leone  
Togo

### Central Africa

Angola  
Burundi  
Cameroon  
Central African Republic  
Chad

Congo  
Democratic Republic of the Congo  
Equatorial Guinea  
Gabon  
Sao Tome and Principe

### East Africa and high-transmission areas in Southern Africa

Comoros  
Eritrea  
Ethiopia  
Kenya  
Madagascar  
Malawi  
Mozambique

Rwanda  
South Sudan  
Uganda  
United Republic of Tanzania  
Zambia

### Low-transmission Southern African countries

Botswana  
Namibia  
South Africa

Swaziland  
Zimbabwe

## Region of the Americas



Argentina  
Belize  
Bolivia (Plurinational State of)  
Brazil  
Colombia  
Costa Rica  
Dominican Republic  
Ecuador  
El Salvador  
French Guiana, France  
Guatemala

Guyana  
Haiti  
Honduras  
Mexico  
Nicaragua  
Panama  
Paraguay  
Peru  
Suriname  
Venezuela (Bolivarian Republic of)

## Eastern Mediterranean Region



Afghanistan  
Djibouti  
Iran (Islamic Republic of)  
Iraq

Pakistan  
Saudi Arabia  
Somalia  
Sudan  
Yemen

## European Region



Azerbaijan  
Georgia  
Kyrgyzstan

Tajikistan  
Turkey  
Uzbekistan

## South-East Asia Region



Bangladesh  
Bhutan  
Democratic People's Republic of Korea  
India  
Indonesia

Myanmar  
Nepal  
Sri Lanka  
Thailand  
Timor-Leste

## Western Pacific Region



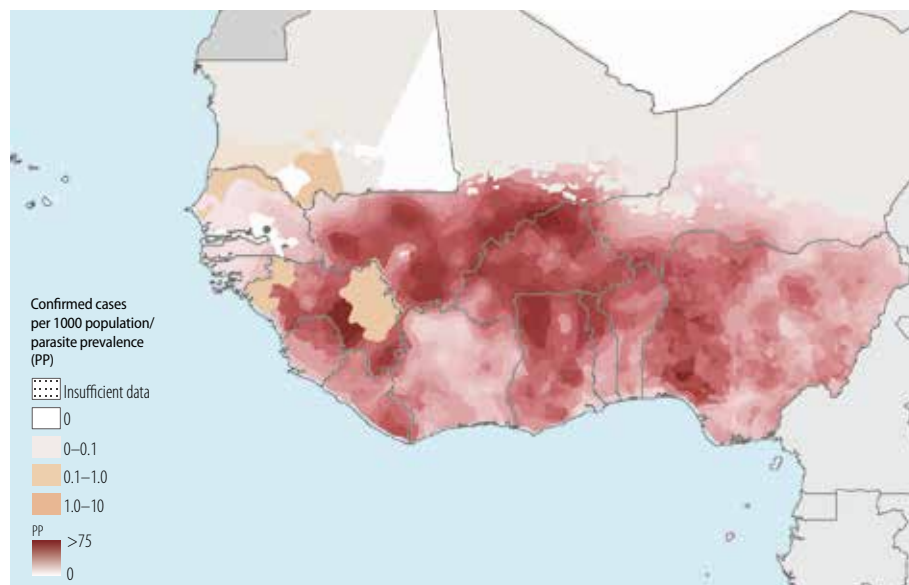
Cambodia  
China  
Lao People's Democratic Republic  
Malaysia  
Papua New Guinea

Philippines  
Republic of Korea  
Solomon Islands  
Vanuatu  
Viet Nam

## WEST AFRICA

BETWEEN 2000 AND 2013, TWO COUNTRIES OUT OF 17 REPORTED DECREASES IN CASE INCIDENCE OF >75%. SURVEILLANCE DATA WERE INSUFFICIENTLY CONSISTENT TO ASSESS TRENDS IN OTHER COUNTRIES.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** About 333 million people in the 17 countries of this subregion are at some risk for malaria, with 322 million at high risk. Cabo Verde is in the pre-elimination programme phase, and Algeria in the elimination phase. Malaria cases are almost exclusively due to *P. falciparum* (Figure F).

**Financing:** Funding for malaria control rose from US\$ 89 million in 2005 to US\$ 557 million in 2013 (Figure B). During 2011–2013 it exceeded US\$ 4 per capita per year in three countries: Cabo Verde, the Gambia and Liberia (Figure C).

**Interventions:** In 2013, the proportion of the population at risk estimated to have access to an insecticide-treated mosquito net (ITN) in their household exceeded 50% in seven countries (Burkina Faso, the Gambia, Ghana, Guinea-Bissau, Mali, Senegal and Togo) (Figure D). Cabo Verde and the Gambia protected more than 40% of their population at risk using indoor residual spraying (IRS), whereas Benin, Ghana, Liberia, Mali and Senegal used IRS on a more limited scale. Eight countries (Burkina Faso, Cabo Verde, the Gambia, Ghana, Liberia, Mali, the Niger and Sierra Leone) delivered enough antimalarial medicines to treat >80% of the population. Benin and Guinea-Bissau did not report on delivery of artemisinin-based combination therapy (ACT) (Figure E). Algeria and Cabo Verde implemented active case detection (ACD), case investigation and a quality assurance system for malaria diagnostic testing (guided by the national reference laboratory), and a radical treatment policy with primaquine for *P. vivax* and gametocytocidal treatment for *P. falciparum*.

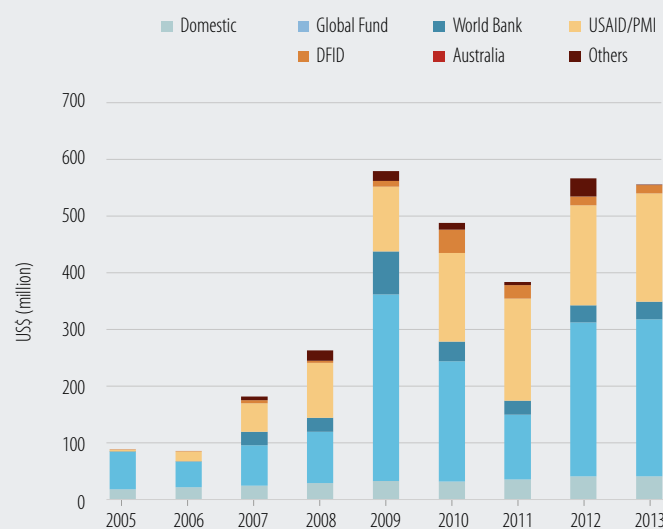
**Trends in cases and deaths:** Both Algeria and Cabo Verde achieved a >75% decrease in case incidence between 2000 and 2013. Algeria is in the elimination phase and reported only 16 indigenous cases, six introduced cases and one relapsing case in 2013; a sharp decrease compared to 2012, when 59 indigenous and three introduced cases were reported (the number of imported cases also fell from 825 in 2012 to 595 in 2013). Cabo Verde has been in the pre-elimination phase since 2010. It reported 22 indigenous cases in 2013 compared with one case in 2012. In the 15 remaining countries, it was not possible to assess trends in

cases or admissions owing to inconsistent reporting, or changes in diagnostic testing or access to health services (Figure G).

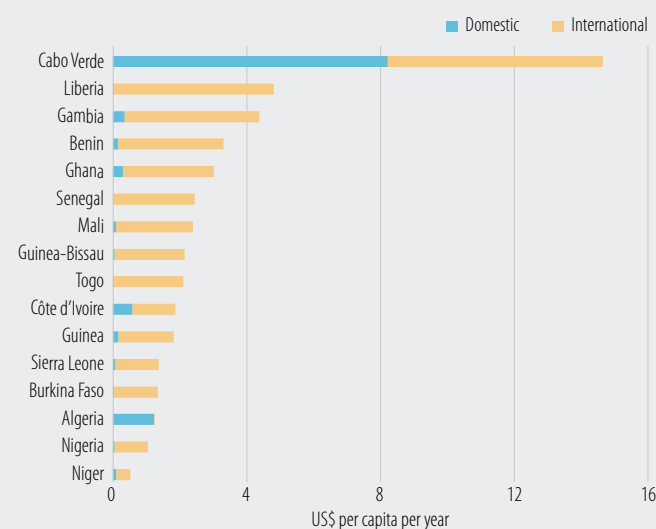
A review of trends in 83 hospitals in Ghana between 2005 and 2013 showed an increase in confirmed malaria cases, admissions and deaths in all age groups, although malaria deaths in children aged under 5 years fell by 29% (WHO, unpublished results). The increase appeared to be related to expanded diagnostic testing and increased access to health services. The slide positivity rate (SPR) remained stable at 34%. A review of trends in 186 hospitals in Nigeria between 2005 and 2013 indicated an increase or no change in confirmed malaria cases, admission and deaths across all age groups, and a stable SPR (59%) (WHO, unpublished results).

Subnational decreases in morbidity and mortality have been reported from Burkina Faso (1), Senegal (2,3) and Togo (4,5) but these findings are insufficient to draw conclusions about national trends.

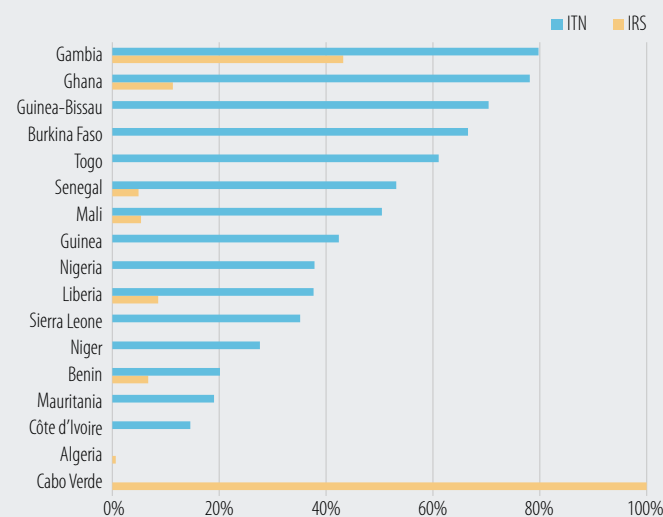
B. Financial contribution for malaria control by source, 2005–2013



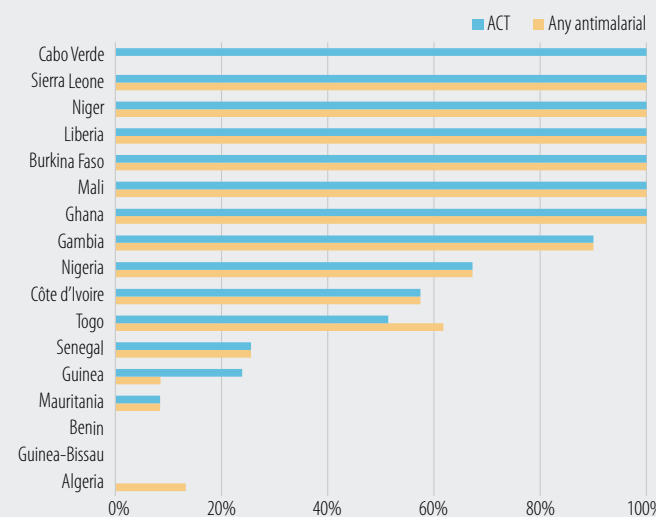
C. US\$ per capita for malaria control, 2011–2013



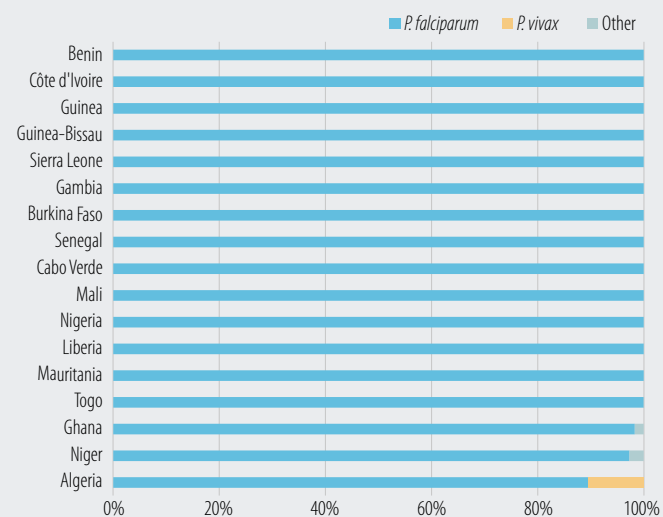
D. Percentage of population at risk with access to an ITN and percentage protected with IRS, 2013



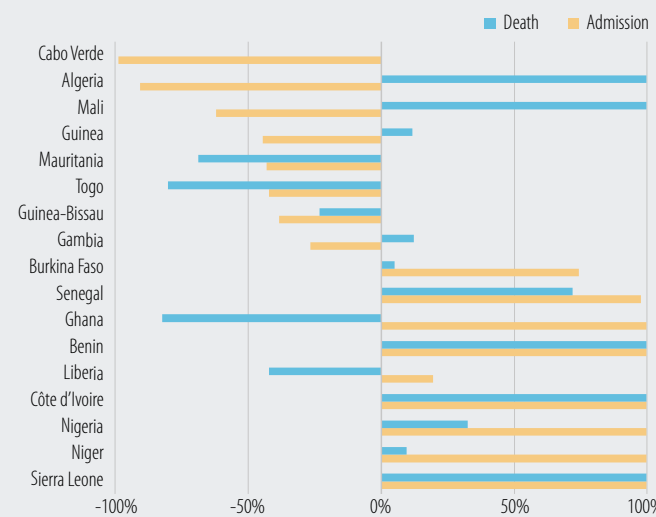
E. Antimalarial treatment courses distributed as a proportion of estimated malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



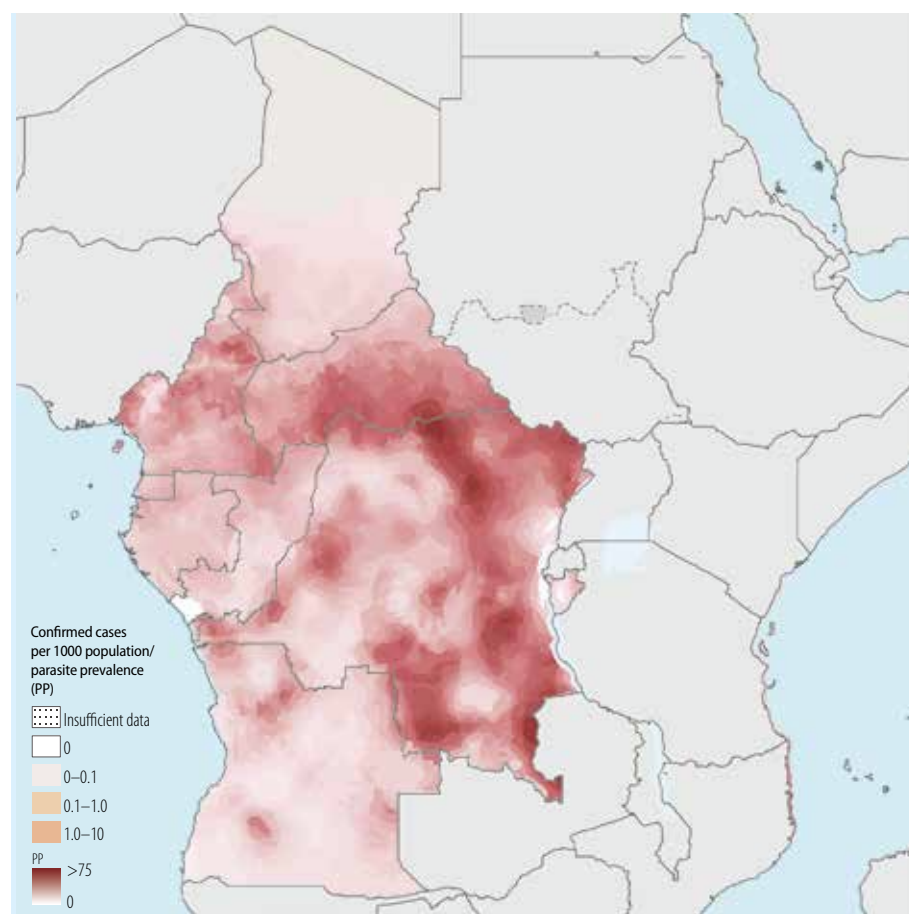
G. Change in admission and death rates, 2000–2013



## CENTRAL AFRICA

OF THE 10 COUNTRIES IN THIS SUBREGION, ONLY ONE REPORTED DECREASES IN CASE INCIDENCE OF >75%. SURVEILLANCE DATA WERE INSUFFICIENTLY CONSISTENT TO ASSESS TRENDS IN OTHER COUNTRIES.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** About 144 million people in the 10 countries of this subregion are at some risk for malaria, with 127 million at high risk (Figure A). Cases are almost exclusively due to *P. falciparum* (Figure F).

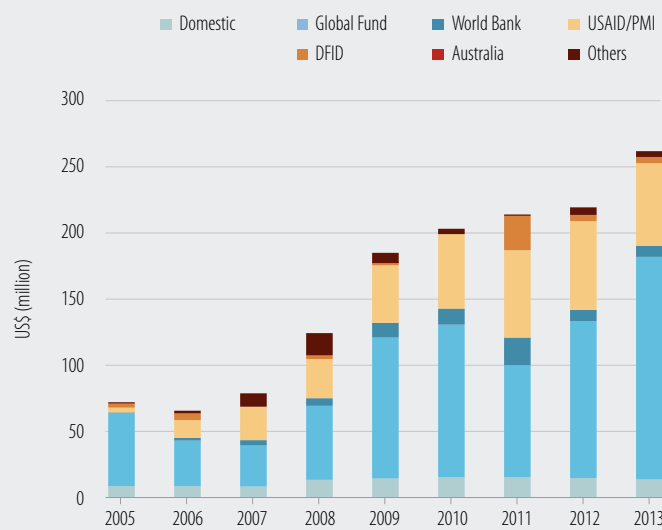
**Financing:** Funding for malaria control in the subregion rose from US\$ 72 million in 2005 to US\$ 263 million in 2013 (Figure B). Malaria financing exceeded US\$ 4 per capita per year in Equatorial Guinea and Sao Tome and Principe during 2011–2013 (Figure C).

**Interventions:** In 2013, the proportion of the population at risk estimated to have access to an ITN in their household exceeded 50% in five countries (Burundi, Chad, Congo, the Democratic Republic of the Congo, and Sao Tome and Principe) (Figure D). Sao Tome and Principe also reported that >60% of the population at risk were protected with IRS. Four countries (Angola, Burundi, the Democratic Republic of the Congo and Sao Tome and Principe) reported distributing sufficient ACTs to treat >50% of estimated malaria cases attending public health facilities in 2013. Congo and Gabon did not report on delivery of ACT (Figure E).

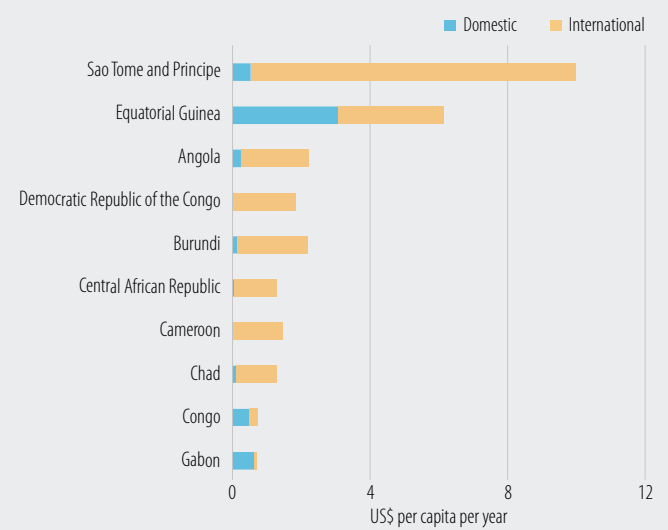
**Trends in cases and deaths:** Between 2000 and 2013, only Sao Tome and Principe achieved a >75% decrease in case incidence; it also reported >90% decrease in malaria admission and death rates. However, the number of cases and admissions in 2011–2013 was higher than in the previous 4 years, suggesting minimal progress in recent years.

In the nine remaining countries, it was not possible to assess trends owing to incomplete reporting or changes in health service access or diagnostic testing. In several countries, the number of confirmed malaria cases and admissions increased in recent years, possibly reflecting improved reporting or improved access to health services (Figure G). Subnational decreases in malaria morbidity and mortality have been reported in the Island of Bioko in Equatorial Guinea (6) (although high transmission persists in some foci) (7), Cameroon (8) and Gabon (9).

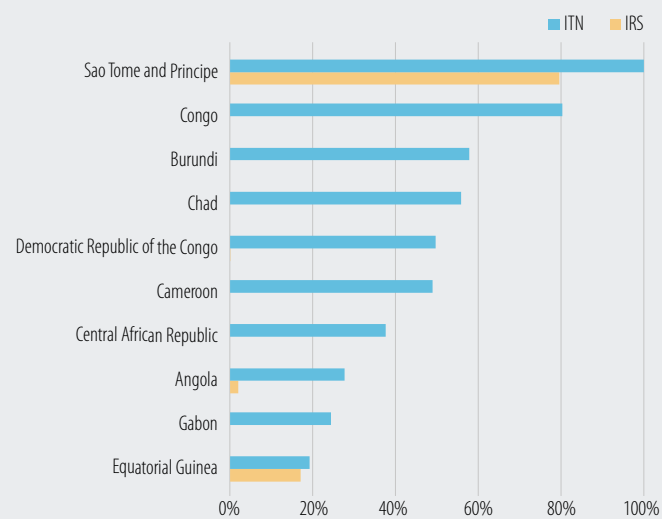
B. Financial contribution for malaria control by source, 2005–2013



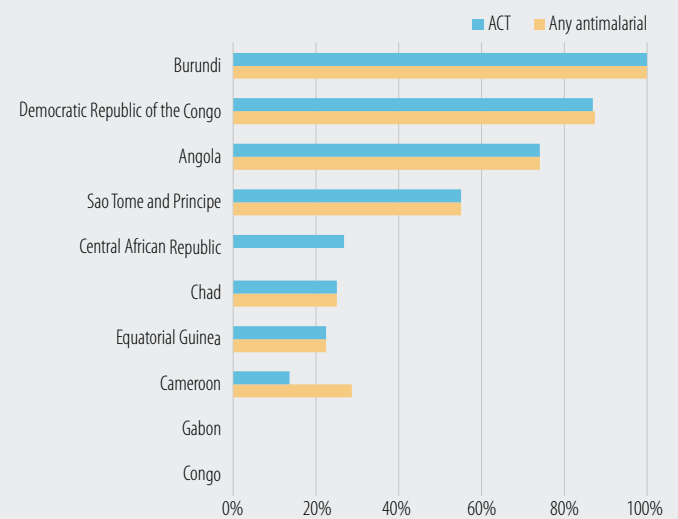
C. US\$ per capita for malaria control, 2011–2013



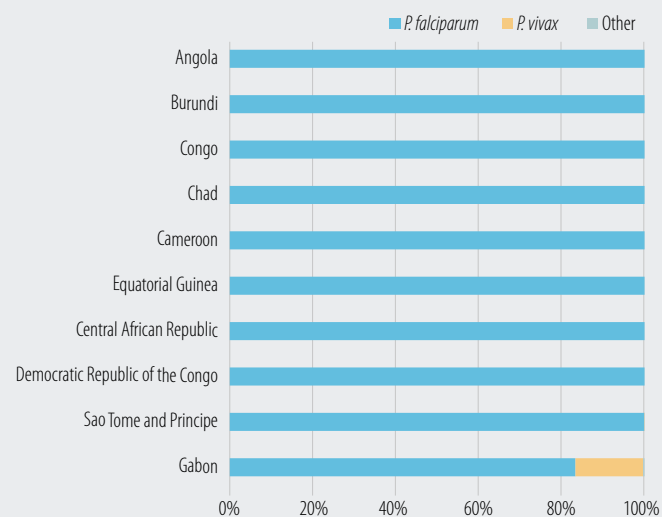
D. Percentage of population at risk with access to an ITN and percentage protected with IRS, 2013



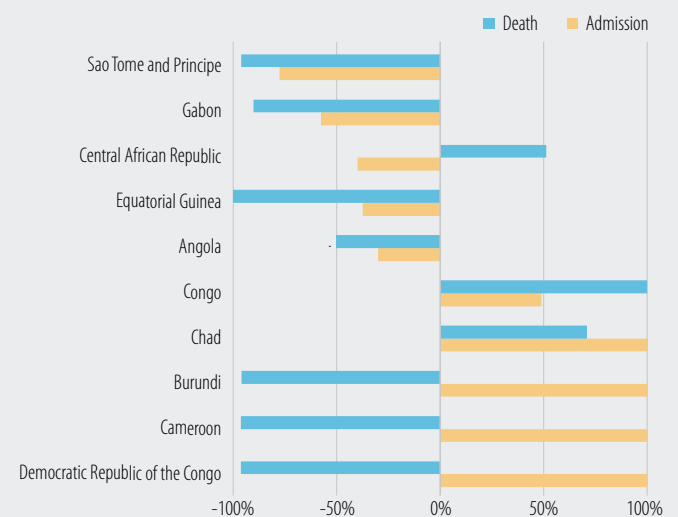
E. Antimalarial treatment courses distributed as a proportion of estimated malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



G. Change in admission and death rates, 2000–2013

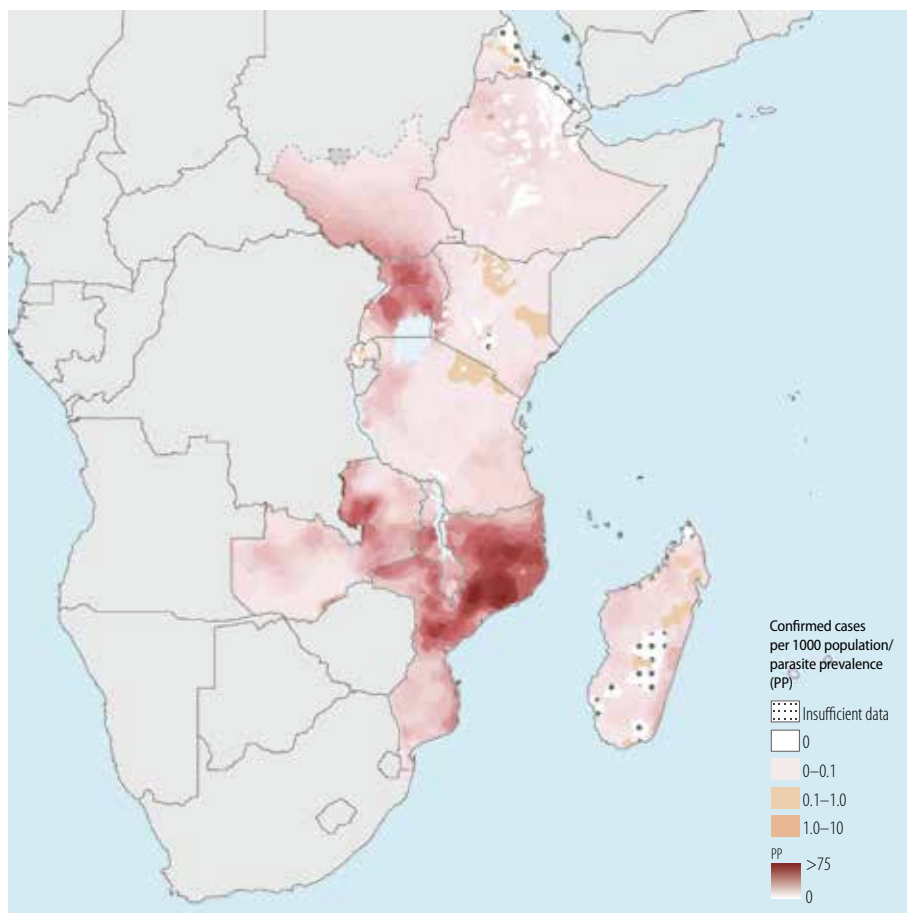


# EAST AND SOUTHERN AFRICA

(excluding low-transmission countries in Southern Africa)

THREE COUNTRIES AND AREAS ACHIEVED >75% DECREASE IN MALARIA ADMISSION RATES BETWEEN 2000 AND 2013. TWO COUNTRIES ARE ON TRACK TO REDUCE MALARIA ADMISSION RATES BY 50–75% BY 2015.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** About 293 million people in the 12 countries in this subregion are at some risk for malaria, with 179 million at high risk. About 25% of the population of Ethiopia and Kenya live in areas that are free of malaria. *P. falciparum* is the dominant species, except in Eritrea and Ethiopia, where *P. vivax* accounts for about 38% of reported cases (Figure F).

**Financing:** Funding for malaria control in the subregion increased from US\$ 217 million in 2005 to US\$ 741 million in 2013. Malaria financing was less than US\$ 4 per capita per year during 2011–2013 in all countries but exceeded US\$ 3 per capita in six (Ethiopia, Kenya, Madagascar, Malawi, Rwanda and Zambia) (Figure C).

**Interventions:** In 2013, the proportion of the population at risk estimated to have access to an ITN in their household exceeded 50% in nine countries (Comoros, Ethiopia, Kenya, Madagascar, Malawi, Mozambique, Rwanda, South Sudan and Zambia), and in Zanzibar in the United Republic of Tanzania (Figure D). IRS was also used in 10 countries, with the proportion of the at-risk population protected reaching >37% in Ethiopia and Mozambique. In 2013, all countries except Comoros and Madagascar reported distribution of sufficient ACTs to treat all patients attending public health facilities (Malawi and Rwanda did not report) (Figure E).

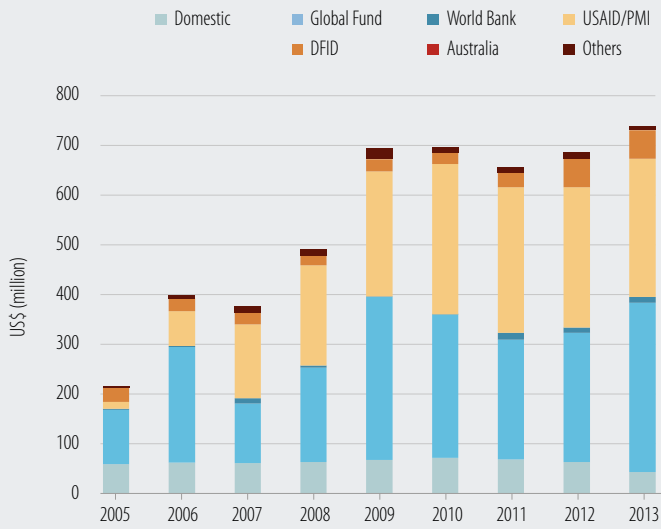
**Trends in cases and deaths:** Between 2000 and 2013, malaria admission rates decreased by >75% in Eritrea, Rwanda and in Zanzibar, in the United Republic of Tanzania (consistent with a

previous study (10)) (Figure G). In Rwanda, confirmed malaria cases and admissions doubled between 2012 and 2013 (483 000 to 962 000 and 5306 to 9508, respectively), while testing remained unchanged. Malaria admission rates are projected to decrease by 50–75% by 2015 in Ethiopia (based on a study in 41 hospitals (11)) and in Zambia. Decreases in malaria admissions were also seen in Mozambique, but no comparable data from earlier than 2007 are available. Recent increases in admissions and deaths in Madagascar reflect the fragility of the gains achieved if control efforts are not maintained.

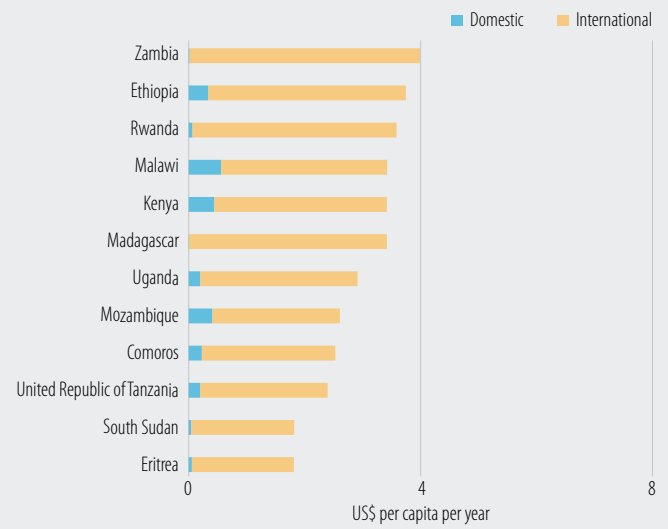
For the seven remaining countries (Comoros, Kenya, Malawi, Mozambique, United Republic of Tanzania [Mainland], South Sudan and Uganda), it was not possible to assess trends owing to inconsistent reporting, changes in health service accessibility or diagnostic testing. Evidence of subnational reductions in morbidity and mortality have been reported in the United Republic of Tanzania (Mainland) (12), Kenya (13), Uganda (14,15) and Zambia (16,17) (mixed results) but these results are insufficient to make inferences about national trends.



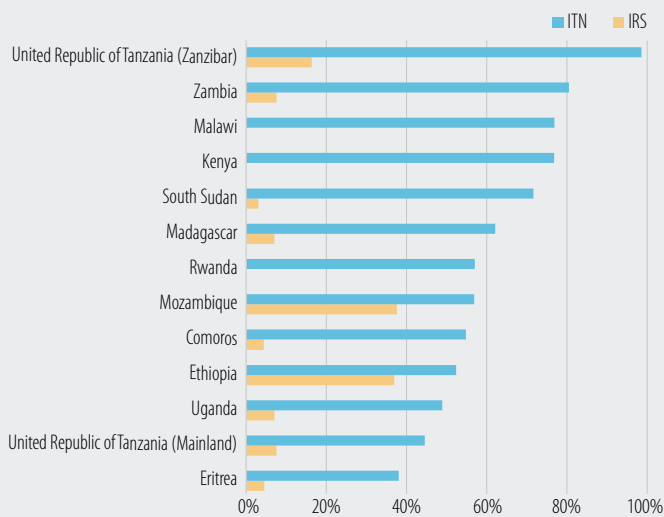
B. Financial contribution for malaria control by source, 2005–2013



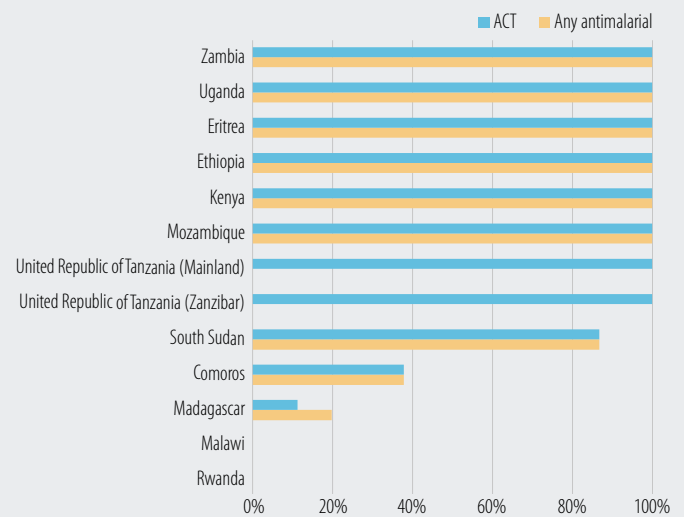
C. US\$ per capita for malaria control, 2011–2013



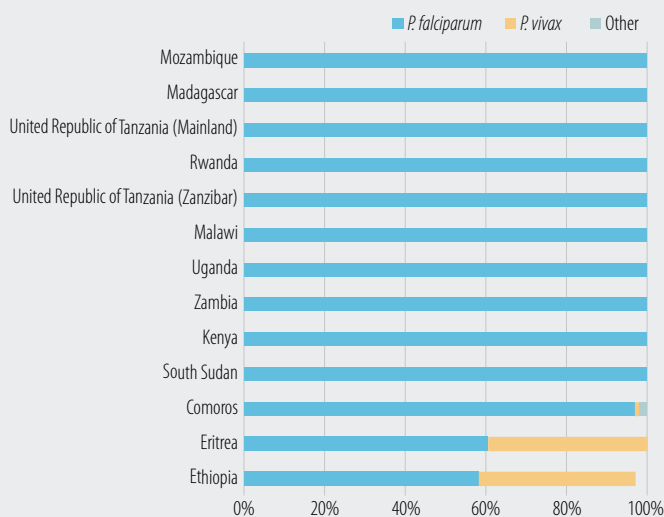
D. Percentage of population at risk with access to an ITN and percentage protected with IRS, 2013



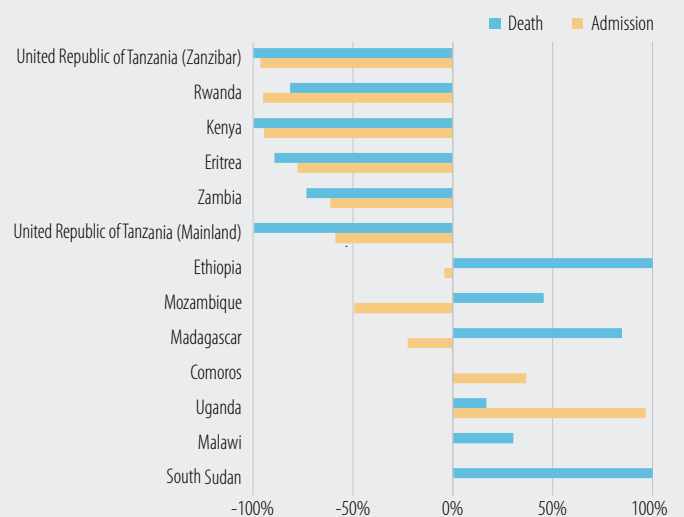
E. Antimalarial treatment courses distributed as a proportion of estimated malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



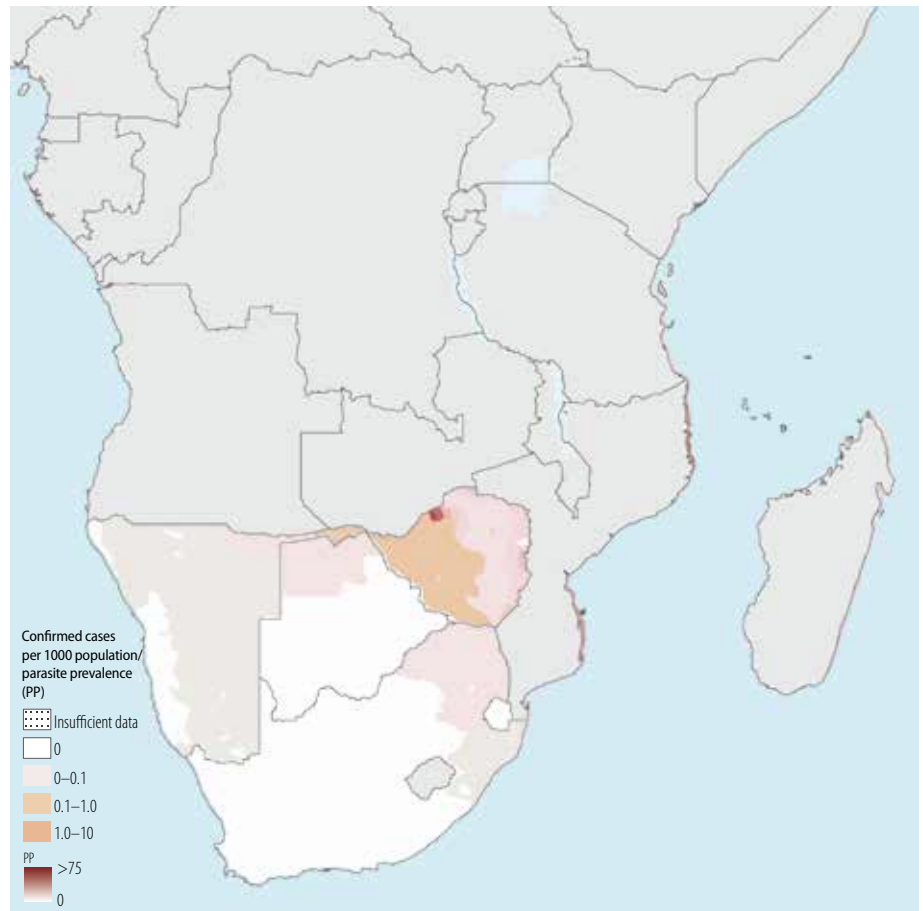
G. Change in admission and death rates, 2000–2013



# LOW-TRANSMISSION SOUTHERN AFRICAN COUNTRIES

FOUR OUT OF FIVE COUNTRIES  
ACHIEVED >75% DECREASE IN  
CASE INCIDENCE IN 2013, AND  
ONE COUNTRY IS ON TRACK  
TO REDUCE INCIDENCE BY  
50–75% BY 2015.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** About 15 million people in the five countries of this subregion are at some risk for malaria, with 11 million at high risk (Figure A). About 80%, or 60 million people, live in areas that are free of malaria. Malaria transmission is highly seasonal. Most malaria cases are caused by *P. falciparum* (Figure F).

**Financing:** Funding for malaria control in this subregion increased from US\$ 29 million in 2005 to US\$ 56 million in 2013 (Figure B). During 2011–2013, it exceeded US\$ 4 per capita per year in all countries of the subregion except Botswana (Figure C).

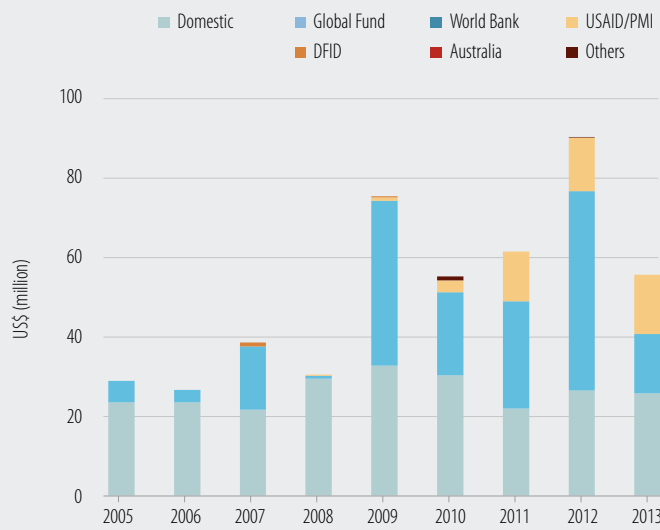
**Interventions:** In 2013, the population at risk estimated to have access to an ITN in their household exceeded 50% in Zimbabwe; although IRS was extensively used, countries protected <50% of their population at high risk with IRS (Figure D). In South Africa, where IRS is the main vector control measure, the proportion of the population at risk protected in 2013 was almost half of what was reported in 2012. All five countries delivered sufficient antimalarial medicines to treat >80% of malaria cases attending public health facilities (Figure E).

**Trends in cases and deaths:** Four of the five countries in this subregion (Botswana, Namibia, South Africa and Swaziland) achieved >75% decrease in case incidence between 2000 and 2013 (Figure G). Reported malaria mortality rates also fell by >75%. However, the number of reported cases in these four countries more than doubled between 2012 and 2013. The increase in reported cases may be due to higher testing rates. In Zimbabwe, the number of diagnostic tests performed

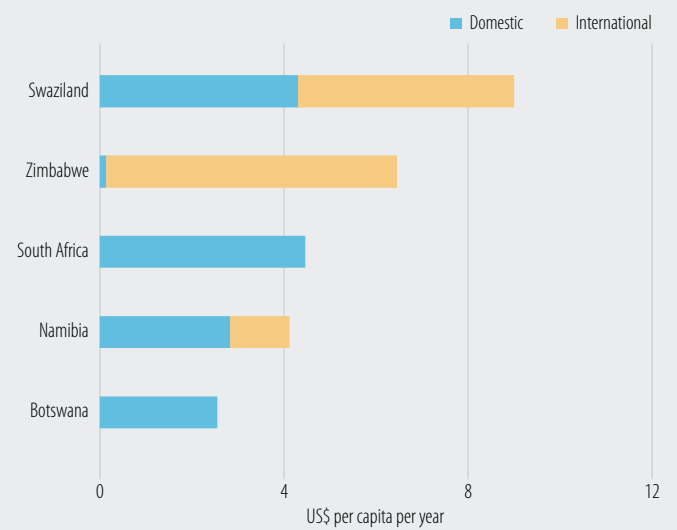
increased fivefold between 2004 and 2013, with rapid diagnostic tests (RDTs) increasingly replacing microscopy. It is therefore not possible to assess trends using nationally reported cases. However, a review of data from 45 hospitals indicated a decrease in malaria admissions and mortality rates of 64% and 71% between 2003 and 2012, suggesting the country is on track to achieve a decrease in admission rates of 50–75% and mortality rates of >75% by 2015. Another subnational study also showed a decrease in malaria case incidence in a district of Zimbabwe (18).

All five countries in the subregion, together with Angola, Mozambique and Zambia, are signatories to the Elimination Eight (E8) regional initiative launched in March 2009, a goal of which is to achieve the eventual elimination of malaria in the region, and to achieve elimination in four countries – Botswana, Namibia, South Africa and Swaziland – by 2020. Despite relatively low numbers of confirmed malaria cases in 2013, unconfirmed cases were also recorded among the total number of cases reported, comprising 10% of the total in Botswana, 2% in South Africa and 5% in Swaziland. With sustained investments in malaria control, and improving diagnostic capacity, it is expected that these countries will continue to progress towards elimination.

