



2005

# WORLD MALARIA REPORT



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# WORLD MALARIA REPORT 2005

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## ACRONYMS AND ABBREVIATIONS

ACT	artemisinin-based combination therapy
AIDS	acquired immunodeficiency syndrome
AIMI	Africa Integrated Malaria Initiative
DDT	dichlorodiphenyltrichloroethane
DFID	United Kingdom Department for International Development
DHS	Demographic and Health Surveys
DTP	diphtheria–tetanus–pertussis
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HIS	health information system
HIV	human immunodeficiency virus
IPT	intermittent preventive treatment
IRS	indoor residual spraying
ITN	insecticide-treated net
LLIN	long-lasting insecticidal net
MDG	Millennium Development Goal
MERG	Monitoring and Evaluation Reference Group
MICS	Multiple Indicator Cluster Surveys
MIS	Malaria Indicator Survey
MoH	Ministry of Health
NGO	nongovernmental organization
NMCP	national malaria control programme
PSI	Population Services International
RAVREDA	Amazon Network for the Surveillance of Antimalarial Drug Resistance
RBM	Roll Back Malaria
UNDP	United Nations Development Programme
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
WHO	World Health Organization
WHOPES	WHO Pesticide Evaluation Scheme

## USERS' GUIDE AND EXPLANATORY NOTES

### 1. Country data by region

Regional and subregional classifications of countries and territories are presented in Annex 2. The information from countries and territories considered to be malaria-endemic is presented from three broad global regions: Africa, Asia and the Americas, which are further divided into subregions. Groupings are based on geographical proximity and, secondarily, on existing WHO regional groupings.

### 2. WHO standard definitions

All WHO standard malaria case definitions and other related definitions are presented in Annex 5.

### 3. Where space is limited, the following abbreviations have been used:

#### • in country or region names:

C. America	Central America
C. Asia	Central Asia
CAR	Central African Republic
DPR Korea	Democratic People's Republic of Korea
Dr Congo	Democratic Republic of the Congo
Eastern Medit.	Eastern Mediterranean
Iran	Islamic Republic of Iran
Lao PDR	Lao People's Democratic Republic
Sao Tome & Prin.	Sao Tome and Principe
SE Asia	South-East Asia
UAE	United Arab Emirates
UR Tanzania	United Republic of Tanzania

#### • in drug names:

AQ	amodiaquine
AQ+SP	amodiaquine+sulfadoxine-pyrimethamine
ATM	artemether
ATM+CQ	artemether+chloroquine
ATM+LUM	artemether-lumefantrine
ASU	artesunate
ASU-comb	artesunate combinations
ASU+AQ	artesunate+amodiaquine
ASU+CQ	artesunate+chloroquine
ASU+MQ	artesunate+mefloquine
ASU+SP	artesunate+sulfadoxine-pyrimethamine
CQ	chloroquine
CQ+SP	chloroquine+sulfadoxine-pyrimethamine
C	clindamycin
DHA	dihydroartemisinin
D	doxycycline

MQ	mefloquine
MQ+SP	mefloquine+sulfadoxine–pyrimethamine
PPQ	piperaquine
PQ	primaquine
PYR	pyronaridine
Q	quinine
Q+SP	quinine+sulfadoxine–pyrimethamine
SP	sulfadoxine–pyrimethamine
T	tetracycline
TMP	trimethoprim

• **in tables and graphics:**

ANC	antenatal clinic
CCM	Country Coordinating Mechanism
CMS	Commercial Market Strategies
d	day
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit GmbH
HDS	Hema Diagnostic Systems
HH	household
MoF	Ministry of Finance
NA	not applicable
NR	not reported
NSO	National Statistical Office
Pf	<i>P. falciparum</i>
Pop.	population
Pv	<i>P. vivax</i>
PW	pregnant women
RDT	rapid diagnostic test
Reg. Org.	Regional Organization
trim.	trimester(s)
U5 or under-5	(children) under 5 years of age



## FOREWORD

**T**he launch of Roll Back Malaria (RBM) in 1998 was a catalyst for renewed global commitment to tackle a disease that affects 3.2 billion people and has devastating effects on health and development. Malaria exacts its greatest toll on the world's poorest and most marginalized. It kills at least one million people a year, yet it is treatable and largely preventable with the tools available now. The ambitious RBM goal of halving the global burden of malaria by 2010 remains an imperative for the global community.