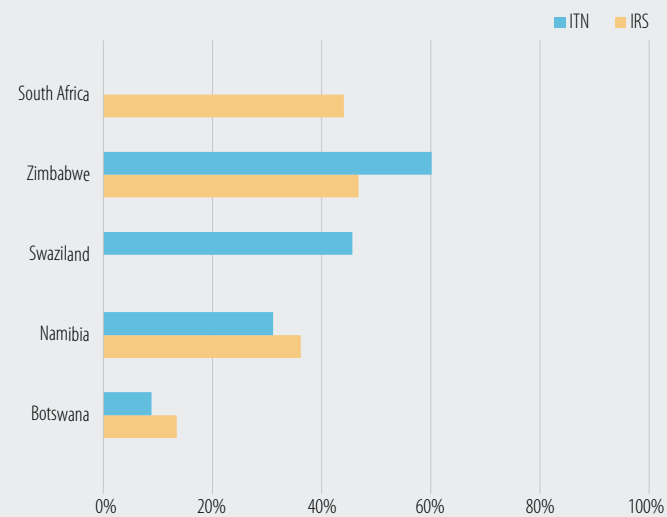
B. Financial contribution for malaria control by source, 2005–2013



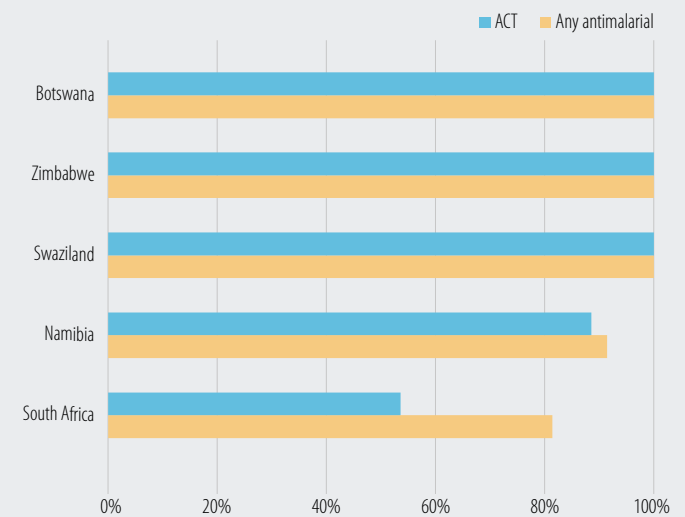
C. US\$ per capita for malaria control, 2011–2013



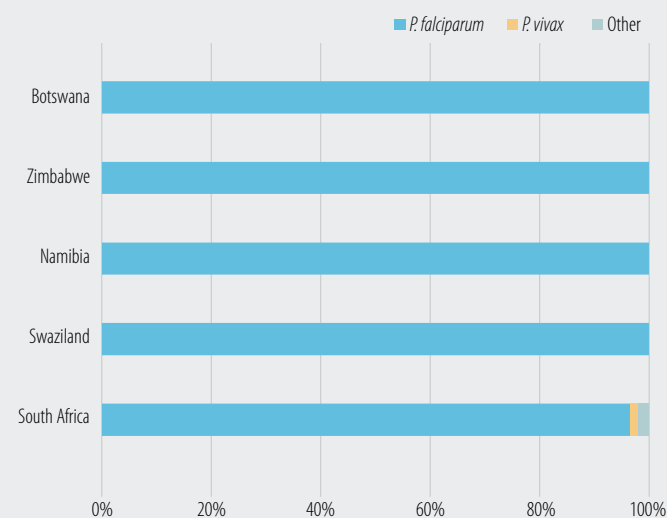
D. Percentage of population at risk with access to an ITN and percentage protected with IRS, 2013



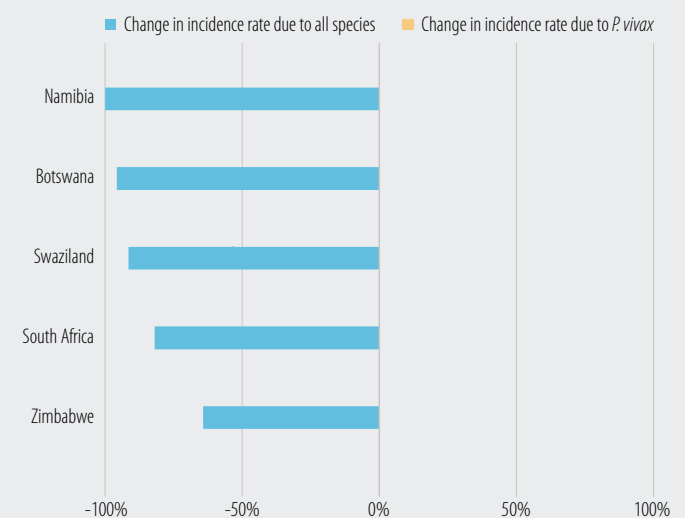
E. Antimalarial treatment courses distributed as a proportion of estimated malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



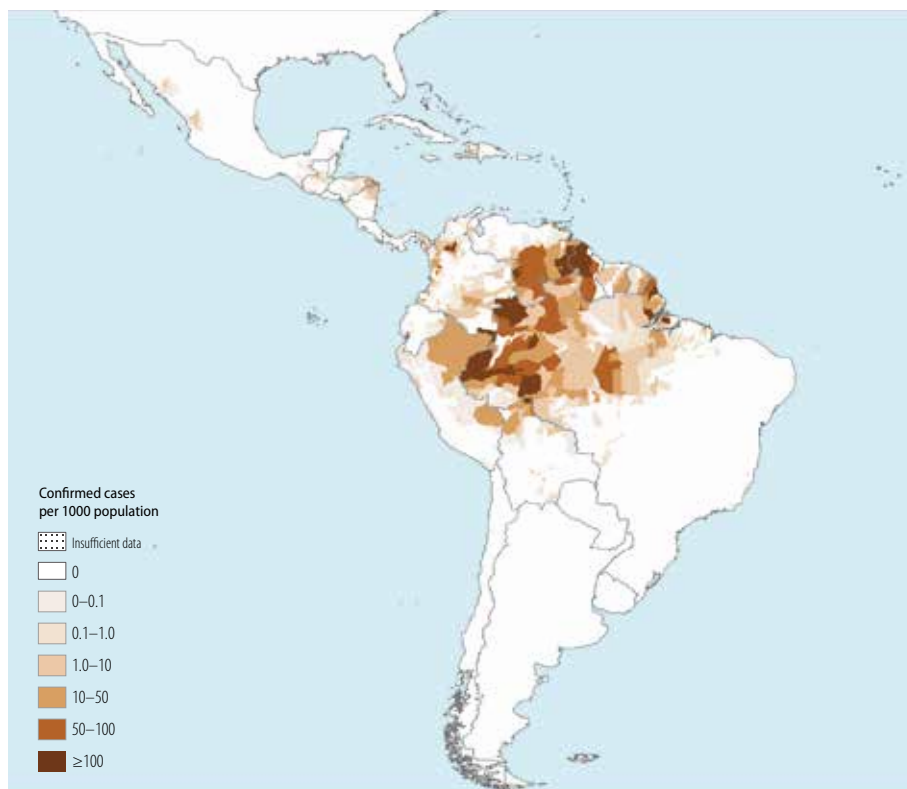
G. Change in case incidence of microscopically confirmed cases, 2000–2013



# REGION OF THE AMERICAS

FIFTEEN OUT OF 21 COUNTRIES ARE ON TRACK TO REDUCE INCIDENCE BY 75% BY 2015, AND THREE COUNTRIES BY 50–75%. ARGENTINA AND PARAGUAY REPORTED ZERO INDIGENOUS CASES IN 2013.

A. Confirmed malaria cases per 1000 population, 2013



**Population at risk:** In the WHO Region of the Americas, about 120 million people in 21 countries are estimated to be at some risk for malaria, with 25 million at high risk. *P. falciparum* is responsible for <30% of malaria cases overall, although the proportion is >50% in Guyana and Suriname, and almost 100% in the Dominican Republic and Haiti.

**Financing:** Funding for malaria control in the region increased from US\$ 153 million in 2005 to US\$ 214 million in 2011, but decreased to US\$ 140 million in 2013 (Figure B). In five of the 21 countries, financing for malaria control exceeded US\$ 4 per capita per year during 2011–2013 (Costa Rica, El Salvador, Mexico, Paraguay and Suriname) (Figure C).

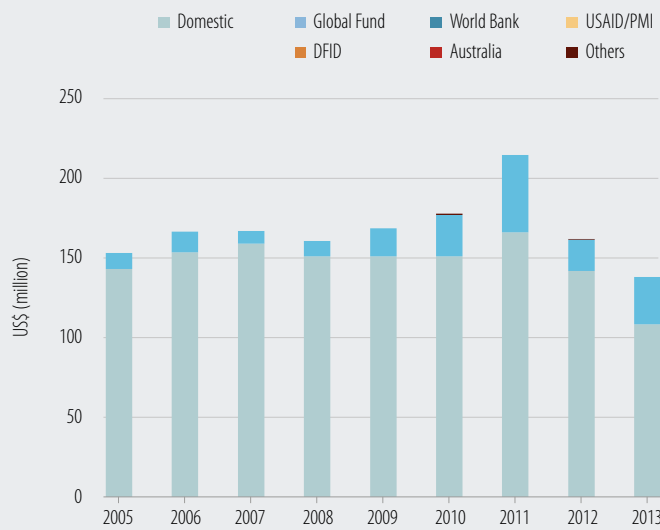
**Interventions:** All the 21 countries or overseas territories of the region apply IRS or ITNs (or both) in focal areas with ongoing transmission. In 2011–2013, four countries distributed enough ITNs to protect more than 60% of the population at high risk, of which one (Nicaragua) also protected >60% of its population at risk with IRS (Figure D). All the countries distributed sufficient antimalarial medicines to treat all patients attending public health facilities (Figure E). All the seven countries in pre-elimination and elimination phases (Argentina, Belize, Costa Rica, Ecuador, El Salvador, Mexico and Paraguay) undertake ACD, case investigation, radical treatment of *P. vivax* and quality assurance of microscopy services.

**Trends in cases and deaths:** The number of confirmed malaria cases in the region decreased from 1.2 million in 2000 to 427 000 cases in 2013. Three countries accounted for 72% of cases in 2013: Brazil (42%), Bolivarian Republic of Venezuela (18%) and Colombia (12%). Reductions of >75% in the incidence of microscopically confirmed malaria cases were reported in 13 out

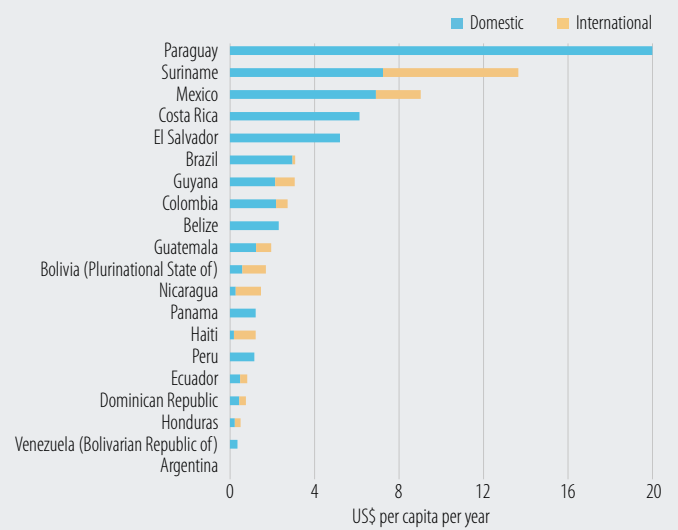
of 21 countries and areas with ongoing transmission between 2000 and 2013 (Argentina, Belize, Plurinational State of Bolivia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Paraguay, Suriname and French Guiana, France). Two countries (Brazil and Colombia) are on track to achieve a 75% decrease in case incidence by 2015. Three countries (the Dominican Republic, Panama and Peru) are on track for a 50–75% decrease in case incidence by 2015. Increases in numbers of cases between 2000 and 2013 were reported by two countries (Guyana and the Bolivarian Republic of Venezuela). In Haiti, the number of reported malaria cases increased, but it is unclear whether the rise is real, or is simply due to changes in the extent of diagnostic testing and reporting (Figure G). The region reported 82 deaths due to malaria in 2013, a 79% decline compared with 2000. Brazil accounts for half of the deaths due to malaria in the region.

Argentina, which is in the elimination phase, has reported zero indigenous cases since 2011, and has initiated the process of certification of malaria elimination. Paraguay, in the pre-elimination phase, has reported zero indigenous cases and 11 imported cases since 2012. Costa Rica reported two cases in 2013 (one *P. vivax* and one *P. malariae*) and four imported cases; Costa Rica and Paraguay are expected to join Argentina in the elimination phase. Four other countries in the pre-elimination phase reported fewer than 1000 cases in total (Belize – 20 *P. vivax* cases; Ecuador – 360 *P. vivax* and *P. falciparum*; El Salvador – five *P. vivax*; and Mexico – 495 *P. vivax*). Ten countries in Central America and the Caribbean have joined a regional initiative that aims to eliminate malaria by 2020, with the support of the Global Fund to Fight AIDS, Tuberculosis and Malaria (Belize, Costa Rica, the Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico [southern part only], Nicaragua and Panama).

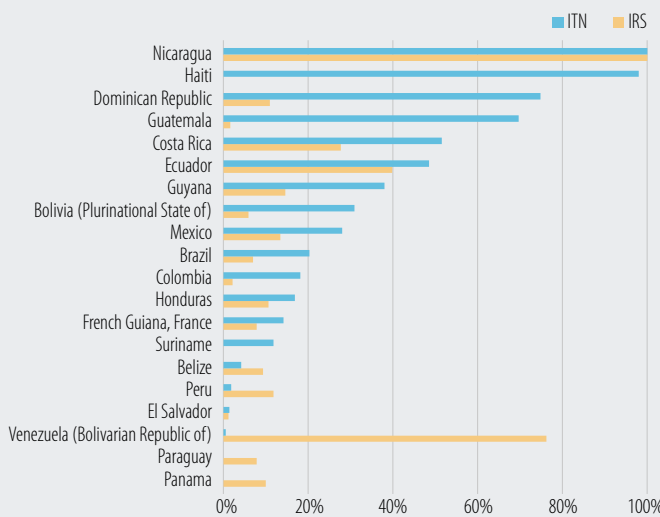
B. Financial contribution for malaria control by source, 2005–2013



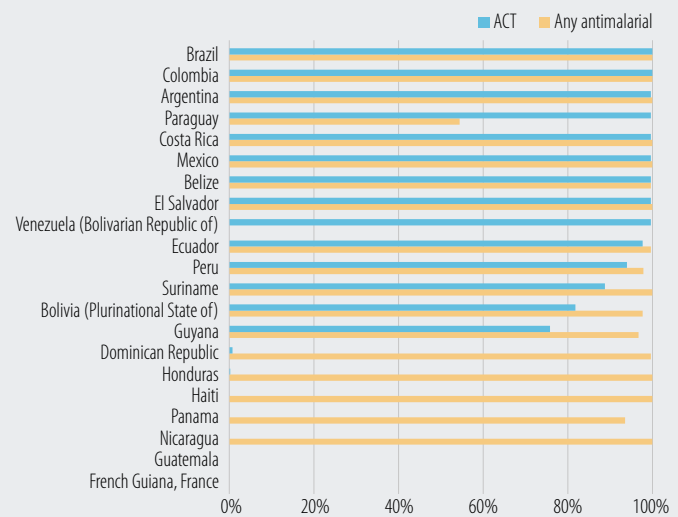
C. US\$ per capita for malaria control, 2011–2013



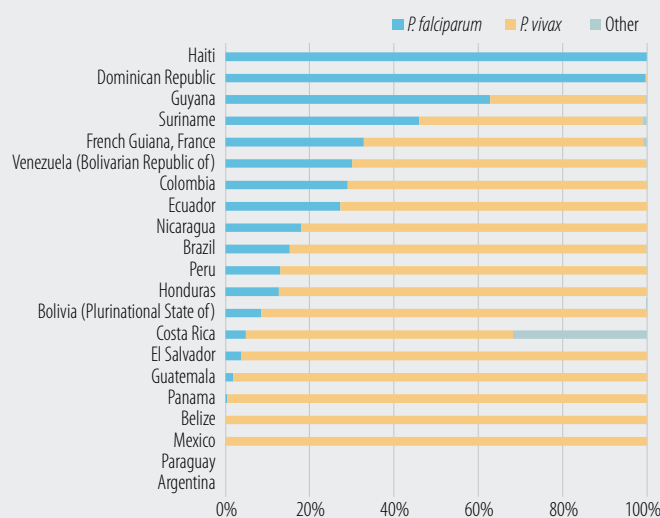
D. Percentage of high-risk population potentially protected with distributed ITNs and percentage protected with IRS, 2013



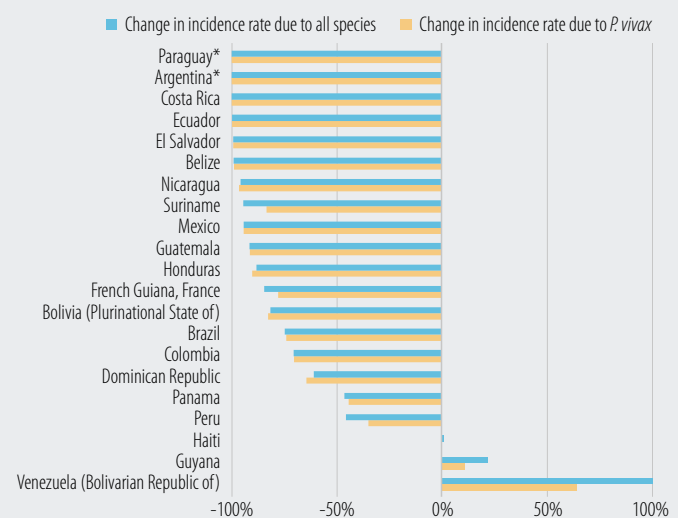
E. Antimalarial treatment courses distributed as a proportion of reported malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



G. Change in case incidence of microscopically confirmed cases, 2000–2013

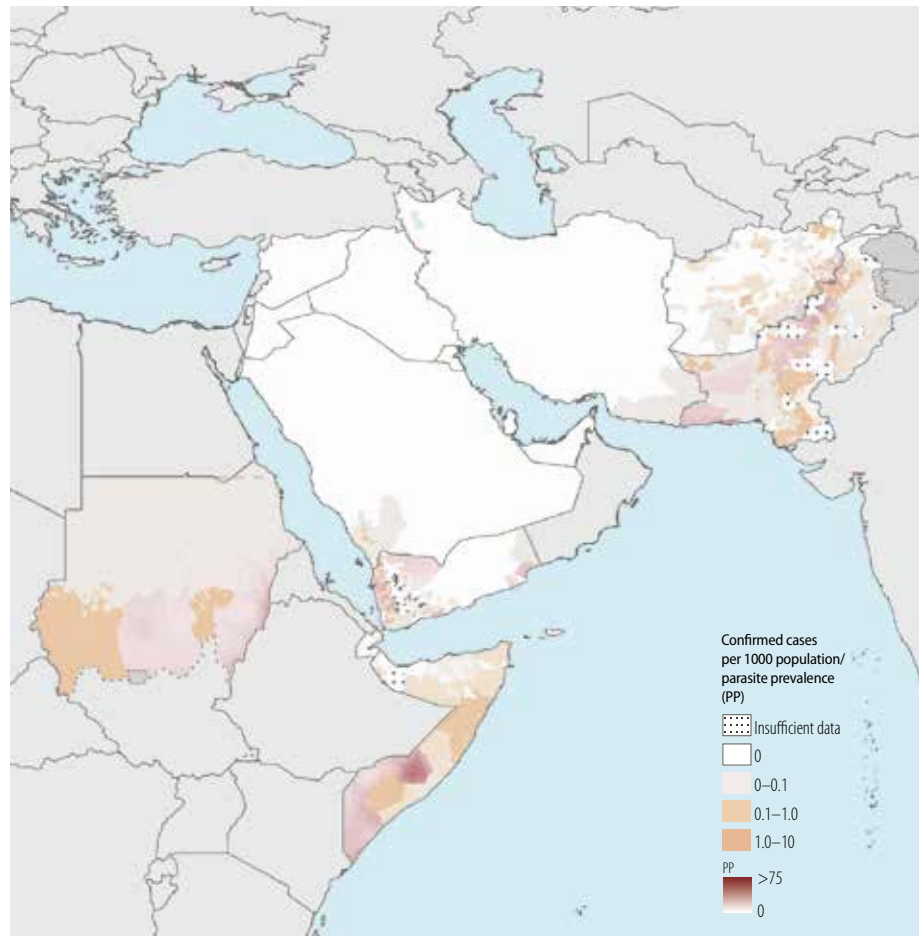


\* Zero cases in 2013

# EASTERN MEDITERRANEAN REGION

OF 12 COUNTRIES WITH ONGOING MALARIA TRANSMISSION IN 2000, SEVEN ACHIEVED >75% DECREASE IN CASE INCIDENCE BETWEEN 2000 AND 2013. SAUDI ARABIA REPORTED ONLY 34 INDIGENOUS CASES IN 2013. IRAQ CONTINUES TO REPORT ZERO LOCAL CASES.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** In 2013, about 280 million people in eight countries in the region were at some risk of malaria, with 104 million at high risk. Six countries have areas of high malaria transmission (Afghanistan, Djibouti, Pakistan, Somalia, the Sudan and Yemen); transmission is focal in Iran (Islamic Republic of) and Saudi Arabia. Most cases are due to *P. falciparum* except in Afghanistan, Iran (Islamic Republic of) and Pakistan, where *P. vivax* predominates (Figure F).

**Financing:** Funding for malaria control in the region rose from US\$ 50 million in 2005 to US\$ 194 million in 2012 but fell to US\$ 136 million in 2013 (Figure B). It exceeded US\$ 4 per capita per year in Iran (Islamic Republic of) and Saudi Arabia during 2011–2013. Domestic financing for malaria control in 2013 accounted for 100% in Saudi Arabia and 59% in Iran (Islamic Republic of).

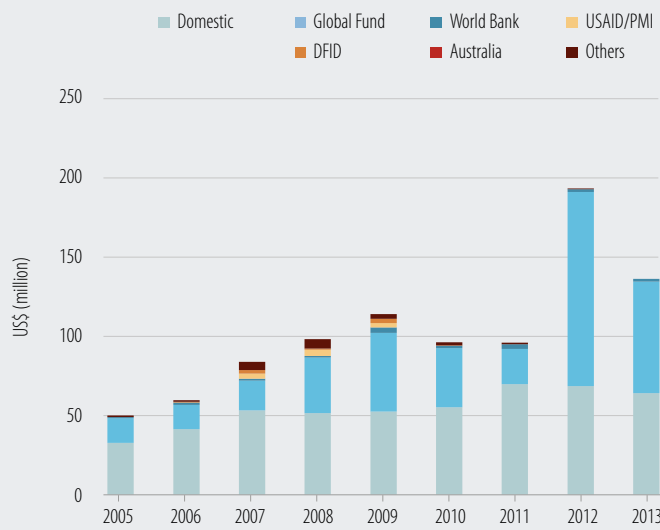
**Interventions:** Afghanistan, Iran (Islamic Republic of) and Saudi Arabia distributed sufficient ITNs in 2011–2013 to protect >60% of their population at high risk (Figure D). Vector control interventions in Iran (Islamic Republic of) and Saudi Arabia were applied in targeted foci. These two countries reported delivering sufficient antimalarial medicines, including ACTs, to treat all cases (Figure E).

**Trends in cases and deaths:** The number of confirmed malaria cases reported in the region decreased from 2 million in 2000 to 1 million in 2013. Two countries accounted for 84% of cases in 2013: the Sudan (57%) and Pakistan (27%). Seven countries

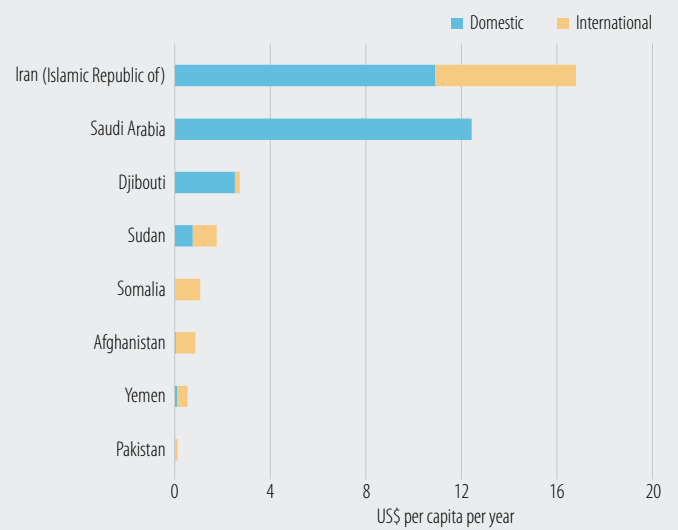
achieved >75% decrease in the incidence of microscopically confirmed cases between 2000 and 2013 (Afghanistan, Iran [Islamic Republic of], Morocco, Oman, Saudi Arabia and the Syrian Arab Republic) (Figure G). Iran (Islamic Republic of) and Saudi Arabia reported only 519 and 34 local cases, respectively, in 2013 (50% and 30% decrease, respectively, compared to 2012). Iraq has not reported any indigenous cases since 2009. An assessment of trends was not possible for Djibouti, Pakistan, Somalia, the Sudan and Yemen, owing to inconsistent reporting. The number of deaths due to malaria in the region fell from 2166 in 2000 to 1027 in 2013. Two countries accounted for >90% of the deaths in 2013: the Sudan (67%) and Pakistan (24%).

In addition to Iraq, three countries in the region are in the prevention of reintroduction phase (Egypt, since 1998; Oman, since 2004; and the Syrian Arab Republic, since 2005). Morocco was certified as free of malaria in 2010. Egypt reported 22 locally acquired cases in a recent outbreak (May–June 2014) in a village 20 km north of Aswan. The outbreak was successfully controlled using preventive measures, prompt treatment, and ACD and case investigation of foci covering 16 villages. Oman has been battling small outbreaks related to importation of parasites since 2007; the country reported 1440 imported and 11 introduced *P. vivax* cases in 2013. The Syrian Arab Republic reported 22 imported cases in 2013 (including 21 *P. falciparum*). However, due to the current situation in the country, the actual numbers cannot be verified.

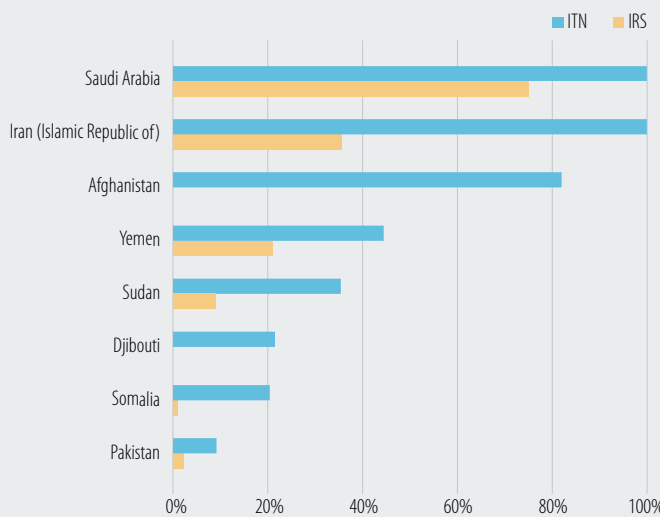
B. Financial contribution for malaria control by source, 2005–2013



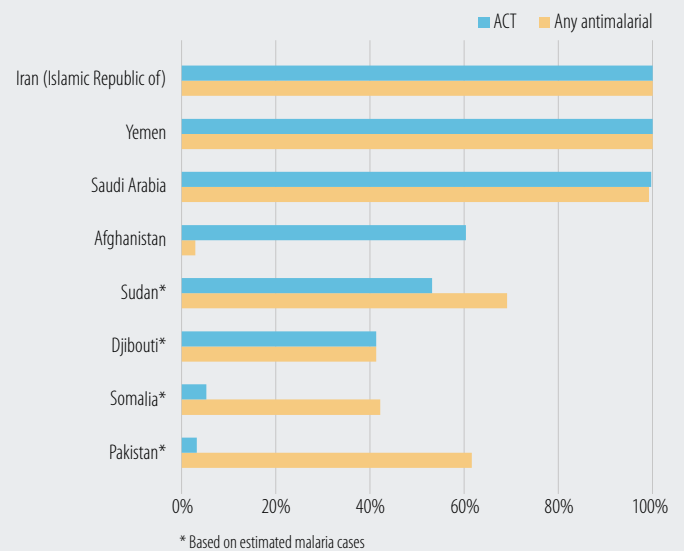
C. US\$ per capita for malaria control, 2011–2013



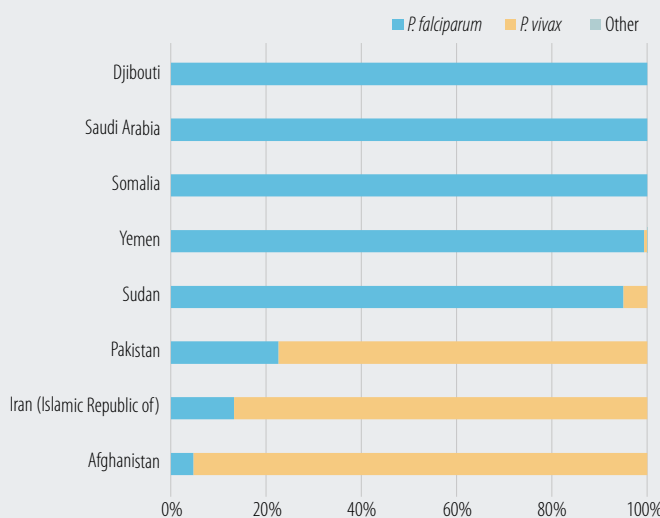
D. Percentage of high-risk population potentially protected with distributed ITNs and percentage protected with IRS, 2013



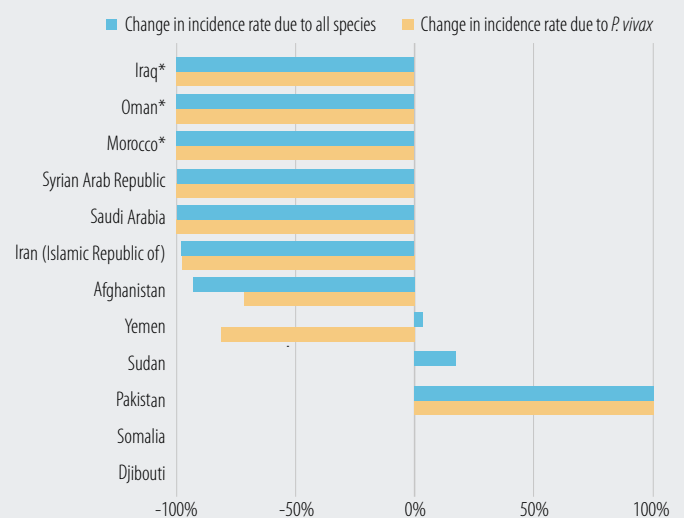
E. Antimalarial treatment courses distributed as a proportion of reported malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



G. Change in case incidence of microscopically confirmed cases, 2000–2013

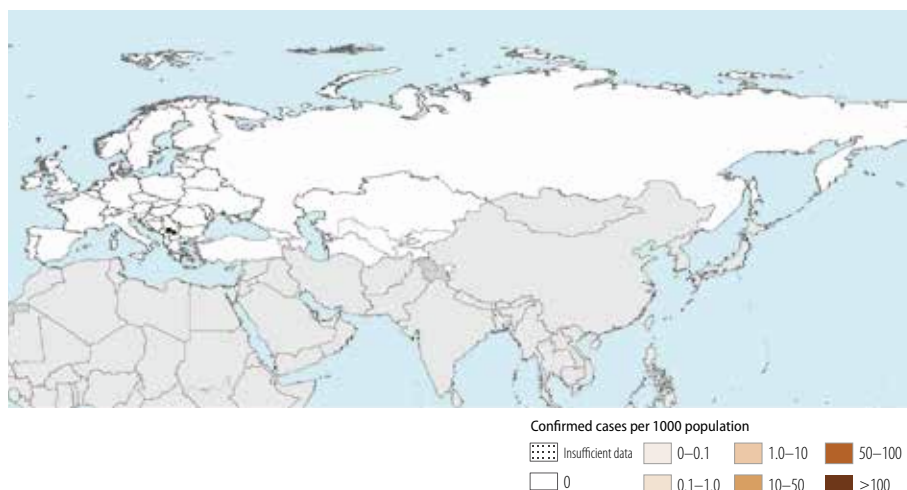


\* Zero cases in 2013

# EUROPEAN REGION

THE NUMBER OF LOCALLY ACQUIRED MALARIA CASES FELL FROM 32 405 IN 2000 TO ONLY 41 IN 2013. THE REGION IS CLOSE TO ATTAINING THE GOAL OF ELIMINATING MALARIA BY 2015.

A. Confirmed malaria cases per 1000 population, 2013



**Population at risk:** In 2000, eight countries in the European Region (Armenia, Azerbaijan, Georgia, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan and Uzbekistan) had local transmission of malaria; however, in 2013, local transmission was confined to just two countries (Tajikistan and Turkey), in which two million people were living in areas with some risk for malaria. All locally acquired cases were due to *P. vivax* (Figure F).

**Financing:** Funding for malaria control in the region rose from about US\$ 35 million in 2005 to US\$ 54 million in 2009, but decreased to US\$ 32 million in 2013 (Figure B). Financing per capita per year ranged from US\$ 1.86 in Tajikistan to US\$ 2600 per capita in Turkey between 2011 and 2013 (Figure C).

**Interventions:** In all countries in the region, malaria is a notifiable disease. Each case and focus is epidemiologically investigated and classified; there are national quality assurance programmes for microscopy and radical treatment of *P. vivax* cases, and adequate access to antimalarial medicines (Figures E and F). IRS and ITNs are undertaken in targeted malaria focal areas.

**Trends in cases and deaths:** All countries in the region achieved >75% decrease in case incidence between 2000 and 2013 (Figure G). Among the eight countries with local transmission in 2000, the number of locally acquired confirmed malaria cases decreased from 32 405 in 2000 to only 41 cases in 2013, all *P. vivax*. Of the 41 cases, 34 were from Turkey (all relapsing from infections that occurred in 2012) and seven from Tajikistan (three indigenous and four introduced). Turkey contained the 2012 outbreak (219 local cases) through intensive control and surveillance efforts (IRS, ACD, and case-based surveillance).

Azerbaijan reported zero local cases in 2013 for the first time. Three other countries have reported zero indigenous cases for the past 3 years or more, and are in the prevention of reintroduction phase (Georgia, Kyrgyzstan and Uzbekistan). Georgia, which had one introduced case in 2011 and one in 2012 (both from migrant workers), reported zero cases in 2013. In 2014, Kyrgyzstan successfully passed the first WHO evaluation for certification as a

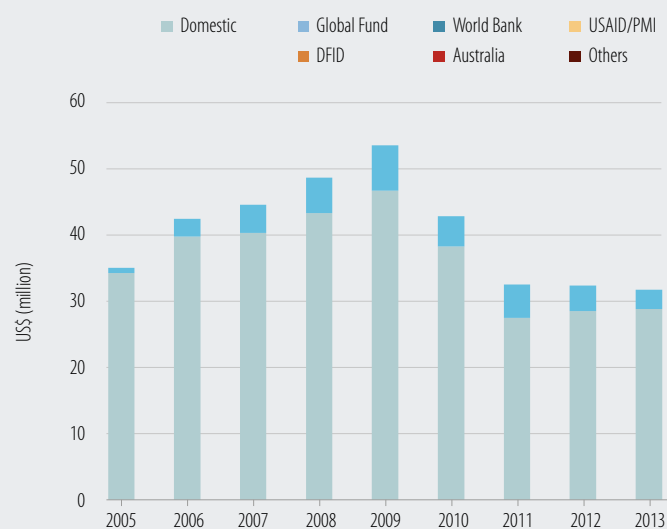
malaria-free country. Two countries have been certified as free of malaria (Turkmenistan in 2010 and Armenia in 2011).

Greece, which had remained malaria free between 1974 and 2010, reported three locally acquired *P. vivax* cases in 2010, 40 in 2011, 20 in 2012 and three in 2013. These cases originated from migrant workers. The resurgence clustered in the Lakonia region in the south of mainland Greece was successfully contained through intensified control efforts, with only two locally acquired *P. vivax* cases detected in the Municipality of Alexandroupolis, Evros, and one in the Municipality of Sofades, Karditsa, in 2013. During 2014, Greece reported zero locally acquired cases.

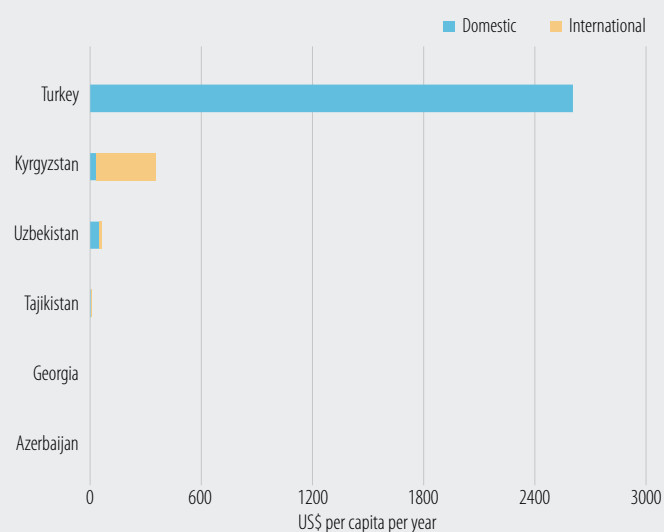
The WHO European Region is close to attaining the goal of interruption of local malaria transmission by 2015, as set out in the 2005 Tashkent Declaration. Nonetheless, the experience of Greece and Turkey highlights the persistent threat of reintroduction and the need for continued vigilance to ensure that any resurgence is rapidly detected and contained.



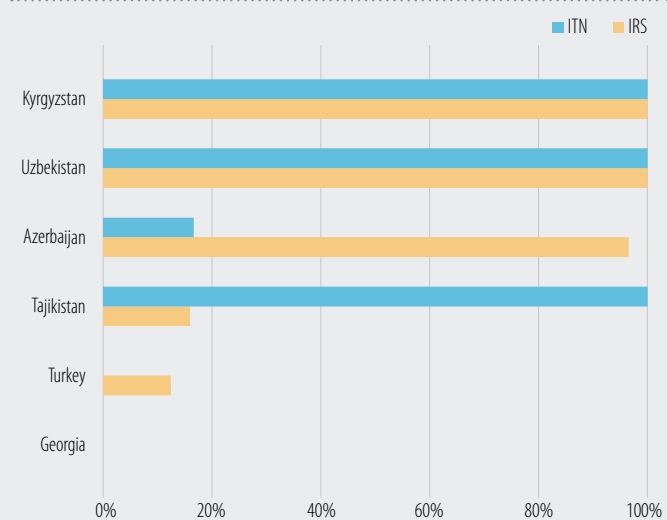
B. Financial contribution for malaria control by source, 2005–2013



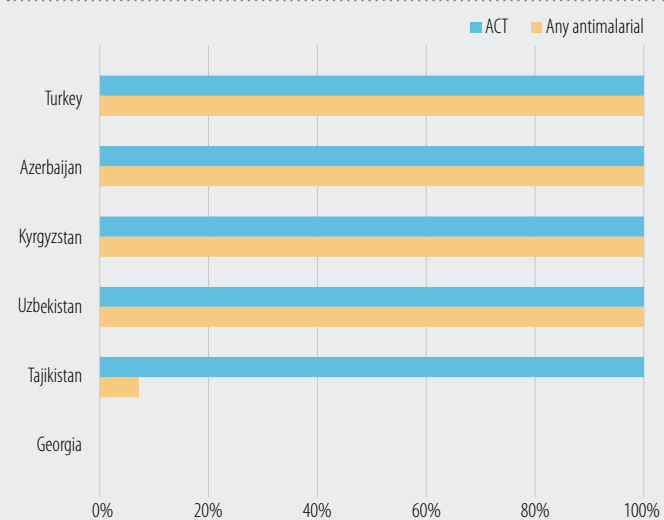
C. US\$ per capita for malaria control, 2011–2013



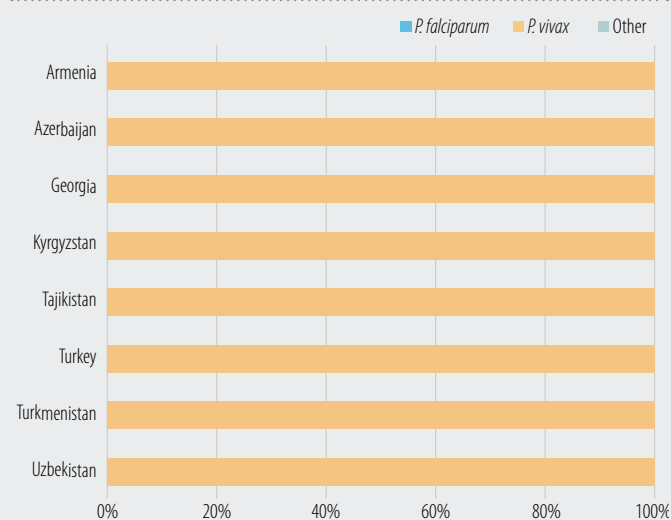
D. Percentage of high-risk population potentially protected with distributed ITNs and percentage protected with IRS, 2013



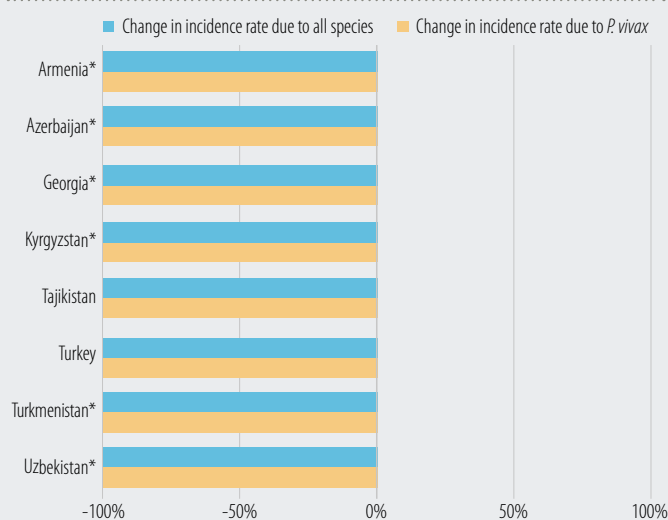
E. Antimalarial treatment courses distributed as a proportion of reported malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



G. Change in case incidence of microscopically confirmed cases, 2000–2013

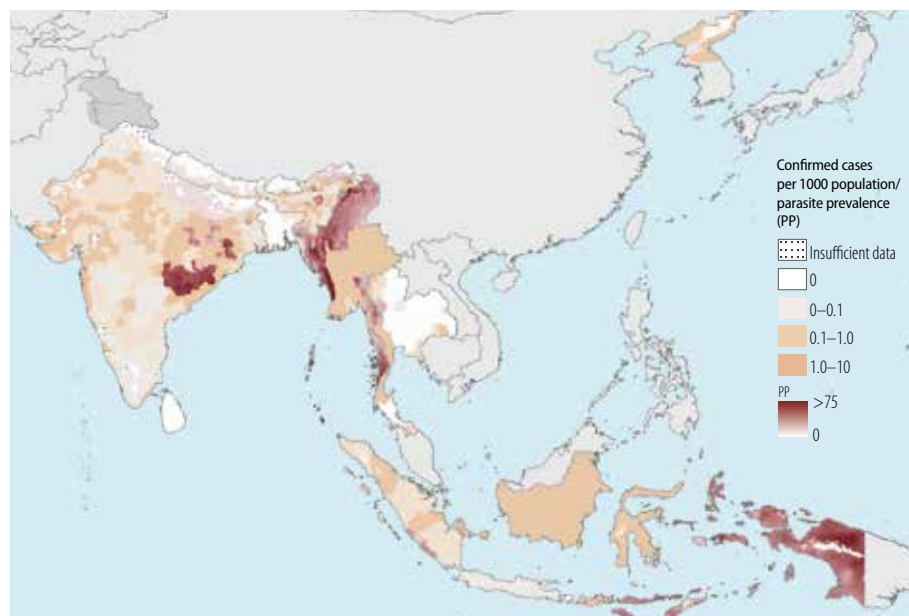


\* Zero cases in 2013

## SOUTH-EAST ASIA REGION

SIX COUNTRIES OUT OF 10 ACHIEVED >75% DECREASE IN CASE INCIDENCE BETWEEN 2000 AND 2013. SRI LANKA REPORTED ZERO LOCALLY ACQUIRED CASES FOR THE FIRST TIME. BHUTAN REPORTED ONLY 15 CASES.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** About 1.4 billion people are at some risk for malaria in the 10 malaria-endemic countries, with 352 million at high risk. The proportion of cases due to *P. falciparum* varies greatly within the region, and cases are exclusively due to *P. vivax* in the Democratic People's Republic of Korea (Figure F).

**Financing:** Funding for malaria control in the region increased from US\$ 104 million in 2005 to US\$ 236 million in 2010, but then fell to US\$ 203 million in 2013 (Figure B). It exceeded US\$ 4 per capita per year in Timor-Leste during 2011–2013 (Figure C). Funding is lowest in countries with the largest populations at risk, possibly because of the challenge of providing adequate financing for large population sizes, but possibly also because populations at risk are estimated less precisely and overestimated. In other words, populations at risk may be defined according to comparatively large administrative units in which the entire population may be classified as being at high risk, even if malaria is confined to a limited area.

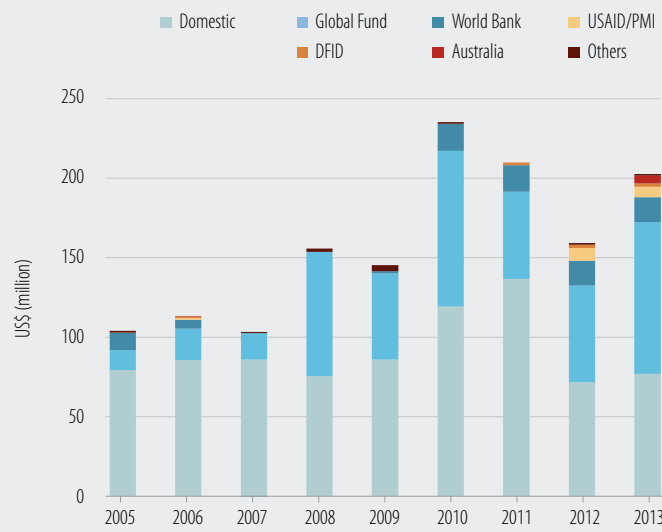
**Interventions:** In 2011–2013, five countries (Bangladesh, Bhutan, the Democratic People's Republic of Korea, Nepal and Timor-Leste) reported delivering sufficient ITNs or undertook sufficient IRS to protect >60% of their populations at high risk (Figure D). In 2013, Bangladesh, Bhutan, the Democratic People's Republic of Korea and Timor-Leste reported delivering sufficient quantities of antimalarial medicines, including ACTs, to treat all reported cases in public health facilities (Figure E). Sri Lanka, Bhutan and the Democratic People's Republic of Korea carried out compulsory notification of cases, case and focus investigation, radical treatment of *P. vivax* cases, gametocytocidal treatment of *P. falciparum* cases, and quality assurance of microscopy services.

**Trends in cases and deaths:** The number of confirmed malaria cases reported in the region decreased from 2.9 to 1.5 million between 2000 and 2013. Three countries accounted for 97% of cases in 2013: India (55%), Myanmar (21%) and Indonesia (21%). Six countries reported >75% decrease in the incidence

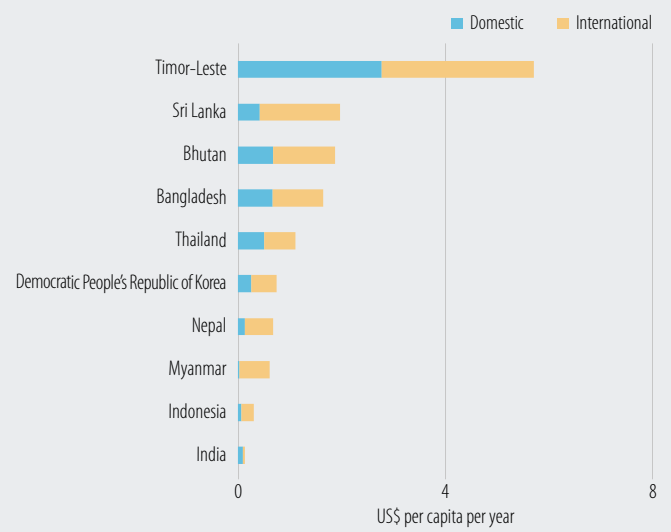
of microscopically confirmed cases between 2000 and 2013 (Bangladesh, Bhutan, the Democratic People's Republic of Korea, Nepal, Timor-Leste and Sri Lanka) (Figure G). Two countries (India and Thailand) are on track to achieve a decrease of 50–75% in case incidence by 2015. The decrease in Thailand may be underestimated, as 2012 and 2013 data include cases reported by nongovernmental organizations working on the borders of Cambodia and Myanmar. It was not possible to discern the direction of trends in Indonesia and Myanmar owing to changes in diagnostic testing and reporting over time. Reported malaria deaths in the region decreased from 5500 to 776 between 2000 and 2013 (Annex 6E). Nepal has reported no deaths from malaria since 2012.

Sri Lanka, in the elimination phase, reported zero locally acquired cases in 2013 for the first time, a rapid decrease from 124 cases in 2011 and 23 in 2012. Bhutan, which is in the pre-elimination phase, reported only 15 indigenous and 30 introduced cases (compared with 82 indigenous cases in 2012). The Democratic People's Republic of Korea, also in the pre-elimination phase, reported 14 407 cases (compared with 21 850 in 2012).

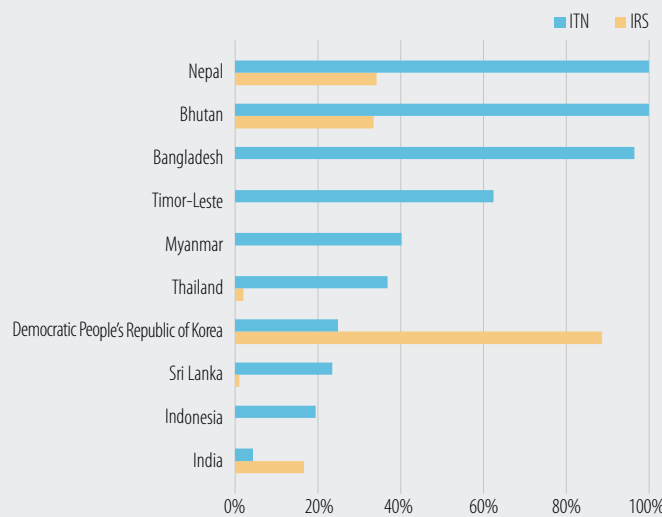
B. Financial contribution for malaria control by source, 2005–2013



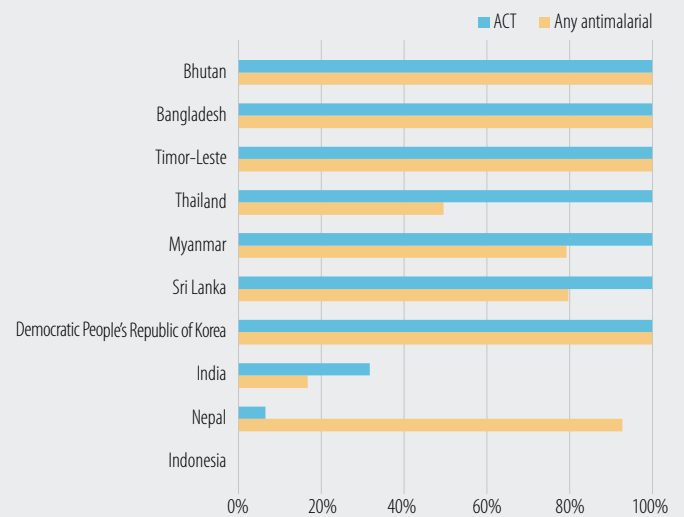
C. US\$ per capita for malaria control, 2011–2013



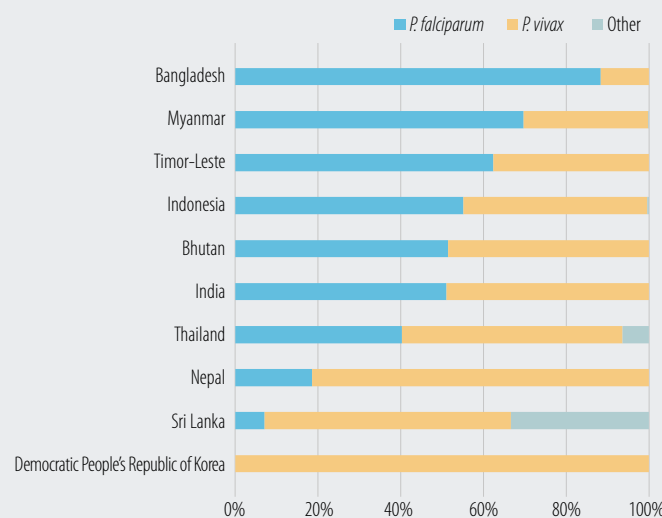
D. Percentage of high-risk population potentially protected with distributed ITNs and percentage protected with IRS, 2013



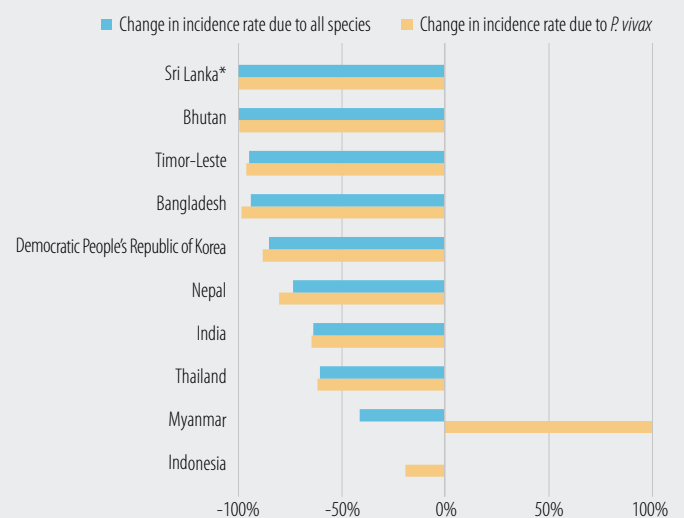
E. Antimalarial treatment courses distributed as a proportion of reported malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



G. Change in case incidence of microscopically confirmed cases, 2000–2013

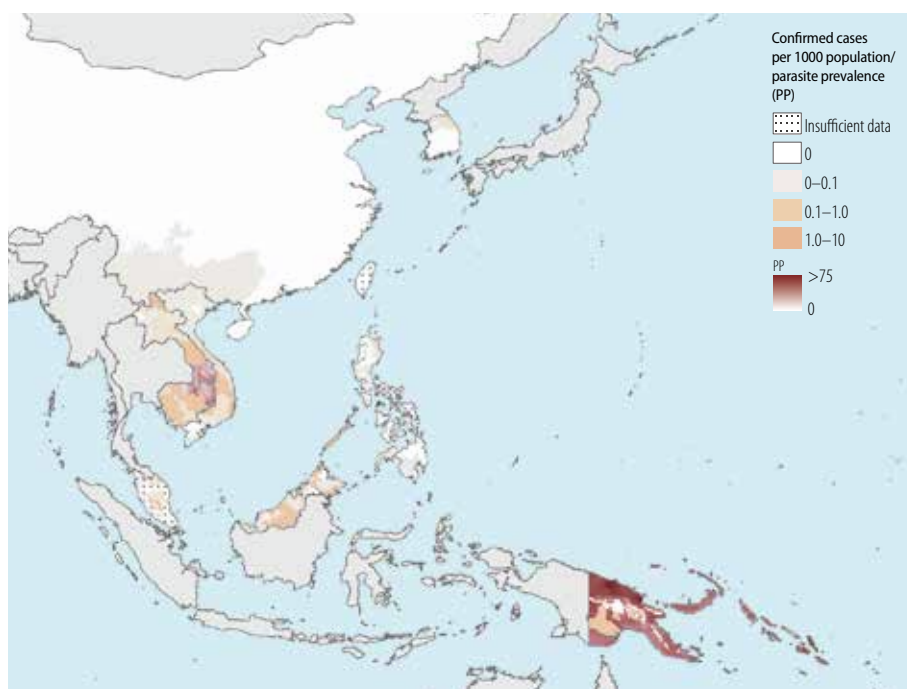


\* Zero cases in 2013

# WESTERN PACIFIC REGION

ALL 10 COUNTRIES IN THIS REGION ARE PROJECTED TO ACHIEVE >75% DECREASE IN CASE INCIDENCE BETWEEN 2000 AND 2015.

A. Confirmed malaria cases per 1000 population/parasite prevalence, 2013



**Population at risk:** About 717 million people in the region are at some risk for malaria, with 41 million at high risk. Malaria transmission is most intense in Papua New Guinea, Solomon Islands and Vanuatu, but is much more focal in other countries in the region, disproportionately affecting ethnic minorities and migrant workers. Both *P. falciparum* and *P. vivax* are prevalent, but cases are entirely due to *P. vivax* in the Republic of Korea and in central areas of China (Figure F). In recent years, *P. knowlesi* has accounted for an increasing number of cases, especially in Malaysia.

**Financing:** Funding for malaria control in the region increased from US\$ 63 million in 2005 to US\$ 169 million in 2010, but dropped to US\$ 123 million in 2013 (Figure B). Malaria funding exceeded US\$ 4 per capita per year during 2011–2013 in two countries (Malaysia and Solomon Islands) (Figure C).

**Interventions:** In 2011–2013, the number of ITNs delivered was sufficient to protect more than 60% of the population at high risk in seven countries, two of which (China and Malaysia) also protected >60% of the population with IRS (Figure D). Nationally representative surveys in Papua New Guinea showed an increase in the proportion of the population with access to a long-lasting insecticidal net (LLIN) in their household from 44% in 2011 to 68% in 2014, while the proportion of RDT positive cases receiving an ACT rose from 0% to 78%. The Republic of Korea reported low levels of vector control coverage, possibly due to the focal nature of the disease, except around the Korean Demilitarized Zone. All countries reported delivering sufficient antimalarial medicines to treat >80% of patients attending public health facilities. The Republic of Korea and Malaysia undertake ACD, case investigation, radical treatment of *P. vivax* and quality assurance of microscopy services.

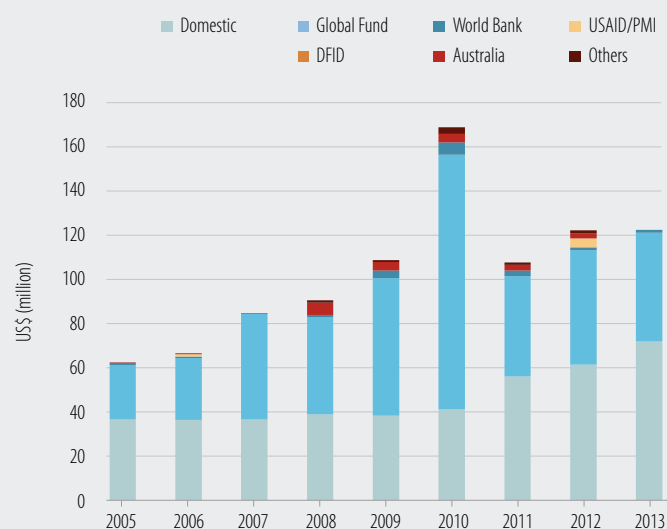
**Trends in cases and deaths:** Three countries accounted for >85% of reported confirmed cases in 2013: Papua New

Guinea (70%), the Lao People's Democratic Republic (9%) and Solomon Islands (6%). All countries except Papua New Guinea achieved >75% decrease in the incidence of microscopically confirmed cases between 2000 and 2013 (Figure G). The Lao People's Democratic Republic reported a twofold increase in cases in 2012 and 2013, but case incidence remains <75% of 2000 levels. Papua New Guinea had a twofold increase in confirmed cases in 2013 compared with 2012, resulting from an increase in diagnostic testing with RDTs. However, nationally representative household surveys indicated a drop in parasite prevalence from 12.4% to 1.8% between 2009 and 2014, while the incidence of malaria at four sentinel surveillance sites fell from 205/1000 to 48/1000. These data are consistent with a reduction in malaria case incidence of >75%.

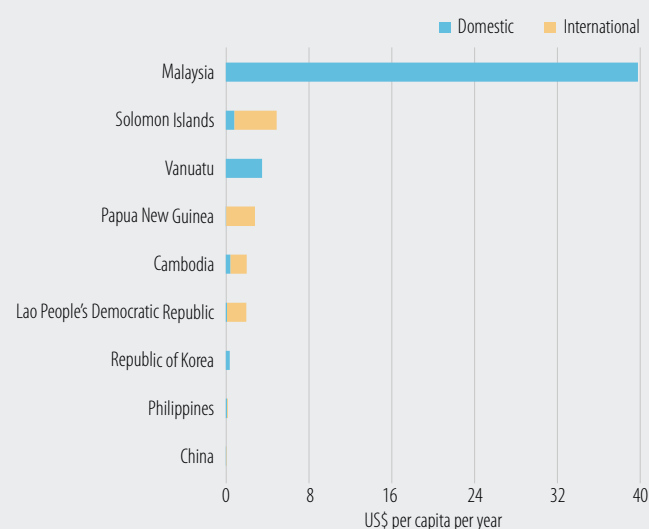
Reported malaria deaths in the region decreased by 93% from 2360 to 406 between 2000 and 2013. In 2013, two countries accounted for 83% of all reported deaths: Papua New Guinea (76%) and the Lao People's Democratic Republic (7%) (Annex 6E). Vanuatu has reported zero deaths from malaria since 2012.

Malaysia is in the pre-elimination phase, and it continues to progress towards elimination, reporting 2979 locally acquired cases in 2013. The number of active foci (3027) and people living within them (>1 million) remain high. Malaria transmission occurs primarily in the districts of Sabah and Sarawak. In the Republic of Korea, which is in the elimination phase, the number of indigenous cases dropped to 383 in 2013. China reported just nine indigenous cases of *P. falciparum* malaria in 2013 and 71 of *P. vivax* and is aiming to eliminate malaria nationally by 2020. The Philippines is proceeding with a subnational elimination approach, and by 2013 had declared 28 of its 80 provinces malaria free. The most malaria-affected provinces are Maguindanao, Palawan and Tawi-Tawi.

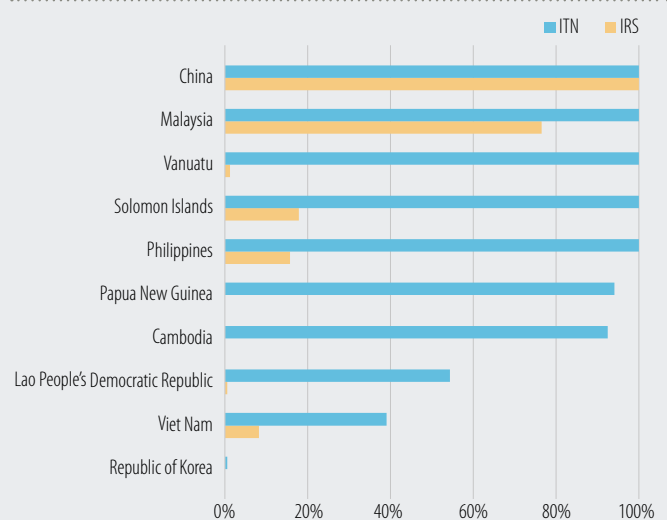
B. Financial contribution for malaria control by source, 2005–2013



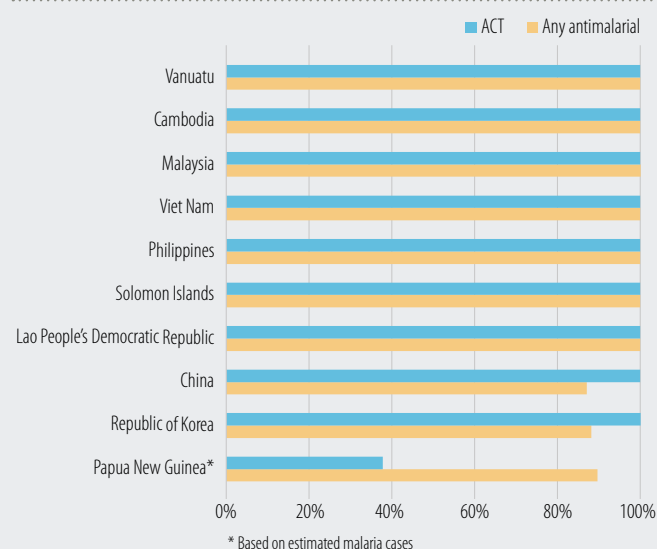
C. US\$ per capita for malaria control, 2011–2013



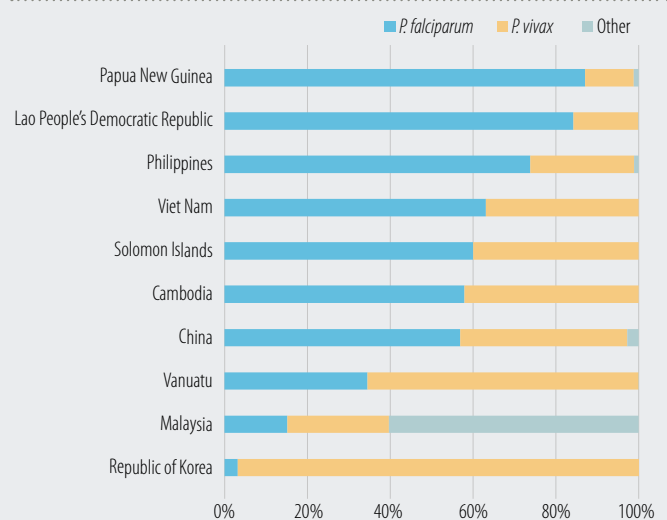
D. Percentage of high-risk population potentially protected with distributed ITNs and percentage protected with IRS, 2013



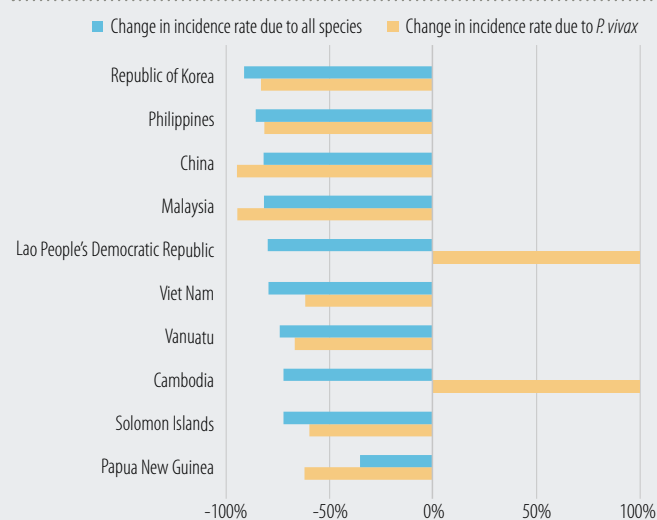
E. Antimalarial treatment courses distributed as a proportion of reported malaria cases in the public sector, 2013



F. Percentage of cases due to *P. falciparum* and *P. vivax*, 2009–2013



G. Change in case incidence of microscopically confirmed cases, 2000–2013



**Table R.1** Summary of trends in reported malaria incidence, 2000–2013

WHO region	On track for ≥75% decrease in incidence 2000–2015	50%–75% decrease in incidence projected 2000–2015	<50% decrease in incidence projected 2000–2015	Increase in incidence 2000–2013	Insufficiently consistent data to assess trends
African	<b>Algeria</b> <b>Botswana</b> <b>Cabo Verde</b> <b>Eritrea</b> <b>Namibia</b> <b>Rwanda</b> <b>Sao Tome and Principe</b> <b>South Africa</b> <b>Swaziland</b>	Ethiopia Zambia Zimbabwe	Madagascar		Angola Guinea Guinea-Bissau Kenya Liberia Malawi Mali Mauritania Mayotte, France Mozambique Niger Nigeria Senegal Sierra Leone Togo Uganda United Republic of Tanzania
Region of the Americas	<b>Argentina*</b> <b>Belize</b> <b>Bolivia (Plurinational State of)</b> <b>Costa Rica</b> <b>Ecuador</b> <b>El Salvador</b> <b>French Guiana, France</b>	<b>Guatemala</b> <b>Honduras</b> <b>Mexico</b> <b>Nicaragua</b> <b>Paraguay*</b> <b>Suriname</b> Brazil Colombia Peru	Dominican Republic Panama	Guyana Venezuela (Bolivarian Republic of)	Haiti
Eastern Mediterranean	<b>Afghanistan</b> <b>Iran (Islamic Republic of)</b> <b>Iraq*</b> <b>Morocco*</b>	<b>Oman*</b> <b>Saudi Arabia</b> <b>Syrian Arab Republic</b>			Djibouti Sudan Pakistan Yemen Somalia
European	<b>Armenia*</b> <b>Azerbaijan*</b> <b>Georgia*</b> <b>Kyrgyzstan*</b>	<b>Tajikistan</b> <b>Turkey</b> <b>Turkmenistan*</b> <b>Uzbekistan*</b>			
South-East Asia	<b>Bangladesh</b> <b>Bhutan</b> <b>Democratic People's Republic of Korea</b>	<b>Nepal</b> <b>Sri Lanka*</b> <b>Timor-Leste</b>	India Thailand		Indonesia Myanmar
Western Pacific	<b>Cambodia</b> <b>China</b> <b>Lao People's Democratic Republic</b> <b>Malaysia</b> <b>Papua New Guinea</b>	<b>Philippines</b> <b>Republic of Korea</b> <b>Solomon Islands</b> <b>Vanuatu</b> <b>Viet Nam</b>			

Source: National malaria control programme reports

Countries in prevention of reintroduction phase are not included in this table

Countries **in bold** achieved ≥75% decrease in case incidence by 2013

\*Country reported zero indigenous cases in 2013.

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# Annex 1 – Data sources and methods

## Sections 1–8

### Section 1: Introduction

**Figure 1.1** The map shows the estimated incidence of malaria cases per 1000 population in 2013. See notes for Figures 8.3–8.5 for estimation of malaria cases per 1000 population.

**Figure 1.2** The map shows the proportion of a country's population that lives on less than US\$ 2 per day, as estimated by the World Bank.<sup>1</sup>

### Section 2: Financing for malaria programmes

**Figures 2.1 and 2.2** *International financing data* were obtained from three sources. The Global Fund supplied information on disbursements for malaria control to WHO up to 2013. Information on funding from the United States Agency for International Development (USAID) was obtained from ForeignAssistance.gov.<sup>2</sup> Malaria funding for the United States Centers for Disease Control was obtained from Congressional Justifications and Operating Plans (1).<sup>3</sup> For other development agencies, information on disbursements was available up to and including 2012, through the Organisation for Economic Co-operation and Development (OECD) Development Co-operation Directorate database on official development assistance (ODA).<sup>4</sup> Contributions from the Department for International Development (DFID), United Kingdom of Great Britain and Northern Ireland (UK) were assumed to have increased in 2013 in line with 2010–2012 disbursements. For other agencies, funding for 2013 was assumed to have remained at 2012 levels.

*Domestic financing data* were obtained from national malaria control programmes (NMCPs). Data included government total malaria budget and expenditures, broken down by programme components including malaria commodities, programme supervision and management, training, and behavioural change interventions. Where domestic financing data were not available, data from previous years were used. Domestic financing data do not include the cost of the time that health workers spend testing, treating and tracking malaria patients; capital costs (e.g. infrastructure or vehicles); and household spending on malaria prevention and treatment.

**Figures 2.3 and 2.4** The potential for increasing global (domestic and international) malaria investments between 2014 and 2020 was explored through two financing scenarios:

- Global investments from endemic and donor countries increase at the projected rate of total government expenditures estimated by the International Monetary Fund

(IMF) for 2014–2020.<sup>5</sup> In the case of multilateral donors such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the average growth rate of government expenditures for all the countries contributing to the Global Fund over the 2014–2020 period was used.<sup>6</sup> For the European Union (EU), which is a Global Fund contributor, the average government expenditure growth rate of EU countries contributing to the Global Fund's budget in 2011–2013 was used.

- Data on net ODA from countries that participated in funding malaria control and elimination activities between 2010 and 2013 were used to calculate a donor investment effort for 2012,<sup>7</sup> as the percentage of the donor country's gross national income (GNI) allocated to ODA. The 2012 global average donor investment effort was then compared to the 0.7% target of GNI for ODA by 2015 (2, 3), and the necessary rate of increase was calculated for the 2012 global investment effort to reach the 2015 target of 0.7%. The rate of increase was then applied to international investments in malaria control until 2015. It was assumed that, after 2015, investments in malaria control and elimination would match the rate of increase of total government expenditures estimated by the IMF for 2016–2020. This second scenario also assumed that governments of endemic countries increase the priority they give to malaria funding. Levels of investment priority for malaria were estimated using the domestic investment priority index (DIPI), calculated as (government spending on malaria/government revenue) × (total population/population at risk). Countries were then classified into quartiles depending on their DIPI. Countries in the lowest quartile, Q1 (i.e. with DIPI ≤25th percentile), were assumed to increase their investment in malaria to reach the level of priority of countries in Q2. Similarly, countries in Q2 were assumed to increase their investments to the level of the next quartile (Q3). Countries in Q3 or Q4 were assumed to increase their investments in malaria control and elimination at the same rate of growth as their total government expenditures (as under scenario 2). For countries with insufficient data available for calculating the DIPI, it was assumed that spending increased at the same rate as government expenditures; for countries for which there were no IMF data, it was assumed that domestic funding remained constant.

### Section 3: Vector control for malaria

**Tables 3.1 and 3.2** Policies regarding vector control interventions were reported to WHO by NMCPs.

1 <http://data.worldbank.org/products/wdi>

2 <http://www.foreignassistance.gov/web/default.aspx>

3 <http://www.cdc.gov/fmo/topic/Budget%20Information/>

4 <http://stats.oecd.org/Index.aspx?datasetcode=CRS1#>

5 <http://www.imf.org/external/pubs/ft/weo/2014/02/weodata/weoselgr.aspx>

6 <http://www.theglobalfund.org/en/partners/governments/>

7 <http://www.oecd.org/dac/stats/documentupload/ODA%202013%20Tables%20and%20Charts%20En.pdf>

**Figures 3.1 and 3.2** Estimates of insecticide-treated mosquito net (ITN) coverage were derived from a model developed by the Malaria Atlas Project (MAP), University of Oxford. The model built on two earlier studies that sought to model aspects of ITN delivery, distribution and coverage – a study by Flaxman et al. (4) and the work of Killian, which culminated in the NetCALC tool (5) – and a series of related publications (6). A two-stage process was followed. First, a mechanism was defined for estimating net crop – that is, the total number of ITNs in households in a country at a given point in time – taking into account inputs to the system (e.g. deliveries of ITNs to a country) and outputs (e.g. the discard of worn ITNs from households). Second, empirical modelling was used to translate estimated net crops into resulting levels of coverage (e.g. access within households).

### Sources of data for the models

- *Long-lasting insecticidal nets (LLINs) delivered to countries:* Milliner Global Associates provided data to WHO by on the number of LLINs delivered by approved manufacturers to each country each year (7). The data were complete for each country from 2000 to 2013 inclusive.
- *ITNs distributed within countries:* NMCPs provided data to WHO on the number of conventional ITNs and LLINs distributed annually within each country. Data were available for 400 of the 616 country-years addressed in the study.
- *Nationally representative household surveys:* a total of 93 national surveys from 39 sub-Saharan African countries from 2001 to 2013 were assembled, covering 15% of all possible country-years since 2000. For 89 of the 93 surveys, it was possible to access the underlying data; for the remaining four surveys, data from the survey reports were used.

### Countries and populations at risk

The main analysis covered 40 of the 47 (8) malaria endemic countries or areas of sub-Saharan Africa. The islands of Mayotte (for which no ITN delivery or distribution data were available) and Cabo Verde (which does not distribute ITNs) were excluded, as were the low-transmission countries of Namibia, Sao Tome and Principe, South Africa and Swaziland, for which ITNs make up a small proportion of vector control. Analyses were limited to populations categorized by NMCPs as being at risk.

### Estimating national net crops through time

As outlined in Flaxman et al. (4), national ITN systems were represented using a discrete time stock-and-flow model. Nets delivered to a country by manufacturers were modelled as first entering a “country stock” compartment (i.e. stored in-country but not yet distributed to households). Nets were then available from this stock for distribution to households by the NMCP or other distribution channels. To accommodate uncertainty in net distribution, we specified the number of nets distributed in a given year as a range, with all available country stock (i.e. the maximum nets that could be delivered) as one extreme and the

NMCP-reported value (i.e. the assumed minimum distribution level) as the other. New nets reaching households joined older nets remaining from earlier time-steps to constitute the total household net crop, with the duration of net retention by households governed by a loss function. Rather than fitting the loss function to a small external dataset, as was done by Flaxman et al., the loss function was fitted directly to the distribution and net crop data within the stock-and-flow model itself. Loss functions were fitted on a country-by-country basis, allowed to vary through time, and defined separately for conventional ITNs and LLINs. The fitted loss functions were compared to existing assumptions about rates of net loss from households. The stock-and-flow model was fitted using Bayesian inference and Markov chain Monte Carlo (MCMC) methods, providing time-series estimates of national household net crop for conventional ITNs and LLINs in each country, together with evaluation of under-distribution, all with posterior credible intervals.

### Estimating national ITN access and use indicators from net crop

Rates of ITN access within households depend not only on the total number of ITNs in a country (i.e. net crop), but also on how those nets are distributed between households. One aspect that is known to strongly influence the relationship between net crop and the distribution of household ownership of nets is the size of households found in different countries (6), which varies greatly across sub-Saharan Africa.

Many recent national surveys report the number of ITNs observed in each surveyed household. These data make it possible not only to estimate net crop, but also to generate a histogram that summarizes the net ownership pattern (i.e. the proportion of households with zero nets, one net, two nets and so on). In this way, the size of the net crop can be linked to distribution patterns among households, taking into account household size, making it possible to generate ownership distributions for each household size stratum. The bivariate histogram of net crop to distribution of nets among households by household size allowed for calculation of the proportion of households with at least one ITN. Also, because the number of both ITNs and people in every household can be triangulated, this histogram allowed for the direct calculation of two additional indicators: the proportion of households with at least one ITN for every two people, and the proportion of the population with access to an ITN within their household.

For the final ITN indicator – the proportion of the population who slept under an ITN the previous night – the relationship between ITN use and each of the three access indicators was explored in 74 of the 93 national surveys for which sufficient data were available. The proportion of the population with access to an ITN within their household displayed the largest correlation (adjusted  $R^2 = 0.96$ ). This relationship was fitted using a simple Bayesian regression model, which was used to predict a time series of ITN use for every country.

### Estimating ITN requirements to achieve universal access

The two-stage modelling framework represented the pathway from ITN delivery from manufacturers through to resulting levels of net access and use in households. It also accounted for two potential factors that may reduce access levels (i.e. the efficiency of allocation of nets to households during distribution, and the loss of nets from households over time), and allowed these to be quantified through time for each country. Using this architecture, it was possible to simulate delivery of any volume of ITNs to a given country over a given future time period, to predict the levels of access and use that would result, and to examine the impact of different amounts of allocation efficiency and net loss. The model was used to estimate the levels of access likely to be achieved by 2016 under a broad spectrum of LLIN delivery levels across the 4-year period. These simulations were run under two scenarios: the first being “business-as-usual”, where current levels were maintained for allocation efficiency and net loss (~a 2-year median retention time), and the second using maximized allocation efficiency and a 3-year median retention time.

**Figure 3.3** The number of ITNs available in households was derived from the ITN coverage model described above. The number of ITNs (LLINs and conventional ITNs) distributed within countries were reported by NMCPs to WHO. The number of LLINs delivered to malaria endemic countries was reported by the seven World Health Organization Pesticide Evaluation Scheme (WHOPES)-approved manufacturers.

**Figure 3.4** Estimates of the number of ITNs needed for different levels of access to nets in the population were derived from the ITN coverage model described above.

**Figure 3.5** A total of 50 household surveys from 31 countries, conducted between 2000 and 2013, were analysed to establish a relationship between the proportion of different subpopulations sleeping under ITNs (children aged under 5 years, children aged 5–19 years and pregnant women) and the total population sleeping under an ITN. The results of the linear regression were then applied to estimates of the proportion of the total population sleeping under an ITN, produced by the model described above.

**Figure 3.6** The proportion of households using ITNs below, at or above the standard capacity of two persons per net was calculated by comparing the number of persons with access to an ITN in each household to the number of persons who slept under an ITN as recorded in household surveys. Households in which the number of persons sleeping under an ITN was the same or greater than the number of persons who could have slept under an available ITN were categorized as using ITNs at or above capacity. Households in which the number of persons sleeping under an ITN was less than the number of persons who could have slept under an ITN were categorized as using ITNs below standard capacity.

**Figure 3.7** The number of persons protected by indoor residual spraying (IRS) and the population at risk of malaria was reported by NMCPs to WHO.

**Figure 3.8** See notes for Figures 3.1, 3.2 and 3.7 for derivation of the population at risk with access to an ITN in their household,

and the proportion benefitting from IRS. Analysis of household-survey data indicates that about half of the people in IRS-sprayed households are also protected by ITNs (9). Therefore, the proportion of the population protected by either ITNs or IRS was estimated by adding half the proportion of the population protected by IRS to the proportion with access to an ITN. The coverage estimate is for June 30, 2013.

**Figures 3.9 and 3.10** Insecticide resistance monitoring results were collected from NMCP reports to WHO, the African Network for Vector Resistance, the MAP, the PMI and the published literature. In these studies, confirmed resistance was defined as mosquito mortality of <90% on bioassay test.

### Section 4: Preventive therapies for malaria

**Table 4.1** Policies regarding preventive therapies were reported by NMCPs to WHO. The number of countries where seasonal malaria chemoprevention, intermittent preventive treatment in pregnancy (IPTp) and intermittent preventive treatment in infants (IPTi) are appropriate was based on criteria described in published WHO guidance for these interventions (10).

**Figure 4.1** The number of pregnant women who attended an antenatal care clinic at least once and who received one, two or three doses of IPTp was derived from NMCP reports to WHO. The number of pregnant women receiving IPTp beyond their first trimester was calculated using the population at risk of malaria and the crude birth rate adjusted for still births and spontaneous abortions after the first trimester, published by the United Nations (UN) Development Programme (8):

$$2013 \text{ population at risk (country-specific)} \times \text{crude birth rate (country-specific)} \times (1.023 \text{ [to account for all still births]}) \times 1.004 \text{ [to account for spontaneous abortions after the first trimester]}$$

For countries that reported on at least one of the IPTp data elements for 2013, having no visible bar for a data element denotes missing data. The Central African Republic, Gabon, Namibia, Nigeria and Somalia did not report on any IPTp data elements for 2013.

**Figure 4.2** The proportion of pregnant women in the population receiving IPTp was derived from both NMCP-reported data and household survey data.

- Using NMCP reports and expected number of pregnancies in the population, as described above, the median value of the proportion of pregnant women who were receiving one dose of IPTp was calculated for each year, among reporting countries, from 2000 to 2013.
- For the estimates based on household survey data, the proportion of pregnant women receiving one, two or three or more doses of IPTp was calculated by approximate year of pregnancy, as determined by child-birth date in the household member roster. Most household surveys collected information on pregnancies during the 3–5 years before the survey date. IPTp indicators recommended by WHO and the Roll Back Malaria (RBM) Partnership Monitoring and Evaluation Reference Group (MERG) were reported by household survey year; the indicators include births within

2 years of the survey date, in an attempt to reduce recall bias regarding pregnancies that occurred more than 2 years before the survey. Calculating receipt of IPTp by year of pregnancy for all years covered by the survey increases the amount of information available to assess trends across countries. The observations for all surveys with data for a given year were combined and reweighted, based on type of survey, survey sampling design and country-year population estimates. The country-year point estimates were recalculated using the new weights. The median and interquartile range were then calculated among countries that had point estimates each year from 2000 to 2013.

- Since few surveys with 2013 data were available, the estimates from 2013 household survey data for the first, second and third dose of IPTp shown in Figure 4.2 are projections from 6-year linear trend analyses. The NMCP data-derived estimates for first-dose IPTp (also shown in Figure 4.2) were not a projection; they provide the most recent and comprehensive estimates of IPTp coverage across countries implementing IPTp in Africa.

## Section 5: Malaria diagnostic testing

**Table 5.1** Policies regarding diagnostic testing were reported by NMCPs to WHO.

**Figure 5.1** The proportion of suspected malaria cases receiving a malaria diagnostic test in public facilities was calculated from NMCP reports to WHO. The number of malaria diagnostic tests performed included the number of rapid diagnostic tests (RDTs) and microscopic slide examinations. Few countries reported the number of suspected malaria cases as an independent value. For countries reporting the total number of malaria cases as presumed malaria cases (i.e. cases classified as malaria without undergoing malaria parasitological testing) and confirmed malaria cases, the number of suspected cases was calculated by adding the number of negative diagnostic tests to the number of presumed and confirmed cases. Using this method for countries that reported only confirmed malaria cases for the total number of malaria cases, the number of suspected cases was equal to the number of cases tested. Such data are not informative when determining the proportion of suspected cases tested; therefore, countries were excluded from the regional calculation for those years in which they reported only confirmed cases for total malaria cases.

**Figure 5.2** The proportion of children aged under 5 years with fever who received a finger or heel stick, and where they were brought for care, were calculated from available household survey data for 2000–2014 (the most recent surveys from 29 countries). Places of care that were included in the public sector health management information system were categorized as public facilities, and included public clinics and hospitals. Private facilities included private clinics, pharmacies and shops.

**Figures 5.3, 5.4 and 5.5** Manufacturers reporting the number of RDT sales included 41 manufacturers that participate in RDT product testing by WHO, the Foundation for Innovative New Diagnostics (FIND), the United States Centers for Disease Control and Prevention (CDC) and the Special Programme for Research and Training in Tropical Diseases (TDR). The number of RDTs reported by manufacturers represents total sales to the public and private sector worldwide. The number of RDTs and artemisinin-based

combination therapies (ACTs) distributed within countries by national programmes are reported by NMCPs to WHO, as are the number of microscopic examinations of blood slides performed for malaria parasites and number of RDTs performed.

**Figure 5.6** Results of RDT product testing conducted by WHO, FIND, CDC and TDR were taken from *Malaria rapid diagnostic test performance: Results of WHO product testing of malaria RDTs: Round 5 (11)*. The panel detection score used to quantify RDT performance is an index that measures test positivity as well as inter-test and inter-lot consistency. The score is the frequency with which all RDTs tested on a sample in the evaluation panel are positive (two RDTs from each of two lots positive against 200 parasite/µl sample, and one RDT from each lot positive for 2000–5000 parasite/µl sample). Therefore, for a sample at 200 parasites/µl, four of four tests have to be positive for that sample to be considered detected by RDT; for a sample at 2000–5000 parasites/µl two of two tests have to be positive for that sample to be considered detected by RDT.

## Section 6: Malaria treatment

**Table 6.1** Policies regarding malaria treatment were reported by NMCPs to WHO.

**Figure 6.1** The proportion of children with uncomplicated malaria (defined as fever in the 2 weeks preceding the survey and parasite infection measured by an RDT at the time of the survey) receiving an ACT was estimated for all countries in sub-Saharan Africa in 2003–2012, using a three-step modelling approach:

1. **Fitting a model to predict whether a child with fever has a malaria infection:** For 37 countries with a demographic and health survey (DHS) or malaria indicator survey (MIS), the malaria parasite infection status of a child was assessed from an RDT given at the time of the survey. It was assumed that a positive RDT provides a reasonable measure of a 2-week prevalence of infection (12–14). A logistic regression model was created to predict malaria parasite infection amongst febrile children in surveys in which RDT testing was not performed. Covariates in the model included the child's age and sex, household wealth quintile, ITN ownership, facility type where treatment was sought (public or other), urban or rural status, and malaria transmission intensity, as measured by the *Plasmodium falciparum* parasite rate (PfPR) of children aged 2–10 years (PfPR2–10).
2. **Predicting the infection status of children in surveys in which RDTs were not used:** Coefficients estimated from the logistic regression model in Step 1 were used to obtain predictions of infection status among all children with a fever from DHS and multiple indicator cluster surveys (MICS) in which RDT testing had not been performed (66 surveys). The national survey-weighted proportion of febrile children with a malaria parasite infection (RDT measured or imputed) aged under 5 years who received an ACT was then calculated for all surveys.
3. **Estimating the proportion of children with malaria that received an ACT:** ACT distribution data reported by NMCPs were used to calculate a predicted ACT "availability" per person at risk for *P. falciparum* malaria in each country. A linear model was then created to predict the proportion of children with malaria receiving an ACT, using ACT availability per capita in the current and previous year as a covariate. Additional covariates,

obtained from the World Bank dataset,<sup>8</sup> included national ITN coverage (by year), measles vaccination coverage, GNI and the proportion of births with a skilled birth attendant. The model was run in a Bayesian framework using MCMC methods, and included uncorrelated random effects for each country and correlated (autoregressive) random effects for each year. For non-survey years, the proportion of children who received ACT for each country and year (2003–2012) was imputed based on the relationship between ACT coverage and ACT availability across countries.

Publicly available sources of population-based survey data were considered if they included a module assessing fever treatment for children aged under 5 years, categorized by type of antimalarial received. For the period 2003–2012, 16 MIS, 55 DHS and 20 MICS were included. Estimates of mean *PfPR*<sub>2–10</sub>, as well as the total population at risk of malaria, were ascertained from the MAP for 2010. Population growth rates were derived from the UN Population Prospects database.<sup>9</sup>

**Figure 6.2** The proportion of children aged under 5 years brought for care, and where they were brought for care, were calculated from the most recent household survey undertaken for each country in sub-Saharan Africa (a total of 29 surveys). Public sector places of care included hospitals, health centres and health posts. The formal private sector included private clinics and doctors. The informal private sector included pharmacies, drug stores, shops and traditional healers. Community included care provided by community health workers.

**Figures 6.3 and 6.4** Data on ACT sales were provided by eight manufacturers eligible for procurement by WHO/United Nations Children's Fund (UNICEF). ACT sales were categorized as either to the public sector or to the private sector, and products were grouped according to type of ACT and product presentation (i.e. co-formulated and co-blistered). Data on ACTs distributed within countries through the public sector were taken from NMCP reports to WHO.

**Figure 6.5** The availability of ACTs in public sector health facilities was measured as the ratio of distributed ACTs reported by NMCPs to the estimated number of presumed and confirmed malaria cases attending public sector health facilities. For countries outside Africa and countries in Africa with consistent reporting, the estimated number of presumed and confirmed cases in the public sector was derived from NMCP reports, corrected for reporting completeness. For countries in Africa with inconsistent reporting, the estimated number of presumed and confirmed cases in the public sector was derived from the estimated number of confirmed malaria cases (see Section 8.3); the proportion of suspected cases tested; and the slide positivity rate (SPR), where:

$$\text{estimated presumed case} = 1 - (\% \text{ suspected cases tested} \times \text{estimated confirmed cases} / \text{SPR})$$

The proportion of children aged under 5 years with fever who received ACT among those who received any antimalarial treatment was calculated from available household survey data

8 <http://data.worldbank.org/products/wdi>

9 [http://esa.un.org/unpd/wpp/unpp/panel\\_population.htm](http://esa.un.org/unpd/wpp/unpp/panel_population.htm)

for countries in sub-Saharan Africa for 2005–2013. Definitions of public sector and private places of care were as described in the diagnostic testing section. Places of care that were included in the public sector health management information system were categorized as public facilities, and they included public clinics and hospitals. Private facilities included private clinics, pharmacies and shops. For recent surveys for which the dataset was not available but a written report had been released, the proportion of ACTs among any antimalarial treatment given was imputed based on the relationship between the indicator for all febrile children and for those children in the public and private sector in other household surveys.

**Figure 6.6** The estimated proportion of confirmed malaria cases and non-malaria cases receiving or not receiving ACTs at public health facilities in the WHO African Region for each year were derived from data reported by national programmes. The ratio of distributed ACTs to the estimated number of presumed and confirmed malaria cases was calculated as described for Figure 6.5 and used for the proportion of cases receiving ACTs. The proportion of suspected malaria cases tested was calculated as for Figure 5.1. The malaria test positivity rate was calculated from the number of malaria diagnostic tests performed and the number of tests positive for malaria. The distributed ACTs were apportioned evenly to presumed and confirmed cases. The proportion of confirmed cases among presumed and confirmed cases was derived from the proportion of suspected cases tested and the malaria test positivity rate. Non-malaria cases included suspected malaria cases that were tested negative, and presumed cases that would have been negative had they been tested.

## Section 7: Gaps in intervention coverage

**Figure 7.1** Data on intervention coverage were derived from nationally representative household survey data from MICS, MIS and DHS conducted in 2011–2013. In total, 21 surveys included data about households without nets; 20 surveys included data on pregnant women who did not receive IPTp; and 23 surveys included data on febrile children aged under 5 years who did not seek treatment and did not receive an ACT, 20 of which also included data on febrile children who did not receive a diagnostic test. For each survey, the proportions of households or children aged under 5 years not covered by a given intervention were calculated over the entire population and within various subpopulations, taking into account the sampling design. The median de facto household population size within each survey was calculated for inclusion in the final analysis. The quartile estimates and interquartile ranges were calculated across all of the country-level proportions.

**Figure 7.2** The proportions of the subpopulations not covered by a given intervention within each survey were assembled and used to fit linear regression models for each service, to predict the overall lack of coverage. The choices of subpopulations were based on published literature reviews that identified the factors most likely to influence coverage estimates. For the household-level analysis, the subpopulations included levels of wealth, presence (or lack) of at least one pregnant woman or child aged under 5 years, education level of the

household head, type of residence and relative household size. For the child-level analyses, the subpopulations included levels of household wealth, type of residence, education level of the mother, age of the child, gender of the child and relative household size. Model selection was based on the optimal R<sup>2</sup>, Akaike information criterion and Bayesian information criterion scores for all possible predictor combinations. The decomposition of the R<sup>2</sup> goodness-of-fit estimator for linear models has been suggested as a method to describe the relative contribution of predictors across the entire distribution of a continuous outcome (15). In this analysis, the decompositions of the goodness-of-fit estimators for each linear model, presented as Owen decomposition values, describe the degree to which different factors contributed to the observed lack of coverage across the surveys. This does not necessarily imply a causal relationship, and the contributions of the individual factors do not necessarily reflect their level of statistical significance in any given country.

**Figure 7.3** The country-specific differences in coverage between levels of endemicity were examined by calculating the absolute difference between the intermediate-to-high malaria risk coverage estimates and the no-to-low malaria risk coverage estimates. The malaria endemicity level was determined by extracting the raster values from the data layers of MAP's forthcoming 2000–2013 time series of *PfPR* at all available survey cluster locations, and classifying those within each cluster as having no-to-low risk or intermediate-to-high risk of malaria. The cluster-level extraction data from *PfPR* raster values were provided by the MAP. The household-level analysis used cluster-level classifications based on *PfPR*s for the year 2000 to take into account the impact of ITNs on the parasite rate. In the other analyses, endemicity classifications were based on the *PfPR*s for the survey year.

## Section 8: Trends in infections, cases and deaths

**Figures 8.1 and 8.2** The main source of information on reported numbers of malaria cases and deaths are the disease surveillance systems operated by ministries of health. Data from such systems have three strengths: (i) case reports are recorded continuously over time and can thus reflect changes in the implementation of interventions or other factors; (ii) routine case and death reports are often available for all geographical units of a country; and (iii) the data 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, for several reasons. First, not all health facilities report each month; hence, variations in case numbers may reflect fluctuations in the number of health facilities reporting rather than a change in underlying disease incidence. Second, 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. Finally, not all malaria cases reported are confirmed by microscopy or RDT; hence, some of the cases reported as malaria may actually be other febrile illnesses (16, 17).

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 (not other febrile illnesses) was tracked.** For high-burden countries in the WHO African Region, where there is little confirmation of cases, the numbers of malaria admissions (in-patient cases) and deaths were reviewed, because the predictive value of malaria diagnosis for an admitted patient is considered to be higher than that of an outpatient diagnosis. In such countries, the analysis may be heavily influenced by trends in cases of 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 (ABER), to ensure that potential differences in diagnostic effort or completeness of reporting are taken into account. To discern decreases in malaria incidence, the ABER should ideally remain constant or be increased. In addition, it is useful to monitor the percentage of suspected malaria cases that are examined with a parasite-based test. Some authorities recommend that the ABER should be >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%. A value of 10% may not be sufficient to detect all febrile cases. In Solomon Islands, a highly endemic country, the ABER exceeds 60%, with an SPR of 25%, achieved solely through passive case detection.
- **Monitoring trends in the SPR or RDT positivity rate.** This rate should be less severely distorted by variations in the ABER than trends in the number of confirmed cases.
- **Monitoring malaria admissions and deaths.** For high-burden African countries, when reviewing the number of malaria admissions or deaths, it is also informative to examine the number of admissions from all causes, which should remain constant or be increased. If the total number of admissions fluctuates, then it may be preferable to examine the percentage of admissions or deaths due to malaria, because 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.** Trends derived from countries with high case detection rates are more likely to reflect trends in the broader community. When examining trends in the number of deaths, it is useful to compare the total number of deaths occurring in health facilities with the total number of deaths estimated to occur in the country.
- **Examining the consistency of trends.** Unusual variation in the number of cases or deaths that cannot be explained by climate or other factors, or inconsistency between trends in cases and in deaths, can suggest deficiencies in reporting systems.
- **Monitoring changes in the proportion of cases due to *P. falciparum* or the proportion of cases occurring in children aged under 5 years.** 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 aged under 5 years; however, unusual fluctuations in these proportions may point to changes in health-facility reporting or to errors in recording.

These procedures help to rule out data-related factors (e.g. incomplete reporting or changes in diagnostic practice) as explanations for a change in the incidence of disease. The aim is to ensure that trends in health-facility data reflect changes in the wider community, which is more likely in situations where changes in disease incidence are large; coverage with public health services is high; and interventions promoting change, such as use of ITNs, are delivered throughout the community rather than being restricted to health facilities.

Where data reported by NMCPs were sufficiently complete and consistent to reliably assess trends between 2000 and 2013, a country was classified as being on track to achieve, by 2015, a decrease in case incidence of >75%, 50–75% or <50%, or to experience an increase in case incidence by 2015, using 2000 as the baseline. A 75% reduction in malaria case incidence is equivalent to a 5% reduction per year between 2000 and 2015. Thus, to achieve a reduction of 75% by 2015, countries need to have reduced the incidence of malaria by

at least 65% between 2000 and 2013. Countries that reduced malaria incidence rates by 43–65% between 2000 and 2013 are projected to achieve reductions in malaria case incidence of 50–75% in 2015.

**Table 8.1** The criteria used to classify countries according to programme phase were updated in 2012 to facilitate tracking of progress over time (18). The updated criteria are based on an evaluation of three main components: the malaria epidemiological situation, case-management practices and the state of the surveillance system (as shown in Table A.1). The evaluation concentrates on the situation in those districts of the country reporting the highest annual parasite index (API). Other components – for example, the stated programme goal, vector control and malaria prevention practices, and health systems and financing – are also important for tracking progress towards elimination; however, they are less specific and are therefore not included as classification criteria.