This is the first comprehensive report by RBM on the burden of malaria in the 107 countries and territories at risk of malaria transmission, and on countries' progress to control the disease. *The Africa Malaria Report 2003* from WHO and UNICEF focused on the region where the burden of cases and deaths remains the highest. This new report looks at all regions, including the tropical areas of the Americas and Asia where up to 20% of deaths occur.

During the 1980s and 1990s, the burden of malaria increased in Africa as a result of drug and insecticide resistance and a general deterioration of primary health services. Malaria also increased in intensity in the Eastern Mediterranean and South-East Asia subregions after the interruption of eradication efforts, and re-emerged in several Central Asian countries as a significant threat to health. The emergence and spread of parasite resistance to previously effective low-cost drugs has, in particular, posed a major challenge for control efforts in all regions. The need to prevent both malaria infections and subsequent illness as well as to provide access to prompt treatment using newer combinations of effective drugs is ever more urgent.

This report from WHO and UNICEF indicates that despite the tremendous challenges which remain, significant progress in the battle against malaria has been made in all malaria-affected regions. Following the initial phase of developing national control plans and obtaining financial support for these plans, most countries have begun to implement the recommended tools and strategies to reach those most at risk of malaria. The RBM partnerships that have developed in support of these country programmes have provided further impetus in moving forward to scale up access to malaria prevention and treatment for those most at risk.

There are many encouraging examples in this report of where these efforts are now beginning to bear fruit. However, much more needs to be done to remove the obstacles that continue to hamper progress. In particular, there is a significant gap between the resources needed for effective malaria control in the countries with the highest burden and what is presently available. Financial support and commitment to malaria control have increased during the past two years, but a much higher level of sustained donor assistance will be required for the foreseeable future if we are to successfully scale-up malaria control efforts.

Our organizations remain firmly committed to working with the RBM partners on behalf of communities ravaged by malaria. With a high level of sustained commitment by all, there is every reason to believe that during the second half of this decade we can stop and reverse the forward march of malaria and that many fewer communities will be affected by this eminently controllable disease.



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Executive Director  
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## EXECUTIVE SUMMARY

**This is the first** comprehensive report by Roll Back Malaria (RBM) partners on the status of malaria worldwide and on countries' progress to control the disease through effective treatment and prevention. The report is based on the best information that was available to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) at the end of 2004 from routine reports, household surveys and special studies.

Malaria remains a major global problem, exacting an unacceptable toll on the health and economic welfare of the world's poorest communities. During the past 4–5 years, however, substantial progress has been made in initiating and scaling up programmes to provide prevention and treatment to those who are most affected by this devastating disease.

During the 1980s and 1990s, the burden of malaria increased in Africa. The reasons for this increase were resistance to commonly used antimalarial drugs, the deterioration of primary health services in many areas and the emerging resistance of mosquitoes to insecticides used for vector control. During the past decade, malaria also resurged or increased in intensity in South-East Asia after interruption of eradication efforts, and re-emerged in several Central Asian and Transcaucasian countries.

Most countries did not start implementing programmes to provide access to the tools and strategies recommended by RBM until 2000. In many countries in Africa where the burden of malaria is greatest, scaling up access to treatment and prevention began even more recently. It is therefore too soon to determine whether the global burden of malaria has increased or decreased since 2000, given available data and scientific methods. Not until several years after high coverage with malaria prevention and treatment has been achieved will the worldwide impact on mortality be measurable.

Some countries have already made and demonstrated progress in reducing malaria. The regional summaries that follow show progress in scaling up malaria control throughout the world since 2000.

### Regional progress in access to treatment and prevention

#### AFRICA

In 2000, African countries committed themselves to providing by the end of 2005 prompt and effective treatment and insecticide-treated nets (ITNs) for 60% of the people at highest risk of malaria and intermittent preventive treatment (IPT) for 60% of pregnant women. Initially, implementation of these measures was severely limited by a shortage of resources for procurement of commodities. Some countries have reached or exceeded at least some of these targets with recent increases in funding. Most remaining countries are now poised to begin scaling up, although substantial challenges remain.