**Table A.1** Criteria for classifying countries according to malaria programme phase

	Pre-elimination	Elimination	Prevention of reintroduction
Malaria situation in areas with most intense transmission			(1) Recently endemic country with zero local transmission for at least 3 years; or (2) country on the register or supplementary list that has ongoing local transmission <sup>a</sup>
Test positivity rate	<5% among suspected malaria patients (PCD) throughout the year		
API in the district with the highest number of cases/1000 population/year (ACD and PCD), <sup>b</sup> averaged over the past 2 years	<5 (i.e. fewer than 5 cases/1000 population)	<1 (i.e. fewer than 1 case/1000 population)	
Total number of reported malaria cases nationwide		A manageable number (e.g. <1000 cases, local and imported) nationwide	
Case management			Imported malaria. Maintain capacity to detect malaria infection and manage clinical disease
All cases detected in the private sector are microscopically confirmed	National policy being rolled out	Yes	Yes
All cases detected in the public sector are microscopically confirmed	National policy being rolled out	Yes	Yes
Nationwide microscopy quality assurance system covers public and private sector	Initiated	Yes	Yes
Radical treatment with primaquine for <i>P. vivax</i>	National policy being updated	National policy fully implemented	Yes
Treatment with ACT plus single-dose primaquine for <i>P. falciparum</i>	National policy being updated	National policy fully implemented	Yes
Surveillance			Vigilance by the general health services
Malaria is a notifiable disease nationwide (<24–48 hours)	Laws and systems being put in place	Yes	Yes
Centralized register on cases, foci and vectors	Initiated	Yes	Yes
Malaria elimination database	Initiated	Yes	Certification process (optional)
Active case detection in groups at high risk or with poor access to services (proactive case detection)	Initiated	Yes	In residual and cleared-up foci, among high-risk population groups
Case and foci investigation and classification (including reactive case detection and entomological investigation)	Initiated	Yes	Yes

ABER: annual blood examination rate; ACD: active case detection; API: annual parasite index; PCD: passive case detection.

<sup>a</sup> Ongoing local transmission = 2 consecutive years of local *P. falciparum* malaria transmission, or 3 consecutive years of local *P. vivax* malaria transmission, in the same locality or otherwise epidemiologically linked.

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

### Figures 8.3–8.5

Maps of *P. falciparum* infection prevalence ( $PfPR_{2-10}$ ) and associated national-level estimates of average  $PfPR_{2-10}$  for countries in sub-Saharan Africa were derived from a geostatistical modelling framework developed by the MAP. The model drew on three categories of data:

- Geopositioned community-based survey measurements of  $PfPR$  were identified through periodic literature searches for published data sources, direct communication with malaria specialists for unpublished data sources, and national household surveys. Surveys were primarily conducted in

children aged under 5 years, although those based on any defined age range of individuals were included. Most surveys were conducted using microscopy or RDTs to identify infected individuals. After checks for consistency, completeness and duplication, a final assembly was defined for subsequent modelling consisting of 28 361 spatio-temporally unique observations at time points between 1995 and 2014.

- Input data layers were also assembled, to represent levels of intervention coverage. For ITNs, national-level trends in ITN use were taken from the coverage model described



earlier (see Section 3). This was used in conjunction with a geostatistical model to generate a continuous space-time “cube” predicting the proportion of individuals sleeping under an ITN the previous night for every 5 × 5 km pixel, and expressed as an annual mean. For IRS, annual reports from NMCPs were assembled, detailing the proportion of the population at risk targeted for coverage each year (note: this does not necessarily represent the proportion ultimately receiving and protected by the intervention). For ACTs, national household survey data were assembled from 93 surveys on the proportion of children with fever accessing an ACT; this was used as a proxy for access to effective antimalarial drugs in clinical malaria cases across the population as a whole. To estimate this coverage in country-years for which no survey was available, an empirical model was built that related coverage levels to the number of ACT courses distributed per capita in each country each year. The latter variable was available from NMCP reported data, and was largely complete for the period 2000–2013.

- A suite of 20 environmental and sociodemographic geospatial input layers were also developed and used as covariates in the *PfPR* model. Existing approaches to constructing and selecting covariates for this purpose are crucial, but have often been subjective and ad hoc (e.g. a huge variety of covariates are used in modelling with little quantitative justification). To address this, we undertook an exhaustive covariate construction and selection process. First, a literature review was conducted to establish a comprehensive list of variables that have been used as covariates in malaria mapping. Second, a large library of covariate data was assembled to reflect this list, including the construction of dynamic versions where possible. Third, the resulting set of 33 base covariates was leveraged to create more than 50 million possible covariate terms via factorial combinations of different spatial and temporal aggregations, transformations and pairwise interactions. Fourth, the expanded set of covariates was tested via successive selection criteria to yield an optimum covariate subset that maximized out-of-sample predictive accuracy. The final subset included predominately dynamic covariates; it substantially out-performed earlier sets used in global malaria risk maps from the MAP.

These data sources were then used in a space–time Bayesian geostatistical model that was a more sophisticated version of an earlier approach constructed by the MAP (19). The new model included mechanisms to adjust the *PfPR* survey data by the age range of individuals observed, the season of each survey and the type of diagnostic used. The impact of interventions was modelled by fitting flexible functional forms to capture the separate effects of ITNs, IRS and ACTs on declining *PfPR* as a function of coverage reached, and the starting (pre-intervention) *PfPR* in the year 2000. The model was used to predict a spatio-temporal cube of age-specific *PfPR* at 5 × 5 km resolution across Africa for each year from 2000 to 2013. Detailed maps of year-specific human population density from the WorldPop project<sup>10</sup> were used, in conjunction with the *PfPR* cube, to calculate population-weighted mean *PfPR*<sub>2-10</sub> for each country and each year. The average number of contemporaneous infections in each country and year was calculated by multiplying

the annual mean all-age *PfPR* by the population in each pixel, then summing across all pixels in each country.

**Tables 8.2 and 8.3, and Figures 8.6–8.8** The methods for producing estimates of malaria cases and deaths in 2000–2013 either adjusted the number of reported cases to take into account the proportion of cases that were not captured by a surveillance system or, for countries with insufficient surveillance data, produced estimates using a modelled relationship between malaria transmission, case incidence or mortality, and intervention vector control coverage, as outlined below.

**Cases** The number of malaria cases was estimated by one of two methods:

- For countries outside the WHO African Region and low-transmission countries in Africa: estimates of the number of cases were made by adjusting the number of reported malaria cases for completeness of reporting, the likelihood that cases are parasite-positive and the extent of health-service use. The procedure, which is described in the *World malaria report 2008* (16, 20), 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 were 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; analyses 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. Such a procedure results in an estimate with wide uncertainty intervals around the point estimate.
- For 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 were inferred from longitudinal studies of malaria incidence recorded in the published literature. Incidence rates were adjusted downwards for populations living in urban settings, and for the expected impact of ITN and IRS programmes. The procedure was initially developed by the RBM MERG in 2004 (21) and also described in the *World malaria report 2008*.

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

- For countries outside the WHO African Region and for low-transmission countries in Africa:<sup>11</sup> 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*. This method was used for all countries outside the WHO African Region and for countries within the WHO 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

10 <http://www.worldpop.org.uk/>

11 Botswana, Cabo Verde, Eritrea, Madagascar, Namibia, South Africa, Swaziland and Zimbabwe

aged under 5 years, as described in the *Global Burden of Disease 2004 update* (22). A case fatality rate of 0.45% was applied to the estimated number of *P. falciparum* cases for countries in the WHO 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.

- For countries in the WHO African Region: child malaria deaths were estimated using a verbal autopsy multi-cause model developed by the WHO Child Health Epidemiology Reference Group to estimate causes of death for children aged 1–59 months in countries with less than 80% of vital registration coverage (23–25). A total of 128 data points from 95 verbal autopsy studies and 37 countries that met the inclusion criteria were included. Among them, 47 data points were either new or updated from the previous estimates of malaria deaths published in the *World malaria report 2012*. Mortality estimates were derived for seven causes of post-neonatal death (pneumonia, diarrhoea, malaria, meningitis, injuries, pertussis and other disorders), causes arising in the neonatal period (prematurity, birth asphyxia and trauma, sepsis, and other conditions of the neonate) and other causes (e.g. malnutrition). Deaths due to measles, unknown causes and HIV/AIDS were estimated separately. The resulting cause-specific estimates were adjusted country by country to fit the estimated 1–59 month mortality envelopes (excluding HIV and measles deaths) for corresponding years. Estimates were then further adjusted for intervention coverage; that is, pneumonia and meningitis estimates were adjusted for the use of *Haemophilus influenzae* type b vaccine, and malaria estimates were adjusted for the use of ITNs.

The bootstrap method was employed to estimate uncertainty intervals by re-sampling from the study-level data to in turn estimate the distribution of the predicted percentage of deaths due to each cause. Deaths in those above the age of 5 years were inferred from a relationship between levels of malaria mortality in different age groups and the intensity of malaria transmission (26); thus, the estimated malaria mortality rate in children aged under 5 years was used to infer malaria-specific mortality in older age groups.

Malaria incidence and mortality rates were estimated using “total population at risk for malaria” as a denominator. Projections to 2015 were based on a linear extrapolation of the trend in incidence and mortality rates from 2000 to 2013.

**Table 8.4, Figures 8.9 and 8.10** The number of cases averted and lives saved between 2001 and 2012 was estimated by calculating the number of cases and deaths that would have occurred if incidence and mortality rates had remained at 2000 levels until 2013 (i.e. had there been no progress). The calculated number of cases and deaths was compared with the estimated number of cases and deaths presented above. The lower numbers of cases and deaths in 2013 compared to 2000 may be due in part to factors other than the expansion

of malaria programmes. Some progress is likely to be related to increased urbanization and overall economic development, which lead to improvements in housing and nutrition.

## Regional profiles

**Figure A.** Incidence rates are derived from reports of confirmed malaria cases in 2013 (by microscopy or RDT) from ministries of health to WHO, and from the number of people living at risk for malaria in each geographical unit as reported by NMCPs. Incidence rates are corrected for reporting completeness by dividing by the proportion of health-facility reports received in 2013 by the number expected. 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 the NMCP did not correspond to a mapping area known to WHO, either because of modifications to administrative boundaries, or the use of names not verifiable by WHO. The maps for countries in sub-Saharan Africa display a combination of: cases per 1000 per year, and parasite prevalence in areas with >10 cases per 1000 population per year. To obtain a measure of combined parasite prevalence for both *P. falciparum* and *P. vivax*, the sum of the two independent parasite rates (19, 27) was calculated at each point (~5 km<sup>2</sup>). Data on environmental suitability for malaria transmission were used to identify areas that would be free of malaria.

**Figure B.** Sources of data for the financial contributions are as described for Figure 3.1.

**Figure C.** Sources of data for international and domestic contributions are as described in the notes for Figure 3.1. Funding per capita at risk was calculated by giving populations at low risk for malaria (i.e. those living in areas with fewer than one case reported per 1000 per year) half the weight of populations at high risk (i.e. those living in areas with one or more cases reported per 1000 per year). This procedure was followed to ensure that countries with populations at low risk for malaria could be included in the analysis, and also to take into account the greater need for malaria programmes and funds in countries with larger proportions of their population at high risk for malaria.

**Figure D.** For the WHO African Region and for Djibouti, Somalia and the Sudan in the WHO Eastern Mediterranean Region, the proportion of the population with access to an ITN is derived from a model that takes into account household survey data, ITNs distributed by NMCPs, and ITNs delivered by manufacturers (see methods for Figures 3.1 and 3.2). For other countries, the proportion of the population protected with ITNs is estimated from the number of ITNs delivered by NMCPs in the past 3 years divided by the population at high risk. It is assumed that each net delivered can cover on average 1.8 people, that conventional nets are re-treated regularly, and that nets have a lifespan of 3 years. The denominator is the population living at high risk for malaria, since it is assumed that, in countries with lower levels of transmission, ITNs will be preferentially targeted to populations at higher risk. IRS coverage is calculated as the total number of people protected with IRS, divided by the population at high risk. There are limited data on the extent to which these interventions overlap, so the two bars

simply represent the percentage of populations protected by the respective interventions individually.

**Figure E.** Few countries have information systems that record treatments given to individual patients. It is therefore necessary to use aggregate information on numbers of treatment courses delivered to public health facilities, and relate this information to the number of malaria cases among patients attending such facilities. For countries in the WHO African Region, the number of treatment courses available is calculated as the total number of ACT courses distributed by a ministry of health, divided by the estimated number of presumed cases recorded as malaria (without a diagnostic test having been performed) plus confirmed *P. falciparum* malaria cases at public health facilities. In other WHO regions, the number of treatment courses available is shown as a percentage of confirmed malaria cases plus presumed malaria cases reported in the public sector, correcting for reporting completeness. The bars for any antimalarial treatment show the number of all treatment courses supplied in relation to all malaria cases of any plasmodium species, including the ACT to treat *P. falciparum*.

**Figure F.** The percentage of confirmed cases in which *P. falciparum* or a mixed infection was detected was calculated as the total number of *P. falciparum* and mixed infections between 2009 and 2013, divided by the number of confirmed cases over that period. For countries in the elimination phase, only locally acquired *P. falciparum* cases and mixed infections were considered.

**Figure G.** Analysis of changes in malaria incidence rates focuses on confirmed cases (by microscopy or RDT) reported by ministries of health, to ensure that malaria (not other febrile illnesses) is tracked. For countries in the WHO African Region, the figure shows percentage reductions in the rate of hospital admissions and deaths (except for Algeria, Botswana, Cabo Verde, Namibia, Sao Tome and Principe, South Africa, Swaziland and Zimbabwe) and in the rate of reported malaria deaths. Although the diagnosis of admitted patients is not always confirmed with a diagnostic test, the predictive value of diagnosis undertaken for an admitted patient is considered to be higher than for outpatient diagnosis. See notes for Figures 8.1 and 8.2 for more details of analysis undertaken.

## Country profiles

### I. Epidemiological profile

**Maps:** The procedures used for the map of confirmed cases per 1000 population divided by parasite prevalence were the same as those used for Figure A of the regional profiles. For the map showing the proportion of cases due to *P. falciparum*, the total number of cases due to *P. falciparum* was divided by the total number of confirmed malaria cases. If no data were available for a subnational geographical area, or there were too few cases to calculate a reliable proportion, the area was highlighted as such. For areas where parasite prevalence was used, the total number of infections due to *P. falciparum* was divided by the total of *P. falciparum* and *P. vivax* infections. Data on environmental suitability for malaria transmission were used to identify areas that would be free of malaria.

**Population:** The total population of each country was taken from the 2012 revision of the *World population prospects*.<sup>12</sup> The country

population was subdivided into three levels of malaria endemicity, as reported by the NMCP: (i) areas of high transmission, where the reported incidence of confirmed malaria due to all species was  $>1$  per 1000 population per year in 2013; (ii) areas of low transmission, where the reported malaria case incidence from all species was  $\leq 1$  per 1000 population per year in 2013, but  $>0$  (transmission in these areas is generally highly seasonal, with or without epidemic peaks); and (iii) malaria free areas, where there is no continuing local mosquito-borne malaria transmission, and all reported malaria cases are imported. An area is designated "malaria free" when no cases have occurred for several years. Areas may be naturally malaria free because of factors that are unfavourable for malaria transmission (e.g. altitude or other environmental factors), or they may become malaria free as a result of effective control efforts. In practice, malaria free areas can be accurately designated by NMCPs only after the local epidemiological situation and the results of entomological and biomarker investigations have been taken into account.

In cases where an NMCP did not provide the number of people living in high- and low-risk areas, the numbers were inferred from subnational case incidence data provided by the programme. The population at risk is the total population living in areas where malaria is endemic (low and high transmission), excluding the population living in malaria free areas. The population at risk is used as the denominator in calculating the coverage of malaria interventions, and is therefore used in assessing current and future needs for malaria control interventions, taking into account the population already covered. For countries in the pre-elimination and elimination stages, "population at risk" is defined by the countries, based on the resident populations in foci where active malaria transmission occurs.

**Parasites and vectors:** The species of mosquito responsible for malaria transmission in a country, and the species of *Plasmodium* involved, are listed according to information provided by WHO regional offices. The proportion of malaria cases due to *P. falciparum* was estimated from the number of *P. falciparum* and mixed infections detected by microscopy, divided by the total number of malaria cases confirmed by microscopy in 2013.

### II. Intervention policies and strategies

**Intervention policy:** The policies and strategies adopted by each country were reported by NMCPs to WHO. They vary according to the epidemiological setting, socioeconomic factors and the capacity of the NMCP or the country's health system. Adoption of policies does not necessarily imply immediate implementation, nor does it indicate full, continuous implementation nationwide.

**Antimalarial treatment policy:** Antimalarial treatment policies were reported by NMCPs to WHO.

**Therapeutic efficacy tests:** Data on therapeutic efficacy were extracted from the WHO global database on antimalarial drug efficacy. The data originated 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 the total number of failures (early treatment failures + late clinical failures + late parasitological failures), divided by the total number of patients who completed the study follow-up. The number of studies included in the analysis

12 [http://esa.un.org/unpd/wpp/unpp/panel\\_population.htm](http://esa.un.org/unpd/wpp/unpp/panel_population.htm)

and the years during which the studies were conducted are shown for each antimalarial medicine. The minimum, median and maximum describe the range of treatment failures observed in the studies for each antimalarial medicine.

### III. Financing

**Sources of financing:** The data shown are those reported by NMCPs. The government contribution is usually the declared government expenditure for the year. In cases where government expenditure was not reported by the programme, the government budget was used. External contributions are those allocated to the programme by external agencies; however, such contributions may or may not be disbursed. Additional information about contributions from specific donor agencies, as reported by these agencies, is given in Annex 2. All countries were asked to convert their local currencies to US\$ for reporting on sources of financing.

**Expenditure by intervention in 2013:** The pie chart shows the proportion of malaria funding from all sources that was spent on ITNs, insecticides and spraying materials, IRS, diagnosis, antimalarial medicines, monitoring and evaluation, human resources, technical assistance and management. There are differences in the completeness of data between countries, and the activities for which expenditures are reported do not necessarily include all items of expenditure. For example, government expenditures usually only include expenditures specific to malaria control, and do not take into account costs related to health facility staff, infrastructure and so on.

### IV. Coverage

**ITN and IRS coverage:** Indicators are shown according to data availability:

- *With access to an ITN (survey)* – the proportion of all individuals that could be covered by available ITNs in each household, assuming each ITN can be shared by two people. The indicator is calculated from nationally representative household surveys such as DHS, MICS and MIS.
- *All ages who slept under an ITN (survey)* – the proportion of all individuals who spent the previous night in surveyed households who slept under an ITN, as measured in a nationally representative household survey such as DHS, MICS or MIS.
- *With access to an ITN (model)* – For high-transmission countries in the WHO African Region, a model was used to estimate the proportion of the population with access to an ITN within their household for years in which household survey results were not available. The methods used to estimate the indicator were the same as those described for Figures 3.1 and 3.2.
- *At high risk protected by ITNs* – For countries in WHO regions other than the African Region, nationally representative household surveys are not undertaken sufficiently frequently to allow an assessment of levels and trends in ITN coverage. Therefore, the number of ITNs distributed by NMCPs is used. The proportion of the population potentially protected with ITNs is calculated as:

$$1.8 \times (\text{number of LLINs distributed in the past 3 years} + \text{number of conventional ITNs distributed or retreated in the past year}) / \text{the population at high risk for malaria}$$

LLINs are considered to have an average useful lifespan of 3 years and conventional ITNs 1 year; also, each net is assumed to protect two people. The ratio of 1.8 is used in the formula to allow for only one person sleeping under some ITNs in households with an odd number of inhabitants. The population at high risk is used as the denominator since it is assumed that populations at high risk will be preferentially targeted to receive an ITN. For countries in the elimination phase, those residing in foci are considered to be the population at risk.

- *At high risk protected by IRS* – calculated as the number of people living in a household where IRS has been applied during the preceding 12 months, divided by the population at risk (the sum of populations living in low- and high-transmission areas). For areas outside Africa, the population at high risk is used as the denominator. The percentage of people protected by IRS is a measure of the extent to which IRS is implemented and the extent to which the population at risk benefits from IRS nationwide. The data show neither the quality of spraying nor the geographical distribution of IRS coverage in a country.

### Cases tested and cases treated in the public sector

**Suspected cases tested** – the number of suspected cases examined by microscopy or by RDT, divided by the total number of suspected malaria cases. For countries that do not report the number of suspected cases independently, the number of suspected malaria cases is derived from the number of presumed and confirmed cases, the number tested and the number of positive tests. This indicator reflects the extent to which a programme can provide diagnostic services to patients attending public health facilities. It does not consider patients attending privately run health facilities, and therefore does not reflect the experience of all patients seeking treatment. In many situations, health facilities in the private sector are less likely to provide a diagnostic test than those in the public sector. The indicator may also be biased if those health facilities that provide a diagnostic test (e.g. hospitals) are more likely than other facilities to submit monthly reports.

**Under 5 with fever with finger/heel stick (survey)** – the proportion of children aged under 5 years with fever in the past weeks who had a finger or heel stick, as measured in a nationally representative household survey such as DHS, MICS or MIS.

**Antimalarial medicines distributed versus cases** – Few countries have information systems that are able to record the treatments given to individual patients. Instead, data on the numbers of antimalarial medicines distributed by the country's ministry of health are used to calculate proxy indicators of access to treatment. Three indicators are shown:

- *Antimalarials distributed versus all malaria cases* – the number of first-line treatment courses distributed, divided by the

estimated number of malaria cases attending public sector health facilities.

- *ACTs distributed versus P. falciparum malaria cases* – the number of ACT treatment courses distributed, divided by the estimated number of *P. falciparum* malaria cases attending public sector health facilities.
- *Primaquine distributed versus P. vivax malaria cases* – the number of primaquine treatment courses distributed, divided by the estimated number of *P. vivax* malaria cases attending public sector health facilities.

For high-transmission countries in the WHO African Region, the estimated number of malaria cases attending public sector health facilities is used as a denominator. For other countries, the denominator is the number of confirmed cases plus the number of presumed cases, adjusted for reporting completeness. These indicators can provide information on whether the NMCP delivers sufficient antimalarial medicines to treat all malaria patients who seek treatment in the public sector. It is not a direct measure of the proportion of patients with malaria cases that have received treatment.

**ACTs as percentage of all antimalarials received (survey)** – children aged under 5 years with fever in the past 2 weeks who received ACTs as a proportion of children aged under 5 years with fever who received any antimalarial.

#### Cases tracked

**Reporting completeness** – calculated as the total number of health facility reports received by a ministry of health during a year, divided by the total number of facility reports that were expected in that year. The expected number of facility reports is the number of health facilities multiplied by the frequency of reporting; that is, if 100 facilities are expected to report each month, 1200 reports would be expected during a year.

**Percentage fever cases <5 seeking treatment at public health facility (survey)** – the proportion of children aged under 5 years with fever in the past 2 weeks who sought treatment at a public health facility, derived from a nationally representative household survey such as DHS, MICS or MIS (for programmes in the control phase only).

**Cases investigated** – the proportion of reported confirmed malaria cases that are investigated for additional information on the characteristics of the case; most importantly, whether the case was imported or locally acquired (for programmes in the pre-elimination and elimination phase only).

**Foci investigated** – the proportion of foci of malaria transmission that are investigated for additional information on the characteristics of transmission of malaria, including evidence of local malaria transmission and entomological information such as vector breeding sites within the transmission focus (for programmes in the pre-elimination and elimination phase only).

## V. Impact

#### Test positivity

**SPR** – the number of microscopically positive cases divided by the total number of slides examined.

**RDT positivity rate** – the number of positive RDT tests divided by the total number of RDT tests carried out. The RDT positivity rate and SPR are derived from the number of parasitologically positive cases per 100 cases examined by RDT or microscopy. They measure the prevalence of malaria parasites among people who seek care and are examined in health facilities. Trends in these indicators may be less distorted by variations in the ABER than trends in the number of confirmed cases.

**Parasite prevalence (survey)** – the proportion of people tested for malaria parasites in a survey (most often children aged under 5 years) who have malaria parasites (programmes in control phase only).

#### Confirmed malaria cases per 1000 and ABER

**ABER (microscopy and RDT)** – the number of parasitological tests (by microscopy or RDT) undertaken per 100 population at risk per year. The numbers of parasitological tests were derived from reports by NMCPs to WHO. The ABER provides information on the extent of diagnostic testing in a population. It can be useful to take into account when interpreting trends in confirmed cases. To discern changes in malaria incidence, the ABER should ideally remain constant (see notes for Figures 8.1 and 8.2). There is no set threshold or target for ABER; rather, it is the trend in ABER in relation to reported case incidence that is most informative.

**Cases (all species)** – the total number of confirmed malaria cases (by microscopy or RDT) divided by the population at risk. The numbers of confirmed cases were derived from reports by NMCPs to WHO. The indicator is useful in assessing changes in the incidence of malaria over time, provided that there has been consistency in patient attendance at facilities, diagnostic testing and case reporting over time.

**Cases (P. vivax)** – the total number of confirmed *P. vivax* malaria cases (by microscopy or RDT) divided by the population at risk. The numbers of confirmed *P. vivax* cases were derived from reports by NMCPs to WHO (the numbers exclude mixed infections).

For countries in the pre-elimination or elimination phases, the total number of indigenous cases (acquired within the country) and imported cases were also plotted.

#### Malaria admissions and deaths (for countries in the control phase)

Numbers for malaria admissions and deaths for countries in the control phase were derived from reports by NMCPs to WHO.

**Admissions (all species)** – the number of patients admitted for malaria with malaria as the primary discharge diagnosis, divided by the population at risk.

**Admissions (P. vivax)** – the number of patients admitted for malaria with *P. vivax* malaria as the primary discharge diagnosis, divided by the population at risk.

**Deaths (all species)** – the number of patients dying in health facilities with malaria as the primary cause of death, divided by the population at risk.

**Deaths (P. vivax)** – the number of patients dying in health facilities with *P. vivax* malaria as the primary cause of death, divided by the population at risk.

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# Annex 2A – Recommended policies and strategies for malaria control, 2013

WHO region	Country/area	Programme Phase	Insecticide-treated nets			Indoor residual spraying			Treatment						Malaria in pregnancy			
			ITNs/LLINs are distributed for free	ITNs/LLINs are distributed to all age groups	ITNs/LLINs distributed through mass campaigns to all age groups	IRS is recommended by malaria control program	DDT is used for IRS	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	Pre-referral treatment with quinine or artemether IM or artesunate suppositories	Single dose of primaquine is used as gametocidal medicine for <i>P. falciparum</i> <sup>1</sup>	Primaquine is used for radical treatment of <i>P. vivax</i> cases	GPPD test is recommended before treatment with primaquine	Directly observed treatment with primaquine is undertaken	IPTp used to prevent malaria during pregnancy	Seasonal malaria chemoprevention (SMC) or IPTc is used
African	Algeria	Elimination	N	N	-	Y	N	NA	-	Y	Y	Y	Y	Y	Y	Y	-	-
	Angola	Control	Y	N	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Benin	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Botswana	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Burkina Faso	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Burundi	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Cabo Verde	Pre-elimination	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Cameroon	Control	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Central African Republic	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Chad	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Comoros	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Congo	Control	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Côte d'Ivoire	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Democratic Republic of the Congo	Control	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Equatorial Guinea	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Eritrea	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Ethiopia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Gabon	Control	N	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Gambia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Ghana	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Guinea	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Guinea-Bissau	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Kenya	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Liberia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Madagascar	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Malawi	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Mali	Control	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Mauritania	Control	Y	N	Y	-	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Mayotte, France	Elimination	Y	Y	-	-	N	Y	-	-	Y	Y	Y	Y	Y	Y	Y	Y
	Mozambique	Control	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Namibia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Niger	Control	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Nigeria	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Rwanda	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Sao Tome and Principe	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Senegal	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Sierra Leone	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
South Africa	Control	N	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
South Sudan <sup>2</sup>	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Swaziland	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Togo	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Uganda	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
United Republic of Tanzania	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
United Republic of Tanzania (Mainland)	Control	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
United Republic of Tanzania (Zanzibar)	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Zambia	Control	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
Zimbabwe	Control	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	



WHO region	Country/area	Programme Phase	Insecticide-treated nets			Indoor residual spraying		Treatment						Malaria in pregnancy				
			ITNs/LLINs are distributed for free	ITNs/LLINs are distributed to all age groups	ITNs/LLINs distributed through mass campaigns to all age groups	IRS is recommended by malaria control program	DDT is used for IRS	ACT policy adopted	Patients of all ages should get diagnostic test	Malaria diagnosis is free of charge in the public sector	RDIs used at community level	Pre-referral treatment with quinine or artemether IM or artesunate suppositories	Single dose of primaquine is used as gametocidal medicine for <i>P. falciparum</i> <sup>1</sup>	Primaquine is used for radical treatment of <i>P. vivax</i> cases	GpD tests recommended before treatment with primaquine	Directly observed treatment with primaquine is undertaken	IPT used to prevent malaria during pregnancy	Seasonal malaria chemoprevention (SMC) or IPTc is used
Eastern Mediterranean	Afghanistan	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Djibouti	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
	Iran (Islamic Republic of)	Elimination	Y	Y	-	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Pakistan	Control	Y	N	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Saudi Arabia	Elimination	Y	-	-	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Somalia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
	Sudan	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
	Yemen	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Azerbaijan	Elimination	Y	N	-	Y	N	NA	NA	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Kyrgyzstan	Prevention of re-introduction	Y	Y	-	Y	N	-	-	Y	Y	Y	Y	Y	Y	Y	NA	NA
Region of the Americas	Tajikistan	Elimination	Y	Y	-	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Turkey	Elimination	N	N	-	Y	N	NA	NA	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Uzbekistan	Prevention of re-introduction	Y	Y	-	Y	N	-	-	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Argentina	Elimination	N	N	N	Y	N	NA	NA	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Belize	Pre-elimination	Y	Y	Y	Y	N	NA	NA	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Bolivia (Plurinational State of)	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Brazil	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Colombia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Costa Rica	Elimination	Y	Y	Y	Y	N	NA	NA	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Dominican Republic	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
Ecuador	Pre-elimination	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
El Salvador	Pre-elimination	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
French Guiana, France	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Guatemala	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Guyana	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Haiti	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Honduras	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Mexico	Pre-elimination	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Nicaragua	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Panama	Control	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Paraguay	Elimination	N	N	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Peru	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Suriname	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
Venezuela (Bolivarian Republic of)	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	
South-East Asia	Bangladesh	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Bhutan	Pre-elimination	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Democratic People's Republic of Korea	Pre-elimination	Y	Y	-	Y	N	NA	NA	Y	Y	Y	Y	Y	Y	Y	NA	NA
	India	Control	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Indonesia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Myanmar	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Nepal	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Sri Lanka	Elimination	Y	Y	-	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Thailand	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Timor-Leste	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
Western Pacific	Cambodia	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	China	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Lao People's Democratic Republic	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA
	Malaysia	Pre-elimination	Y	Y	-	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA

## Annex 2A – Recommended policies and strategies for malaria control, 2013 (continued)

WHO region	Country/area	Programme Phase	Insecticide-treated nets			Indoor residual spraying		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	Treatment				Malaria in pregnancy	
			ITNs/LLINs are distributed for free	ITNs/LLINs are distributed to all age groups	ITNs/LLINs distributed through mass campaigns to all age groups	IRS is recommended by malaria control program	DDT is used for IRS					Pre-referral treatment with quinine or artemether IM or artesunate suppositories	Single dose of primaquine gametocidal medicine for <i>P. falciparum</i> <sup>1</sup>	Primaquine is used for radical treatment of <i>P. vivax</i> cases	GPPD test is recommended before treatment with primaquine	Directly observed treatment with primaquine is undertaken	IPTp used to prevent malaria during pregnancy
Western Pacific	Papua New Guinea	Control	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y	Y	N	
	Philippines	Control	Y	Y	N	Y	N	Y	Y	Y	Y	Y	Y	Y	NA	NA	
	Republic of Korea	Elimination	Y	N	-	-	N	NA	Y	Y	-	Y	N	N	NA	NA	
	Solomon Islands	Control	Y	Y	N	Y	N	Y	Y	Y	N	Y	Y	N	NA	Y	
	Vanuatu	Control	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y	Y	NA	NA	
	Viet Nam	Control	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y	NA	NA	

(Y) = Actually implemented.

(N) = Not implemented.

(NA) = Not applicable.

(-) = Question not answered or not applicable.

1. Single dose of primaquine (0.75 mg base/kg).

2. In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf))



# Annex 2B – Antimalarial drug policy, 2013

WHO region	Country/area	P. falciparum				Prevention during pregnancy	Treatment
		Uncomplicated unconfirmed	Uncomplicated confirmed	Severe	Prevention during pregnancy		
African	Algeria	-	-	-	-	-	-
	Angola	AL	AL	AS; QN	SP (IPT)	-	CQ
	Benin	AL	AL	AS; QN	SP (IPT)	-	-
	Botswana	AL	AL	QN	CO+PG	-	-
	Burkina Faso	AL; AS+AQ	AL; AS+AQ	AS; QN	SP (IPT)	-	-
	Burundi	AS+AQ	AS+AQ	AS; QN	-	-	-
	Cabo Verde	AL	AL	QN	CQ	-	-
	Cameroon	AS+AQ	AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Central African Republic	AL	AL	AS; AM; QN	SP (IPT)	-	-
	Chad	AL; AS+AQ	AL; AS+AQ	AS; 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	AS; QN	SP (IPT)	-	-
	Equatorial Guinea	AS+AQ	AS+AQ	AS	-	-	-
	Eritrea	AS+AQ	AS+AQ	QN	-	-	AS+AQ+PQ
	Ethiopia	AL	AL	AS; AM; QN	-	-	CQ
	Gabon	AS+AQ	AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Gambia	AL	AL	QN	SP (IPT)	-	-
	Ghana	AS+AQ	AL; AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Guinea	AS+AQ	AS+AQ	AS	SP (IPT)	-	-
	Guinea-Bissau	AL	AL	AS; QN	SP (IPT)	-	-
	Kenya	AL	AL	AS; AM; QN	SP (IPT)	-	-
	Liberia	AS+AQ	AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Madagascar	AS+AQ	AS+AQ	QN	SP (IPT)	-	-
	Malawi	AL	AL	AS; QN	SP (IPT)	-	-
	Mali	AS+AQ	AL; AS+AQ	QN	SP (IPT)	-	-
	Mauritania	AS+AQ	AL; AS+AQ	QN	-	-	-
	Mayotte, France	-	AL	-	-	-	CQ+PQ
	Mozambique	AL	AL	AS; QN	SP (IPT)	-	-
	Namibia	AL	AL	QN	SP (IPT)	-	AL
	Niger	AL	AL	AS; QN	SP (IPT)	-	-
	Nigeria	AL; AS+AQ	AL; AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Rwanda	AL	AL	AS; QN	SP (IPT)	-	-
	Sao Tome and Principe	AS+AQ	AS+AQ	QN	SP (IPT)	-	-
	Senegal	AS+AQ	AL; AS+AQ	AS; QN	SP (IPT)	-	-
	Sierra Leone	AS+AQ	AL; AS+AQ	AS; AM; QN	SP (IPT)	-	-
	South Africa	-	AL; QN+CL; QN+D	QN	CO+PG	-	AL+PQ; CO+PQ
	South Sudan <sup>1</sup>	AS+AQ	AS+AQ	AM; AS; QN	SP (IPT)	-	AS+AQ+PQ
	Swaziland	-	AL	AS	CO+PG	-	-
	Togo	AL; AS+AQ	AL; AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Uganda	AL	AL	AS; QN	SP (IPT)	-	-
	United Republic of Tanzania	AL; AS+AQ	AL; AS+AQ	AS; AM; QN	SP (IPT)	-	-
	Mainland	AL	AL	AS; AM; QN	SP (IPT)	-	-
	Zanzibar	AS+AQ	AS+AQ	AS; QN	SP (IPT)	-	-
	Zambia	AL	AL	AS; AM; QN	SP (IPT)	-	-
	Zimbabwe	AL	AL	QN	SP (IPT)	-	-
Eastern Mediterranean	Zimbabwe	AL	AL	QN	SP (IPT)	-	-
	Afghanistan	CO	AS+SP+PQ	AM; AS; QN	-	-	CO+PQ(8w)
	Djibouti	AL	AL+PQ	QN	-	-	CO+PQ (14d)
	Iran (Islamic Republic of)	-	AS+SP; AS+SP+PQ	AS; QN+D	-	-	CO+PQ(14d & 8w)
	Pakistan	CO	AS+SP+PQ	AS; QN	-	-	CO+PQ(14d)
	Saudi Arabia	-	AS+SP+PQ	AM; AS; QN	-	-	CO+PQ(14d)
	Somalia	AS+SP	AS+SP	AS; QN	-	-	CQ+PQ
Sudan	AS+SP	AS+SP	AM; QN	-	-	AL+PQ(14d)	
Yemen	AS+SP	AS+SP	AM; QN	-	-	CO+PQ(14d)	

WHO region	Country/area	<i>P. falciparum</i>			Prevention during pregnancy	Treatment	
		Uncomplicated unconfirmed	Uncomplicated confirmed	Severe			
<b>European</b>	Azerbaijan	AS+SP	AS+SP	AS; QN	-	CO+PQ(14d)	
	Kyrgyzstan	-	-	-	-	CO+PQ(14d)	
	Tajikistan	-	AL	QN	-	CO+PQ(14d)	
	Turkey	-	-	-	-	CO+PQ(14d)	
	Uzbekistan	-	-	-	-	CO+PQ(14d)	
	<b>Region of the Americas</b>	Argentina	-	AL+PQ	-	-	CO+PQ
		Belize	-	CO+PQ (1d)	QN	-	CO+PQ(14d)
		Bolivia (Plurinational State of)	-	AS+MQ+PQ	QN	-	CO+PQ(7d)
		Brazil	-	AL+PQ(1d); AS+MQ+PQ(1d)	AMH+CL; AS+CL; QN+CL	-	CO+PQ(7d)
		Colombia	-	AL	AS	-	CO+PQ(14d)
		Costa Rica	-	CO+PQ(1d)	QN	-	CO+PQ(7d); CO+PQ(14d)
		Dominican Republic	-	CO+PQ(1d)	CQ; QN	-	CO+PQ(14d)
		Ecuador	-	AL+PQ	QN	-	CO+PQ(14d)
		El Salvador	-	CO+PQ(1d)	QN	-	CO+PQ(14d)
French Guiana, France		-	AL; AT+PQ	AS; QN+D	-	CO+PQ(14d)	
Guatemala		-	CO+PQ(3d)	CQ	-	CO+PQ(14d)	
Guyana		-	AL+PQ(1d)	AM	-	CO+PQ(14d)	
Haiti		-	CO+PQ(1d)	QN	-	CO+PQ(14d)	
Honduras		-	CO+PQ(1d)	QN	-	CO+PQ(14d)	
<b>South-East Asia</b>	Mexico	-	CQ+PQ	-	-	CO+PQ	
	Nicaragua	-	CO+PQ(1d)	QN	-	CO+PQ(7d)	
	Panama	-	AL+PQ(1d)	QN	-	CO+PQ(7d); CO+PQ(14d)	
	Paraguay	-	AL+PQ	AS	-	CO+PQ	
	Peru	-	AS+MQ	AS+MQ	-	CO+PQ	
	Suriname	-	AL+PQ	AS	-	CO+PQ(14d)	
	Venezuela (Bolivarian Republic of)	-	AS+MQ+PQ	AM; QN	-	CO+PQ(14d)	
	Bangladesh	-	AL	AM; QN	-	CO+PQ(14d)	
	Bhutan	-	AL	AM; QN	-	CO+PQ(14d)	
	Democratic People's Republic of Korea	-	-	-	-	CO+PQ(14d)	
	India	CO	AS+SP+PQ	AM; AS; QN	-	CO+PQ(14d)	
	Indonesia	-	AS+AQ; DHA-PP+PQ	AM; AS; QN	-	AS+AQ; DHA-PP+PQ(14d)	
	Myanmar	-	AL; AM; AS+MQ; DHA-PPQ; PQ	AM; AS; QN	-	CO+PQ(14d)	
	Nepal	CO	AL+PQ	AS; QN	-	CO+PQ(14d)	
Sri Lanka	-	AL+PQ	QN	-	CO+PQ(14d)		
Thailand	-	AS+MQ	QN+D	-	CO+PQ(14d)		
Timor-Leste	-	AL	AM; AS; QN	-	CO+PQ(14d)		
<b>Western Pacific</b>	Cambodia	-	AS+MQ; DHA-PPQ+PQ	AM; QN	-	DHA-PPQ	
	China	-	ART+NQ; ART-PPQ; AS+AQ; DHA-PPQ	AM; AS; PYR	-	CO+PQ(8d)	
	Lao People's Democratic Republic	-	AL	AS+AL	SP(IPT)	AL	
	Malaysia	-	AS+MQ	QN+T	-	CO+PQ(14d)	
	Papua New Guinea	-	AL	AM; AS	SP(IPT)	AL+PQ	
	Philippines	AL	AL+PQ	QN+T; QN+CL; QN+D	SP(IPT)	CO+PQ(14d)	
	Republic of Korea	CO	-	-	-	CO+PQ(14d)	
	Solomon Islands	AL	AL	AL; AS	CQ	AL+PQ(14d)	
	Vanuatu	-	AL	QN	CO(weekly)	AL+PQ(14d)	
	Viet Nam	-	DHA-PPQ	AS; QN	CO(weekly)	CO+PQ(14d)	
	AL=Artemether-lumefantrine AM=Artemether AQ=Amodiaquine ART=Artemisinin	AS= Artesunate					
		AT= Atovaquone					
		CL= Clindamycin					
		CQ= Chloroquine					
D=Doxycycline							
DHA=Dihydroartemisinin							
MQ=Mefloquine							
NQ=Naphthoquine							
PG=Proguanil							
PPQ=Piperazine							
PQ=Primaquine							
PYR=Pyronaridine							
QN=Quinine							
SP=Sulphadoxine-pyrimethamine							
T=Tetracycline							

1 In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.2, [http://apps.who.int/gip/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gip/ebwha/pdf_files/WHA66/A66_R21-en.pdf))

# Annex 3 – Funding for malaria control, 2011–2013

WHO region	Country/area	Year	Contributions reported by donors				Contributions reported by countries							
			Global Fund <sup>1</sup>	PMU/ USAID <sup>2</sup>	The World Bank <sup>3</sup>	DFID <sup>4</sup>	Government	Global Fund	The World Bank	PMU/ USAID	Other bilaterals	WHO	UNICEF	Other contributions <sup>5</sup>
African	Algeria	2011	-	-	-	-	31 477 010	0	-	-	0	17 000	-	0
		2012	-	-	-	-	98 151 555	0	-	-	0	33 000	-	0
		2013	-	-	-	-	0 <sup>4</sup>	-	-	-	-	-	-	0
	Angola	2011	0	30 648 000	70 700	0	66 637 986 <sup>4</sup>	-	-	30 614 000	-	-	-	-
		2012	7 070 000	30 199 300	0	0	57 415 819 <sup>4</sup>	2 135 717	-	30 750 000	1 000 000	-	-	1 000 000
		2013	25 220 000	28 550 000	-	-	64 047 348 <sup>4</sup>	19 286 339	-	27 200 000	-	-	3 555 239	-
	Benin	2011	5 470 000	18 477 300	2 019 107	0	200 000 <sup>4</sup>	18 060 813	0	21 000 000	0	660 000	248 540	0
		2012	5 533 925	17 900 000	-	-	1 500 000 <sup>4</sup>	9 011 888	-	16 100 000	-	660 000	1 235 571	-
		2013	27 650 000	16 650 000	33 000	-	-	-	-	-	-	-	-	-
	Botswana	2011	-	-	-	-	2 250 933	-	-	-	1 171 250	-	-	1 171 250
		2012	-	-	-	-	1 921 908	-	-	-	250 000	-	-	250 000
		2013	-	-	0	-	1 947 775	0	-	0	0	-	0	0
	Burkina Faso	2011	10 500 000	-	-	-	6 482 938	2 546 429	0	2 072 216	34 903	99 027	140 253	0
		2012	38 000 000	-	-	-	11 380 472	4 834 000	0	2 698 000	16 600	29 500	14 000	0
		2013	9 400 000	-	1 980 000	-	58 920 267	40 645 351	0	8 552 723	0	37 800	521 760	942 955
	Burundi	2011	6 149 217	-	-	-	147 422 <sup>4</sup>	8 661 526	-	5 988 000	94 000	266 540	708 425	94 000
		2012	1 018 766	-	-	-	22 000 <sup>4</sup>	4 382 754	-	8 000 000	1 031 803	94 294	1 540 000	2 602 730
		2013	22 750 000	-	-	-	22 000 <sup>4</sup>	4 419 879	-	9 260 000	-	65 000	373 532	-
	Cabo Verde	2011	-	-	-	-	604 871 <sup>4</sup>	-	-	-	-	-	-	-
		2012	364 436	-	-	-	481 264 <sup>4</sup>	-	-	-	-	-	-	-
		2013	893 000	-	-	-	397 920	555 169	-	-	-	130 448	-	-
	Cameroon	2011	66 200 000	-	-	-	5 150 943 <sup>4</sup>	55 336 850	0	0	0	313 300	-	0
		2012	1 551 732	-	-	-	3 178 626 <sup>4</sup>	11 655 745	0	0	0	449 000	1 196 800	0
2013		10 880 000	-	-	-	5 246 883 <sup>4</sup>	15 293 706	-	-	5 415 537	904 218	118 341	5 415 537	
Central African Republic	2011	723 324	-	-	-	34 000 <sup>4</sup>	481 345	-	0	0	100 000	-	0	
	2012	3 578 002	-	-	-	371 463 <sup>4</sup>	-	-	0	74 535	-	219 747	0	
	2013	12 280 000	-	-	-	160 000	5 342 710	0	0	0	-	2 000 000	-	
Chad	2011	4 208 387	-	-	-	600 000 000 <sup>4</sup>	-	-	-	-	-	-	-	
	2012	-	-	-	-	-	-	-	-	-	-	-	-	
	2013	34 670 000	-	0	-	-	-	-	-	-	-	-	-	
Comoros	2011	1 106 246	-	-	-	114 215 <sup>4</sup>	773 425	-	0	0	137 000	-	0	
	2012	127 142	-	-	-	225 621 <sup>4</sup>	-	-	0	0	20 000	-	-	
	2013	3 540 000	-	-	-	137 147	499 000	-	0	0	40 000	5576	0	
Congo	2011	1 262 613	-	-	-	-	3 982 625	-	-	-	-	-	-	
	2012	1 035 856	-	-	-	6 956 815 <sup>4</sup>	4 740 367	-	-	-	-	-	-	
	2013	736 000	-	-	-	0	0	-	0	0	45 000	10 000	0	
Côte d'Ivoire	2011	14 300 000	-	-	-	34 964 064 <sup>4</sup>	27 941 028	-	-	244 000	2 605 303	69 012	307 749	
	2012	17 900 000	-	-	-	-	-	-	-	336 278	-	-	-	
	2013	45 350 000	-	-	-	4 663 194 <sup>4</sup>	74 853 096	-	-	2 440 000	36 338	49 780	244 000	
Democratic Republic of the Congo	2011	2 106 190	35 700 000	-	25 900 000	7 812 690	33 775 293	58 805 836	18 000 000	36 765 988	-	2 389 964	36 765 988	
	2012	105 000 000	37 000 000	-	-	303 835	64 140 129	73 719 913	34 930 000	45 000	520 000	5 584 965	12 575 325	
	2013	58 210 000	34 000 000	8 460 000	4 750 000	7 812 690	86 281 277	2 952 042	37 001 000	0	0	1 790 452	35 020 370	
Equatorial Guinea	2011	2 599 520	-	-	-	5 251 694 <sup>4</sup>	3 425 062	-	-	3 135 452	-	-	3 135 452	
	2012	-310 000	-	-	-	2 659 791 <sup>4</sup>	-	-	-	5 319 581	-	-	5 319 581	
	2013	0	-	-	-	2 582 747 <sup>4</sup>	0	-	-	4 490 030	-	-	4 490 030	
Eritrea	2011	4 908 106	-	-	-	-	10 722 859	0	0	0	0	0	0	
	2012	8 229 050	-	-	-	-	11 157 713	0	0	0	0	0	0	
	2013	14 460 000	-	-	-	-	15 871 769	-	-	-	-	-	-	
Ethiopia	2011	51 900 000	41 400 000	-	-	-	32 231 572	-	-	-	171 357	27 243	-	
	2012	23 800 000	41 500 000	-	-	-	42 424 919	-	-	-	0	-	-	
	2013	113 140 000	43 770 000	-	-	19 705 028	85 723 876	-	29 370 000	-	1 116 677	-	15 000 000	
Gabon	2011	-	-	-	-	-	-	-	-	-	-	-	-	
	2012	-270 000	-	-	-	-	-	-	-	-	-	-	-	
2013	0	-	-	-	226 596	0	0	0	0	11 276	0	0		

WHO region	Country/area	Year	Contributions reported by donors				Contributions reported by countries							
			Global Fund <sup>1</sup>	PMI/USAID <sup>2</sup>	The World Bank <sup>3</sup>	DFID <sup>4</sup>	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions <sup>5</sup>
African	Gambia	2011	7 119 980	-	-	-	613 412	8 835 940	0	0	89 000	40 000	4800	0
		2012	5 393 233	-	-	-	597 812	4 107 095	-	-	119 149	134 306	-	119 149
		2013	9 290 000	-	-	-	726 578	4 919 685	0	0	16 000	16 000	26 229	100 000
	Ghana	2011	-	30 400 000	-	8 566 783	6 663 582	53 169 328	400 000	34 000 000	250 000	300 000	2 000 000	16 000 000
		2012	24 600 000	30 800 000	-	-	7 700 154	34 668 998	0	27 010 000	581	200 000	79 490	7 911 545
		2013	67 800 000	28 550 000	3 480 000	2 010 000	8 736 726	67 804 357	0	27 000 000	38 817	47 050	0	-
	Guinea	2011	-	9 985 000	-	-	-	-	-	-	-	49 500	-	-
		2012	20 100 000	10 000 000	-	-	50 880	17 055 505	-	10 000 000	6 773 166	41 060	15 736	6 773 166
		2013	4 600 000	12 370 000	-	-	3 015 335	-	-	10 000 000	-	-	-	-
	Guinea-Bissau	2011	2 922 931	-	-	-	79 269 000 <sup>4</sup>	10 70 641	0	0	99 750	68 000	7 238	0
		2012	255 313	-	-	-	-	18 177	0	0	0	124 135	436 945	0
		2013	7 320 000	-	-	-	0	701 363	0	0	-	73 734	218 811	-
	Kenya	2011	12 200 000	36 400 000	-	17 400 000	2 635 294	38 141 176	6 423 529	35 964 706	20 338 983	-	-	20 338 983
		2012	10 900 000	35 900 000	-	-	2 635 294	9 353 875	8 790 698	35 604 651	232 558	-	337 209	13 111 111
		2013	33 310 000	34 260 000	-	17 520 000	1 372 093	29 089 771	1 127 907	32 400 000	23 457 627	-	0	23 457 627
	Liberia	2011	5 198 534	13 000 000	-	-	-	16 400 946	0	12 000 000	-	19 675	304 750	-
		2012	12 200 000	12 000 000	-	-	-	14 243 081	0	12 000 000	500 000	73 333	0	500 000
		2013	5 880 000	12 000 000	-	-	284 306 <sup>4</sup>	14 026 642	0	12 000 000	-	44 890	340 647	-
	Madagascar	2011	18 400 000	28 700 000	-	-	90 900	19 557 627	0	33 900 000	47 250	153 000	422 624	0
		2012	25 500 000	26 700 000	-	-	95 000	31 371 350	0	28 742 000	51 000	111 315	875 717	0
		2013	22 650 000	26 030 000	-	-	15 286	29 994 536	0	27 000 000	369 500	299 000	737 588	0
	Malawi	2011	45 000 000	26 500 000	-	-	720 000	9 720 000	-	21 600 000	3 240 000	-	-	720 000
		2012	2 473 270	24 200 000	-	-	-	-	-	-	-	-	-	-
2013		9 080 000	24 080 000	-	-	-	-	-	-	-	-	-	-	
Mali	2011	-	33 000 000	-	-	2 737 186 <sup>4</sup>	2 858 296	0	4 737 692	3 19 404	92 000	0	3 19 404	
	2012	-	26 500 000	-	-	1 259 872	0	5 298 930	-	-	52 584	-	-	
	2013	13 850 000	25 010 000	-	-	1 871 915	18 180 392	0	25 500 000	0	92 000	3 092 000	0	
Mauritania	2011	-	-	-	-	11 000 000	0	0	0	0	0	0	0	
	2012	-530 000	-	-	-	170 000	0	0	0	0	0	0	0	
	2013	0	-	-	-	1 130 593	-	-	-	-	11 767	42 583	-	
Mayotte, France	2011	-	-	-	-	-	-	-	-	-	-	-	-	
	2012	-	-	-	-	-	-	-	-	-	-	-	-	
	2013	-	-	-	-	-	-	-	-	-	-	-	-	
Mozambique	2011	7 683 006	33 000 000	-	2 526 054	2 006 991	-	-	-	-	-	-	-	
	2012	29 700 000	29 800 000	-	-	65 800 000	-	-	-	-	-	-	-	
	2013	12 630 000	29 020 000	1 880 000	-	65 800 000	2 497 243	-	29 000 000	-	100 000	2 668 555	-	
Namibia	2011	1 298 393	-	-	-	4 466 719	589 694	0	0	0	0	0	0	
	2012	1 243 974	-	-	-	4 500 000	926 804	0	0	0	0	0	0	
	2013	3 610 000	-	-	-	14 811 934	882 630	0	0	0	100 000	0	0	
Niger	2011	3 300 846	-	-	-	500 000 <sup>4</sup>	529 956	0	0	0	4 500	586 204	0	
	2012	441 165	-	-	-	2 115 926 <sup>4</sup>	225 901	60 000	38 000	0	16 000	816 535	0	
	2013	9 310 000	-	-	15 400 000	7 849 962	19 000 000	0	0	43 000	27 000	4 000 000	-	
Nigeria	2011	29 900 000	51 100 000	-	-	1 740 000	83 083 666	5 492 349	43 600 000	18 908 794	-	35 000	18 908 794	
	2012	123 000 000	55 900 000	-	-	5 541 401	48 592 984	7 040 569	73 271 000	101 837	-	1 000 000	-	
	2013	45 370 000	73 270 000	25 330 000	12 750 000	-	-	-	-	-	-	-	-	
Rwanda	2011	17 000 000	18 700 000	-	-	-	-	-	-	-	-	-	-	
	2012	26 000 000	18 100 000	-	-	-	-	-	-	-	-	-	-	
	2013	22 880 000	18 000 000	-	-	-	-	-	-	-	-	-	-	
Sao Tome and Principe	2011	1 571 589	-	-	-	52 941	1 521 822	0	0	0	54 428	3 000	0	
	2012	-	-	-	-	128 502	926 494	459 294	0	2 000	47 962	3 000	1 022 740	
	2013	3 700 000	-	0	-	107 238	1 002 778	0	1 050 830	32 512	0	0	2 000	
Senegal	2011	1 118 536	24 500 000	-	-	118 000	9 620 506	-	21 758 440	-	372 518	617 113	-	
	2012	20 700 000	23 800 000	-	-	213 985 <sup>4</sup>	4 675 836	-	24 500 000	-	12 490	443 356	-	
	2013	3 660 000	24 120 000	62 000	-	404 235 <sup>4</sup>	-	-	-	10 478	43 261	286 406	10 478	
Sierra Leone	2011	13 800 000	-	-	-	1 231 395 <sup>4</sup>	11 763 088	-	-	-	430 000	2812	-	
	2012	2 991 631	-	-	-	26 898	13 216 219	1 952 807	-	112 855	64 000	7 874 921	112 855	
	2013	6 210 000	-	-	-	-	-	-	-	-	-	-	-	

# Annex 3 – Funding for malaria control, 2011–2013 (continued)

WHO region	Country/area	Year	Contributions reported by donors					Contributions reported by countries										
			Global Fund <sup>1</sup>	PMU/US\$ <sup>2</sup>	The World Bank <sup>3</sup>	DFID <sup>4</sup>	Government	Global Fund	The World Bank	PMU/US\$ <sup>2</sup>	Other bilaterals	WHO	UNICEF	Other contributions <sup>5</sup>				
African	South Africa	2011	-	-	-	-	13 162 365	-	-	-	-	-	-	-	8 571 428	-	8 571 428	
		2012	-	-	-	-	24 291 216	-	-	-	-	-	-	-	254 869	-	254 869	
		2013	-	-	0	-	125 660 300	-	-	-	-	-	-	-	-	-	-	
	South Sudan <sup>6</sup>	2011	21 800 000	69 200	-	-	530 000 <sup>4</sup>	15 361 962	-	-	-	-	-	-	6 162 036	750 000	1 300 000	
		2012	27 000 000	-	-	-	0 <sup>4</sup>	38 496 269	-	-	-	-	-	-	192 057 566	2 934 000	1 300 000	
		2013	8 720 000	-	-	-	-	46 437 577	-	-	-	-	-	-	2 934 000	1 000 000	4 108 159	
	Swaziland	2011	-	-	-	-	1 002 947	1 924 448	0	0	0	0	0	0	0	0	0	0
		2012	1 116 084	-	-	-	685 739	1 376 584	-	-	-	-	-	-	-	-	-	-
		2013	1 340 000	-	-	-	556 245	640 867	0	0	0	0	0	0	132 445	20 250	0	
	Togo	2011	21 000 000	-	-	-	223 897	-	-	-	-	-	-	-	14 090	23 832	8674	14 090
		2012	239 270	-	-	-	225 535	884 398	0	0	0	0	0	0	0	88 490	0	8747
		2013	20 510 000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Uganda	2011	9 465 369	35 300 000	-	914 725	-	56 141 986	-	-	-	-	-	-	40 000	317 816	2 545 396	40 000
		2012	83 100 000	34 600 000	-	-	-	83 701 649	-	-	-	-	-	-	-	-	-	-
		2013	19 510 000	33 000 000	-	27 080 000	-	20 146 401	-	-	-	-	-	-	-	-	-	-
	United Republic of Tanzania <sup>7</sup>	2011	-	49 900 000	-	59 400	-	260 823	18 509 587	0	79 898	43 953	122 388	4898	138 140	490 000	138 140	52 388
		2012	-	48 000 000	-	-	-	554 417	18 031 872	2 281 500	4 288 680	138 140	490 000	138 140	41 153	2 528 703	41 153	2 528 703
		2013	56 330 000	46 060 000	-	-	-	952 652	142 485 233	0	40 602 700	0	70 000	0	0	0	0	0
	Mainland	2011	42 500 000	-	-	-	260 823	17 701 499	0	75 000	165 480	0	360 000	0	0	0	0	0
		2012	15 200 000	-	-	-	553 167	18 031 872	0	165 480	0	0	0	0	0	0	0	0
		2013	52 220 000	46 060 000	-	8 160 000	-	937 500	140 356 602	0	37 117 700	0	0	0	0	0	0	2 487 550
	Zanzibar	2011	1 363 902	-	-	-	0	808 088	0	4898	43 953	52 388	4898	138 140	130 000	138 140	138 140	138 140
		2012	-	-	-	-	1 250	2 128 631	0	2 281 500	4 123 200	3 485 000	-	-	-	-	-	-
2013		4 110 000	-	-	-	15 152	2 128 631	0	2 281 500	4 123 200	3 485 000	-	-	-	-	-	-	
Zambia	2011	-	-	-	-	279 788	5 282 152	29 401 235	24 000 000	24 000 000	24 000 000	7 215 019	130 000	75 000	50 000	7 161 185	7 161 185	
	2012	-	-	-	-	402 975	12 105 399	3 612 027	24 000 000	24 000 000	24 000 000	1 850 000	130 000	50 000	27 318	0	0	
	2013	29 340 000	24 030 000	10 450 000	4 830 000	185 325	19 361 732	0	24 000 000	24 000 000	24 000 000	3 500 000	204 466	0	18 250	0	0	
Zimbabwe	2011	-	-	-	-	906 000	19 069 239	-	12 000 000	2 000	0	0	0	0	0	0	2 000	
	2012	-	-	-	-	706 200	7 460 006	-	13 000 000	-	-	-	-	-	-	-	-	
	2013	9 990 000	15 030 000	-	-	1 082 700 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-	
Region of the Americas	Argentina	2011	-	-	-	-	1 082 700 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-
		2012	-	-	-	-	1 082 700 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-
		2013	-	-	0	-	1 082 700 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-
Belize	2011	-	-	-	-	215 224 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-	-
	2012	-	-	-	-	250 000 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-	-
	2013	-	-	0	-	261 500 <sup>4</sup>	0	-	-	-	-	-	-	-	-	-	-	-
Bolivia (Plurinational State of)	2011	1 525 890	-	-	-	1 110 000 <sup>4</sup>	1 400 635	0	177 000	0	0	0	0	0	0	0	0	0
	2012	3 423 745	-	-	-	1 110 097 <sup>4</sup>	1 909 295	0	72 000	0	0	0	0	0	0	0	0	0
	2013	-	-	-	-	1 110 097 <sup>4</sup>	365 193	0	0	0	0	0	0	0	0	0	0	0
Brazil	2011	7 641 225	-	-	-	78 565 078 <sup>4</sup>	17 851 837	0	151 079	0	0	0	0	0	0	0	0	0
	2012	-230 000	-	-	-	61 378 194 <sup>4</sup>	0	0	56 126	0	0	0	0	0	0	0	0	0
	2013	-	-	-	-	73 291 509 <sup>4</sup>	0	0	18 700	0	0	0	0	0	0	0	0	0
Colombia	2011	4 615 661	-	-	-	20 157 754 <sup>4</sup>	5 347 470	0	176 651	0	52 000	0	0	0	0	0	0	0
	2012	3 133 235	-	-	-	22 898 987 <sup>4</sup>	5 959 287	0	121 177	0	45 000	0	0	0	0	0	0	0
	2013	6 740 000	-	-	-	23 100 498 <sup>4</sup>	4 832 745	0	142 406	-	0	0	0	0	0	0	0	0
Costa Rica	2011	-	-	-	-	5 270 000 <sup>4</sup>	0	0	0	0	0	0	0	0	0	0	0	0
	2012	-	-	-	-	5 350 000 <sup>4</sup>	0	0	0	0	0	0	0	0	0	0	0	0
	2013	-	-	0	-	4 830 000 <sup>4</sup>	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic	2011	1 423 587	-	-	-	2 153 141 <sup>4</sup>	1 823 682	0	46 155	0	0	0	0	0	0	0	0	0
	2012	1 475 716	-	-	-	2 068 141 <sup>4</sup>	2 323 120	0	0	0	0	0	0	0	0	0	20 776	
	2013	-	-	-	-	1 966 812 <sup>4</sup>	1 158 508	0	0	0	21 930	0	0	0	0	0	0	0
Ecuador	2011	1 939 571	-	-	-	3 314 143 <sup>4</sup>	327 863	0	71 590	0	0	0	0	0	0	0	0	0
	2012	1 690 157	-	-	-	2 003 620 <sup>4</sup>	150 820	0	3595	0	0	0	0	0	0	0	0	0
	2013	1 110 000	-	-	-	1 852 740 <sup>4</sup>	735 047	-	19 719	-	50 000	-	-	-	-	-	-	-



WHO region	Country/area	Year	Contributions reported by donors				Contributions reported by countries							
			Global Fund <sup>1</sup>	PMI/ USAID <sup>2</sup>	The World Bank <sup>3</sup>	DFID <sup>4</sup>	Government	Global Fund	The World Bank	PMI/ USAID	Other bilaterals	WHO	UNICEF	Other contributions <sup>5</sup>
Region of the Americas	El Salvador	2011	-	-	-	-	3 513 000 <sup>4</sup>	0	0	0	-	0	0	0
		2012	-	-	-	-	3 688 650 <sup>4</sup>	0	-	0	-	0	0	0
		2013	-	-	0	-	2 854 844 <sup>4</sup>	0	-	-	56 948	-	-	-
	French Guiana, France	2011	-	-	-	-	-	0	0	0	-	-	-	-
		2012	-	-	-	-	-	0	0	0	-	-	-	-
		2013	-	-	-	-	-	0	0	0	-	-	-	-
	Guatemala	2011	8 917 396	-	-	-	10 600 000 <sup>4</sup>	3 596 431	0	27 617	0	0	0	0
		2012	2 821 516	-	-	-	5 637 645 <sup>4</sup>	2 780 074	0	11 933	0	5 260	0	0
		2013	-2 089 000	-	-	-	1 385 919 <sup>4</sup>	3 498 024	0	30 622	0	0	0	0
	Guyana	2011	612 352	-	-	-	1 107 340 <sup>4</sup>	-	0	120 000	0	14 000	0	4 000
		2012	425 717	-	-	-	1 075 952 <sup>4</sup>	799 527	0	150 000	0	20 000	0	0
		2013	379 000	-	-	-	904 858 <sup>4</sup>	809 474	0	297 569	0	15 899	0	-
	Haiti	2011	18 400 000	-	-	-	-	1 160 658	-	-	-	25 000	-	-
		2012	4 516 089	-	-	-	-	1 327 642	-	64 222	-	205 000	-	-
		2013	-	-	-	-	2 433 241	1 248 119	-	-	-	169 000	-	-
	Honduras	2011	572 711	-	-	-	990 876 <sup>4</sup>	842 438	0	80 278	0	11 856	0	0
		2012	1 288 990	-	-	-	592 631 <sup>4</sup>	970 940	0	58 936	0	14 546	0	0
		2013	955 000	-	-	-	971 742 <sup>4</sup>	1 106 404	0	99 330	0	0	0	0
	Mexico	2011	-	-	-	-	23 741 789 <sup>4</sup>	0	0	0	0	0	0	0
		2012	-	-	-	-	24 285 354 <sup>4</sup>	0	0	0	0	0	0	0
2013		-	-	0	-	25 256 768 <sup>4</sup>	0	-	-	-	0	-	-	
Nicaragua	2011	2 331 302	-	-	-	320 053 <sup>4</sup>	2 032 089	0	43 163	0	5 433	0	0	
	2012	803 339	-	-	-	439 258 <sup>4</sup>	1 747 908	0	43 163	0	6 001	0	0	
	2013	2 430 000	-	-	-	980 326 <sup>4</sup>	2 075 252	0	37 630	0	0	0	-	
Panama	2011	-	-	-	-	3 798 322 <sup>4</sup>	0	0	110 000	0	0	0	0	
	2012	-	-	-	-	7 919 505 <sup>4</sup>	0	0	23 951	0	15 209	0	0	
	2013	-	-	0	-	7 220 410 <sup>4</sup>	0	0	32 136	0	-	0	-	
Paraguay	2011	-	-	-	-	1 813 409 <sup>4</sup>	0	0	0	0	0	0	0	
	2012	-	-	-	-	2 115 436 <sup>4</sup>	0	-	0	0	5 635	0	0	
	2013	-	-	0	-	5 145 662 <sup>4</sup>	0	-	-	-	0	-	-	
Peru	2011	-	-	-	-	76 268 653 <sup>4</sup>	0	0	0	0	0	0	0	
	2012	-	-	-	-	125 155 514 <sup>4</sup>	0	0	77 438	0	-	0	0	
	2013	-	-	0	-	429 285 <sup>4</sup>	0	0	56 703	0	0	0	0	
Suriname	2011	710 949	-	-	-	-	500 000	0	19 989	0	0	0	0	
	2012	355 313	-	-	-	1 500 000 <sup>4</sup>	355 000	0	19 625	0	100 000	0	-	
	2013	549 000	-	-	-	1 938 592 <sup>4</sup>	550 000	-	140 000	-	-	0	-	
Venezuela (Bolivarian Republic of)	2011	-	-	-	-	790 292 <sup>4</sup>	0	0	0	0	-	-	-	
	2012	-	-	-	-	800 000 <sup>4</sup>	0	0	0	-	-	-	-	
	2013	-	-	0	-	-	0	0	0	-	-	-	-	
Eastern Mediterranean	Afghanistan	2011	1 161 128	-	-	-	7 535 557	-	802 371	-	30 000	-	65 236	
		2012	11 800 000	-	-	-	10 613 985	-	-	-	116 291	-	-	
		2013	17 630 000	-	1 730 000	-	16 651 753	-	-	-	109 068	-	-	
Djibouti	2011	112 748	-	-24 500	-	84 745	206 939	420 117	-	-	-	-	-	
	2012	44 923	-	-	-	1 050 000	48 527	8413	-	-	55 782	142 000	-	
	2013	0	-	-	-	-	-	-	-	-	121 616	200 563	9 200	
Iran (Islamic Republic of)	2011	2 350 551	-	-	-	12 500 000	1 474 935	-	-	-	12 000	-	-	
	2012	8 256 054	-	-	-	9 222 400	5 238 195	-	-	-	12 500	-	-	
	2013	-	-	-	-	5 000 000	-	-	-	-	6 000	-	-	
Pakistan	2011	1 185 971	-	-	-	4 496 398	-	-	-	-	500 000	-	481 000	
	2012	19 000 000	-	-	-	15 231 843	-	-	-	-	-	-	-	
	2013	5 850 000	-	-	-	8 057 177	-	-	-	-	-	-	-	
Saudi Arabia	2011	-	-	-	-	26 360 000	-	-	-	-	-	-	-	
	2012	-	-	-	-	29 440 000	-	-	-	-	-	-	-	
	2013	-	-	0	-	29 440 000	-	-	-	-	-	-	-	
Somalia	2011	2 594 870	-	-	-	-	5 685 340	-	-	-	86 000	-	-	
	2012	22 100 000	-	-	-	63 250	11 904 217	-	-	-	103 400	-	-	
	2013	2 270 000	-	-	-	64 515	15 062 018	-	-	-	138 400	-	-	

# Annex 3 – Funding for malaria control, 2011–2013 (continued)

WHO region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund <sup>1</sup>	PMU/USID <sup>2</sup>	The World Bank <sup>3</sup>	DFID <sup>4</sup>	Government	Global Fund	The World Bank	PMU/USID	Other bilaterals	WHO	UNICEF	Other contributions <sup>5</sup>	
Eastern Mediterranean	Sudan	2011	14 900 000	-	-	-	40 876 334	19 418 808	-	-	1 041 351	114 575	553 635	363 495	
		2012	51 800 000	-	-	-	40 783 892	38 398 132	-	-	-	641 921	494 000	1 680 907	
		2013	35 680 000	-	-	-	34 289 075	34 938 594	-	-	-	475 893	140 000	-	
	Yemen	2011	-	-	-	-	2 293 646	880 150	-	-	80 000	240 000	-	9 084 589	
		2012	-	-	-	-	2 293 646	8 908 540	-	-	-	-	-	5 807 093	
		2013	5 970 000	-	-	-	2 293 553	6 256 730	-	-	200 000	-	-	1 986 444	
	European	Azerbaijan	2011	280 163	-	-	-	3 738 835	610 905	-	-	0	35 000	-	0
			2012	548 346	-	-	-	5 000 968	462 920	-	-	0	35 000	-	0
			2013	554 000	-	-	-	4 827 461	432 570	-	-	-	35 000	-	0
		Kyrgyzstan	2011	1 016 966	-	-	-	70 000	1 114 124	-	-	0	0	-	0
			2012	496 411	-	-	-	70 000	850 061	-	-	0	0	-	0
			2013	580 000	-	-	-	65 000	434 351	-	-	-	25 000	-	0
		Tajikistan	2011	3 305 782	-	-	-	412 825 <sup>4</sup>	3 403 673	-	-	0	15 000	-	0
2012			2 114 927	-	-	-	416 753 <sup>4</sup>	2 068 376	-	-	0	20 000	-	0	
2013			1 310 000	-	-	-	633 740	1 714 393	-	-	-	35 000	-	-	
Turkey		2011	-	-	-	-	21 821 901	0	-	-	0	0	-	0	
		2012	-	-	-	-	22 927 000	0	-	-	0	0	-	0	
		2013	0	-	-	-	-	0	-	-	-	0	-	0	
Uzbekistan		2011	-	-	-	-	1 529 810	583 446	-	-	-	0	-	0	
	2012	-	-	-	-	1 208 161	448 627	-	-	0	0	-	0		
	2013	545 000	-	-	-	1 480 992	288 060	-	-	-	0	-	0		
South-East Asia	Bangladesh	2011	8 873 006	-	-	-	8 686 483 <sup>4</sup>	8 890 744	-	-	-	118 000	-	-	
		2012	3 304 342	-	-	-	4 761 717	7 505 444	439 490	-	-	98 000	-	-	
		2013	16 400 000	-	-	-	4 134 615	8 033 087	-	-	-	399 189	-	-	
	Bhutan	2011	260 267	-	-	-	222 222	-	-	-	22 600	22 600	-	22 600	
		2012	440 259	-	-	-	213 595	292 324	-	-	146 759	27 898	-	146 759	
		2013	405 000	-	-	-	-	-	-	-	-	-	-	-	
	Democratic People's Republic of Korea	2011	4 756 310	-	-	-	1 875 000	2 500 899	-	-	-	23 000	-	-	
		2012	3 163 494	-	-	-	1 882 000	6 568 434	-	-	-	5 000	-	-	
		2013	2 710 000	-	-	-	1 895 000	2 706 329	-	-	-	25 000	-	-	
	India	2011	3 260 689	-	-	-	99 525 920	6 496 121	30 898 403	-	-	-	-	-	
		2012	11 500 000	-	-	-	47 240 020	7 863 868	16 696 978	-	-	-	-	-	
		2013	7 170 000	-	15 800 000	-	51 336 600	4 811 540	4 299 233	-	-	-	-	-	
	Indonesia	2011	18 800 000	-	-	-	-	40 573 846	0	-	0	222 222	3 111 111	0	
2012		18 800 000	-	-	-	-	11 072 851	0	-	0	51 141	471 362	0		
2013		31 050 000	-	-	-	-	34 580 791	0	-	0	400 000	3 525 000	0		
Myanmar	2011	-	-	-	1 814 419	1 259 002	5 900 000	-	-	-	-	-	-		
	2012	19 800 000	-	-	-	1 000 000	10 513 382	-	5 500 000	1 757 475	142 500	948 890	870 441		
	2013	15 030 000	-	-	2 340 000	1 028 807	14 863 117	-	5 400 000	-	142 500	1 000 000	-		
Nepal	2011	-	-	-	-	192 361	1 907 500	0	-	0	46 500	0	3 559 305		
	2012	6 182 591	-	-	-	726 465	2 960 440	-	-	-	46 500	-	-		
	2013	4 920 000	-	-	-	1 910 485	3 110 685	-	-	-	46 500	-	-		
Sri Lanka	2011	4 384 546	-	-	-	1 800 000	5 316 488	-	-	-	18 000	-	-		
	2012	2 618 112	-	-	-	572 945	1 442 758	-	-	-	7 400	-	-		
	2013	3 880 000	-	-	-	601 528	1 382 732	-	-	-	10 000	-	-		
Thailand	2011	13 800 000	-	-	-	15 252 969	3 002 074	-	77 541	566 115	61 408	-	566 115		
	2012	7 152 655	-	-	-	7 098 780	16 246 556	-	-	79 772	104 979	-	79 772		
	2013	11 330 000	-	-	-	5 893 255	9 937 671	-	2 783 111	-	139 166	-	70 833		
Timor-Leste	2011	774 076	-	-	-	2 278 680	3 902 662	0	0	0	41 920	0	0		
	2012	5 040 394	-	-	-	2 687 572	5 375 143	0	0	80 000	25 000	0	0		
	2013	2 600 000	-	-	-	2 981 432	4 372 545	-	-	-	65 012	-	120 000		
Western Pacific	Cambodia	2011	15 300 000	-	-	-	3 127 120	39 422 203	0	0	0	380 347	0	60 000	
		2012	1 441 288	-	-	-	3 427 795	22 685 407	0	456 796	6 407 41	201 718	0	0	
		2013	12 110 000	-	-	-	3 484 029	13 240 888	0	3 996 624	0	431 792	0	-	

WHO region	Country/area	Year	Contributions reported by donors				Contributions reported by countries								
			Global Fund <sup>1</sup>	PMI/USAID <sup>2</sup>	The World Bank <sup>3</sup>	DFID <sup>4</sup>	Government	Global Fund	The World Bank	PMI/USAID	Other bilaterals	WHO	UNICEF	Other contributions <sup>5</sup>	
Western Pacific	China	2011	4 782 175	-	-	-	-	24 430 525	-	-	-	-	-	-	-
		2012	12 800 000	-	-	-	-	33 697 258	-	-	-	-	-	-	-
		2013	1 860 000	-	-	-	16 812 725	0	0	0	0	0	0	0	0
	Lao People's Democratic Republic	2011	7 010 161	-	-	-	470 764	4 326 267	0	0	0	46 000	0	0	0
		2012	6 394 182	-	-	-	1 361 672	3 745 346	0	271 773	20 000	0	0	2500	
		2013	3 260 000	406 000	-	-	1 122 915	4 038 937	0	1 201 132	20 000	0	0	0	
	Malaysia	2011	-	-	-	-	37 844 710	0	-	-	0	0	0	0	0
		2012	-	-	-	-	44 424 578	-	-	-	-	-	-	-	-
		2013	-	-	0	-	39 845 997	-	-	-	-	0	-	-	8 968 127
	Papua New Guinea	2011	10 600 000	-	-	-	190 200	23 842 245	0	0	0	200 000	0	0	0
		2012	22 900 000	-	-	-	584 290 <sup>4</sup>	-	-	-	-	-	-	-	-
		2013	22 970 000	-	-	-	388 000	25 311 547	0	0	0	-	0	0	-
	Philippines	2011	1 665 107	-	-	-	3 969 519 <sup>4</sup>	12 322 318	0	0	0	75 000	0	0	2 501 000
		2012	4 271 657	-	-	-	3 939 519 <sup>4</sup>	7 224 199	0	0	0	0	0	0	0
		2013	4 810 000	-	-	-	5 235 686	8 612 874	0	0	0	315 326	0	0	22 220
	Republic of Korea	2011	-	-	-	-	712 000	0	-	-	0	0	0	0	0
		2012	-	-	-	-	681 674	0	-	-	0	0	0	0	0
		2013	-	-	0	-	519 102	0	-	-	-	0	-	-	0
	Solomon Islands	2011	-	-	-	-	840 284	1 537 685	0	0	0	697 890	0	0	6 229 231
		2012	-	-	-	-	269 486	1 696 290	0	0	0	706 000	0	0	5 432 362
2013		-	-	0	-	270 180	1 305 840	0	0	1 987 523	852 472	0	0	6 74 896	
Vanuatu	2011	-	-	-	-	943 619	2 052 359	0	0	0	287 615	0	0	2 050 753	
	2012	-	-	-	-	812 377 <sup>4</sup>	2 446 418	0	0	0	287 615	0	0	1 178 215	
	2013	-	-	0	-	812 377 <sup>4</sup>	1 162 890	0	0	1 692 091	287 615	0	0	0	
Viet Nam	2011	-	-	-	-	5 229 083	5 648 842	0	0	0	108 500	0	0	0	
	2012	-	-	-	-	4 615 385	3 961 323	0	0	0	156 804	0	0	0	
	2013	4 250 000	-	1 000 000	-	4 523 810	5 254 143	0	0	0	410 000	0	0	-	

DFID, United Kingdom Department for International Development; PMI, United States President's Malaria Initiative; UNICEF, United Nations Children's Fund; USAID, United States Agency for International Development

1. Source: The Global Fund website (malaria-specific grants)

2. Source: USAID internal database, The President's Malaria Initiative, Sixth Annual Report to Congress, April 2013

3. Source: OECD Database

4. Budget not expenditure

5. Other contributions as reported by countries; NGOs; foundations, etc.

6. In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf))

7. Where national totals for the United Republic of Tanzania are unavailable, refer to the sum of Mainland and Zanzibar

\* Negative disbursements reflect recovery of funds on behalf of the financing organization DFID, Department for International Development; PMI, President's Malaria Initiative; UNICEF, United Nations Children's Fund; USAID, United States Agency for International Development

# Annex 4 – Intervention coverage estimated from routinely collected data, 2011–2013

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of population with access to an ITN	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% antimalarials distributed vs reported cases	% ACTs distributed vs reported P.f. cases
African	Algeria	2011	0	0	0	-	-	0	0	191	0	65	0
		2012	0	0	0	-	13 000	0	0	887	0	65	0
		2013	0	0	0	-	17 407	0	0	603	0	13	0
	Angola	2011	1 720 738	1 720 738	0	39	21	689 638	3	3 898 070	3 898 070	100	100
		2012	477 044	477 044	0	34	26	676 090	3	3 747 190	3 747 190	99	99
		2013	1 182 519	1 182 519	0	28	28	419 353	2	2 814 900	2 814 900	74	74
	Benin	2011	5 135 942	5 135 942	0	100	67	426 232	4	1 911 338	1 911 338	64	64
		2012	708 643	708 643	0	100	44	694 729	7	-	-	-	-
		2013	584 285	584 285	0	100	20	694 729	7	-	-	-	-
	Botswana	2011	12 000	12 000	0	18	-	207 991	16	10 149	10 149	100	100
		2012	52 500	52 500	0	21	-	163 647	13	4606	4606	100	100
		2013	0	0	0	9	-	176 887	13	3953	3953	100	100
	Burkina Faso	2011	774 344	774 344	0	99	74	116 708	1	5 918 783	5 703 335	100	100
		2012	264 432	264 432	0	87	60	115 638	1	5 720 987	5 720 987	100	100
		2013	9 959 820	9 959 820	0	100	67	0	0	5 797 938	5 797 938	100	100
	Burundi	2011	2 869 433	2 869 433	0	100	59	224 496	3	2 343 078	1 791 325	100	100
		2012	703 699	703 699	0	100	63	59 300	1	2 183 228	2 183 228	100	100
		2013	731 981	731 981	0	98	58	0	0	3 836 437	3 836 437	100	100
	Cabo Verde	2011	0	0	0	-	-	282 265	100	0	0	-	-
		2012	0	0	0	-	-	282 265	100	0	0	0	0
		2013	0	0	0	-	-	298 475	100	0	0	0	0
	Cameroon	2011	8 115 879	8 115 879	0	71	22	0	0	1 234 405	1 234 405	29	29
		2012	217 600	217 600	0	71	62	0	0	762 338	760 375	21	21
		2013	0	0	0	67	49	0	0	1 048 811	497 022	29	14
	Central African Republic	2011	0	0	0	38	45	0	0	0	0	-	-
		2012	30 000	30 000	0	39	32	0	0	0	0	0	0
		2013	150 000	150 000	0	7	38	0	0	0	420 000	420 000	27
	Chad	2011	3 495 086	3 495 086	0	58	36	0	0	122 879	122 879	4	4
		2012	0	0	0	56	54	0	0	0	0	-	-
		2013	1 234 177	1 234 177	0	67	56	0	0	814 449	814 449	25	25
Comoros	2011	9896	9896	0	69	71	31 922	5	117 620	117 620	74	74	
	2012	666	666	0	68	48	0	0	0	0	-	-	
	2013	377 252	377 252	0	95	54	31 150	4	60 868	60 868	38	38	
Congo	2011	507 763	507 763	0	22	21	0	0	113 705	113 705	8	8	
	2012	1 203 982	1 203 982	0	71	56	0	0	202 402	202 402	14	14	
	2013	14 005	14 005	0	70	81	0	0	0	0	-	-	
Côte d'Ivoire	2011	8 135 784	8 135 784	0	86	48	0	0	2 349 795	2 349 795	56	56	
	2012	0	0	0	75	36	0	0	0	0	-	-	
	2013	1 821 267	1 821 267	0	88	15	0	0	2 358 567	2 358 567	57	57	
Democratic Republic of the Congo	2011	12 033 092	12 033 092	0	62	31	111 972	0	15 240 702	15 240 702	89	89	
	2012	18 644 449	18 644 449	0	90	48	103 497	0	11 693 982	11 693 982	68	68	
	2013	7 947 747	7 947 747	0	100	50	36 126	0	14 941 450	7 112 841	87	42	
Equatorial Guinea	2011	2 798	2 798	0	1	39	27 319	0	40 199	40 199	13	13	
	2012	4 431	4 431	0	2	28	148 092	20	40 199	40 199	22	22	
	2013	8 397	8 397	0	4	19	129 000	17	40 911	40 911	22	22	
Eritrea	2011	992 779	992 779	0	45	45	274 143	5	197 403	197 403	100	100	
	2012	83 943	83 943	0	35	48	298 734	5	219 793	219 793	100	100	
	2013	86 597	86 597	0	33	38	275 857	4	182 911	182 911	100	100	
Ethiopia	2011	4 279 165	4 279 165	0	60	52	20 865 542	35	5 058 582	5 058 582	100	100	
	2012	6 260 000	6 260 000	0	71	49	5 721 331	9	9 000 000	9 000 000	100	100	
	2013	11 709 780	11 709 780	0	64	52	23 150 388	37	12 800 000	9 164 641	100	100	
Gabon	2011	0	0	0	-	-	0	0	0	0	-	-	
	2013	21 666	21 666	0	2	24	0	0	2 166	850 000	-	-	

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of population with access to an ITN	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% antimalarials distributed vs reported cases	% ACTs distributed vs reported P.f. cases <sup>1</sup>	
African	Gambia	2011	734 063	734 063	0	93	60	747 485	43	549 830	549 830	100	100	
		2012	275 042	275 042	0	100	81	484 086	27	484 901	484 901	93	93	
		2013	138 149	138 149	0	100	80	800 290	43	468 767	468 767	90	90	
	Ghana	2011	4 151 906	4 151 906	0	39	35	926 699	4	14 493 253	14 493 253	100	100	
		2012	7 874 094	7 874 094	0	93	60	2 117 240	8	4 170 828	4 170 828	60	60	
		2013	1 926 300	1 926 300	0	97	78	2 936 037	11	8 330 784	8 330 784	100	100	
	Guinea	2011	48 942	48 942	0	2	41	924 025		924 025	924 025	21	21	
		2012	90 188	90 188	0	3	28	902 516		902 516	802 110	21	18	
		2013	5 268 245	5 268 245	0	83	42	370 771		370 771	1 402 400	8	32	
	Guinea-Bissau	2011	170 442	170 442	0	26	38							
		2012	73 819	73 819	0	34	60							
		2013	116 268	116 268	0	38	71							
	Kenya	2011	9 058 461	9 058 461	0	73	60	1 832 090	6					
		2012	4 226 261	4 226 261	0	79	80	2 435 836	7	12 000 000	12 000 000	100	100	
		2013	1 641 982	1 641 982	0	80	76	0	0	0	8 300 000	7 000 000	100	100
	Liberia	2011	830 000	830 000	0	100	38	834 671		8 300 000	8 300 000	100	100	
		2012	0	0	0	74	43	960 000		6 059 525	4 581 525	100	100	
		2013	510 275	510 275	0	35	38	367 930		1 332 055	443 900	100	38	
	Madagascar	2011	3 939 740	3 939 740	0	62	63	10 012 822	46	256 452	256 452	30	30	
		2012	6 947 498	6 947 498	0	76	53	1 597 374	7	2 026 100	2 026 100	100	100	
		2013	1 037 395	1 037 395	0	89	62	1 579 521	7	266 000	266 000	20	20	
	Malawi	2011	6 742 108	6 742 108	0	41	38	321 919	2	7 199 047	7 202 530	100	100	
		2012	636 318	636 318	0	100	49	1 873 056	12	6 956 821	6 956 821	100	100	
		2013	4 173 156	4 173 156	0	65	58	697 512	5	17 199 74	17 199 74	49	49	
	Mali	2011	1 935 348	1 935 348	0	86	63	758 021	5	3 842 790	3 842 790	100	100	
		2012	636 465	636 465	0	79	51	826 386	5	3 080 130	3 080 130	100	100	
		2013	13 000	13 000	0	55	35			64 078	64 078	10	10	
	Mauritania	2011	105 000	105 000	0	13	19			56 015	56 015	8	8	
		2012	2543	2543	0	18		23 559	51					
		2013	40 988	40 988	0	100		43 399	9					
	Mayotte, France	2011	39 400	39 400	0	100		381	1					
		2012	3 244 164	3 244 164	0	44	41	8 532 525	35	9 391 810	9 391 810	100	100	
		2013	2 669 244	2 669 244	0	53	49	1 789 110	7	5 106 570	5 106 570	73	73	
Mozambique	2011	3 315 727	3 315 727	0	64	57	9 647 202	37	13 477 650	13 477 650	100	100		
	2012	87 900	87 900	0	30		599 939	38	110 031	110 031	100	100		
	2013	93 900	93 900	0	30		559 305	34	22 313	22 313	100	100		
Namibia	2011	104 249	104 249	0	31		598 901	36	90 377	87 520	91	88		
	2012	516 550	516 550	0	14	41	186 603	1	3 199 290	3 199 290	73	73		
	2013	541 550	541 550	0	19	35	192 761	1	3 500 243	3 500 243	74	74		
Niger	2011	409 400	409 400	0	15	28			6 556 070	6 556 070	100	100		
	2012	18 141 631	18 141 631	0	62	32	177 235	0	7 648 896	7 648 896	16	16		
	2013	14 448 634	14 448 634	0	55	36	2 415 540	1	12 877 360	12 877 360	27	27		
Nigeria	2011	6 215 476	6 215 476	0	40	38	0	0	32 568 349	32 568 349	67	67		
	2012	816 915	816 915	0	90	64	1 571 625	14	288 508	288 788	48	48		
	2013	1 675 233	1 675 233	0	100	53	1 080 889	9	6 197 86	6 114 82	95	93		
Rwanda	2011	5 249 761	5 249 761	0	100	57								
	2012	4985	4985	0	85		115 610	63	11 546	11 546	100	100		
	2013	105 312	105 312	0	100		146 773	78	10 703	10 703	85	85		
Sao Tome and Principe	2011	14 596	14 596	0	100		153 514	80	8752	8752	55	0		
	2012	2 465 770	2 465 770	0	72	38	887 315	7	675 707	675 707	19	19		
	2013	267 482	267 482	0	44	47	1 095 093	8	713 344	713 344	19	19		
Senegal	2011	3 902 145	3 902 145	0	85	53	690 090	5	976 840	976 840	25	25		
	2012	45 833	45 833	0	100	65	851 000	15	1 873 610	1 873 610	100	100		
	2013	139 391	139 391	0	100	27	986 898	17	2 004 308	2 004 308	100	100		
Sierra Leone	2011	441 859	441 859	0	19	35	0	0	2 201 370	2 201 370	100	100		
	2013	441 859	441 859	0	19	35	0	0	2 201 370	2 201 370	100	100		

# Annex 4 – Intervention coverage estimated from routinely collected data, 2011–2013 (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	% of population potentially protected by ITNs delivered	Modelled % of population with access to an ITN	No. of people protected by IBS	% IBS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% antimalarials distributed vs reported cases	% ACTs distributed vs reported P.f. cases	
African	South Africa	2011		0	0	-	-	5 000 000	96	7620	7620	77	0	
		2012		0	0	-	-	5 000 000	95	3897	3897	57	0	
		2013		0	0	-	-	2 318 129	44	8272	5444	81	54	
	South Sudan <sup>2</sup>	2011	386 563	386 563	0	100	73	61	170 440	2	4 333 150	4 333 150	100	100
		2012	1 036 109	1 036 109	0	60	71	332 968	3	3 125 448	3 125 448	87	93	
	Swaziland	2011	47 857	47 857	0	63	-	-	1750	1750	1750	100	100	100
		2012	40 612	40 612	0	83	-	-	350	350	350	47	47	100
		2013	0	0	0	46	-	-	1352	1352	1352	100	100	100
	Togo	2011	2 547 606	2 547 606	0	78	53	0	0	0	659 800	39	-	-
		2012	329 999	329 999	0	85	74	0	0	0	812 911	914 218	52	58
		2013	468 575	468 575	0	88	61	0	0	0	964 927	802 904	62	51
	Uganda	2011	709 000	709 000	0	46	47	2 543 983	7	19 579 200	19 579 200	100	100	100
		2012	1 000 747	1 000 747	0	45	39	2 543 983	7	23 864 320	23 864 320	100	100	100
		2013	13 219 306	13 219 306	0	72	49	2 581 839	7	24 375 450	24 375 450	100	100	100
	United Republic of Tanzania	2011	14 481 950	14 481 950	0	-	-	-	7 189 920	-	16 775 381	16 775 381	-	-
		2012	2 208 293	2 208 293	0	-	-	6 774 050	-	-	10 175 160	10 175 160	-	-
		2013	2 547 391	2 547 391	0	-	-	3 761 997	-	-	20 382 485	20 382 485	-	-
	Mali	2011	14 452 674	14 452 674	0	100	61	6 095 891	14	16 727 880	16 727 880	100	100	100
		2012	1 535 867	1 535 867	0	95	65	6 518 120	14	10 128 060	10 128 060	100	100	100
		2013	2 489 536	2 489 536	0	69	44	3 537 097	7	20 377 410	20 377 410	100	100	100
	Zanzibar	2011	29 276	29 276	0	48	-	1 094 029	83	47 501	47 501	100	100	100
		2012	672 426	672 426	0	97	-	255 930	19	47 100	47 100	100	100	100
		2013	57 855	57 855	0	98	-	224 900	16	5075	5075	100	100	100
	Zambia	2011	3 532 137	3 532 137	0	81	54	7 542 497	56	6 957 420	6 957 420	100	100	100
		2012	2 688 575	2 688 575	0	94	77	4 250 000	31	4 289 743	4 289 743	100	100	100
		2013	3 362 588	3 362 588	0	100	80	1 063 460	7	15 926 301	15 926 301	100	100	100
Zimbabwe	2011	0	0	0	52	58	3 299 058	52	2 079 657	2 079 657	100	100	100	
	2012	457 000	457 000	0	46	39	3 106 659	48	1 236 958	1 236 958	100	100	100	
	2013	2 010 000	2 010 000	0	67	60	3 106 659	47	815 260	815 260	100	100	100	
Region of the Americas	Argentina	2011		0	0	-	-	23 088	11	100	100	100	100	
		2012		0	0	-	-	26 712	13	50	50	100	100	
		2013		0	0	-	-	24 636	12	50	50	100	100	
	Belize	2011	0	0	0	2	-	31 363	14	79	1	100	100	
		2012	3000	3000	0	2	-	20 052	9	37	1	100	100	
		2013	2324	2324	0	4	-	21 413	9	26	0	100	100	
	Bolivia (Plurinational State of)	2011	42 800	42 800	0	4	-	45 214	1	7200	923	100	100	
		2012	24 526	24 526	0	5	-	28 000	1	7400	350	100	100	
		2013	20 965	20 965	0	4	-	30 280	1	7342	959	100	100	
	Brazil	2011	13 739	13 739	0	1	-	714 128	2	445 531	114 081	100	100	
		2012	361 241	361 241	0	2	-	369 103	1	905 010	141 410	100	100	
		2013	147 736	147 736	0	2	-	324 477	1	452 990	122 290	100	100	
	Colombia	2011	274 682	262 732	11 950	7	-	1 032 000	10	92 518	27 698	100	100	
		2012	313 398	313 398	0	11	-	359 100	3	171 342	50 398	100	100	
2013		146 196	146 196	0	12	-	154 000	1	68 879	48 285	100	100		
Costa Rica	2011	4000	4000	0	1	-	48 000	3	170	0	100	100		
	2012	3000	3000	0	1	-	22 000	1	50	0	100	100		
	2013	7000	7000	0	1	-	13 560	1	20	0	100	100		
Dominican Republic	2011	70 437	70 437	0	3	-	78 236	1	1608	8	100	-		
	2012	62 095	62 095	0	4	-	61 557	1	947	5	100	-		
	2013	54 139	54 139	0	4	-	49 510	1	579	4	100	-		
Ecuador	2011	30 022	30 022	0	4	-	105 234	1	13 979	8999	100	100		
	2012	13 502	13 502	0	2	-	83 357	1	4720	548	100	100		
		2013	20 337	20 337	0	1	94 321	1	378	161	100	98		

WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of population with access to an ITN	No. of people protected by IRS	% IRS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% antimalarials distributed vs reported cases	% ACTs distributed vs reported P.f. cases <sup>1</sup>	
Region of the Americas	El Salvador	2011	0	0	0	-	-	26 167	2	109 635	0	100	-	
		2012	0	0	0	-	-	16 905	1	124 753	0	100	-	
		2013	10 000	10 000	0	1	-	15 076	1	10 865	0	100	-	
	French Guiana, France	2011	0	0	0	0	-	18 895	8	-	-	-	-	
		2012	13 969	13 969	0	10	-	16 625	7	-	-	-	-	
		2013	2880	2880	0	12	-	16 932	7	-	-	-	-	
		2011	0	0	0	0	-	42 555	1	6822	0	100	-	
	Guatemala	2012	618 803	618 803	0	16	-	65 390	1	7966	0	100	-	
		2013	282 788	282 788	0	23	-	37 450	1	-	-	-	-	
		2011	14 550	14 550	0	7	-	19 320	3	29 471	20 299	100	100	
	Guyana	2012	16 800	16 800	0	10	-	20 700	3	31 601	20 291	100	100	
		2013	27 921	27 921	0	14	-	41 000	6	31 479	13 655	100	100	
		2011	0	0	0	0	-	0	0	0	0	100	-	
	Haiti	2012	2 987 653	2 987 653	0	53	-	0	0	0	117 293	0	100	-
		2013	0	0	0	52	-	-	-	109 625	0	100	-	
		2011	8798	8798	0	1	-	126 858	2	65 019	1	100	-	
	Honduras	2012	30 630	30 630	0	1	-	104 495	2	45 926	1	100	-	
		2013	66 920	66 920	0	3	-	121 121	2	37 248	2	100	-	
		2011	0	0	0	15	-	69 331	2	6747	3	-	-	
	Mexico	2012	52 766	52 766	0	17	-	42 985	1	5002	2	-	-	
		2013	4500	4500	0	2	-	49 401	1	2974	4	100	-	
		2011	14 300	14 300	0	4	-	200 448	7	206 511	1	100	-	
	Nicaragua	2012	18 350	18 350	0	3	-	87 446	3	218 419	1	100	-	
		2013	17 100	17 100	0	3	-	126 403	4	49 256	0	100	-	
		2011	0	0	0	0	-	23 766	1	420	0	100	-	
	Panama	2012	0	0	0	0	-	21 071	1	920	0	100	-	
2013		0	0	0	0	-	17 055	1	705	0	100	-		
2011		0	0	0	10	-	34 736	15	10	0	100	-		
Paraguay	2012	0	0	0	0	-	40 126	17	15	0	100	100		
	2013	0	0	0	0	-	19 425	8	11	2	100	100		
	2011	0	0	0	0	-	55 595	1	-	-	-	-		
Peru	2012	9900	9900	0	0	-	51 630	1	-	-	-	-		
	2013	4600	4600	0	1	-	162 600	3	42 670	6504	99	94		
	2011	712	712	0	33	-	-	-	-	-	-	-		
Suriname	2012	0	0	0	32	-	-	-	-	-	-	-		
	2013	4892	4892	0	12	-	-	-	-	300	100	0		
	2011	1665	1665	0	1	-	3 589 089	65	800	300	100	0		
Venezuela (Bolivarian Republic of)	2012	515	515	0	0	-	3 637 795	65	-	-	-	-		
	2013	467	467	0	0	-	4 369 755	76	27 659	27 659	35	100		
	2011	3 352 326	3 352 326	0	38	-	0	0	0	-	-	-		
Afghanistan	2012	37 551	37 551	0	34	-	0	0	0	-	-	-		
	2013	359 622	359 622	0	29	-	0	0	0	11 135	11 135	3	61	
	2011	100	100	0	37	-	26	26	0	-	-	-		
Djibouti	2012	26 400	26 400	0	23	-	0	0	0	8920	8920	41	41	
	2013	25 700	25 700	0	22	-	26	26	0	5976	3417	100	100	
	2011	60 000	60 000	0	61	-	84 484	11	204 224	3100	5670	100	100	
Iran (Islamic Republic of)	2012	243 728	243 728	0	98	-	281 203	36	6230	3400	100	100		
	2013	169 084	169 084	0	100	-	-	-	-	-	-	-		
	2011	0	0	0	0	-	-	-	-	-	-	-		
Pakistan	2012	439 181	439 181	0	0	-	4 584 426	3	2 280 000	596 600	65	91		
	2013	2 238 300	2 238 300	0	3	-	1 161 825	1	2 150 000	590 840	62	90		
	2011	100 000	100 000	0	35	-	2 600 000	100	2724	2724	98	98		
Saudi Arabia	2012	767 000	767 000	0	75	-	2 210 000	98	1283	1283	38	38		
	2013	750 000	750 000	0	100	-	1 736 400	75	974	974	39	39		
	2011	210 231	210 231	0	15	-	429 514	4	-	-	-	-		
Somalia	2012	455 000	455 000	0	14	-	240 558	2	18 868	9268	3	1		
	2013	525 000	525 000	0	20	-	90 060	1	292 000	292 000	42	42		

**Eastern Mediterranean**

# Annex 4 – Intervention coverage estimated from routinely collected data, 2011–2013 (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	% of population potentially protected by ITNs delivered	Modelled % of population with access to an ITN	No. of people protected by IBS	% IBS coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% antimalarials distributed vs reported cases	% ACTs distributed vs reported P.f. cases	
Eastern Mediterranean	Sudan	2011	882 901	882 901	0	27	39	2 947 155	8	2 546 884	2 512 852	51	53	
		2012	782 901	782 901	0	14	34	3 967 730	11	2 478 038	2 462 470	49	51	
		2013	5 803 319	5 803 319	0	35	40	3 352 581	9	2 630 400	2 077 204	69	58	
	Yemen	2011	2 183 1	2 183 1	0	7	-	1 480 416	9	273 180	273 180	100	100	
		2012	1 209 215	1 209 215	0	19	-	1 886 500	12	179 000	166 500	66	0	
		2013	1 350 309	1 350 309	0	28	-	2 204 429	13	303 847	303 847	100	0	
	European	Azerbaijan	2011	10 000	10 000	0	34	-	309 162	100	10	2	100	100
			2012	10 000	10 000	0	25	-	211 500	99	4	1	100	100
			2013	0	0	0	17	-	209 004	97	4	4	100	100
		Kyrgyzstan	2011	48 600	48 600	0	100	-	223 000	100	5	0	100	100
			2012	35 000	35 000	0	100	-	146 466	100	3	0	100	100
			2013	35 000	35 000	0	100	-	100 633	100	4	0	100	100
		Tajikistan	2011	117 041	117 041	0	14	-	644 136	25	78	5	100	100
2012			100 000	100 000	0	17	-	503 156	19	31	2	94	100	
2013			100 000	100 000	0	21	-	437 436	16	1	1	7	100	
Turkey		2011	0	0	0	0	-	221 225	100	205	105	100	82	
		2012	0	0	0	0	-	50	0	600	235	100	100	
		2013	0	0	0	100	-	21 200	12	400	350	100	100	
Uzbekistan		2011	50 000	50 000	0	100	-	300 543	100	1	0	100	100	
	2012	20 000	20 000	0	100	-	375 605	100	1	1	100	100		
	2013	0	0	0	100	-	328 020	100	3	3	100	100		
South-East Asia	Bangladesh	2011	2 890 013	1 391 953	1 498 060	55	-	0	0	68 540	48 540	100	0	
		2012	85 976	20 052	65 924	23	-	0	0	94 810	71 040	100	0	
		2013	717 000	612 000	105 000	25	-	0	0	42 390	42 390	100	0	
	Bhutan	2011	8942	8942	0	43	-	148 318	27	125	125	53	100	
		2012	10 000	10 000	0	39	-	141 322	26	82	35	95	95	
		2013	93 726	93 726	0	36	-	32 824	6	518	518	100	100	
	Democratic People's Republic of Korea	2011	79 960	79 960	0	6	-	2 013 084	17	18 104	0	100	100	
		2012	332 000	332 000	0	11	-	1 646 580	14	23 537	0	100	100	
		2013	0	0	0	6	-	2 651 611	22	80 353	0	100	100	
	India	2011	6 580 000	6 580 000	0	2	-	53 348 697	5	330 000 000	2 920 000	100	100	
		2012	0	0	0	1	-	49 942 758	5	30 523 925	3 147 400	100	100	
		2013	0	0	0	1	-	45 854 424	4	147 000	147 000	17	32	
	Indonesia	2011	2 829 748	2 829 748	0	8	-	527 555	0	479 850	479 850	16	29	
2012		845 712	845 712	0	7	-	110 000	0	341 697	341 697	13	24		
2013		911 443	911 443	0	5	-	0	0	0	0	-	-		
Myanmar	2011	1 613 830	551 107	1 062 723	12	-	1036	0	594 756	569 607	96	100		
	2012	2 964 812	1 042 244	1 922 568	22	-	56 414	0	546 060	546 060	74	0		
	2013	2 812 517	1 508 557	1 303 960	25	-	0	0	371 663	371 663	63	0		
Nepal	2011	934 476	934 476	0	24	-	256 070	2	71 140	612	91	6		
	2012	499 166	499 166	0	26	-	443 229	3	669 152	53 252	100	0		
	2013	1 395 865	1 395 865	0	38	-	345 000	3	38 113	325	93	0		
Sri Lanka	2011	0	0	0	35	-	80 499	2	17	17	98	100		
	2012	637 250	637 250	0	30	-	75 354	2	70	48	61	100		
	2013	0	0	0	23	-	50 666	1	95	43	80	100		
Thailand	2011	232 150	100 343	131 807	5	-	423 638	1	5642	5642	15	38		
	2012	264 806	139 000	125 806	4	-	451 730	1	3298	3298	10	28		
	2013	783 896	670 000	113 896	6	-	106 374	0	16 503	16 503	50	100		
Timor-Leste	2011	24 613	24 613	0	31	-	102 858	9	19 739	15 981	54	54		
	2012	25 148	25 148	0	35	-	159 743	14	5211	2923	85	85		
		2013	253 037	253 037	0	48	-	0	0	23 667	3131	100	100	



WHO region	Country/area	Year	No. of ITN + LLIN sold or delivered	No. of LLIN sold or delivered	No. of ITN sold or delivered	% of population potentially protected by ITNs delivered	Modelled % of population with access to an ITN	No. of people protected by ITN	% ITN coverage	Any 1st-line treatment courses delivered (including ACT)	ACT treatment courses delivered	% antimalarials distributed vs reported cases	% ACTs distributed vs reported cases <sup>1</sup>	
Western Pacific	Cambodia	2011	1 212 490	1 203 321	9169	57	-	0	0	206 529	120 529	75	70	
		2012	2 177 808	2 177 808	0	84	-	0	0	0	422 024	422 024	100	0
		2013	5418	5418	0	77	-	0	0	0	117 547	117 547	100	0
	China	2011	656 674	149 394	507 280	0	-	1 043 963	0	0	-	-	-	-
		2012	257 935	0	257 935	0	-	1 096 877	0	0	-	-	-	-
		2013	58 874	0	58 874	0	-	447 639	0	0	4127	3919	87	100
	Lao People's Democratic Republic	2011	241 935	241 935	0	26	-	0	0	0	56 340	56 340	100	100
		2012	54 056	54 056	0	52	-	1856	0	0	104 400	104 400	100	0
		2013	439 677	439 677	0	33	-	13 113	0	0	58 470	58 470	100	0
	Malaysia	2011	260 487	260 487	0	100	-	307 769	27	27	5306	2218	100	100
		2012	220 703	220 703	0	100	-	489 988	42	42	4725	2088	100	100
		2013	317 943	317 943	0	100	-	682 288	57	57	3850	2873	100	100
	Papua New Guinea	2011	1 140 571	1 140 571	0	61	-	-	-	-	1 259 038	1 259 038	100	100
		2012	1 062 508	1 062 508	0	77	-	-	-	-	886 560	886 560	87	96
		2013	1 625 831	1 625 831	0	94	-	-	0	0	915 330	915 330	90	99
	Philippines	2011	3 037 404	3 037 404	0	14	-	1 052 050	1	1	34 080	34 080	100	100
		2012	783 463	783 463	0	12	-	1 541 860	2	2	13 469	13 469	100	100
		2013	715 125	715 125	0	10	-	1 108 220	1	1	24 771	24 771	100	0
	Republic of Korea	2011	10 000	10 000	0	1	-	-	-	-	838	838	65	-
		2012	0	0	0	1	-	-	-	-	555	555	65	-
		2013	0	0	0	1	-	-	-	-	600	600	88	100
	Solomon Islands	2011	46 574	46 574	0	100	-	175 265	33	33	236 665	236 665	100	100
		2012	31 781	31 781	0	100	-	131 752	24	24	190 255	190 255	100	0
		2013	371 124	371 124	0	100	-	98 971	18	18	146 439	146 439	100	0
	Vanuatu	2011	92 385	92 385	0	100	-	18 490	8	8	-	-	-	-
		2012	35 863	35 863	0	100	-	9705	4	4	52 010	52 010	100	1
		2013	94 232	94 232	0	100	-	3033	1	1	24 000	24 000	100	1
Viet Nam	2011	766 606	100 000	666 606	7	-	1 555 892	5	5	274 852	110 576	100	100	
	2012	968 413	0	968 413	8	-	1 364 815	4	4	266 351	141 570	100	-	
	2013	0	0	0	18	-	1 310 820	4	4	218 389	141 570	100	100	

1 Based on probable and confirmed cases adjusting for reporting completeness and any first-line treatment courses distributed as proxy indicator for treated cases

2 In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WH/A66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WH/A66/A66_R21-en.pdf))

# Annex 5 – Household surveys, 2011–2013

WHO region	Country/area	Source	% of HH that have at least one ITN	% of HH with enough ITNs for individuals who slept in the house the previous night	% of population with access to an ITN in their household	% of existing ITNs in HH used the previous night	% of the population who slept under an ITN the previous night	% of the children <5 years who slept under an ITN the previous night	% of pregnant women who slept under an ITN the previous night	% of HH sprayed by IRS within last 12 months	% of HH with = 1 ITN for 2 pers. and/or sprayed by IRS within last 12 months	% of children age 6-59 months with a hemoglobin measurement <8g/dL	% of children age 6-59 months with a positive microscopy blood smear	% of children <5 years with fever in last 2 weeks for whom advice or treatment was sought	% of children <5 years with fever in last 2 weeks who received any antimalarial	% of children <5 years in the last 2 weeks who had a finger or heel stick	% of women who received at least 3 doses of IPT during ANC visits during their last pregnancy
<b>African</b>	Angola	MIS 2011	35	6	19	84	19	26	26	-	-	3	10	59	76	-	9
	Benin	DHS 2012	-	43	64	89	62	-	74	7	-	7	-	59	31	17	-
	Burundi	MIS 2012	63	23	46	83	47	53	55	6	27	-	17	59	71	48	0
	Cameroon	DHS 2011	18	4	11	62	7	11	10	3	11	6	-	59	26	26	13
	Comoros	DHS 2012	-	23	41	93	37	44	6	6	-	-	-	55	14	29	-
	Congo	DHS 2012	33	9	23	90	25	31	26	2	-	-	4	67	39	29	18
	Côte d'Ivoire	DHS 2012	67	30	49	62	32	37	40	2	31	12	17	67	18	11	8
	Democratic Republic of the Congo	DHS 2013	-	24	47	85	49	-	59	-	-	-	8	59	19	19	-
	Ethiopia	DHS 2011	-	-	-	-	-	-	-	-	-	-	5	27	35	-	-
	Gabon	DHS 2012	36	14	27	87	26	39	-	6	20	5	-	71	36	15	2
	Guinea	DHS 2012	-	9	25	68	19	28	2	28	-	17	-	54	5	9	-
	Liberia	MIS 2011	50	16	31	83	31	36	39	12	26	8	28	77	69	33	26
		DHS 2013	-	20	37	71	31	31	36	13	-	-	-	80	42	42	-
	Madagascar	MIS 2011	81	31	57	88	66	75	70	41	62	1	7	44	19	6	4
		DHS 2013	-	28	48	85	54	-	61	30	-	4	-	55	41	13	-
	Malawi	MIS 2012	55	18	37	91	40	56	51	9	25	9	28	59	89	36	13
	Mali	DHS 2013	-	38	65	90	58	-	73	6	-	21	-	49	17	12	-
	Mozambique	DHS 2011	51	22	37	70	29	35	34	19	37	10	35	63	60	30	11
		DHS 2012	-	-	-	-	-	-	-	-	-	-	9	64	78	14	-
	Nigeria	DHS 2013	-	22	36	35	13	-	16	2	-	-	-	78	18	11	-
	Rwanda	DHS 2013	-	41	66	75	60	-	74	12	-	-	-	72	93	30	-
	Senegal	DHS 2011	63	15	38	69	28	34	36	11	24	14	3	54	41	10	14
		DHS 2013	-	27	57	66	39	-	43	13	-	-	10	54	18	-	-
	Sierra Leone	DHS 2013	-	14	38	93	41	-	52	5	-	17	-	75	77	40	-
	Uganda	DHS 2011	60	26	45	75	34	42	46	8	32	5	-	85	68	26	11
	United Republic of Tanzania	DHS 2012	91	52	74	77	65	70	74	15	15	61	6	79	61	25	5
	Zimbabwe	DHS 2011	29	12	20	39	8	10	10	19	26	4	-	44	29	7	6
Haiti	DHS 2012	19	5	11	-	7	12	-	-	7	-	-	49	-	12	-	
Honduras	DHS 2012	-	-	-	-	-	-	-	-	-	-	-	64	-	-	-	
<b>Eastern Mediterranean</b>	Sudan	DHS 2012	51	-	31	-	14	16	-	-	-	-	-	-	-	-	-

DHS, Demographic and Health Survey; HH, households; IPTp, intermittent preventive treatment in pregnancy; IRS, indoor residual spraying; ITN, insecticide-treated mosquito net; MICS, Multiple Indicator Cluster Survey; MIS, Malaria Indicator Survey



# Annex 6A – Reported malaria cases and deaths, 2013

WHO region	Country/area	Population						Reported malaria cases (health facility)										Cases at community level				Inpatient malaria cases and deaths	
		UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Presumed and confirmed malaria cases	Malaria case definition	Mic. slides/ RDIs performed	Mic. slides/ RDIs positive	Mic. slides/ RDIs <i>P. falciparum</i>	Mic. slides/ RDIs <i>P. vivax</i>	Imported cases/ (introduced cases)	Presumed and confirmed cases	RDT positive cases	Inpatient malaria cases	Malaria attributed deaths						
																		603	12 762	3 144 100	P+C	14	2
African	Algeria	39 208 194		0	N/A	12 762	603	P+C	12 762	603	14	2	587 /6)	-	-	-	3	3					
	Angola	21 471 618	21 471 618	1 471 618	N/A	5 273 305	3 144 100	P+C	4 129 073	1 999 868	-	-	-	-	-	-	225 223	7300					
	Benin	10 323 474	10 323 474	1 032 474	N/A	2 041 444	1 670 273	P+C	1 450 005	1 078 634	-	-	-	46 842	11 768	99 368	2 288						
	Botswana	2 021 144	1 313 744	363 806	N/A	506	506	P+C	456	456	456	-	-	-	-	-	60	7					
	Burkina Faso	16 934 839	16 934 839	1 693 483	N/A	7 857 296	7 146 026	P+C	4 480 321	3 769 051	-	-	-	469 683	-	414 234	6 294						
	Burundi	10 162 532	7 926 775	2 439 008	N/A	7 384 501	4 469 007	P+C	7 056 881	4 141 387	-	-	-	98 421	36 951	142 522	3 411						
	Cabo Verde	498 897		N/A	298 745	10 621	46	P+C	10 621	46	22	24	-	-	-	46	0	0					
	Cameroun	22 253 959	22 253 959	15 800 311	N/A	3 625 958	1 824 633	P+C	1 827 976	26 651	-	-	-	460 779	42 581	468 269	4 349						
	Central African Republic	4 616 417	4 616 417	4 616 417	N/A	491 074	407 131	P+C	200 243	116 300	-	-	-	47 401	47 401	12 124	1026						
	Chad	12 825 314	12 697 061	10 260 251	N/A	1 272 841	1 272 841	P+C	621 469	754 565	-	-	-	-	-	44 810	1881						
	Comoros	734 917	734 917	690 822	N/A	185 779	62 565	P+C	176 370	53 156	45 669	72	-	0	0	17 485	15						
	Congo	4 447 632	4 447 632	4 447 632	N/A	209 169	183 026	P+C	69 375	43 232	43 232	-	-	0	0	17 118	2870						
	Côte d'Ivoire	20 316 086	20 316 086	20 316 086	N/A	5 982 151	4 708 425	P+C	3 780 679	2 506 953	-	-	-	17 373	17 373	142 763	3 261						
	Democratic Republic of the Congo	67 513 677	67 513 677	65 488 267	N/A	14 871 716	11 363 817	P+C	10 223 122	6 715 223	4 103 745	-	-	4664	4664	955 311	30 918						
	Equatorial Guinea	757 014	757 014	757 014	N/A	44 561	25 162	P+C	32 528	13 129	13 129	-	-	-	3276	6914	66						
	Eritrea	6 333 135	6 333 135	4 496 526	N/A	134 183	34 678	P+C	120 822	21 317	12 482	7361	-	15 409	-	3719	6						
	Ethiopia	94 100 756	63 047 507	941 008	N/A	9 243 894	3 316 013	P+C	8 573 335	2 645 454	1 687 163	958 291	-	-	-	27 114	358						
	Gabon	1 671 711	1 671 711	1 671 711	N/A	256 531	185 196	P+C	100 317	28 982	26 432	-	-	-	-	23 053	273						
	Gambia	1 849 285	1 849 285	1 849 285	N/A	889 494	279 829	P+C	850 457	240 792	175 126	-	-	1721	1721	10 281	262						
	Ghana	25 904 598	25 904 598	16 362 567	N/A	8 444 417	7 200 797	P+C	2 883 071	1 639 451	1 629 198	-	-	54 904	0	462 557	2506						
	Guinea	11 745 189	11 745 189	11 745 189	N/A	775 341	775 341	P+C	160 988	54 584	63 353	-	-	0	0	12 585	108						
	Guinea-Bissau	1 704 255	1 704 255	1 704 255	N/A	238 580	132 176	P+C	160 988	54 584	63 353	-	-	-	-	15 280	418						
	Kenya	44 353 691	33 708 805	15 967 329	N/A	14 677 837	9 750 935	P+C	7 262 170	2 335 286	2 335 286	-	-	60 648	53 243	12 904	360						
	Liberia	4 294 077	4 294 077	4 294 077	N/A	2 202 213	1 483 676	P+C	1 962 757	1 244 220	1 244 220	-	-	305 199	-	12 904	1191						
	Madagascar	22 924 851	22 924 851	6 877 455	N/A	2 142 620	387 045	P+C	1 071 310	387 045	-	-	-	87 046	47 852	10 752	641						
	Malawi	16 362 567	16 362 567	16 362 567	N/A	5 787 441	3 906 838	P+C	3 161 495	1 280 892	-	-	-	15 408	-	-	3723						
	Mali	15 301 650	15 301 650	13 771 485	N/A	2 849 453	2 327 385	P+C	1 889 286	1 367 218	-	-	-	183 149	139 722	50 333	1680						
	Mauritania	3 889 880	3 500 892	2 295 029	N/A	135 985	128 486	P+C	9086	1587	-	-	-	-	-	7324	25						
Mayotte, France	222 152		N/A	0	82	82	C	-	-	9	71	-	-	-	20	0	0						
Mozambique	25 833 752	25 833 752	25 833 752	N/A	8 200 849	3 924 832	P+C	7 274 891	2 998 874	2 998 874	-	-	336 697	283 298	83 812	2941							
Namibia	2 303 315	1 658 387	1 543 221	N/A	188 004	49 111	P+C	94 002	49 111	136	-	-	0	0	628	21							
Niger	17 831 270	17 831 270	12 303 576	N/A	5 151 131	4 391 189	P+C	2 191 740	1 431 798	1 426 696	-	-	45 480	20 169	322 497	2209							
Nigeria	173 615 345	173 615 345	173 615 345	N/A	21 659 831	12 830 911	P+C	8 828 920	-	-	-	-	-	-	693 029	7878							
Rwanda	11 776 522	11 776 522	11 776 522	N/A	6 129 170	962 618	P+C	3 064 585	962 618	962 618	-	-	78 178	77 939	9508	409							
Sao Tome and Principe	192 993	192 993	192 993	N/A	108 652	92 611	P+C	108 634	92 611	92 611	1	-	0	0	1843	11							
Senegal	14 133 280	14 133 280	13 567 949	N/A	1 119 100	772 222	P+C	692 767	345 889	345 889	-	-	94 932	41 599	20 801	815							
Sierra Leone	6 092 075	6 092 075	6 092 075	N/A	2 576 550	1 715 851	P+C	2 562 657	1 701 958	1 701 958	-	-	486 936	-	38 568	4326							
South Africa	52 776 130	5 277 613	2 111 045	N/A	603 932	8851	P+C	603 726	8645	8645	-	-	-	-	5366	105							
South Sudan¹	11 296 173	11 296 173	11 296 173	N/A	1 855 501	1 855 501	P+C	603 726	8645	8645	-	-	-	-	-	1311							
Swaziland	1 249 514	349 864	0	N/A	669	669	P+C	1 442 571	882 430	272 847	233	-	-	-	159	4							
Togo	6 816 982	6 816 982	6 816 982	N/A	2 885 142	882 430	P+C	1 442 571	882 430	272 847	-	-	82 904	82 904	33 875	1361							
Uganda	37 578 876	37 578 876	33 820 988	N/A	24 068 702	14 464 650	P+C	11 106 414	1 502 362	1 502 362	-	-	-	-	371 553	8528							
United Republic of Tanzania	49 253 126	49 253 126	36 331 049	N/A	14 650 226	8 585 484	P+C	7 617 188	1 552 444	2 194	-	-	-	-	371 380	8526							
Mainland	47 859 545	47 859 545	34 937 468	N/A	14 122 269	8 582 934	P+C	7 089 585	1 550 250	-	-	-	-	-	-	-							
Zanzibar	1 393 581	1 393 581	1 393 581	N/A	527 957	2548	P+C	527 957	2194	2194	-	-	-	-	173	2							
Zambia	14 314 515	14 314 515	14 314 515	N/A	5 465 122	5 465 122	P+C	1 115 005	422 633	422 633	-	-	-	-	163 144	3548							
Zimbabwe	13 327 925	6 663 963	6 663 963	N/A	1 115 005	422 633	P+C	1 115 005	422 633	422 633	-	-	-	-	21 969	352							
Region of the Americas	Argentina	41 446 246	N/A	N/A	0	4913	4	C	4913	4	4	-	-	-	0	0	0						
	Belize	331 900	N/A	N/A	4539	25 351	26	C	25 351	26	26	-	-	-	0	0	0						
	Bolivia (Plurinational State of)	10 671 200	3 766 934	512 218	N/A	144 139	7342	C	144 139	7342	959	6346	-	-	1070	0	0						

WHO region	Country/area	Population				Reported malaria cases (health facility)										Cases at community level			Inpatient malaria cases and deaths	
		UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Presumed and confirmed malaria cases	Malaria case definition	Mic. slides/ RDTs performed	Mic. slides/ RDTs positive	Mic. slides/ RDTs <i>P. falciparum</i>	Mic. slides/ RDTs <i>P. vivax</i>	Imported cases/ (introduced cases)	Presumed and confirmed cases	RDT positive cases	Inpatient malaria cases	Malaria attributed deaths			
Region of the Americas	Brazil	200 361 925	40 673 471	4 608 324	N/A	1 893 018	178 546	C	1 893 018	177 767	29 201	143 050	-	0	0	2355	41			
	Colombia	48 321 405	10 872 316	7 151 568	N/A	327 064	51 722	C	284 332	51 696	17 650	33 345	-	0	-	313	10			
	Costa Rica	4 872 166	N/A	N/A	2500	16 774	6	C	16 774	6	-	-	4	0	-	0	0			
	Dominican Republic	10 403 761	8 905 619	447 362	N/A	502 683	378	C	502 683	378	161	217	10	0	-	15	5			
	Ecuador	15 737 878	N/A	N/A	265 371	397 628	7	C	397 628	378	161	217	10	0	-	1	0			
	El Salvador	6 340 454	N/A	N/A	54 877	103 748	7	C	103 748	7	-	-	1	0	-	0	0			
	French Guiana, France	249 227	249 227	213 089	N/A	22 327	875	C	22 327	875	304	220	-	0	-	103	3			
	Guatemala	15 468 203	7 038 032	2 320 230	N/A	171 405	6214	C	171 405	6214	101	6062	-	0	-	-	-			
	Guyana	799 613	743 640	279 865	N/A	205 903	31 479	C	205 903	31 479	13 655	13 953	-	0	-	-	3			
	Haiti	10 317 461	10 317 461	5 468 254	N/A	172 624	20 957	C	172 624	20 957	20 957	20 957	-	0	-	0	364	10		
	Honduras	8 097 688	5 895 117	1 133 676	N/A	145 294	5428	C	145 294	5428	1113	4269	-	0	-	-	1			
	Mexico	122 332 399	N/A	N/A	4 064 020	1 017 508	499	C	1 017 508	499	4	495	4	0	-	0	0			
	Nicaragua	6 080 478	3 052 400	79 046	N/A	536 170	1194	C	536 170	1194	220	974	-	0	-	0	220			
	Panama	3 864 170	2 921 313	170 023	N/A	93 624	705	C	93 624	705	6	699	-	0	-	0	33			
	Paraguay	6 802 295	N/A	N/A	1 064 590	24 806	11	C	24 806	11	7	3	11	0	-	1	0			
	Peru	30 375 603	4 860 096	1 366 902	N/A	864 648	43 468	C	864 648	43 468	6630	36 285	-	0	-	25	4			
	Suriname	539 276	84 666	84 666	N/A	19 736	729	C	19 736	729	322	322	-	0	-	5	1			
	Venezuela (Bolivarian Republic of)	30 405 207	5 716 179	790 535	N/A	476 764	78 643	C	476 764	78 643	22 777	50 938	-	0	-	-	6			
	Eastern Mediterranean	Afghanistan	30 551 674	23 089 547	8 222 177	N/A	787 624	319 742	P+C	507 145	39 763	1877	37 386	-	118 971	6851	3688	24		
Djibouti		872 932	436 466	0	N/A	7934	1684	P+C	7189	1684	939	-	0	0	0	197	17			
Iran (Islamic Republic of)		77 447 168	N/A	N/A	746 100	385 172	1373	C	385 172	1373	72	426	854 (26)	-	-	91	2			
Iraq		33 765 232	N/A	N/A	-	1 796 587	8	C	1 796 587	8	-	-	8	-	-	0	0			
Pakistan		182 142 594	179 065 987	52 670 037	N/A	7 752 797	3 472 727	P+C	4 561 825	281 755	46 067	223 660	-	0	-	46 013	244			
Saudi Arabia		28 828 870	N/A	N/A	40 434	1 309 783	2513	C	1 309 783	2513	34	-	2479	-	-	8	0			
Somalia		10 495 583	10 495 583	7 310 851	N/A	119 752	60 199	P+C	102 870	43 317	-	-	-	-	-	2230	-			
Sudan		37 964 306	37 964 306	32 990 981	N/A	2 197 563	989 946	P+C	1 800 000	592 383	-	-	-	-	-	122 620	685			
Yemen		24 407 381	16 733 857	10 447 499	N/A	927 821	149 451	P+C	881 148	102 778	102 369	408	-	0	0	1201	55			
Azerbaijan		9 413 420	N/A	N/A	12 613	432 810	4	C	432 810	4	-	-	4	-	-	4	0			
European	Georgia	4 340 895	N/A	N/A	0	192	7	C	192	7	-	-	7	-	-	0	0			
	Kyrgyzstan	5 547 548	N/A	N/A	0	54 249	4	C	54 249	4	-	-	4	-	-	4	0			
	Tajikistan	8 207 834	N/A	N/A	1 954 522	213 916	14	C	213 916	14	-	-	7 (11)	-	-	13	0			
	Turkey	74 932 641	N/A	N/A	0	255 125	285	C	255 125	285	-	34	251	-	-	0	3			
	Uzbekistan	28 934 102	N/A	N/A	0	908 301	3	C	908 301	3	-	-	3	-	-	3	0			
	Bangladesh	156 594 962	16 223 238	4 165 426	N/A	93 926	3864	P+C	93 926	3864	3597	262	-	23 027	17 590	1155	15			
	Bhutan	753 947	N/A	N/A	234 669	31 632	45	P+C	31 632	45	14	9	23 (30)	-	-	45	0			
	Democratic Peoples Republic of Korea	24 895 480	N/A	N/A	13 111 053	71 453	14 407	P+C	71 453	14 407	-	-	-	-	-	0	0			
	India	1 252 139 596	1 114 404 240	275 470 711	N/A	127 891 198	881 730	C	127 891 198	881 730	462 079	417 884	-	-	-	-	440			
	Indonesia	249 865 631	152 418 035	42 477 157	N/A	3 197 890	1 833 256	P+C	1 708 161	343 527	170 848	150 985	-	0	0	-	45			
	Myanmar	53 259 018	31 955 411	19 705 837	N/A	2 601 112	333 871	P+C	1 300 556	333 871	222 770	98 860	-	55 051	55 051	18 362	236			
Nepal	27 797 457	13 328 881	1 009 048	N/A	169 464	38 113	P+C	133 325	19 744	273	1659	-	-	777	58	0				
Sri Lanka	21 273 228	N/A	N/A	0	1 236 580	95	C	1 236 580	95	-	-	95	-	-	78	0				
Thailand	67 010 502	33 505 251	5 360 840	N/A	1 830 090	33 302	C	1 830 090	33 302	14 449	15 573	-	-	8300	3014	37				
Timor-Leste	1 132 879	1 132 879	872 317	N/A	178 200	1042	P+C	178 183	1025	373	512	-	198	198	18	3				
Western Pacific	Cambodia	15 135 169	8 021 640	6 659 474	N/A	152 137	24 130	P+C	149 316	21 309	7092	11 267	-	20 613	20 613	3708	12			
	China	1 385 566 537	579 466 850	197 320	N/A	5 555 001	4 127	P+C	5 554 960	4 086	2907	930	-	-	-	-	23			
	Lao Peoples Democratic Republic	6 769 727	3 994 139	2 437 102	N/A	339 013	41 385	P+C	335 759	38 131	24 538	12 537	-	7563	7493	584	28			
	Malaysia	29 716 965	N/A	N/A	1 050 143	1 576 012	3850	C	1 576 012	3850	422	385	865 (26)	-	-	3468	14			
	Papua New Guinea	7 321 262	7 321 262	6 881 986	N/A	1 454 166	1 125 808	S	608 352	279 994	119 469	7579	-	51 066	36 131	12 911	307			
	Philippines	98 393 574	78 501 709	7 058 669	N/A	318 883	6514	C	318 883	6514	4968	1357	-	1206	1206	729	12			
	Republic of Korea	49 262 698	N/A	N/A	5 625 106	443	443	C	443	443	-	383	50	-	-	260	2			
	Solomon Islands	561 231	555 619	555 619	N/A	245 014	53 270	P+C	217 353	25 609	13 194	-	-	0	0	1245	18			
	Vanuatu	252 763	250 235	250 235	N/A	28 943	2381	P+C	28 943	2381	1039	1342	-	502	502	37	0			
	Viet Nam	91 679 733	34 373 702	16 095 160	N/A	3 115 804	35 406	P+C	3 097 526	17 128	9532	6901	-	24 058	-	8384	6			

## Annex 6A – Reported malaria cases and deaths, 2013 (continued)

WHO region	Country/area	Population				Reported malaria cases (health facility)										Cases at community level			Inpatient malaria cases and deaths	
		UN Population	At risk (low + high)	At risk (high)	Number of people living in active foci	Suspected malaria cases	Presumed and confirmed malaria cases	Mic. slides/ RDTs performed	Mic. slides/ RDTs positive	Mic. slides/ RDTs <i>P. falciparum</i>	Mic. slides/ RDTs <i>P. vivax</i>	Imported cases/ (introduced cases)	Presumed and confirmed cases	RDT positive cases	Inpatient malaria cases	Malaria attributed deaths				
<b>Regional Summary</b>																				
	African	923 135 304	782 340 469	638 070 206	298 745	192 819 341	122 483 789	108 819 619	44 764 581	21 033 630	965 727	915	2 993 774	912 461	4 948 924	116 336				
	Region of the Americas	573 818 555	105 096 471	24 625 760	5 455 897	7 166 127	428 812	7 123 395	428 007	114 643	297 219	38	0	1070	3435	84				
	Eastern Mediterranean	426 475 740	267 785 746	111 641 545	786 534	15 285 033	4 997 643	11 351 719	1 065 074	151 358	261 880	3340	118 971	6851	176 048	1027				
	European	131 376 440	N/A	N/A	1 967 135	1 864 593	317	1 864 593	317	0	41	276	0	0	31	3				
	South-East Asia	1 854 722 700	1 362 967 935	349 061 336	13 345 722	137 301 545	3 139 725	134 475 104	1 613 840	874 403	700 151	118	78 276	81 916	22 730	776				
	Western Pacific	1 684 659 659	712 485 156	40 135 566	6 675 249	12 785 416	1 297 314	11 887 104	399 445	183 161	54 309	915	105 008	65 945	31 326	422				
	Total	5 594 188 398	3 230 675 778	1 163 534 413	28 529 282	367 222 055	132 347 600	275 521 534	48 271 264	22 357 195	2 279 327	5602	3 296 029	1 068 243	5 182 494	118 648				

Notes: C, confirmed; P, probable; S, suspected

N/A, not applicable; RDT, rapid diagnostic test

1 In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf))







WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
African	Comoros	Presumed and confirmed	-	-	-	-	29 554	54 830	53 511	46 426	57 084	103 670	76 661	65 139	62 565	
		Microscopy examined	-	-	-	-	-	-	-	-	13 387	87 595	63 217	125 030	154 824	
		Confirmed with microscopy	-	-	-	-	6086	20 559	-	-	-	5982	35 199	22 278	45 507	46 130
	Congo	RDT Examined	-	-	-	-	-	-	-	-	-	5249	20 226	27 714	21 546	
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	1339	2578	4333	7026	
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Côte d'Ivoire	Presumed and confirmed	-	-	-	-	-	-	157 757	149 552	157 125	150 583	446 656	277 263	117 640	183 026
		Microscopy examined	-	-	-	-	-	-	-	163 924	203 869	203 160	-	-	-	69 375
		Confirmed with microscopy	-	-	-	-	-	-	-	103 213	117 291	92 855	-	37 744	120 319	43 232
	Democratic Republic of the Congo	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	0
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Equatorial Guinea	Presumed and confirmed	-	1 193 288	1 109 751	1 136 810	1 275 138	1 280 914	1 253 408	1 277 670	1 343 654	1 847 366	1 721 461	2 588 004	2 795 919	4 708 425
		Microscopy examined	-	-	-	-	-	-	-	-	19 661	34 755	-	49 828	195 546	395 914
		Confirmed with microscopy	-	-	-	-	-	-	-	-	352	7388	62 726	29 976	107 563	215 104
Ethiopia	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	3 384 765	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	1 033 064	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	2 291 849	
Eritrea	Presumed and confirmed	-	2 199 247	2 640 168	4 386 638	4 133 514	6 334 608	5 008 959	3 720 570	4 933 845	7 839 435	9 252 959	9 442 144	9 128 398	11 363 817	
	Microscopy examined	964 623	3244	3704	4820	5320	5531	4779	1 181 323	2 613 038	2 956 592	3 678 849	4 226 533	4 329 318	4 126 129	
	Confirmed with microscopy	897	1531	1735	2438	2684	2971	2050	740 615	1 618 091	1 873 816	2 374 930	2 700 818	2 656 864	2 611 478	
Gambia	RDT Examined	-	-	-	-	-	-	-	2275	428	12 436	54 728	2 912 088	3 327 071	6 096 993	
	Confirmed with RDT	-	-	-	-	-	-	-	243	127	4889	42 850	1 861 163	2 134 734	4 103 745	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ghana	Presumed and confirmed	-	125 746	74 861	65 517	27 783	24 192	10 148	19 568	67 196	84 532	78 095	37 267	20 890	25 162	
	Microscopy examined	-	22 637	52 228	52 428	41 361	48 937	46 096	68 905	11 815	15 960	42 585	23 004	33 245	27 039	
	Confirmed with microscopy	-	9716	6078	10 346	4119	9073	6541	9528	5842	7883	11 603	39 636	20 601	13 196	
Ethiopia	RDT Examined	-	-	-	-	-	-	-	7520	655	3773	16 772	2899	6826	5489	
	Confirmed with RDT	-	-	-	-	-	-	-	445	1620	2581	14 177	1865	1973	1894	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ethiopia	Presumed and confirmed	-	2 555 314	2 929 684	3 582 097	5 170 614	3 901 957	3 038 565	2 557 152	2 532 645	3 043 203	4 068 764	3 549 559	3 876 745	3 316 013	
	Microscopy examined	-	851 942	1 115 167	1 010 925	1 312 422	1 364 194	785 209	739 627	986 323	2 065 237	2 509 543	3 418 719	3 778 479	8 573 335	
	Confirmed with microscopy	-	392 377	427 795	463 797	578 904	538 942	447 780	451 816	458 561	927 992	1 158 197	1 480 306	1 692 578	2 645 454	
Ethiopia	RDT Examined	-	-	-	-	-	-	-	-	-	262 877	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	108 324	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ethiopia	Presumed and confirmed	127 024	132 918	157 440	166 321	200 214	235 479	111 527	190 749	187 714	113 803	185 105	178 822	188 089	185 196	
	Microscopy examined	-	-	-	-	100 107	129 513	136 916	142 406	151 137	1623	54 714	-	66 018	90 185	
	Confirmed with microscopy	50 810	53 167	62 976	58 212	70 075	70 644	33 458	45 186	40 701	660	12 816	-	18 694	26 432	
Ethiopia	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	10 132	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	4129	
	Imported cases	-	-	-	-	-	-	-	-	-	-	1120	-	1059	2550	
Ethiopia	Presumed and confirmed	-	481 590	620 767	540 165	395 043	329 426	427 598	439 798	508 846	479 409	194 009	261 967	271 038	279 829	
	Microscopy examined	-	-	-	-	-	-	-	-	-	-	290 842	172 241	156 580	236 329	
	Confirmed with microscopy	-	-	-	-	-	-	-	-	39 164	50 378	52 245	71 588	29 325	65 666	
Ethiopia	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	705 862	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	614 128	
	Imported cases	-	-	-	-	-	-	-	-	-	-	64 108	190 379	271 038	175 126	
Ethiopia	Presumed and confirmed	3 349 528	3 044 844	3 140 893	3 552 896	3 416 033	3 452 969	3 511 452	3 123 147	3 200 147	3 694 671	3 849 536	4 154 261	10 676 731	7 200 797	
	Microscopy examined	-	-	-	-	-	-	-	-	1 100 238	2 431 048	2 031 674	1 172 838	4 219 097	1 394 249	
	Confirmed with microscopy	-	-	-	-	475 441	655 093	472 255	476 484	956 359	962 599	1 029 384	624 756	2 971 699	721 898	
Ethiopia	RDT Examined	-	-	-	-	-	-	-	-	143 879	468 449	247 278	781 892	1 438 284	1 488 822	
	Confirmed with RDT	-	-	-	-	-	0	0	-	138 124	141 771	42 253	416 504	783 467	917 553	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

# Annex 6B – Reported malaria cases by method of confirmation, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
African	Guinea	Presumed and confirmed	816 539	851 877	850 147	731 911	876 837	850 309	834 835	888 643	657 003	812 471	1 092 554	1 189 016	1 220 574	775 341	
		Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	43 549	-	-	
		Confirmed with microscopy	4800	6238	16 561	107 925	103 069	50 452	41 228	28 646	28 646	33 405	20 932	20 936	5450	191 421	63 353
		RDT Examined	-	-	-	-	-	-	16 554	21 150	20 866	-	-	-	139 066	-	-
	Guinea-Bissau	Confirmed with RDT	-	-	-	-	-	-	12 999	15 872	-	14 909	-	90 124	125 779	147 904	
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Presumed and confirmed	246 316	202 379	194 976	162 344	187 910	185 493	148 720	140 205	148 542	156 633	140 143	174 986	129 684	132 176	
		Microscopy examined	-	-	-	-	-	33 721	34 862	34 384	31 083	25 379	48 799	57 698	61 048	58 909	
	Kenya	Confirmed with microscopy	-	-	-	-	-	14 659	15 120	14 284	11 299	11 757	20 239	21 320	23 547	17 733	
		RDT Examined	-	-	-	-	-	-	-	-	-	-	56 455	139 531	97 047	102 079	
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	20 152	50 662	26 834	36 851	
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Liberia	Presumed and confirmed	4 216 531	3 262 931	3 319 399	5 338 008	7 545 541	9 181 224	8 926 058	9 610 691	9 610 691	839 903	8 123 689	6 071 583	9 335 951	9 750 953	
		Microscopy examined	-	-	43 643	96 893	59 995	-	-	-	-	-	-	2 384 402	3 009 051	4 836 617	
		Confirmed with microscopy	-	-	20 049	39 383	28 328	-	-	-	-	-	-	898 531	1 002 805	1 426 719	
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	2 060 608	
Madagascar	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	164 424	655 285		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	26 752	274 678		
	Presumed and confirmed	1 392 483	1 386 291	1 598 919	2 198 297	1 458 408	1 229 385	1 087 563	736 194	694 428	726 905	1 035 940	2 480 748	1 800 372	1 483 676		
	Microscopy examined	31 575	33 354	27 752	37 333	39 174	37 943	29 318	30 921	123 939	238 752	327 392	335 973	728 443	772 362		
Malawi	Confirmed with microscopy	6946	8538	5272	6909	7638	6753	5689	4823	80 373	157 920	212 677	577 641	496 269	496 269		
	RDT Examined	-	-	-	-	-	-	-	-	57 325	880 952	508 987	635 855	676 569	1 144 405		
	Confirmed with RDT	-	-	-	-	-	39 850	645 738	411 899	449 032	626 924	709 246	1 338 121	899 488	747 951		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mali	Presumed and confirmed	3 646 212	3 823 796	2 784 001	3 358 960	2 871 098	3 688 389	4 498 949	4 786 045	5 185 082	6 183 816	6 851 108	5 338 701	4 922 596	3 906 838		
	Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	119 996	406 907	132 475		
	Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	50 526	283 138	44 501		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	580 708	2 763 986	3 029 020		
Mali	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	253 973	1 281 846	1 236 391		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Presumed and confirmed	546 634	612 896	723 077	809 428	1 969 214	962 706	1 022 592	1 291 853	1 291 853	1 045 424	1 633 423	2 171 542	2 171 739	2 327 385		
	Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mali	Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	1 380 178	974 558	1 889 286		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	227 482	307 035	788 487		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Mauritania	Presumed and confirmed	-	243 942	224 614	318 120	224 840	223 472	188 025	222 476	201 044	174 820	244 319	154 003	169 104	128 486		
	Microscopy examined	-	-	-	-	-	-	31 013	-	835	3717	5449	3752	1865	5510		
	Confirmed with microscopy	-	-	-	-	-	-	1061	-	268	603	909	1130	255	957		
	RDT Examined	-	-	-	-	-	-	-	-	720	4338	2299	7991	3293	3576		
Mayotte, France	Confirmed with RDT	-	-	-	-	-	-	-	-	34	337	1085	1796	1633	630		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Presumed and confirmed	-	-	-	792	743	500	392	421	346	352	396	92	72	82		
	Microscopy examined	-	-	-	792	743	500	392	421	346	352	2023	1214	1463	82		
Mozambique	Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
African	Namibia	Presumed and confirmed Microscopy examined	-	538 512	445 803	468 259	610 799	339 204	265 595	172 024	132 130	87 402	25 889	14 406	3163	4745	
		Confirmed with microscopy RDT Examined	-	41 636	23 984	20 295	36 043	23 339	27 690	4242	1092	505	556	335	194	136	92 495
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	1525	-	-	4775
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Niger	Presumed and confirmed Microscopy examined	-	1 340 142	888 345	681 783	760 718	817 707	886 531	1 308 896	2 229 812	2 358 156	3 643 803	3 157 482	3 888 044	4 391 189	
		Confirmed with microscopy RDT Examined	-	-	-	56 460	76 030	46 170	87 103	55 628	62 243	79 066	49 285	68 529	84 234	255 087	
		Confirmed with RDT	-	-	-	-	-	21 230	12 567	1 308 896	530 910	312 802	7 426 774	1 130 514	1 084 747	1 799 299	
		Imported cases	-	-	-	-	-	9873	3956	193 399	434 615	230 609	570 773	712 347	758 108	1 176 711	
		Presumed and confirmed Microscopy examined	2 476 608	2 253 519	2 605 381	2 608 479	3 310 229	3 532 108	3 982 372	2 969 950	2 834 174	4 295 686	3 873 463	4 306 945	6 938 519	12 830 911	
		Confirmed with microscopy RDT Examined	-	-	-	-	-	-	-	-	-	-	335 201	672 185	1 953 399	1 633 960	
	Nigeria	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	45 924	242 526	2 898 052	7 194 960	
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	144 644	27 674	-	-	-	
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Presumed and confirmed Microscopy examined	32 149	44 034	50 953	47 830	53 991	22 370	7293	2421	1647	6182	3346	8442	12 550	9261	
	Rwanda	Presumed and confirmed Microscopy examined	66 076	83 045	93 882	81 372	97 836	68 819	58 672	49 298	38 583	59 228	48 366	83 355	103 773	73 866	
		Confirmed with microscopy RDT Examined	31 975	42 086	50 586	42 656	46 486	18 139	5146	2421	1647	3798	2233	6373	10 706	6352	
		Confirmed with RDT	-	-	-	-	-	-	-	-	140 478	60 649	9989	33 924	23 124	34 768	
		Imported cases	-	-	-	-	-	-	-	-	4611	2384	507	2069	1844	2891	
		Presumed and confirmed Microscopy examined	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	707 772	604 290	634 106	772 222	
		Confirmed with microscopy RDT Examined	56 169	55 494	54 257	85 246	67 750	105 093	138 254	195 487	48 324	43 026	27 793	18 325	19 946	24 205	
Sao Tome and Principe	Presumed and confirmed Microscopy examined	44 959	12 920	14 425	26 865	22 234	33 160	48 070	78 278	24 830	19 614	17 750	14 142	15 612	20 801		
	Confirmed with RDT	-	-	-	-	-	-	-	90 161	487 188	485 548	651 737	555 614	524 971	668 562		
	Imported cases	-	-	-	-	-	-	-	40 054	217 096	146 319	325 920	263 184	265 468	325 088		
	Presumed and confirmed Microscopy examined	460 881	447 826	507 130	524 987	355 638	233 833	160 666	653 987	932 819	747 339	934 028	856 332	1 945 859	1 715 851		
Sierra Leone	Confirmed with microscopy RDT Examined	-	4985	10 605	12 298	4985	10 605	12 298	-	-	770 463	718 473	46 280	194 787	185 403		
	Confirmed with RDT	-	2206	3702	3945	2206	3702	3945	-	-	273 149	25 511	104 533	104 533	76 077		
	Imported cases	-	-	-	-	-	3452	4675	-	235 800	544 336	1 609 455	886 994	1 975 972	2 377 254		
	Presumed and confirmed Microscopy examined	64 624	26 506	15 649	13 459	13 399	7755	14 456	6327	7796	6117	8060	9866	6846	8851		
South Africa	Confirmed with microscopy RDT Examined	-	26 506	15 649	13 459	13 399	7755	12 098	6327	7796	6072	3787	5986	1632	2572		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	276 669	204 047	3880	30 053	239 705		
	Imported cases	-	-	-	-	-	-	-	-	-	-	4273	-	3997	6073		
	Presumed and confirmed Microscopy examined	-	237 712	462 056	646 673	515 958	337 582	116 473	101 008	136 492	325 634	900 283	795 784	1 125 039	1 855 501		
South Sudan <sup>1</sup>	Confirmed with microscopy RDT Examined	-	-	-	-	-	-	-	-	116 555	-	-	-	-	-		
	Confirmed with RDT	-	-	-	-	-	-	-	-	52 011	-	900 283	112 024	225 371	262 520		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Presumed and confirmed Microscopy examined	29 374	12 854	10 129	7203	5140	6066	7807	6338	5881	6624	1722	797	626	669		
Swaziland	Presumed and confirmed Microscopy examined	-	24 123	13 997	12 564	6754	4587	3985	-	-	-	-	-	-	-		
	Confirmed with microscopy RDT Examined	-	1 395	670	342	574	279	155	84	58	106	87	130	78	161		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Imported cases	-	-	-	-	-	-	-	-	-	-	181	419	217	474		
															233		