With respect to prompt and effective treatment, surveys have shown that on average half of African children with fever are treated with an antimalarial drug, but most

of these treatments involved chloroquine, against which resistance of the *P. falciparum* parasite is very high. Increasing availability of artemisinin-based combination therapy (ACT), a new and highly effective treatment against falciparum malaria, is expected to improve treatment outcomes within the next few years. By the end of 2004, 23 African countries had changed their national drug policy and adopted ACTs. In addition, 22 countries had adopted and begun to implement the RBM-recommended strategy of home management of malaria for children under 5 years of age—which involves education and training of mothers and provision of pre-packaged high-quality medicines—in order to provide more prompt treatment for children in rural areas with poor access to facility-based care.

With respect to progress on prevention, the number of ITNs distributed has increased 10-fold during the past 3 years in more than 14 African countries. Subsidized or free-of-charge ITN distribution has proved successful in increasing coverage of the most vulnerable populations. This is often linked to antenatal care and/or child immunization services, or national child immunization campaigns. Surveys conducted from 1999 to 2004, with the median survey year 2001, have shown that the median proportion of children under 5 years of age using ITNs was only 3% (ranging from 0.1% to 63% across 34 countries). There is, however, indication of rapid improvement. Surveys conducted in 2002–2004 showed remarkable increases in ITN coverage for children under 5 years of age in countries such as Eritrea (63%) and Malawi (36%). In selected areas of Senegal, household ownership of ITNs increased from 11% in 2000 to 41% by 2004. Updated, wide-scale assessments of ITN coverage are not yet available for most other countries.

Urban, relatively wealthy households are far more likely to own ITNs than rural and poorer households, in which people are at higher risk of malaria. Some African countries have succeeded in breaking this pattern. Programmes of highly subsidized ITN distribution through public health services in Ghana and Nigeria, and a national campaign of free ITN distribution alongside measles immunization for children under 5 years of age in Togo, resulted in high coverage rates in all population groups.

In most African countries, many more households have mosquito nets not treated with insecticide than ITNs. Scaling up of insecticide re-treatment services will therefore also be an important factor in increasing ITN coverage.

Efforts to prevent the silent but significant burden of asymptomatic infections in pregnant women residing in areas of stable malaria transmission have been revitalized through partnerships between malaria and reproductive health programmes. A total of 11 African countries, in addition to scaling up delivery of ITNs to pregnant women, are now in the process of implementing IPT for pregnant women.

## **ASIA**

Malaria remains a significant problem in the Eastern Mediterranean subregion, especially in areas where, over the past 30 years, complex emergencies and the associated destruction of health systems have aggravated the disease situation. Since 1998–1999, regional expenditures on malaria control have increased. The main control strategies are access to prompt and effective treatment, indoor residual spraying (IRS), epidemic preparedness and strengthening of surveillance systems. These strategies have succeeded in halting or reversing the trend of increasing case rates in many countries. In a high-risk area of Yemen, for example, vector control



and strengthened surveillance with active community participation have succeeded in reducing the number of malaria cases 10-fold since 2001.

Vivax malaria resurged in Central Asia and Transcaucasia, and falciparum malaria re-emerged in Tajikistan during the 1990s. Beginning in 2002, this region stepped up vector control through ITNs and IRS. Some countries also made considerable progress in surveillance methods and epidemic preparedness. Kyrgyzstan, for example, reinforced surveillance, used targeted IRS and improved case management in malaria-affected areas in response to a 2002 epidemic. These efforts are keeping malaria in check, although reported incidence remained around 10-fold higher in 2003 than in 1990. Sustained commitment and adequate financial support will be needed to prevent malaria from becoming a greater problem.

South-East Asia has the highest rate of drug resistance in the world, and multidrug resistance has contributed to the re-emergence of malaria in many areas, especially along international borders. Adults lacking immunity who work in forested areas or as migratory labourers are at high risk. Since 1998, all countries in the region have been routinely monitoring drug resistance. Out of 9 countries in this region, 6 have adopted ACTs as a national policy for first-line treatment of uncomplicated falciparum malaria. Challenges remain, however, for improving access to ACTs in private clinics, pharmacies and shops and in reducing the use of counterfeit and substandard drugs. Improving capacity for laboratory diagnosis of malaria through microscopy or rapid diagnostic tests is also a major focus of malaria control efforts, particularly in remote areas where malaria risk is high.