# Annex 6B – Reported malaria cases by method of confirmation, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
African	Togo	Presumed and confirmed	45 643	5 993 506	7 950 109	21 076 063	22 647 469	21 333 887	20 750 997	20 550 475	19 255 361	24 926 648	26 101 704	22 338 325	768 287	881 611
		Microscopy examined	53 533	53 804	1 223 726	5 916 961	7 439 690	10 144 630	6 405 218	7 010 355	6 240 987	60 691	7 342 943	6 042 835	579 507	560 096
		Confirmed with microscopy	17 734	-	599 627	2 778 398	3 381 414	3 868 359	2 795 694	2 891 295	2 891 295	67	2 858 184	1 947 905	260 535	272 855
		RDT Examined	-	-	-	-	-	-	-	188 225	188 225	-	121 248	136 123	1 822 911	660 627
	Uganda	Confirmed with RDT	-	-	-	-	-	-	-	103 390	-	3031	1974	434 729	436 839	609 575
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Presumed and confirmed	3 552 859	5 624 032	7 536 748	9 657 332	10 717 076	9 867 174	10 168 389	11 978 636	11 602 700	12 086 399	13 208 169	12 173 358	13 591 932	14 464 650
		Microscopy examined	-	-	1 100 374	1 566 474	1 859 780	2 107 011	2 238 155	2 348 373	2 397 037	3 612 418	3 705 284	385 928	3 466 571	3 718 588
	United Republic of Tanzania <sup>1</sup>	Confirmed with microscopy	-	-	557 159	801 784	879 032	1 104 310	867 398	1 045 378	979 298	1 301 337	1 581 160	1 413 149	1 502 362	
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	194 819	2 449 526	7 387 826
		Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	97 147	1 249 109	
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mainland	Presumed and confirmed	45 643	369 474	413 361	11 418 731	11 930 393	11 466 713	10 582 608	8 571 839	7 739 151	12 840 249	12 893 535	10 164 967	8 477 435	8 585 482
		Microscopy examined	53 533	53 804	123 352	4 350 487	5 579 910	8 037 619	4 167 063	4 661 982	3 843 950	60 691	3 637 659	5 656 907	6 931 025	6 804 085
		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	211	1 277 024	1 813 179	1 772 062	1 481 275
		RDT Examined	-	-	-	-	-	-	-	-	-	121 248	136 123	1 628 092	1 091 615	813 103
	Mozambique <sup>2</sup>	Confirmed with RDT	-	-	-	-	-	-	-	-	-	3031	1974	337 582	214 893	71 169
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Presumed and confirmed	-	324 584	369 394	11 379 411	11 898 627	11 441 681	10 566 201	8 562 200	7 643 050	12 752 090	12 819 192	10 160 478	8 474 278	8 582 934
		Microscopy examined	-	-	71 384	4 296 588	5 528 934	7 993 977	4 136 387	4 638 471	3 830 767	-	3 573 710	5 513 619	6 784 639	6 720 141
Zanzibar	Confirmed with microscopy	-	20 152	25 485	1 960 909	2 490 446	2 756 421	1 926 711	1 845 624	-	-	1 276 660	1 812 704	1 771 388	1 480 791	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	1 315 662	701 477	369 444	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	333 568	212 636	69 459	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zambia	Presumed and confirmed	45 643	44 890	43 967	39 320	31 766	25 032	16 407	9 639	96 101	88 159	74 343	44 889	3157	2548	
	Microscopy examined	53 533	53 804	51 968	53 899	50 976	43 642	30 676	23 511	56 579	60 691	63 949	143 288	146 386	83 944	
	Confirmed with microscopy	17 734	18 385	16 983	15 705	11 936	7628	1585	293	77	211	364	475	674	484	
	RDT Examined	-	-	-	-	-	-	-	-	-	173 311	121 248	312 430	390 138	443 659	
Zimbabwe	Confirmed with RDT	-	-	-	-	-	-	-	-	4508	3031	1974	4014	2257	1710	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed	3 337 796	3 838 402	3 760 335	4 346 172	4 078 234	4 121 356	4 731 338	4 248 295	3 080 301	2 976 395	4 229 839	4 607 908	4 695 400	5 465 122	
	Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Region of the Americas	Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Argentina	Presumed and confirmed	440	215	125	122	115	252	212	387	130	86	72	18	4	4	
	Microscopy examined	7949	6685	5043	3977	3018	3018	6353	6353	5157	-	2547	7872	12 694	4913	
	Confirmed with microscopy	440	215	125	122	115	252	212	387	130	86	72	18	4	4	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bahamas <sup>3</sup>	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed	2	4	1	3	2	1	49	6	14	0	46	18	4	4	
	Microscopy examined	22	18 385	16 983	34	17	9	546	35	35	27 272	31 013	-	-	-	
Other Region of the Americas	Confirmed with microscopy	2	4	1	3	2	1	49	6	14	0	46	18	4	4	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Region of the Americas	Presumed and confirmed Microscopy examined	1486	1162	1134	1084	1066	1549	844	845	540	256	150	79	37	26	
	Confirmed with microscopy	18 559	18 173	15 480	15 480	17 358	25 119	25 755	22 134	25 550	26 051	27 366	22 996	20 789	25 351	
	RDT Examined	1486	1162	1134	1084	1066	1549	844	845	540	256	150	79	37	26	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	31 469	15 765	14 276	20 343	14 910	20 142	18 995	14 610	9748	9748	9743	13 769	7143	7415	7342
	Confirmed with microscopy	143 990	122 933	137 509	158 299	163 307	202 021	208 616	180 316	159 826	159 826	132 633	133 463	143 272	121 944	133 260
	RDT Examined	31 469	15 765	14 276	20 343	14 910	20 142	18 995	14 610	9748	9748	9234	12 252	6108	6293	6272
	Confirmed with RDT	-	-	-	-	5000	6000	6000	1500	5000	5000	981	7394	7390	10 960	10 879
	Imported cases	-	-	-	-	-	1300	730	-	-	-	509	1517	1035	1122	1070
Bolivia (Plurinational State of)	Presumed and confirmed Microscopy examined	613 241	388 303	348 259	408 886	465 004	606 067	549 469	458 652	315 746	309 316	334 667	267 146	242 758	178 546	
	Confirmed with microscopy	2 562 576	2 274 610	2 118 491	2 009 414	2 194 780	2 660 539	2 959 489	2 986 381	2 726 433	2 620 787	2 711 432	2 476 335	2 325 775	1 873 518	
	RDT Examined	613 241	388 303	348 259	408 886	465 004	606 067	549 469	458 652	315 746	309 316	334 667	266 713	237 978	174 048	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	90 275	-	1486	23 566	19 500	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	433	4780	3719	
	Presumed and confirmed Microscopy examined	144 432	231 233	204 916	180 956	142 241	121 629	120 096	125 262	79 230	79 347	117 650	64 309	60 179	51 722	
	Confirmed with microscopy	478 820	747 079	686 635	640 453	562 681	493 562	451 240	564 755	470 381	428 004	521 342	396 861	346 599	284 332	
	RDT Examined	144 432	231 233	204 916	180 956	142 241	121 629	120 096	125 262	79 230	79 347	117 657	60 121	50 938	44 293	
	Confirmed with RDT	-	-	-	-	-	-	-	25 000	22 754	8362	-	21 171	70 168	42 732	
	Imported cases	-	-	-	-	-	-	-	3200	1329	95	13	4188	9241	7403	
Colombia	Presumed and confirmed Microscopy examined	1879	1363	1021	718	1289	3541	2903	1223	966	262	114	17	8	6	
	Confirmed with microscopy	61 267	43 053	17 738	9622	9204	12 767	24 498	22 641	17 304	4829	15 599	10 690	7485	16 774	
	RDT Examined	1879	1363	1021	718	1289	3541	2903	1223	966	262	114	17	8	6	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	4	6	1	4	
	Presumed and confirmed Microscopy examined	1233	1038	1296	1529	2355	3837	3525	2711	1840	1643	2482	1616	932	579	
	Confirmed with microscopy	427 297	411 431	391 216	349 717	322 948	397 108	446 839	435 649	381 010	353 336	469 052	421 405	415 808	431 683	
	RDT Examined	1233	1038	1296	1529	2355	3837	3525	2711	1840	1643	2482	1616	932	579	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	26 585	56 150	90 775	71 000	
	Imported cases	-	-	-	-	-	-	-	-	-	-	932	-	-	-	
Dominican Republic	Presumed and confirmed Microscopy examined	104 528	108 903	86 757	52 065	28 730	17 050	9863	8464	4891	4120	1888	1233	558	378	
	Confirmed with microscopy	544 646	538 757	403 225	433 244	357 633	358 361	318 132	352 426	384 800	446 740	481 030	460 785	459 157	397 628	
	RDT Examined	104 528	108 903	86 757	52 065	28 730	17 050	9863	8464	4891	4120	1888	1233	558	378	
	Confirmed with RDT	-	-	-	-	-	-	-	-	2758	4992	7800	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	753	362	117	85	112	67	49	40	33	20	24	24	15	7	
	Confirmed with microscopy	279 072	111 830	115 378	102 053	94 819	102 479	113 754	95 857	97 872	83 031	115 256	100 883	124 885	103 748	
	RDT Examined	753	362	117	85	112	67	49	40	33	20	24	24	15	7	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ecuador	Presumed and confirmed Microscopy examined	3708	3823	3661	3839	3038	3414	4074	4828	3265	3462	1608	1209	900	875	
	Confirmed with microscopy	48 162	44 718	44 718	32 402	32 402	32 402	32 402	32 402	11 994	20 065	14 373	14 429	13 638	22 327	
	RDT Examined	3708	3823	3661	3839	3038	3414	4074	4828	3265	3462	1608	1209	900	875	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	7	6	6	1	
	Presumed and confirmed Microscopy examined	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7198	7080	7198	6817	5346	6214	
	Confirmed with microscopy	246 642	198 114	197 113	156 227	148 729	178 726	168 958	129 410	173 678	154 651	235 075	195 080	186 645	171 405	
	RDT Examined	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7198	7080	7384	6817	5346	6214	
	Confirmed with RDT	-	-	-	-	-	-	-	3000	2000	2000	2000	-	-	0	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
French Guiana, France	Presumed and confirmed Microscopy examined	3708	3823	3661	3839	3038	3414	4074	4828	3265	3462	1608	1209	900	875	
	Confirmed with microscopy	48 162	44 718	44 718	32 402	32 402	32 402	32 402	32 402	11 994	20 065	14 373	14 429	13 638	22 327	
	RDT Examined	3708	3823	3661	3839	3038	3414	4074	4828	3265	3462	1608	1209	900	875	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7198	7080	7198	6817	5346	6214	
	Confirmed with microscopy	246 642	198 114	197 113	156 227	148 729	178 726	168 958	129 410	173 678	154 651	235 075	195 080	186 645	171 405	
	RDT Examined	53 311	35 824	35 540	31 127	28 955	39 571	31 093	15 382	7198	7080	7384	6817	5346	6214	
	Confirmed with RDT	-	-	-	-	-	-	-	3000	2000	2000	2000	-	-	0	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
Guatemala	Presumed and confirmed Microscopy examined	1486	1162	1134	1084	1066	1549	844	845	540	256	150	79	37	26	
	Confirmed with microscopy	18 559	18 173	15 480	15 480	17 358	25 119	25 755	22 134	25 550	26 051	27 366	22 996	20 789	25 351	
	RDT Examined	1486	1162	1134	1084	1066	1549	844	845	540	256	150	79	37	26	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	31 469	15 765	14 276	20 343	14 910	20 142	18 995	14 610	9748	9748	9743	13 769	7143	7342	
	Confirmed with microscopy	143 990	122 933	137 509	158 299	163 307	202 021	208 616	180 316	159 826	159 826	132 633	133 463	143 272	121 944	
	RDT Examined	31 469	15 765	14 276	20 343	14 910	20 142	18 995	14 610	9748	9748	9234	12 252	6108	6293	
	Confirmed with RDT	-	-	-	-	5000	6000	6000	1500	5000	5000	981	7394	7390	10 960	
	Imported cases	-	-	-	-	-	1300	730	-	-	-	509	1517	1035	1070	

# Annex 6B – Reported malaria cases by method of confirmation, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Region of the Americas	Guyana	Presumed and confirmed	24 018	27 122	21 895	27 627	28 866	38 984	21 064	11 656	11 815	13 673	22 935	29 471	31 601	31 479
		Microscopy examined	209 197	211 221	175 966	185 877	151 938	210 429	202 688	202 688	178 005	137 247	169 309	212 863	201 693	196 622
	Haiti	Confirmed with microscopy	24 018	27 122	21 895	27 627	28 866	38 984	21 064	11 656	11 815	13 673	22 935	29 471	31 601	31 479
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	35	-	0
	Honduras	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	35	55	-
		Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Presumed and confirmed	16 897	9 837	-	-	10 802	21 778	32 739	29 825	36 774	49 535	84 153	34 350	25 928	20 957
		Microscopy examined	21 190	51 067	-	-	30 440	3 541 506	87 951	142 518	168 950	270 438	270 427	184 934	167 726	172 624
		Confirmed with microscopy	16 897	9 837	-	-	10 802	21 778	32 739	29 825	36 774	49 535	84 153	34 350	27 866	20 957
		RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Confirmed with RDT		-	-	-	-	-	-	-	-	-	-	-	-	-	55 86	
Imported cases		-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Presumed and confirmed		35 125	24 149	17 223	14 063	17 134	15 943	11 947	10 512	10 512	8 368	9 313	9 685	7 618	64 39	
Microscopy examined		175 595	174 430	178 616	137 891	145 082	153 474	125 162	130 255	130 255	119 484	108 529	152 961	152 451	151 165	
Jamaica <sup>a</sup>	Confirmed with microscopy	35 125	24 149	17 223	14 123	17 293	16 007	11 923	10 513	8 368	9 321	9 685	7 618	64 39	53 64	
	RDT Examined	-	-	-	-	-	2 500	2 500	-	-	4 000	4 000	4 000	4 000	4 000	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	0	-	45	10	64	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed	7	6	7	9	141	88	194	199	199	22	22	12	9	5	
	Microscopy examined	874	596	725	394	3879	2470	6821	30 732	34 149	10 763	5042	3687	123		
	Confirmed with microscopy	7	6	7	9	141	88	194	199	199	22	22	12	9	5	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mexico	Presumed and confirmed	7 390	4 996	4 624	3 819	3 406	2 967	2 514	2 361	2 357	2 703	1 226	1 124	833	499	
	Microscopy examined	2 003 569	1 857 233	1 852 553	1 565 155	1 454 575	1 559 076	1 345 915	1 430 717	1 430 717	1 246 780	1 240 087	1 035 424	1 025 659	1 017 508	
	Confirmed with microscopy	7 390	4 996	4 624	3 819	3 406	2 967	2 514	2 361	2 357	2 703	1 226	1 130	842	499	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed	23 878	10 482	7 695	6 717	6 897	6 642	3 114	1 356	762	610	610	692	925	1 194	
	Microscopy examined	509 443	482 919	491 689	448 913	492 319	516 313	464 581	521 464	533 173	544 717	544 717	535 914	521 904	536 278	
	Confirmed with microscopy	23 878	10 482	7 695	6 717	6 897	6 642	3 114	1 356	762	610	610	692	925	1 194	
	RDT Examined	-	-	-	-	-	-	11 563	16 173	10 000	10 000	9 000	18 500	14 021	16 444	
Panama	Confirmed with RDT	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed	1036	928	2 244	4 500	5 095	3 667	1 663	1 281	1 281	744	778	418	844	705	
	Microscopy examined	149 702	156 589	165 796	166 807	171 179	208 582	212 254	204 193	204 193	200 574	158 481	141 038	116 588	107 711	
	Confirmed with microscopy	1036	928	2 244	4 500	5 095	3 667	1 663	1 281	1 281	744	778	418	844	705	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed	6853	2 710	2 778	1 392	694	376	823	1 341	1 341	341	91	27	10	15	
	Microscopy examined	97 026	71 708	99 338	126 582	97 246	85 942	111 361	92 339	94 316	64 660	64 660	62 178	48 611	24 806	
Paraguay	Confirmed with microscopy	6853	2 710	2 778	1 392	694	376	823	1 341	341	91	27	10	15	11	
	RDT Examined	-	-	-	-	-	-	-	-	1 997	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Imported cases	-	-	-	-	-	-	-	-	-	7	-	-	-		
	Presumed and confirmed	68 321	78 544	99 237	88 408	93 581	87 699	64 925	50 797	44 522	42 645	31 545	25 005	31 436		
	Microscopy examined	1 483 816	1 417 423	1 582 385	1 485 012	1 438 925	1 438 925	1 438 925	1 438 925	796 337	892 990	744 627	702 894	758 723		
	Confirmed with microscopy	68 321	78 544	99 237	88 408	93 581	87 699	64 925	50 797	44 522	42 645	31 545	25 005	31 436		
	RDT Examined	-	-	-	-	-	-	-	-	0	37 022	37 022	58	562		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	1	34	134		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-		
Peru	Presumed and confirmed	11 361	16 003	12 837	10 982	8 378	9 131	32 89	11 04	2086	2499	1 771	795	569		
	Microscopy examined	63 377	67 369	68 070	43 241	56 975	59 855	45 722	31 768	28 137	33 279	16 533	15 135	17 464		
	Confirmed with microscopy	11 361	16 003	12 837	10 982	8 378	9 131	32 89	11 04	2086	2499	1 771	795	569		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Presumed and confirmed	11 361	16 003	12 837	10 982	8 378	9 131	32 89	11 04	2086	2499	1 771	795	569		
	Microscopy examined	63 377	67 369	68 070	43 241	56 975	59 855	45 722	31 768	28 137	33 279	16 533	15 135	17 464		
	Confirmed with microscopy	11 361	16 003	12 837	10 982	8 378	9 131	32 89	11 04	2086	2499	1 771	795	569		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-		
Suriname	Confirmed with RDT	-	-	-	-	-	-	-	224	1 774	1 438	541	1025	4008		
	Imported cases	-	-	-	-	-	-	-	637	623	538	138	20	248		
	Presumed and confirmed	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Presumed and confirmed	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Microscopy examined	-	-	-	-	-	-	-	-	-	-	-	-	-		

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Region of the Americas	Presumed and confirmed	29 736	20 006	29 491	31 719	46 655	45 049	37 062	41 749	32 037	35 828	45 155	45 824	52 803	78 643
	Microscopy examined	261 866	198 000	278 205	344 236	420 165	420 165	479 708	392 197	414 137	370 258	400 495	382 303	410 663	476 764
	Confirmed with microscopy	29 736	20 006	29 491	31 719	46 655	45 049	37 062	41 749	32 037	35 828	45 155	45 824	52 803	78 643
	RDT Examined	-	-	-	-	-	-	-	4141	-	-	-	-	-	-
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Presumed and confirmed	203 911	364 243	626 839	585 602	273 377	326 694	414 407	456 490	467 123	390 729	392 463	482 748	391 365	319 742
	Microscopy examined	257 429	-	-	-	248 946	338 253	460 908	504 856	549 494	521 817	524 523	531 053	511 408	507 145
	Confirmed with microscopy	94 475	-	415 356	360 940	242 022	116 444	86 129	92 202	81 574	64 880	69 397	77 549	54 840	39 263
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	0	0
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	0	0	
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Presumed and confirmed	4667	4312	5021	5036	2142	2469	6457	6457	4694	3528	2686	1010	232	25	
Microscopy examined	-	-	-	-	1913	1913	-	3461	2896	-	-	-	124	1410	
Confirmed with microscopy	-	-	-	5036	122	413	1796	210	210	119	2686	1010	-	22	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	3	
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Presumed and confirmed	17	11	10	45	43	23	29	29	30	80	94	85	116	206	
Microscopy examined	1 155 904	1 357 223	1 041 767	-	-	-	-	23 402	34 880	41 344	664 294	-	816 600	-	
Confirmed with microscopy	17	11	10	45	43	23	29	29	30	80	94	85	116	206	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	17	11	10	45	43	23	29	29	30	80	94	85	116	206	
Presumed and confirmed	19 716	19 303	15 558	23 562	13 821	18 966	15 909	15 712	11 460	6 122	3031	3239	1629	1373	
Microscopy examined	1 732 778	1 867 500	1 416 693	1 358 262	1 326 108	1 674 895	1 131 261	1 074 196	966 150	744 586	614 817	530 470	479 655	385 172	
Confirmed with microscopy	19 716	19 303	15 558	23 562	13 821	18 966	15 909	15 712	11 460	6 122	3031	3239	1629	1373	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	7422	10 379	6436	6502	6219	4570	2782	2434	2434	3111	1645	1184	1529	842	
Presumed and confirmed	1860	1265	952	347	155	47	24	24	3	6	1	7	11	8	
Microscopy examined	-	997 812	1 072 587	681 070	913 400	944 163	970 000	844 859	844 859	1 105 054	1 493 143	1 849 930	2 097 732	1 963 638	
Confirmed with microscopy	1860	1265	952	347	155	47	24	24	3	6	1	7	11	8	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	-	-	-	-	-	-	0	-	-	-	-	-	-	-	
Presumed and confirmed	59	59	107	73	56	100	83	83	75	142	145	218	312	364	
Microscopy examined	277 671	335 723	345 173	405 800	405 601	-	-	367 705	292 826	290 566	232 598	171 400	285 039	108 432	
Confirmed with microscopy	59	59	107	73	56	100	83	83	75	142	145	218	312	364	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	56	59	88	69	55	100	83	83	75	142	145	215	312	364	
Presumed and confirmed	694	635	590	740	615	544	443	443	705	965	898	1193	1531	2051	
Microscopy examined	494 884	521 552	495 826	409 532	326 127	258 981	242 635	244 346	244 346	245 113	234 803	226 009	267 353	269 990	
Confirmed with microscopy	694	635	590	740	615	544	443	443	705	965	898	1193	1531	2051	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	688	633	584	734	615	544	443	443	701	957	898	1169	1518	2029	
Presumed and confirmed	3 337 054	3 572 845	4 238 778	4 210 611	1 958 350	4 022 823	4 314 637	4 553 732	4 658 701	4 242 032	4 281 356	4 065 802	4 285 449	4 285 449	
Microscopy examined	-	3 572 425	3 399 524	4 577 037	4 243 108	4 776 274	4 490 577	4 905 561	3 775 793	3 655 272	4 281 346	4 168 648	4 168 648	4 497 330	
Confirmed with microscopy	82 526	125 292	107 666	125 152	126 719	127 826	124 910	128 570	104 454	132 688	220 870	287 592	250 526	196 078	
RDT Examined	-	-	-	-	-	-	-	-	-	-	243 521	279 724	518 709	410 949	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	34 891	19 721	46 997	40 255	
Imported cases	6608	3074	2612	1724	1232	1059	1278	1149	190	120	2333	1941	2788	3406	
Presumed and confirmed	-	821 860	825 443	819 869	780 392	715 878	804 087	1 015 781	1 114 841	1 114 841	1 078 745	944 723	1 062 827	1 186 179	
Microscopy examined	6608	3074	2612	1724	1232	1059	1278	1149	190	120	2333	1941	2788	3406	
Confirmed with microscopy	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	1872	1471	1402	1024	924	855	1008	2397	1430	2275	1912	2719	3324	2479	

# Annex 6B – Reported malaria cases by method of confirmation, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Eastern Mediterranean	Presumed and confirmed Microscopy examined	10 364	10 364	96 922	23 349	36 732	28 404	49 092	50 444	82 980	72 362	24 553	41 167	59 709	60 199		
	Microscopy examined	-	-	21 350	12 578	30 127	47 882	-	-	-	73 985	59 181	20 593	26 351	-	33 186	
	Confirmed with microscopy	-	-	15 732	7 571	11 436	12 516	16 430	16 675	-	36 905	25 202	5 629	16 27	18 842	28 895	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	200 105	35 236	-	69 684	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	18 924	17 24	-	14 422	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Presumed and confirmed Microscopy examined	4 332 827	3 985 702	3 054 400	3 084 320	2 083 711	2 515 693	2 117 514	3 040 181	3 040 181	3 073 996	2 361 188	1 465 496	1 246 833	1 001 571	989 946	
	Microscopy examined	-	-	-	-	-	-	-	-	2 243 981	2 050 354	2 791 156	-	-	-	-	
	Confirmed with microscopy	368 557	203 491	280 550	933 267	537 899	628 417	721 233	686 908	686 908	569 296	711 462	1 653 300	2 222 380	2 000 700	1 800 000	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	95 192	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	42	79	27	24	13	28	34	34	37	51	39	23	48	42	22	
	Microscopy examined	-	-	-	-	-	-	-	-	68 000	-	25 751	19 151	25 109	19 136	18 814	
	Confirmed with microscopy	42	79	27	24	13	28	34	34	37	51	39	23	48	42	22	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	36	16	12	22	12	28	34	34	37	51	39	23	48	42	22		
Presumed and confirmed Microscopy examined	1 394 495	-	187 159	265 032	158 561	200 560	217 270	217 270	223 299	158 608	138 579	198 963	142 147	165 678	149 451		
Microscopy examined	-	-	556 143	398 472	501 747	472 970	799 747	799 747	585 015	781 318	797 621	645 463	645 093	685 406	723 691		
Confirmed with microscopy	1 394 495	-	75 508	50 811	48 756	44 150	55 000	55 000	67 607	43 545	53 445	78 269	60 207	68 849	63 484		
RDT Examined	-	-	-	-	-	-	-	-	303	5015	18 566	97 289	108 110	150 218	157 457		
Confirmed with RDT	-	-	-	-	-	-	-	-	70	661	2001	28 428	30 203	41 059	39 294		
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
European	Presumed and confirmed Microscopy examined	141	79	52	29	47	7	230	1	1	0	1	-	-	-		
	Microscopy examined	356	174	165	126	220	209	230	658	658	30 761	31 026	-	-	-		
	Confirmed with microscopy	141	79	52	29	47	7	0	1	1	0	1	-	-	-		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	1526	1058	506	482	386	242	143	110	110	73	80	52	8	4		
	Microscopy examined	527 688	536 260	507 252	536 822	545 145	515 144	498 697	465 033	465 033	408 780	451 436	456 652	449 168	497 040	432 810	
	Confirmed with microscopy	1526	1058	506	482	386	242	143	110	110	73	80	52	8	4		
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Presumed and confirmed Microscopy examined	173	438	472	315	256	155	60	60	1	1	2	2	4	1		
	Microscopy examined	-	3574	6145	5457	3365	5169	4400	4398	3400	4398	4120	2368	2032	1046	192	
	Confirmed with microscopy	245	438	474	316	257	155	60	60	25	8	7	0	6	5	7	
	RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Presumed and confirmed Microscopy examined	12	28	2743	468	93	226	318	318	96	18	6	0	5	4			
Microscopy examined	70 500	72 020	69 807	144 070	79 895	114 316	74 729	62 444	62 444	40 833	33 983	30 190	27 850	18 268	54 249		
Confirmed with microscopy	12	28	2743	468	93	226	318	318	96	18	4	6	5	3	4		
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Presumed and confirmed Microscopy examined	795	898	642	533	382	205	143	143	122	96	107	102	85	3			
Microscopy examined	-	-	-	-	-	-	-	-	35 784	28 340	27 382	33 024	28 311	-			
Confirmed with microscopy	795	898	642	533	382	205	143	143	122	96	107	102	85	-			
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Presumed and confirmed Microscopy examined	19 064	11 387	6160	5428	3588	2309	1344	1344	42	47	107	101	83	-			
Microscopy examined	233 785	248 565	244 632	296 123	272 743	216 197	175 894	159 232	159 232	158 068	165 266	173 523	173 367	209 239	213 916		
Confirmed with microscopy	19 064	11 387	6160	5428	3588	2309	1344	1344	42	47	107	101	83	-			
RDT Examined	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Imported cases	-	-	-	-	-	-	-	-	7	0	1	1	13	15	7		



WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
European	Presumed and confirmed Microscopy examined	11 432	10 812	10 224	9 222	5 302	2 084	796	358	215	84	78	128	376	285	
	Confirmed with microscopy	1 597 290	1 550 521	1 320 010	1 187 814	1 158 673	1 042 509	934 839	775 502	616 570	606 875	507 841	421 295	337 830	337 830	255 125
	RDT Examined	11 432	10 812	10 224	9 222	5 302	2 084	796	358	215	84	78	128	376	285	
	Confirmed with RDT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Imported cases	-	-	-	-	-	-	29	29	49	46	69	127	157	251	-
	Presumed and confirmed Microscopy examined	24	8	18	7	3	1	1	0	0	1	0	0	0	0	3
	Confirmed with microscopy	50 105	50 075	59 834	72 643	71 377	56 982	58 673	65 666	75 524	94 237	81 784	-	-	-	-
	RDT Examined	24	8	18	7	3	1	1	0	0	1	0	0	0	0	0
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Presumed and confirmed Microscopy examined	126	77	74	74	66	102	76	89	27	1	0	0	0	0	0
	Confirmed with microscopy	735 164	691 500	735 164	812 543	893 187	917 843	924 534	858 968	883 807	916 839	921 364	886 243	805 761	908 301	908 301
	RDT Examined	126	77	74	74	66	102	76	89	27	1	0	0	0	0	0
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Imported cases	-	-	-	-	-	-	3	2	20	4	2	1	1	1	3
Presumed and confirmed Microscopy examined	437 838	320 010	313 859	489 377	386 555	290 418	164 159	59 866	168 885	79 853	91 227	51 773	29 518	29 518	3864	
Confirmed with microscopy	360 300	250 258	275 987	245 258	185 215	220 025	209 991	266 938	336 505	397 148	308 326	270 253	253 887	253 887	74 755	
RDT Examined	55 599	54 216	62 269	54 654	58 894	48 121	32 857	58 659	50 004	25 203	20 519	20 232	40 16	40 16	1866	
Confirmed with RDT	-	-	-	-	-	-	-	3 199	106 001	156 639	152 936	119 849	35 675	35 675	19 171	
Imported cases	-	-	-	-	-	-	-	1 207	34 686	38 670	35 354	31 541	5885	5885	1998	
Presumed and confirmed Microscopy examined	5935	5982	6511	3806	2670	1825	1868	793	450	1421	487	207	82	82	45	
Confirmed with microscopy	76 445	65 974	74 696	61 246	54 892	60 152	66 079	51 446	47 268	62 341	54 709	44 481	42 512	42 512	31 632	
RDT Examined	5935	5982	6511	3806	2670	1825	1868	793	450	1421	487	207	82	82	45	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Presumed and confirmed Microscopy examined	204 428	300 000	241 192	60 559	33 803	11 507	9353	4795	16 989	14 845	13 520	16 760	21 850	21 850	14 407	
Confirmed with microscopy	-	143 674	129 889	32 083	-	-	-	7985	24 299	34 818	25 147	26 513	39 238	39 238	71 453	
RDT Examined	90 582	143 674	16 578	16 538	27 090	11 315	12 983	4795	16 989	14 845	13 520	16 760	21 850	21 850	14 407	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Presumed and confirmed Microscopy examined	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	1 532 497	1 563 574	1 599 986	1 310 656	1 067 824	881 730	
Confirmed with microscopy	86 790 375	90 389 019	91 617 725	99 136 143	97 111 526	104 120 792	106 606 703	86 355 000	86 734 579	103 396 076	108 679 429	108 969 660	109 033 790	109 033 790	113 109 094	
RDT Examined	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	1 532 497	1 563 574	1 599 986	1 310 656	1 067 824	881 730	
Confirmed with RDT	-	-	-	-	-	-	-	8 500 000	9 000 000	9 000 000	9 100 000	10 600 000	10 500 384	13 125 480	14 782 104	
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Presumed and confirmed Microscopy examined	1 432 178	2 776 477	2 416 039	2 554 223	3 016 262	1 445 831	1 320 581	1 140 423	746 119	544 470	1 963 807	2 384 260	2 051 425	2 051 425	1 833 256	
Confirmed with microscopy	1 752 763	1 604 573	1 440 320	1 224 232	1 109 801	1 178 457	1 233 334	1 750 000	1 243 744	1 420 795	1 335 445	962 090	1 429 139	1 429 139	1 447 980	
RDT Examined	245 612	2 67 592	273 793	223 074	268 852	437 323	347 597	333 792	266 277	199 577	465 764	422 447	417 819	417 819	343 527	
Confirmed with RDT	-	-	-	-	-	19 164	12 990	-	462 249	1 040 633	255 733	250 709	471 586	471 586	260 181	
Imported cases	-	-	-	-	-	-	-	-	-	-	72 914	-	-	-	-	
Presumed and confirmed Microscopy examined	581 560	661 463	721 739	716 806	602 888	516 041	538 110	520 887	634 280	591 492	693 124	567 452	480 586	480 586	315 509	
Confirmed with microscopy	381 610	463 194	467 871	481 201	432 581	437 387	485 251	512 862	499 296	381 424	275 374	312 689	265 135	265 135	138 473	
RDT Examined	120 083	170 502	173 096	177 530	152 070	165 737	203 071	216 510	223 174	164 965	103 285	91 752	75 220	75 220	26 509	
Confirmed with RDT	-	-	-	-	-	-	-	499 725	543 941	599 216	729 831	795 618	1 158 831	1 158 831	1 162 083	
Imported cases	-	-	-	-	-	-	-	157 448	223 899	271 103	317 523	373 542	405 366	405 366	307 362	
Presumed and confirmed Microscopy examined	48 686	146 351	133 431	196 605	140 687	178 056	166 474	135 809	153 331	123 903	96 383	71 752	70 272	70 272	38 113	
Confirmed with microscopy	100 063	126 962	183 519	196 223	158 044	188 930	166 476	135 809	153 331	150 230	102 977	95 011	152 780	152 780	100 336	
RDT Examined	7981	6396	12 750	9506	4895	5050	4969	5621	3888	3335	3115	1910	1659	1659	1197	
Confirmed with RDT	-	-	-	-	-	-	-	-	-	-	17 887	25 353	22 472	22 472	32 989	
Imported cases	-	-	-	-	-	-	-	-	-	-	779	1504	433	433	777	



WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Western Pacific	Presumed and confirmed Microscopy examined	368 913	373 838	353 114	412 251	393 288	403 892	150 126	102 140	84 078	95 006	80 859	57 296	53 270	
	Confirmed with microscopy	300 806	297 345	278 178	321 954	316 898	328 555	311 447	276 639	231 221	212 329	182 847	202 620	191 137	
	RDT Examined	68 107	76 493	74 936	90 297	76 390	75 337	65 404	40 535	33 002	35 373	23 202	21 904	21 540	
	Confirmed with RDT	-	-	-	-	-	-	-	-	-	17 300	17 457	13 987	26 216	
	Imported cases	-	-	-	-	-	-	-	-	-	4 331	3 455	2 479	4 069	
	Presumed and confirmed Microscopy examined	33 779	19 493	35 151	42 008	34 912	30 067	20 215	24 279	22 271	16 831	57 64	34 35	23 81	
	Confirmed with microscopy	31 668	36 576	54 234	53 524	61 092	40 625	38 214	30 267	24 813	29 180	19 183	16 981	15 219	
	RDT Examined	6768	7647	14 339	14 653	9834	8055	5471	3473	3615	4013	2077	733	767	
	Confirmed with RDT	-	-	-	-	-	-	-	1 639	2065	10 246	12 529	16 292	13 724	
	Imported cases	-	-	-	-	-	-	-	292	574	4 156	2 743	2 702	16 14	
	Presumed and confirmed Microscopy examined	274 910	188 122	151 961	108 350	84 473	74 766	59 601	51 668	49 186	54 297	45 588	43 717	35 406	
	Confirmed with microscopy	2 682 862	2 821 440	2 856 539	2 694 854	2 728 481	2 842 429	3 634 060	1 297 365	2 829 516	2 760 119	2 791 917	2 897 730	2 684 996	
	RDT Examined	74 316	68 699	47 807	24 909	19 496	22 637	16 389	11 355	16 130	17 515	16 612	19 638	17 128	
	Confirmed with RDT	-	10 000	94 000	-	-	130 000	78 294	72 087	44 647	7017	491 373	514 725	412 530	
Imported cases	-	-	-	-	-	-	-	-	-	-	-	-	-		
<b>Regional Summary (Presumed and confirmed malaria cases)</b>		<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
African Region		35 663 718	52 098 035	56 721 175	91 116 994	98 423 832	96 541 393	95 920 674	99 645 518	90 068 547	118 026 130	128 263 514	122 023 537	110 176 919	122 454 712
Region of the Americas		1 181 104	982 778	895 134	889 993	909 466	1 049 444	920 506	784 591	563 429	573 032	677 242	495 093	469 884	428 483
Eastern Mediterranean		9 312 314	7 966 892	8 228 975	8 200 465	4 528 808	7 117 410	7 137 177	8 348 266	8 459 131	7 217 208	6 370 339	5 986 974	5 911 503	4 999 692
European		33 293	24 785	20 891	16 558	10 123	5331	3111	1436	757	451	356	311	422	317
South-East Asia		5 046 227	6 508 866	5 846 648	5 972 055	6 331 300	4 422 348	4 180 952	3 526 781	3 425 384	3 058 012	4 610 770	4 463 996	3 760 367	3 121 363
Western Pacific		2 966 036	2 515 921	2 535 215	2 472 548	2 780 229	2 551 772	2 453 993	2 106 470	2 030 728	1 735 776	1 651 715	1 373 263	1 090 370	1 297 314
<b>Total</b>		<b>54 202 692</b>	<b>70 097 277</b>	<b>74 248 038</b>	<b>108 668 613</b>	<b>112 983 758</b>	<b>111 687 698</b>	<b>110 616 413</b>	<b>114 413 062</b>	<b>104 547 976</b>	<b>130 610 609</b>	<b>141 573 936</b>	<b>134 343 174</b>	<b>121 409 415</b>	<b>132 301 881</b>

1 In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf))

2 Where national totals for the United Republic of Tanzania are unavailable, refer to the sum of Mainland and Zanzibar

3 There is no local transmission

4 Armenia, Morocco and Turkmenistan are certified malaria-free countries, but are included in this listing for historical purposes

# Annex 6C – Reported malaria cases by species, 2000–2013

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
African	Algeria	Suspected	27 733	26 411	18 803	17 059	16 686	18 392	13 869	14 745	11 964	15 635	12 224	11 974	15 790	12 762	
		No Pf	261	247	188	313	71	242	91	261	185	88	401	179	860	550	
		No Pv	277	181	116	111	92	57	24	24	24	10	6	4	12	24	30
	Angola	No Other	-	1 249 767	1 862 662	3 246 258	2 489 170	2 283 097	2 329 316	2 383 097	3 157 924	4 713 776	5 232 136	4 591 529	4 469 357	4 849 418	5 273 305
		Suspected	2 080 348	-	-	-	-	-	53 200	237 950	271 458	-	-	-	-	-	
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Benin	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		No Other	-	747 417	830 700	819 256	853 034	877 447	861 847	1 171 522	1 147 005	1 256 708	1 432 095	1 565 487	1 875 386	2 041 444	
		Suspected	-	-	-	-	-	-	-	-	-	534 590	-	68 745	0	-	
	Botswana	No Pf	-	-	-	-	-	-	-	-	-	0	-	0	0	-	
		No Pv	-	-	-	-	-	-	-	-	-	0	-	0	0	-	
		No Other	-	-	-	-	-	-	-	-	-	0	-	0	0	-	
	Burkina Faso	Suspected	71 555	48 281	28 907	23 657	22 404	11 242	23 514	30 906	41 153	32 460	12 196	11 411	308	506	
		No Pf	-	-	-	-	-	-	-	381	914	951	1046	432	193	456	
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Burundi	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Suspected	-	382 593	1 221 666	1 474 440	1 581 262	1 667 622	2 138 649	2 570 507	3 892 138	4 675 363	6 037 806	5 446 870	7 852 299	7 857 296		
	No Pf	-	0	0	0	0	0	0	0	0	-	-	-	-	-		
Cameroon	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Suspected	6843	7141	8022	6001	9833	7902	8729	8902	9033	21 913	-	26 508	8715	10 621		
Central African Republic	No Pf	144	107	76	68	45	68	160	36	70	65	47	36	36	46		
	No Pv	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Chad	Suspected	6 513 878	6 025 420	5 049 576	4 560 140	4 083 466	2 188 395	634 507	604 153	604 153	1 650 749	1 883 199	1 845 691	3 044 828	2 865 319	3 625 958	
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Cote d'Ivoire	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Suspected	139 988	181 037	195 562	136 683	196 781	178 753	114 403	119 477	152 260	175 210	66 484	221 980	468 986	491 074		
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Democratic Republic of the Congo	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Suspected	442 246	456 075	517 760	514 918	481 287	507 617	269 094	535 428	495 401	623 839	743 471	528 454	722 654	1 272 841		
Equatorial Guinea	No Pf	20 977	19 520	21 959	21 532	665	14 770	21 354	24 282	24 015	-	-	-	-	-		
	No Pv	19 101	18 767	21 974	23 663	695	16 898	23 801	24 006	23 742	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Guinea	Suspected	-	-	-	-	43 918	29 554	54 830	53 511	46 426	64 489	159 976	135 248	168 043	185 779		
	No Pf	-	-	-	-	-	-	-	-	-	5771	33 791	21 387	43 681	45 669		
	No Pv	-	-	-	-	-	-	-	-	-	79	528	334	637	72		
Mali	No Other	-	-	-	-	-	-	-	-	-	132	880	557	1189	363		
	Suspected	-	-	-	-	-	157 757	210 263	210 263	243 703	260 888	446 656	277 263	117 640	209 169		
	No Pf	-	-	-	-	-	-	-	103 213	117 291	92 855	-	37 744	120 319	43 232		
Mozambique	No Pv	-	-	-	-	-	-	-	0	0	0	-	0	0	0		
	No Other	-	-	-	-	-	-	-	0	0	0	-	0	0	0		
	Suspected	-	1 232 328	1 145 765	1 165 901	1 298 356	1 294 030	1 253 408	1 277 670	1 359 788	1 874 733	1 721 461	2 607 856	3 423 623	5 982 151		
Niger	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Senegal	Suspected	967 484	2 200 960	2 642 137	4 389 020	4 136 150	6 337 168	5 011 688	4 163 310	5 929 093	8 929 758	10 568 756	12 018 784	11 993 189	14 871 716		
	No Pf	889	1517	1727	2418	2659	2844	2043	1885	1251	-	-	-	-	4 103 745		
	No Pv	-	-	-	6	7	110	3	7	27	-	0	0	0	0		
Sierra Leone	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Togo	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Zambia	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
African	Eritrea	Suspected	138 667	121 011	107 599	65 025	49 703	80 428	62 449	77 946	96 792	97 479	138 982	134 183		
		No Pf	-	8994	5335	3480	5750	8791	5638	3358	3358	9785	10 263	12 121	12 482	
		No Pv	-	722	743	639	791	6508	2832	3244	3244	3989	4932	9204	7361	
	Ethiopia	No Other	-	-	-	-	-	-	252	281	0	0	57	19	381	1433
		Suspected	3 014 879	3 617 056	4 129 225	5 904 132	4 727 209	3 375 994	2 844 963	3 060 407	4 335 001	5 487 972	5 420 110	5 487 972	5 962 646	9 243 894
		No Pf	233 218	262 623	291 402	396 621	374 335	293 326	269 514	274 657	594 751	732 776	814 547	814 547	946 595	1 687 163
	Gabon	No Pv	157 625	164 772	171 387	178 676	149 020	158 658	171 710	173 300	287 114	390 252	665 813	745 983	958 291	
		No Other	-	-	-	-	-	-	-	-	-	0	0	-	-	-
		Suspected	127 024	132 918	157 440	166 321	230 246	294 348	214 985	287 969	298 150	114 766	233 770	178 822	238 483	256 531
	Gambia	No Pf	50 810	53 167	62 976	58 212	70 075	70 644	33 458	45 186	40 701	187	2157	-	-	26 432
		No Pv	-	-	-	-	-	-	-	-	-	23	720	-	-	0
		No Other	-	-	-	-	-	-	-	-	-	0	2015	-	-	0
	Ghana	Suspected	481 590	620 767	540 165	395 043	427 598	329 426	439 798	508 846	479 409	-	492 062	-	1 724 884	889 494
		No Pf	-	-	-	-	-	-	-	-	-	-	64 108	190 379	271 038	175 126
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Guinea	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suspected	3 349 528	3 044 844	3 140 893	3 552 896	3 416 033	3 452 969	3 511 452	3 123 147	3 349 781	5 489 798	5 056 851	5 067 731	12 578 946	8 444 417	
	No Pf	-	-	-	-	-	-	-	457 424	918 105	924 095	926 447	593 518	3 755 166	1 629 198	
Guinea-Bissau	No Pv	-	-	-	-	-	-	-	0	0	0	0	0	0	0	
	No Other	-	-	-	-	-	-	-	19 060	38 254	38 504	102 937	31 238	0	0	
	Suspected	816 539	851 877	850 147	731 911	876 837	850 309	834 835	888 643	657 003	812 471	1 092 554	1 276 057	1 220 574	775 341	
Kenya	No Pf	4800	6238	16 561	4378	103 069	50 452	41 228	28 646	33 405	20 932	20 936	5450	191 421	63 353	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Liberia	Suspected	246 316	202 379	194 976	162 344	187 910	204 555	168 462	160 305	168 326	170 255	195 006	300 233	237 398	238 580	
	No Pf	-	-	-	-	-	-	-	12 856	-	-	-	-	-	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Madagascar	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suspected	4 216 531	3 262 931	3 342 993	5 395 518	7 577 208	9 181 224	8 926 058	9 610 691	-	8 123 689	7 557 454	13 127 058	12 883 521	14 677 837	
	No Pf	-	-	-	39 383	28 328	-	-	-	839 903	-	898 531	1 002 805	1 453 471	2 335 286	
Mali	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suspected	-	-	-	-	-	66 043	1 455 807	835 082	994 560	1 200 320	3 087 659	2 887 105	2 441 800	2 202 213	
Mauritania	No Pf	-	-	-	-	-	44 875	761 095	80 373	157 920	212 657	212 927	577 641	1 407 455	1 244 220	
	No Pv	-	-	-	-	-	-	-	0	0	0	0	-	-	0	
	No Other	-	-	-	-	-	-	-	0	0	0	0	-	-	0	
Mozambique	Suspected	1 417 112	1 411 107	1 621 399	2 228 721	1 489 944	1 260 575	1 111 192	894 213	589 202	717 982	719 967	805 701	980 262	2 142 620	
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mozambique	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suspected	3 646 212	3 823 796	2 784 001	3 358 960	2 871 098	3 688 389	4 498 949	4 786 045	5 185 082	6 183 816	6 851 108	5 734 906	6 528 505	5 787 441	
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mozambique	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suspected	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	3 324 238	2 628 593	2 171 739	2 849 453	
Mozambique	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mozambique	Suspected	-	243 942	224 614	318 120	224 840	223 472	217 977	222 476	202 297	181 935	250 073	162 820	172 374	135 985	
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mozambique	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Suspected	-	-	-	792	743	500	392	421	346	352	2023	1214	1463	82	
	No Pf	-	-	-	-	-	-	373	413	328	306	355	86	66	77	
Mozambique	No Pv	-	-	-	-	-	-	3	0	4	8	10	5	2	1	
	No Other	-	-	-	-	-	-	2	1	7	20	31	0	4	-	
	Suspected	-	-	-	-	-	-	-	6 155 082	4 831 491	4 310 086	6 059 263	7 059 112	6 170 561	8 200 849	
Mozambique	No Pf	-	-	-	-	-	-	-	-	-	-	878 009	663 132	927 841	2 998 874	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

# Annex 6C – Reported malaria cases by species, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
African	Namibia	Suspected	-	538 512	445 803	468 259	610 799	265 595	172 024	155 399	102 956	39 855	74 407	10 844	188 004	
		No Pf	-	-	-	-	-	-	-	-	1092	505	556	335	194	136
		No Pv	-	-	-	-	-	-	-	-	-	0	0	0	0	0
	Niger	Suspected	-	1 340 142	888 345	681 783	766 502	889 986	982 245	3 677 661	4 493 676	4 719 439	10 616 033	3 637 778	4 250 976	5 151 131
		No Pf	-	-	-	-	53 637	74 129	44 612	54 515	60 998	77 484	601 456	757 449	817 072	1 426 696
		No Pv	-	-	-	-	-	-	-	-	-	-	0	0	0	0
	Nigeria	Suspected	2 476 608	2 253 519	2 605 381	2 608 479	3 310 229	3 532 108	3 982 372	2 969 950	2 834 174	4 295 686	3 873 463	5 221 656	11 789 970	21 659 831
		No Pf	-	-	-	-	-	-	-	-	-	-	523 513	-	-	-
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Rwanda	Suspected	-	1 329 106	1 519 315	1 735 774	1 915 990	2 409 080	2 379 278	2 318 079	2 096 061	3 186 306	2 708 973	3 204 542	3 095 386	6 129 170
		No Pf	-	-	-	-	-	-	-	-	316 242	698 745	638 669	208 858	483 470	879 316
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sao Tome and Principe	Suspected	66 250	84 993	94 249	86 546	105 341	73 050	60 819	49 298	358 122	119 877	58 961	117 279	126 897	108 652
		No Pf	-	-	-	-	-	-	-	-	-	-	2219	6363	10 700	9242
		No Pv	-	-	-	-	-	-	-	-	-	-	14	4	1	1
Senegal	Suspected	1 134 587	974 256	1 000 310	1 472 764	1 240 918	1 418 091	1 645 494	1 337 550	1 031 000	947 514	1 043 632	900 903	897 943	1 119 100	
	No Pf	44 959	14 261	15 261	28 272	23 171	38 746	49 366	118 332	194 234	19 614	343 670	277 326	281 080	345 889	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sierra Leone	Suspected	460 881	450 605	514 033	533 340	358 417	243 082	172 707	653 987	1 014 160	1 415 330	2 327 928	1 150 747	2 579 296	2 576 550	
	No Pf	-	2206	3702	3945	2206	3702	3945	-	-	273 149	218 473	25 511	1 537 322	1 701 958	
	No Pv	-	0	0	0	0	0	0	-	-	-	-	-	-	-	
South Africa	Suspected	64 624	26 506	15 649	13 459	13 399	7755	14 456	6327	7796	6117	276 669	382 434	152 561	603 932	
	No Pf	-	-	-	-	-	-	-	-	-	-	2181	6906	3109	8645	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	14	5	0	
South Sudan <sup>1</sup>	Suspected	-	237 712	462 056	646 673	515 958	337 582	116 473	101 008	201 036	325 634	900 283	795 784	1 125 039	1 855 501	
	No Pf	-	-	-	-	-	-	-	-	-	-	-	112 024	-	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Swaziland	Suspected	29 374	35 582	23 456	19 425	11 320	10 374	11 637	6338	5881	6624	1722	797	626	669	
	No Pf	0	1395	670	342	574	279	155	84	58	106	87	130	78	160	
	No Pv	-	0	0	0	0	0	0	0	0	0	0	0	0	0	
Togo	Suspected	0	498 826	583 872	490 256	516 942	437 662	566 450	914 590	1 193 316	1 304 772	1 419 928	893 588	1 311 047	2 885 142	
	No Pf	-	-	-	-	-	-	-	220 521	344 098	191 357	224 080	237 282	260 526	272 847	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uganda	Suspected	3 552 859	5 624 032	8 079 963	10 422 022	11 697 824	10 869 875	11 539 146	13 281 631	13 020 439	14 397 480	15 332 293	12 522 232	16 845 771	24 068 702	
	No Pf	-	-	546 015	785 748	861 451	1 082 223	850 050	1 024 470	959 712	1 275 310	1 565 348	231 873	2 662 258	5 518 853	
	No Pv	-	-	-	-	-	-	-	-	-	-	15 812	0	0	-	
United Republic of Tanzania <sup>2</sup>	Suspected	81 442	384 741	494 245	13 792 604	15 007 921	16 740 283	12 821 375	11 387 904	11 496 544	13 018 946	15 388 319	15 299 205	14 513 120	0	
	No Pf	17 734	18 385	16 983	15 705	11 936	7628	1585	293	67	211	2338	4489	2730	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	0	0	0	-	
Mainland	Suspected	-	324 584	415 293	13 715 090	14 937 115	16 679 237	12 775 877	11 355 047	11 473 817	12 752 090	15 116 242	14 843 487	13 976 370	14 122 269	
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
African	Zanzibar	Suspected	81 442	80 309	78 952	77 514	70 806	61 046	45 498	32 857	32 140 66	266 856	272 077	455 718	536 750	527 957		
		No Pf	17 734	18 385	16 983	15 705	11 936	7 628	1 585	-	293	77	211	4489	2730	2194		
		No Pv	-	-	-	-	-	-	-	-	-	0	0	0	201	52		
	Zambia	Suspected	3 337 796	3 838 402	3 760 335	4 346 172	4 078 234	4 121 356	4 731 338	4 248 295	3 080 301	2 976 395	4 229 839	4 607 908	4 695 400	5 465 122	-	
		No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Zimbabwe	Suspected	-	-	-	-	1 815 470	1 494 518	1 313 458	1 272 731	1 089 322	867 135	912 618	480 011	727 174	1 115 005	-	
		No Pf	-	-	-	-	-	-	-	-	-	-	249 379	319 935	276 963	422 633	-	
		No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Region of the Americas	Argentina	Suspected	7949	6685	5043	3977	3018	3018	6353	6353	5157	86	2547	7872	12 694	4913	
			No Pf	1	0	0	0	1	1	1	2	0	0	0	0	0	0	0
			No Pv	439	215	125	122	115	251	211	385	385	130	86	72	18	4	4
		Bahamas <sup>3</sup>	Suspected	22	4	1	34	17	9	546	6	6	35	0	27 272	31 013	0	-
			No Pf	-	-	-	-	2	1	-	-	13	-	-	-	-	-	-
			No Pv	-	-	-	-	0	0	-	-	0	-	-	-	-	-	-
Belize		Suspected	18 559	18 173	15 480	15 480	17 358	25 119	25 755	22 134	25 550	26 051	27 366	22 996	20 789	25 351	-	
		No Pf	20	6	0	0	6	32	10	0	0	1	0	1	1	0	0	
		No Pv	1466	1156	1134	1084	1060	1517	834	845	540	255	149	78	36	26	0	
Bolivia (Plurinational State of)		Suspected	143 990	122 933	137 509	158 299	168 307	208 021	214 616	181 816	164 826	133 614	140 857	150 662	132 904	144 139	-	
		No Pf	2536	808	727	793	695	1080	1785	1622	836	574	1200	526	385	975	-	
		No Pv	28 932	14 957	13 549	17 319	14 215	19 062	17 210	12 988	8912	8660	12 569	7635	8141	7398	-	
Brazil		Suspected	2 562 576	2 274 610	2 118 491	2 009 414	2 194 780	2 660 539	2 959 489	2 986 381	2 726 433	2 711 062	2 711 432	2 477 821	2 349 341	1 893 018	-	
		No Pf	131 616	81 333	80 188	88 174	110 422	155 169	145 858	93 591	49 358	50 933	51 048	32 100	32 437	29 717	-	
		No Pv	478 212	306 396	267 245	320 378	354 366	450 687	403 383	364 912	266 300	258 271	283 435	231 368	203 018	143 050	-	
Colombia	Suspected	478 820	747 079	686 635	640 453	562 681	493 562	451 240	589 755	493 135	436 366	521 342	418 032	416 767	327 064	-		
	No Pf	51 730	100 242	88 972	75 730	55 158	43 472	46 147	54 509	22 392	21 441	34 334	14 650	17 106	20 370	-		
	No Pv	92 702	130 991	115 944	105 226	87 083	78 157	73 949	70 753	56 838	57 111	83 255	44 701	51 467	37 862	-		
Costa Rica	Suspected	61 261	43 053	17 738	9622	9204	12 767	24 498	22 641	17 304	4829	15 599	10 690	7485	16 774	-		
	No Pf	12	1	2	14	5	3	32	11	0	1	2	4	0	1	-		
	No Pv	1867	1362	1008	704	1284	3538	2667	1212	966	261	112	13	5	4	-		
Dominican Republic	Suspected	427 297	411 431	391 216	349 717	322 948	397 108	446 839	435 649	381 010	353 336	495 637	477 555	506 533	502 683	-		
	No Pf	1226	1034	1292	1528	2353	3829	3519	2708	1839	1643	2480	1614	950	576	-		
	No Pv	7	4	4	1	2	8	6	3	1	0	2	2	2	3	-		
Ecuador	Suspected	544 646	538 757	403 225	433 244	357 633	358 361	318 132	352 426	387 558	451 732	488 830	460 785	459 157	397 628	-		
	No Pf	48 974	37 491	20 015	10 724	5891	2212	1596	1158	396	551	258	296	80	161	-		
	No Pv	55 624	71 412	66 742	41 341	22 839	14 836	8267	7306	4495	3569	1630	937	478	217	-		
El Salvador	Suspected	279 072	111 830	115 378	102 053	94 819	102 479	113 754	95 857	97 872	83 031	115 256	100 884	124 885	103 748	-		
	No Pf	9	2	0	2	1	2	1	2	1	1	2	3	3	0	-		
	No Pv	744	360	117	83	111	65	48	38	32	19	22	12	16	7	-		
French Guiana, France	Suspected	48 162	44 718	44 718	32 402	32 402	32 402	32 402	32 402	11 994	20 065	14 373	14 429	13 638	22 327	-		
	No Pf	3051	3166	2547	3080	2437	1777	1847	845	406	424	604	376	264	538	-		
	No Pv	657	657	954	759	600	1637	2227	1804	925	1003	476	339	257	337	-		
Guatemala	Suspected	214	0	160	0	0	71	27	23	10	6	5	5	2	-	-		
	No Pf	1474	1044	1841	1310	852	1062	804	196	50	56	35	107	54	101	-		
	No Pv	50 171	34 772	33 695	29 817	28 103	38 641	30 289	15 182	7148	7024	7163	6707	5278	6062	-		
		36	0	0	0	0	48	0	0	0	0	0	0	0	0	-		

# Annex 6C – Reported malaria cases by species, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013		
Region of the Americas	Guyana	Suspected	209 197	211 221	175 966	185 877	151 938	210 429	202 688	178 005	137 247	169 309	212 863	201 728	196 622	205 903	
		No Pf	12 324	12 831	10 599	12 970	12 226	16 438	16 438	9818	4677	5741	7542	14 401	15 945	16 772	13 655
		No Pv	11 694	14 291	11 296	14 654	16 141	21 255	10 560	6712	5927	6029	6029	8402	9066	11 244	13 953
	Haiti	No Other	0	0	0	3	446	1291	686	267	147	102	132	96	92	101	0
		Suspected	21 190	51 067	-	-	30 440	3 541 506	87 951	142 518	168 950	270 438	270 427	184 934	167 726	172 624	0
		No Pf	16 897	9837	-	-	10 802	21 778	32 739	29 824	36 768	49 535	84 153	32 969	25 423	20 957	0
	Honduras	No Pf	0	0	0	0	0	0	0	1	6	0	0	0	0	0	0
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Suspected	175 577	174 430	178 616	137 891	145 082	153 474	125 162	130 255	119 484	108 529	152 961	152 451	155 165	144 673	0
	Jamaica <sup>3</sup>	No Pf	1446	938	606	540	834	998	767	813	610	1382	986	605	583	1159	0
		No Pv	33 679	23 211	16 617	13 583	16 425	15 011	11 156	9700	7758	7939	8759	7013	5856	4269	0
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mexico	Suspected	874	596	725	394	3879	2470	6821	199	30 732	34 149	10 763	5042	3687	-	-
		No Pf	-	3	-	-	-	-	-	-	21	17	-	-	-	-	-
		No Pv	-	2	-	-	-	-	-	-	1	4	-	-	-	-	-
Nicaragua	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Suspected	2 003 569	1 857 233	1 852 553	1 565 155	1 454 575	1 559 076	1 345 915	1 430 717	1 246 780	1 240 087	1 192 081	1 035 424	1 025 659	1 017 508	0	
	No Pf	131	69	19	44	49	22	16	4	0	1	0	6	9	4	0	
Panama	No Pv	7259	4927	4605	3775	3357	2945	2498	2357	2357	2702	1226	1124	833	495	0	
	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Suspected	509 443	482 919	491 689	448 913	492 319	516 313	476 144	537 637	543 173	553 717	554 414	535 925	552 722	536 170	0	
Paraguay	No Pf	1369	1194	995	1213	1200	1114	336	106	61	93	154	150	236	219	0	
	No Pv	22 645	9304	6700	5525	5699	5498	2784	1250	701	517	538	775	999	974	0	
	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Peru	Suspected	149 702	156 589	165 796	166 807	171 179	208 582	212 254	204 193	200 574	158 481	141 038	116 588	107 711	93 624	0	
	No Pf	45	39	337	627	882	766	62	48	4	3	20	1	1	6	0	
	No Pv	991	889	1907	3873	4213	2901	1601	1233	740	775	398	353	843	699	0	
Suriname	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Suspected	97 026	71 708	99 338	126 582	97 246	85 942	111 361	92 339	96 313	64 660	62 178	48 611	31 499	24 806	0	
	No Pf	0	4	1	4	1	0	2	2	7	10	5	7	11	7	0	
Venezuela (Bolivarian Republic of)	No Pv	6853	2706	2777	1388	693	376	821	1337	333	81	22	3	4	3	0	
	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Suspected	1 483 816	1 417 423	1 582 385	1 485 012	1 438 925	1 438 925	1 438 925	861 290	1 438 925	42 645	42 645	744 650	702 952	759 285	864 648	
Afghanistan	No Pf	20 618	17 687	21 174	19 154	20 955	15 058	8437	7766	4768	4044	2929	2374	2929	3399	6630	
	No Pv	47 690	61 680	78 000	66 588	72 676	72 611	56 488	43 031	33 895	32 976	29 169	22 018	28 164	36 285	0	
	No Other	13	11	10	13	0	-	-	-	-	0	3	3	7	11	0	
Djibouti	Suspected	63 377	67 369	68 070	43 241	56 975	59 855	45 722	33 992	29 911	34 717	-	15 270	20 810	19 736	0	
	No Pf	10 648	13 217	9752	8782	6738	6931	2331	547	838	929	721	331	126	420	0	
	No Pv	1673	1229	1648	1047	915	1611	733	509	639	895	817	382	167	359	0	
Egypt <sup>3</sup>	No Other	811	1549	1388	0	726	589	225	14	17	18	36	17	2	64	0	
	Suspected	261 866	198 000	278 205	344 236	420 165	420 165	479 708	396 338	414 137	370 258	400 495	382 303	410 663	476 764	0	
	No Pf	5491	2774	2572	5562	4620	6026	6928	8077	5540	8776	12 385	11 167	13 302	22 777	0	
Iran (Islamic Republic of)	No Pv	24 829	17 224	26 907	26 111	41 972	38 985	30 111	33 621	26 437	27 002	32 710	34 651	39 478	50 938	0	
	No Other	1	8	12	46	63	38	23	51	60	50	60	6	23	46	0	
	Suspected	366 865	-	-	-	280 301	548 503	789 186	869 144	935 043	847 666	847 589	936 252	847 933	787 624	0	
Iran (Islamic Republic of)	No Pf	5115	-	84 528	44 243	12 789	5917	6216	6283	4355	4026	6142	5581	1231	1877	0	
	No Pv	89 240	-	330 083	316 697	229 233	110 527	79 913	85 919	77 219	60 854	63 255	71 968	53 609	37 386	0	
	No Other	-	-	-	-	-	-	0	0	0	0	-	-	-	-	0	
Iran (Islamic Republic of)	Suspected	-	-	-	-	-	3969	-	7945	6305	-	-	356	1410	-	0	
	No Pf	-	-	-	-	-	413	1796	210	119	-	1010	-	22	939	0	
	No Pv	-	-	-	-	-	0	0	0	0	-	0	-	0	0	0	
Iran (Islamic Republic of)	No Other	-	-	-	-	-	0	0	0	0	-	0	-	0	0	0	
	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	No Pf	17	9	8	44	39	23	27	28	76	81	82	107	179	238	0	
Iran (Islamic Republic of)	No Pv	0	0	2	1	4	0	2	4	4	13	3	9	26	19	0	
	No Other	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	
Iran (Islamic Republic of)	No Pf	2546	2158	2382	4475	1380	2219	1199	1266	938	264	166	152	44	72	0	
	No Pv	-	17 145	13 176	19 087	12 441	16 747	14 710	14 322	10 337	5485	2610	2668	1418	1073	0	
	No Other	-	0	0	0	0	0	0	0	0	0	0	0	0	1	0	



WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
Eastern Mediterranean	Iraq <sup>2</sup>	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		No Pf	-	-	1	0	0	0	0	0	1	0	2	3	0	1	-	
		No Pv	-	-	346	47	24	3	5	1	4	7	1	4	7	8	7	-
		No Other	-	-	-	0	0	0	0	0	0	0	0	0	0	0	0	-
	Oman	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		No Pf	316	283	266	299	158	153	100	93	94	160	140	101	83	81	-	
		No Pv	366	336	315	428	449	385	341	602	718	870	1039	1422	1963	1366	-	
		No Other	12	16	9	13	8	6	2	2	2	1	2	3	0	1	0	-
	Pakistan	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		No Pf	-	7 024 978	7 530 636	8 662 496	6 074 739	8 671 271	8 680 304	9 330 723	9 330 723	8 330 040	7 973 246	8 601 835	8 418 570	8 902 947	7 752 797	-
		No Pv	-	41 771	32 591	39 944	32 761	42 056	37 837	39 856	24 556	24 556	37 079	73 857	73 925	70 006	46 067	-
		No Other	-	83 504	75 046	85 176	93 385	85 748	86 999	88 699	88 699	79 868	95 604	143 136	205 879	215 950	223 660	-
	Saudi Arabia	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		No Pf	-	2360	1999	1234	-	-	984	2349	833	1649	883	1045	1279	974	-	
		No Pv	-	678	567	462	-	-	280	515	638	672	1023	1719	2088	1527	-	
		No Other	-	28	42	28	0	1	12	0	0	12	0	24	19	35	6	-
	Somalia	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		No Pf	-	-	102 540	28 356	55 423	63 770	-	-	120 060	106 341	220 698	99 403	-	119 752	-	
		No Pv	-	-	-	-	-	-	-	617	738	504	0	-	-	-	-	
		No Other	-	-	-	-	-	-	-	617	738	504	0	-	-	-	-	
Sudan	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pf	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Syrian Arab Republic <sup>3</sup>	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pf	-	14	6	8	9	17	27	35	46	38	19	37	40	21	-		
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Other	42	65	21	15	4	11	7	2	2	5	3	0	1	1	0	-	
Yemen	Suspected	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	No Pf	-	-	667 794	612 693	611 552	629 380	962 017	740 940	900 735	899 320	835 018	804 940	891 394	927 821	-		
	No Pv	-	-	73 667	47 782	47 306	42 627	53 887	64 991	42 702	52 836	77 271	59 689	109 504	102 369	-		
	No Other	-	-	1659	1474	1297	1442	1019	2339	745	589	966	478	398	408	-		
European	Armenia <sup>4</sup>	Suspected	356	174	165	126	220	209	230	658	30 761	31 467	31 026	0	0	0	-	
		No Pf	1	0	0	4	2	0	0	0	1	0	0	0	0	0	-	
		No Pv	140	79	52	25	45	7	0	0	0	0	0	0	0	0	-	
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
	Azerbaijan	Suspected	527 688	536 260	507 252	536 822	545 145	515 144	498 697	465 033	408 780	451 436	456 652	449 168	497 040	432 810	-	
		No Pf	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
		No Pv	1526	1056	506	482	386	242	143	109	72	80	50	6	3	0	-	
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
	Georgia <sup>3</sup>	Suspected	173	3574	6145	5457	3365	5169	4400	3400	4398	4120	2368	2032	1046	192	-	
		No Pf	0	0	1	2	1	0	1	0	1	5	0	3	3	6	-	
		No Pv	245	438	473	314	255	155	59	24	7	1	0	3	2	1	-	
		No Other	0	0	0	0	0	0	0	0	0	1	0	0	0	0	-	
	Kyrgyzstan <sup>3</sup>	Suspected	70 500	72 020	69 807	144 070	79 895	114 316	74 729	62 444	40 833	33 983	30 190	27 850	18 268	54 249	-	
		No Pf	0	0	1	0	0	0	1	0	0	0	0	0	1	1	-	
		No Pv	12	28	2742	468	93	226	318	96	18	4	6	4	2	3	-	
		No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	
	Russian Federation <sup>3</sup>	Suspected	795	898	642	533	382	205	143	35 784	28 340	27 382	33 024	28 311	0	-	-	
		No Pf	60	-	48	51	43	31	41	42	47	62	60	39	-	-	-	
		No Pv	-	-	-	-	-	-	-	76	46	40	34	40	-	-	-	
		No Other	-	-	-	-	-	-	-	4	3	5	5	6	-	-	-	
Tajikistan	Suspected	233 785	248 565	244 632	296 123	272 743	216 197	175 894	159 232	158 068	165 266	173 523	173 367	209 239	213 916	-		
	No Pf	831	826	509	252	151	81	28	7	2	1	1	5	2	1	-		
	No Pv	18 233	10 561	5651	5176	3437	2228	1316	628	316	164	111	73	31	13	-		
	No Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-		
Turkey	Suspected	1 597 290	1 550 521	1 320 010	1 187 814	1 158 673	1 042 509	934 839	775 502	616 570	606 875	507 841	421 295	337 830	255 125	-		
	No Pf	7	11	12	12	13	32	29	29	23	16	49	97	131	186	-		
	No Pv	11 424	10 799	10 209	9209	5289	2052	767	329	191	65	28	30	243	94	-		
	No Other	1	2	3	1	0	0	0	0	1	3	0	1	1	-	-		

# Annex 6C – Reported malaria cases by species, 2000–2013 (continued)

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013			
European	Turkmenistan <sup>4</sup>	Suspected	50 105	50 075	59 834	72 643	71 377	56 982	58 673	65 666	75 524	94 237	81 784	0	0	-		
		No Pf	-	-	0	0	0	0	0	0	0	0	0	-	-	-		
		No Pv	24	8	18	7	3	1	1	1	0	1	0	0	-	-		
	Uzbekistan <sup>3</sup>	No Other	0	0	0	0	0	0	0	0	0	0	0	-	-	-		
		Suspected	735 164	691 500	735 164	812 543	893 187	917 843	924 534	858 968	883 807	883 807	916 839	921 364	886 243	805 761	908 301	
		No Pf	1	0	1	0	0	0	3	2	0	0	1	0	1	1	2	
	South-East Asia	Bangladesh	No Pf	125	77	72	74	66	102	73	87	27	3	5	0	0	1	
			No Pv	0	0	1	0	0	0	0	0	0	0	0	0	0	0	
			No Other	742 539	516 052	527 577	679 981	512 876	462 322	341 293	270 137	270 137	526 701	569 767	496 616	390 102	309 179	93 926
		Bhutan	No Pf	39 475	39 274	46 418	41 356	46 402	37 679	24 828	46 117	69 606	18 242	52 012	49 084	94 28	94 28	35 97
			No Pv	16 124	14 942	15 851	13 298	12 492	10 442	8 029	13 063	14 409	68 53	38 24	25 79	396	396	262
			No Other	76 445	65 974	74 696	61 246	54 892	60 152	66 079	51 446	51 446	47 389	62 790	54 760	44 494	42 512	31 632
		Democratic People's Republic of Korea	No Pf	2738	2915	3207	1518	966	853	772	288	136	559	140	87	33	33	14
			No Pv	3197	2805	3015	2126	1580	871	963	414	148	413	261	92	47	31	31
			No Other	204 428	300 000	354 503	76 104	33 803	11 507	25 966	7985	24 299	34 818	25 147	26 513	39 238	71 453	71 453
Western Pacific		India	No Pf	-	115 615	98 852	16 538	15 827	6728	6913	4795	16 989	14 845	13 520	16 760	21 850	14 407	
			No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			No Other	86 790 375	90 389 019	91 617 725	99 136 143	97 111 526	104 120 792	106 606 703	94 855 000	95 734 579	112 496 076	119 279 429	119 470 044	122 159 270	127 891 198	
		Indonesia	No Pf	1 047 218	1 005 236	897 446	857 101	890 152	805 077	840 360	741 076	775 523	839 877	830 779	662 748	524 370	462 079	
			No Pv	984 572	1 080 248	943 781	1 012 302	1 025 211	1 011 492	944 769	767 851	750 687	723 697	765 622	645 652	534 129	417 884	
			No Other	2 939 329	4 113 458	3 582 566	3 555 381	3 857 211	2 206 129	2 219 308	2 556 631	2 556 631	2 185 835	2 733 407	3 174 612	3 534 331	3 197 890	
	Myanmar	No Pf	89 289	85 596	98 430	81 591	98 729	127 594	160 147	-	-	127 813	95 557	200 662	199 977	170 848		
		No Pv	156 323	190 608	190 048	161 180	145 868	147 543	177 006	159 179	159 179	125 150	93 801	221 176	187 989	150 985		
		No Other	843 087	954 155	1 016 514	1 020 477	883 399	787 691	820 290	1 159 516	1 230 444	1 136 064	1 277 568	1 210 465	1 423 966	2 601 112		
	Nepal	No Pf	95 499	130 029	133 187	138 178	114 523	124 644	149 399	148 010	167 562	121 636	70 941	59 604	314 676	222 770		
		No Pv	21 802	35 783	35 030	35 151	34 045	37 014	50 667	53 351	52 256	40 167	29 944	28 966	135 388	98 860		
		No Other	252	941	864	867	501	638	453	433	288	319	346	162	28 020	11 573		
	Sri Lanka	Suspected	140 768	266 917	304 200	383 322	293 836	361 936	377 981	265 997	302 774	270 798	213 353	188 702	243 432	169 464		
		No Pf	560	428	2165	1195	743	1181	1358	1295	792	575	550	219	612	273		
		No Pv	7056	6216	10 621	8200	3892	5691	3932	3870	3096	2760	2349	1631	1480	1659		
Thailand	No Other	1 781 372	1 353 386	1 390 850	1 192 259	1 198 181	974 672	1 076 121	1 047 104	1 047 104	909 632	1 001 107	985 060	948 250	1 236 580			
	No Pf	59 650	10 600	4848	1273	549	134	27	7	46	21	18	12	41	42			
	No Pv	150 389	55 922	36 563	9237	3171	1506	564	191	623	529	702	158	45	52			
Timor-Leste	No Other	4 403 739	4 100 778	3 819 773	3 256 939	3 012 710	2 524 788	2 280 070	2 041 733	1 931 768	1 884 820	1 777 977	1 450 885	1 130 757	1 830 090			
	No Pf	43 717	29 061	20 389	19 024	13 371	14 670	14 124	16 557	12 108	9486	9401	5710	11 553	14 449			
	No Pv	37 975	34 467	24 166	18 331	13 319	14 921	15 991	16 495	13 886	13 616	13 401	8608	17 506	15 573			
Cambodia	No Other	47	40	40	32	29	59	35	16	10	23	20	13	3172	3084			
	Suspected	15 212	83 049	120 344	83 785	242 957	185 367	223 002	215 402	215 338	198 867	266 384	225 772	182 854	178 200			
	No Pf	-	-	26 651	33 411	39 164	43 093	37 896	34 174	34 406	29 252	28 350	14 261	1962	373			
China	No Pf	-	-	11 148	15 392	16 158	15 523	13 477	12 544	11 295	12 160	11 432	3758	2288	512			
	No Pv	-	-	-	-	-	-	-	-	-	-	-	-	-				
	No Other	281 444	202 179	187 213	208 801	183 062	165 382	200 050	198 794	210 856	386 420	433 424	433 424	194 263	152 137			
Western Pacific	No Pf	46 150	37 105	33 010	36 338	31 129	17 482	24 779	16 518	36 387	17 442	8213	7054	14 896	7092			
	No Pv	4505	4408	4386	5179	5709	9004	7551	4987	4625	6362	4794	5155	19 575	11 267			
	No Other	-	-	-	-	-	-	-	-	-	-	-	-	-	2418			
China	Suspected	0	5 397 517	5 788 432	4 776 469	4 331 038	3 892 885	4 076 104	4 062 585	4 435 793	4 642 479	7 118 649	9 190 401	6 918 770	5 555 001			
	No Pf	-	3732	5753	3497	3879	3588	2808	1613	1222	948	1269	1370	1419	2907			
	No Pv	-	17 295	19 581	24 852	23 138	18 187	32 345	27 550	15 323	8214	3675	1907	1080	930			
No Other	-	-	-	-	-	-	-	-	-	-	-	50	60	184				

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Western Pacific	Lao Peoples Democratic Republic	Suspected	496 070	303 306	309 688	326 297	218 884	173 698	210 927	275 602	311 395	266 096	280 549	221 390	369 976	339 013
		No Pf	38 271	25 851	20 696	18 307	15 648	13 106	28 347	17 178	18 938	5328	4393	5770	37 692	24 538
		No Pv	1689	1204	712	574	491	473	316	193	193	247	176	122	442	7634
	Malaysia	No Other	-	1 808 759	1 761 721	1 632 024	1 577 387	1 425 997	1 388 267	1 565 033	1 562 148	1 565 982	1 619 074	1 600 439	1 566 872	1 576 012
		Suspected	1 832 802	1 808 759	1 761 721	1 632 024	1 577 387	1 425 997	1 388 267	1 565 033	1 562 148	1 565 982	1 619 074	1 600 439	1 566 872	1 576 012
		No Pf	6000	5643	5486	2756	2496	2222	1790	1778	2268	1885	1681	973	894	606
	Papua New Guinea	No Pv	5953	6315	4921	3127	3167	2729	2774	2862	3820	3379	3812	2422	1461	969
		No Other	-	-	-	-	-	-	-	615	1011	1502	984	1758	2306	-
		Suspected	1 897 579	1 802 857	1 739 219	1 783 145	2 000 261	1 962 493	1 816 963	1 779 343	1 769 032	1 507 122	1 505 393	1 279 140	1 113 528	1 454 166
	Philippines	No Pf	63 591	74 117	58 403	54 653	63 053	62 926	59 040	61 803	61 071	48 681	56 735	59 153	58 747	119 469
		No Pv	14 721	18 113	14 187	14 055	18 730	22 833	22 744	16 239	16 806	11 472	13 171	9654	7108	7579
		No Other	-	-	-	-	-	-	2998	5128	3168	1024	1990	632	609	1279
	Republic of Korea	Suspected	36 596	34 968	37 005	48 441	446 104	593 996	396 706	408 254	278 652	352 006	301 031	327 060	332 063	318 883
		No Pf	25 912	18 006	22 831	32 948	29 018	20 033	24 515	8789	11 807	13 933	11 824	6877	4774	4968
		No Pv	-	-	-	-	-	6482	8839	3622	4806	4951	2885	2380	2189	1357
Solomon Islands	No Other	-	-	-	-	-	-	-	17	197	262	175	127	57	83	
	Suspected	4183	2556	1799	1171	864	1369	2051	2227	1052	1345	1772	838	555	443	
	No Pf	-	-	-	-	-	-	-	-	11	26	51	56	54	31	
Vanuatu	No Pv	-	-	-	-	-	-	-	2227	1052	1319	1721	782	501	397	
	No Other	-	-	-	-	-	-	-	-	-	-	0	0	0	0	
	Suspected	601 612	594 690	556 356	416 728	643 908	633 796	657 110	396 169	396 169	338 244	282 297	284 931	254 506	249 520	245 014
Viet Nam	No Pf	46 703	50 806	50 090	64 910	64 449	54 001	54 441	48 612	29 492	19 580	22 892	14 454	14 748	13 194	
	No Pv	21 322	25 649	24 822	27 399	25 927	22 515	20 971	16 653	11 173	8544	12 281	8665	9339	11 628	
	No Other	-	-	-	-	-	-	-	139	84	-	-	0	232	446	
Viet Nam	Suspected	58 679	48 422	75 046	82 670	80 879	86 170	62 637	52 958	52 420	44 960	48 088	32 656	33 273	28 943	
	No Pf	3226	3402	7016	8406	6999	3817	3522	2424	1579	1802	1545	770	1257	1039	
	No Pv	2972	4236	7210	6582	6350	4453	4405	2987	1850	1632	2265	1224	1680	1342	
Viet Nam	No Other	-	-	-	-	-	-	-	0	0	4	10	2	470	0	
	Suspected	2 883 456	2 950 863	3 054 693	2 835 799	2 778 295	2 793 458	3 024 558	3 755 566	1 409 765	2 907 219	2 803 918	3 312 266	3 436 534	3 115 804	
	No Pf	57 605	52 173	36 583	29 435	19 023	14 231	17 911	11 470	8901	12 719	12 763	10 101	11 448	9532	
Viet Nam	No Pv	15 935	15 898	10 846	9004	5681	5102	4497	4737	2348	3206	4466	5602	7220	6901	
	No Other	-	-	-	-	-	-	-	0	0	0	0	0	0	0	

1 In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf))

2 Where national totals for the United Republic of Tanzania are unavailable, refer to the sum of Mainland and Zanzibar

3 There is no local transmission

4 Armenia and Turkmenistan are certified malaria-free countries, but are included in this listing for historical purposes

# Annex 6D – Reported malaria deaths, 2000–2013

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
African	Algeria	1	1	-	-	-	-	-	-	-	0	1	5	1	0	
	Angola	9510	9473	14 434	38 598	12 459	56	10 220	60	9465	355	8114	6909	69	7300	
	Benin	-	468	707	560	944	322	1226	1005	918	1157	801	1753	2261	1671	
	Botswana	-	4	23	1	19	11	7	6	1	6	8	8	1	7	
	Burkina Faso	-	4233	4032	4860	4205	5224	333	3828	61	4707	51	5519	88	6294	
	Burundi	691	167	483	185	689	354	434	90	595	566	2677	2677	1116	2263	44
	Cabo Verde	-	0	0	4	0	0	2	0	2	0	2	0	1	1	0
	Cameroun	-	-	-	-	-	-	836	2887	1811	1112	4943	241	2528	3209	39
	Central African Republic	422	535	-	326	859	523	865	467	456	456	515	526	711	1442	810
	Chad	712	957	98	1021	13	558	837	617	1018	1018	221	676	1	1359	1881
	Comoros	-	-	-	-	0	92	0	0	10	47	-	53	14	9	15
	Congo	-	-	-	-	-	-	-	113	70	116	12	-	12	623	2870
	Côte d'Ivoire	-	-	-	-	-	-	-	5	1249	391	1023	261	261	1534	3261
	Democratic Republic of the Congo	3856	416	2152	989	13 613	1439	12 970	1616	17 940	217	23 476	310	15 725	215	
	Equatorial Guinea	-	-	-	-	-	-	-	-	3	0	0	20	52	77	0
	Eritrea	-	37	86	29	24	6	47	0	0	19	0	4	0	30	6
	Ethiopia	-	67	1607	68	401	71	432	17	189	189	11	242	150	195	358
	Gabon	2016	438	1141	175	466	87	238	48	156	156	0	95	46	134	273
	Gambia	-	160	3	122	2	270	9	229	14	94	94	151	246	289	262
	Ghana	54	1717	60	2103	74	2037	54	4622	29	4622	3378	3859	1539	2855	13
	Guinea	6	517	15	586	528	490	-	274	441	441	11	735	4	11	9
	Guinea-Bissau	-	416	780	535	565	373	507	242	487	168	168	296	472	4	418
	Kenya	48 767	48 286	47 697	51 842	25 403	44 328	40 079	285	1102	1102	-	26 017	230	284	135
	Liberia	-	-	-	-	-	41	36	310	310	345	1706	1422	-	11	31
	Madagascar	238	742	211	817	302	699	186	428	127	127	348	177	398	552	641
	Malawi	-	2027	5775	2872	3457	3042	6464	54	8048	25	23	3931	3398	3398	3723
	Mali	444	562	826	1309	1012	1285	1914	1782	951	951	2331	3006	1558	1894	1680
	Mauritania	-	-	-	-	-	-	67	5	5	-	66	211	17	106	25
	Mayotte, France	-	-	-	-	-	-	-	-	-	-	-	0	0	0	0
	Mozambique	-	-	-	-	-	-	-	1733	4424	4424	954	3354	923	2818	2941
	Namibia	-	1728	1504	1106	1185	1325	571	181	181	152	10	63	2	4	8
	Niger	1244	2366	2248	1382	2060	2570	2356	2159	2083	2083	2159	2083	2083	2825	2209
	Nigeria	-	4317	4092	5343	6032	156	6586	10 289	8677	8677	4126	4238	1860	4209	7878
	Rwanda	-	1653	3167	1208	2362	1288	2486	449	566	280	280	175	380	459	409
	Sao Tome and Principe	198	2	251	1	139	1	17	0	0	11	0	9	2	2	11
	Senegal	127	1515	61	1602	79	1587	50	1935	24	24	574	553	160	649	313
	Sierra Leone	-	328	30	157	56	50	23	254	871	871	564	8188	2723	3611	2962
	South Africa	424	81	96	142	88	63	87	37	37	43	45	83	54	1	104
	South Sudan <sup>1</sup>	-	-	-	-	-	-	-	-	-	263	187	1053	297	1321	1311
	Swaziland	-	62	46	30	28	17	27	0	0	10	2	8	1	3	4
	Togo	-	1394	1661	1130	1183	1024	819	13	2663	9	9	14	944	1197	373
	Uganda	-	-	-	-	-	-	2795	113	1279	1279	69	4463	5958	6585	4136
	United Republic of Tanzania	379	1087	815	15 121	19 859	18 238	141	12 565	5065	5065	16 776	10 896	11 806	3925	73
	United Republic of Tanzania (Mainland)	-	838	441	14 943	19 547	18 075	4	12 529	5007	5007	16 696	10 893	11 799	3925	73
	United Republic of Tanzania (Zanzibar)	379	249	374	178	312	163	137	36	36	58	80	3	7	0	0
	Zambia	-	5513	9021	4935	8289	3388	6484	3801	3781	3781	38	2790	4540	36	2011
	Zimbabwe	-	-	1844	1044	1809	1916	174	18	37	37	108	40	451	351	352
Region of the Americas	Argentina	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
	Bahamas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Belize	0	0	0	-	1	0	1	0	0	0	0	0	0	0	
	Bolivia (Plurinational State of)	11	0	4	1	3	0	0	0	0	0	0	0	0	0	
	Brazil	243	142	93	103	100	122	105	93	67	85	76	69	64	41	
	Colombia	41	58	40	24	25	28	53	19	22	12	12	18	20	10	
	Costa Rica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Dominican Republic	6	17	11	12	16	16	10	17	11	11	14	15	10	8	
	Ecuador	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
	El Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
French Guiana, France	0	3	2	5	1	2	5	5	5	2	1	1	2	2		
Guatemala	0	0	0	0	2	4	2	3	0	0	0	0	0	0		

WHO region	Country/area	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Region of the Americas	Guyana	-	30	27	41	38	32	20	20	11	11	18	3	3	3	
	Haiti	16	62	76	102	23	29	32	28	17	7	8	5	6	10	
	Honduras	0	0	0	0	0	1	0	0	2	2	1	2	1	1	
	Jamaica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Mexico	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Nicaragua	4	2	8	7	1	6	1	0	0	0	0	1	0	2	0
	Panama	1	1	2	4	2	1	1	1	1	1	0	1	0	1	0
	Paraguay	0	0	0	0	0	4	6	2	2	2	2	0	0	0	0
	Peru	20	25	12	9	6	4	6	2	2	2	2	0	2	2	4
	Suriname	24	23	15	18	7	1	1	1	1	0	0	1	1	0	1
	Venezuela (Bolivarian Republic of)	24	28	23	40	35	17	11	16	9	11	11	18	16	6	6
	Eastern Mediterranean	Afghanistan	-	-	-	-	-	0	-	25	46	32	22	40	36	24
		Djibouti	-	-	-	-	-	-	29	1	-	0	0	0	0	17
		Egypt <sup>2</sup>	-	-	-	-	-	-	0	0	2	2	2	4	-	-
Iran (Islamic Republic of)		4	2	2	5	1	1	1	3	3	-	-	0	-	2	
Iraq		-	-	-	-	-	0	0	0	0	0	0	0	0	0	
Oman		-	-	-	-	-	0	0	0	2	2	0	0	0	0	
Pakistan		-	-	-	-	-	52	9	24	-	-	-	4	260	244	
Saudi Arabia		-	0	0	0	0	0	0	2	0	0	0	2	0	0	
Somalia		-	-	8	54	79	15	58	45	49	45	45	6	5	-	
Sudan		2162	2252	2125	2479	1814	1789	1193	1254	1125	1142	1023	612	618	685	
Syrian Arab Republic <sup>2</sup>		-	-	-	-	-	2	2	1	1	1	0	0	0	1	
Yemen		-	-	-	-	-	-	73	-	-	38	92	75	72	55	
European		Armenia <sup>1</sup>	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
	Georgia <sup>2</sup>	-	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Kyrgyzstan <sup>2</sup>	0	0	0	0	0	0	0	0	0	0	0	1	0	0	
	Russian Federation <sup>2</sup>	2	3	2	4	5	3	4	3	2	1	1	1	1	-	
	Tajikistan	-	0	0	0	0	0	0	0	0	0	0	0	0	0	
	Turkey	0	0	0	0	0	0	0	0	3	1	1	4	0	3	
	Turkmenistan <sup>3</sup>	0	0	0	0	0	0	0	0	0	0	0	-	-	-	
	Uzbekistan <sup>2</sup>	0	0	0	0	0	0	0	1	0	0	0	0	0	0	
	South-East Asia	Bangladesh	484	470	598	574	505	501	508	86	154	8	7	13	0	15
		Bhutan	15	14	11	14	7	5	7	0	2	1	0	0	1	0
		Democratic People's Republic of Korea	-	-	-	-	-	-	-	0	0	0	0	0	0	0
		India	892	1015	973	1006	949	963	1708	1311	1055	1144	1018	754	519	440
		Indonesia	833	-	-	-	508	88	494	-	669	900	432	388	252	45
Myanmar		14	2814	14	2476	27	1707	14	1261	9	972	788	65	403	236	
Nepal		-	1	3	5	7	10	42	3	-	8	0	2	0	0	
Sri Lanka		77	52	30	4	1	0	1	1	0	0	0	0	0	0	
Thailand		625	424	361	204	230	161	113	97	101	5	80	2	37	37	
Timor-Leste		-	-	-	-	65	71	68	23	33	8	58	5	3	3	
Western Pacific		Cambodia	91	476	67	492	50	296	59	241	20	279	151	11	45	12
		China	31	27	42	52	31	48	37	18	23	10	19	33	14	23
		Lao People's Democratic Republic	0	242	4	187	0	77	0	14	0	5	7	3	0	28
		Malaysia	2	46	38	21	4	33	1	18	3	26	33	18	16	14
	Papua New Guinea	617	144	647	145	619	725	668	559	628	604	616	523	381	307	
	Philippines	536	439	71	162	167	145	124	73	1	24	0	2	1	12	
	Republic of Korea	0	0	0	0	0	0	0	1	1	1	2	2	0	2	
	Solomon Islands	38	55	61	71	51	38	3	15	13	53	34	7	18	18	
	Vanuatu	1	4	1	14	1	5	1	5	1	2	1	1	0	0	
	Viet Nam	5	91	3	8	34	2	41	1	25	3	0	14	0	6	
	Regional summary	African	69 089	91 269	105 487	141 069	107 526	93 259	102 642	50 672	74 745	47 236	112 823	59 969	66 420	57 079
		Region of the Americas	390	391	313	367	260	263	248	207	145	145	165	127	115	84
		Eastern Mediterranean	2166	2254	2135	2538	1894	1859	1365	1355	1228	1262	1145	742	987	1027
		European	2	3	2	4	5	3	4	4	5	2	1	6	0	3
South-East Asia		2940	4790	1990	4283	2299	3506	2955	2782	2023	3047	2383	1229	1215	776	
Western Pacific		1321	1524	934	1152	957	1369	933	945	714	1007	863	614	475	422	
<b>Total</b>		<b>75 908</b>	<b>100 231</b>	<b>110 861</b>	<b>149 413</b>	<b>112 941</b>	<b>100 259</b>	<b>108 147</b>	<b>55 965</b>	<b>78 860</b>	<b>52 699</b>	<b>117 380</b>	<b>62 687</b>	<b>69 212</b>	<b>59 391</b>	

1 In May 2013 South Sudan was reassigned to the WHO African Region (WHA resolution 66.21, [http://apps.who.int/gb/ebwha/pdf\\_files/WHA66/A66\\_R21-en.pdf](http://apps.who.int/gb/ebwha/pdf_files/WHA66/A66_R21-en.pdf))

2 There is no local transmission

3 Armenia and Turkmenistan are certified malaria-free countries, but are included in this listing for historical purposes

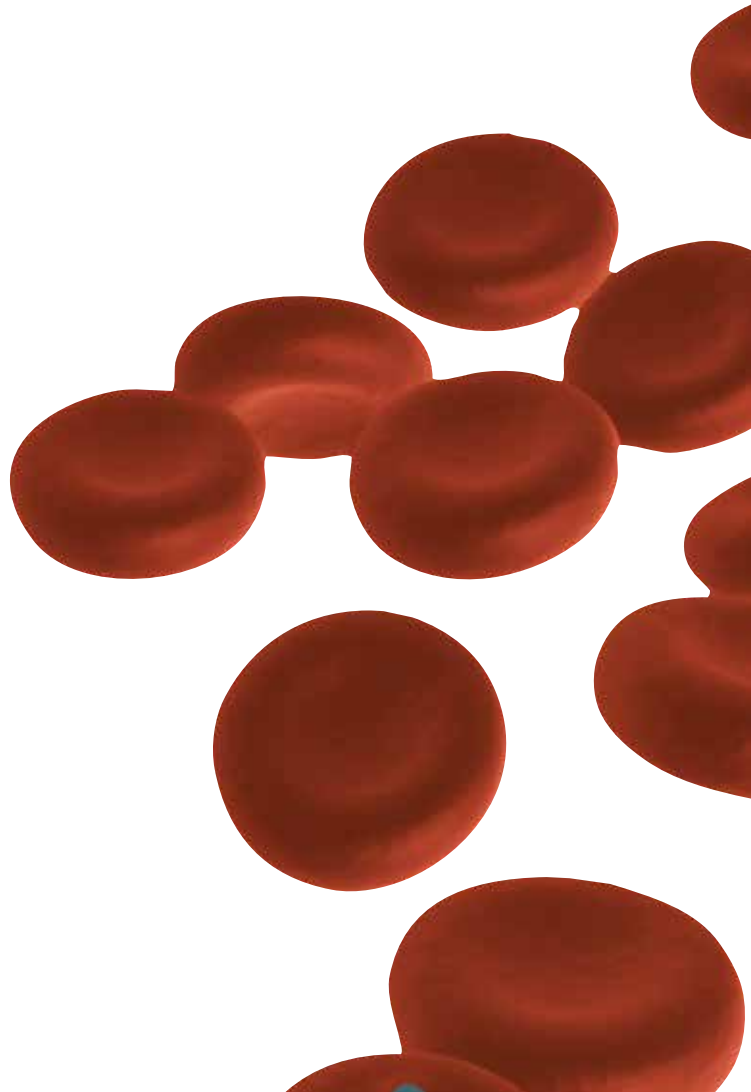


Schweizerische Eidgenossenschaft  
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