All countries in South-East Asia use IRS and/or larviciding for vector control in selected areas most affected by malaria, and all include epidemic preparedness and surveillance among national control strategies. Use of IRS, chiefly with pyrethroid insecticides, and ITN distribution, which started recently in most countries, have been associated with reductions in reported case rates in selected areas. Indonesia and Sri Lanka, for example, have had substantial successes. Sri Lanka, which uses focused IRS in high-transmission areas, larviciding and ITN distribution, ceased having epidemics after 1992 and reduced malaria incidence to the lowest level observed since 1967. In a high-risk area on central Java, Indonesia, improved diagnostic and treatment services, including outreach to poor rural areas and ITN distribution, halted and reversed a major malaria epidemic in 2001. This project also provided the impetus for re-establishment of malaria monitoring and surveillance systems.

In the Western Pacific subregion, malaria control was revitalized in the mid-1990s following a resurgence of the disease related to economic decline, large-scale population movement and breakdown of disease control and health-care services. Key strategies are vector control through ITNs and IRS, epidemic preparedness and prompt and effective treatment. Rates of reported cases fell gradually between 1992 and 2003. In Viet Nam, the number of malaria deaths declined rapidly after introduction and effective use of ACTs for first-line treatment. In a high-risk area of Malaysia, ITN distribution and improved diagnosis and treatment services offered by primary health-care volunteers reduced malaria incidence 28-fold between 1995 and 2003.

## THE AMERICAS

Malaria transmission occurs in 9 countries of the region that share the Amazon rainforest and in 8 countries in Central America and the Caribbean. Population movements associated with gold mining and forestry work have resulted in isolated epidemics. All affected countries use IRS and/or larviciding in focal areas at risk. Nine countries include ITNs in their national control strategies. Based on demonstrated chloroquine resistance, 8 of the 9 Amazon countries have recently changed national drug policies to use ACTs for the treatment of falciparum malaria. Chloroquine has retained its efficacy for treatment and prophylaxis against falciparum malaria in Central America north of the Panama Canal, the Dominican Republic and Haiti, and for treatment of vivax malaria throughout the region. A programme of “focalized treatment” consisting of improved treatment and IRS in focal areas successfully interrupted malaria transmission throughout much of Mexico, while the rational utilization of insecticides keeps costs low.

### Meeting increased demand and sustaining support for malaria control

The estimated cost for supporting the minimal set of malaria interventions required to effectively control malaria is around US\$ 3.2 billion per year for the 82 countries with the highest burden of malaria (US\$ 1.9 billion for Africa and US\$ 1.2 billion elsewhere). Only a fraction of that sum is available. Financial support and commitment to malaria control have increased since the inception of RBM. However, most of this increase has occurred during the past 2 years, and there remains a huge resource gap, especially in high-burden countries.

At present, according to available data, governments in malaria-affected countries provide the main source of funds for national malaria control programmes. In 2002–2003, governments provided 71% of total funds in Africa, 80% in Asia, and 96% in the Americas. Despite these investments by national governments, the poorest countries tend to have the highest burden of malaria, and national funding commitments are unable to fill the gap between what is needed and what is available. Thus, sustained and increased donor assistance will be required for the foreseeable future.

The Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), which began disbursement for malaria control in 2003, is an important international funding source. The GFATM disbursed more than US\$ 200 million in 2003–2004 to 28 countries in Africa, 15 countries in Asia and 4 countries in the Americas. Approved commitments for malaria control for 2005–2006 total US\$ 881 million.

ACTs, the most effective available treatments against falciparum malaria, are 10 to 20 times more costly than chloroquine, the former mainstay of therapy. The demand for ACTs has increased rapidly since the GFATM began disbursing funds to countries. In 2004, this surge in demand resulted in a shortage of artemether–lumefantrine (Coartem®), the first ACT prequalified by WHO. Scaling up production of artemisinin—the raw material needed to produce ACTs—is a high priority for RBM. Improved forecasting of medication needs and financial commitment by countries will be crucial if the pharmaceutical companies manufacturing ACTs are to step up production. With respect to prevention, grants from the GFATM that were approved in 2003–2004 are expected to provide at least 108 million ITNs to countries.

## Data collection and reporting

Sources of information relied on for global RBM monitoring include reports from national malaria control programmes, household surveys, drug efficacy monitoring at sentinel sites and health information systems.

National malaria control programmes provide regular overviews of local malaria control strategies and policies, financing of programme activities and service delivery activities. Although reporting on programmatic indicators is not fully standardized across regions and varying control strategies, this information is useful for understanding changes in programme performance.

Household (community-based) surveys provide the most relevant data on coverage with ITNs and access to malaria treatment. The national Multiple Indicator Cluster Surveys supported by UNICEF and the Demographic and Health Surveys conducted by Macro/Measure with support from the United States Agency for International Development at five-year intervals in many countries provide most data points. In 2004, RBM developed the Malaria Indicator Survey package for use in monitoring trends to increase coverage of malaria prevention and treatment. The Malaria Indicator Survey can be used to conduct household surveys in the absence of other surveys, or to fill gaps within the interval between subsequent Demographic and Health Surveys or Multiple Indicator Cluster Surveys. Surveys using this approach will be highly useful in preparing future world malaria reports. The next round of Multiple Indicator Cluster Surveys, to be conducted in 30 African malaria-endemic countries in 2005–2006, is expected to provide additional reliable information on increases in intervention coverage.

Drug efficacy monitoring has in most regions greatly improved with the establishment of surveillance systems, sentinel sites and standardized study protocols within the past few years. These efforts are helping countries in regular updating of national drug policies, and they should continue to be expanded and supported.

For countries in South-East Asia and the Americas, data from national health information systems are generally believed to provide a useful indication of trends in malaria cases and deaths. To improve the interpretation of health information systems data, their completeness should be assessed routinely in all countries using standardized methods. In most African countries, only a minority of patients who are ill with malaria are seen in medical facilities, thus health information systems data do not paint a reliable, let alone complete, picture. Here, major investments in health systems will be required before the utility of health information systems for monitoring disease trends can even be assessed, and population-level data are indispensable. In addition to all-cause under-5 mortality, the prevalence of childhood anaemia and malarial parasitaemia could be useful survey-based burden indicators.

## Conclusion

The goal of the RBM Partnership is to halve the burden of malaria in endemic countries by 2010. This report shows clear progress in scaling up antimalarial interventions in many countries. In Africa, several countries will reach at least

some of the targets set by African heads of state in Abuja in 2000. It is clear, however, that there is much work to be done.

The strengthening of countries' health-care systems—and of monitoring and evaluation—is paramount. At present it is too early to assess the impact of the recent scale-up of malaria prevention and treatment, but there are good reasons to believe a measurable reduction in morbidity and mortality should start to become apparent in the second half of the decade.

### **Global burden of malaria**

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**At the end of 2004, 107 countries and territories had areas at risk of malaria transmission. Some 3.2 billion people lived in areas at risk of malaria transmission.**

**An estimated 350–500 million clinical malaria episodes occur annually; most of these are caused by infection with *P. falciparum* and *P. vivax*. Falciparum malaria causes more than 1 million deaths each year. It also contributes indirectly to many additional deaths, mainly in young children, through synergy with other infections and illnesses.**

**Patterns of malaria transmission and disease vary markedly between regions and even within individual countries. This diversity results from variations between malaria parasites and mosquito vectors, ecological conditions that affect malaria transmission and socioeconomic factors, such as poverty and access to effective health care and prevention services.**

**About 60% of the cases of malaria worldwide, about 75% of global falciparum malaria cases and more than 80% of malaria deaths occur in Africa south of the Sahara. *P. falciparum* causes the vast majority of infections in this region and about 18% of deaths in children under 5 years of age. Malaria is also a major cause of anaemia in children and pregnant women, low birth weight, premature birth and infant mortality. In endemic African countries, malaria accounts for 25–35% of all outpatient visits, 20–45% of hospital admissions and 15–35% of hospital deaths, imposing a great burden on already fragile health-care systems.**

**Evidence continues to accumulate to support the view that adults infected with HIV, in addition to children under 5 years of age and pregnant women, should be targeted for malaria prevention and treatment. Malaria contributes synergistically with HIV/AIDS to morbidity and mortality in areas where both infections are highly prevalent, such as in Africa south of the Sahara. In addition to providing immediate health benefits, prevention and treatment of malaria may lessen transient increases in HIV viral load during malaria episodes and thus help limit the progression and transmission of HIV.**

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## RÉSUMÉ ANALYTIQUE

**N**ous présentons ici le premier rapport exhaustif des partenaires du projet Faire reculer le paludisme (RBM) sur cette maladie dans le monde et sur les progrès réalisés par les pays en matière de traitement et de prévention. C'est un bilan des informations les plus fiables extraites des comptes rendus réguliers, enquêtes auprès des ménages et études spéciales dont disposaient l'Organisation mondiale de la Santé (OMS) et le Fonds des Nations Unies pour l'Enfance (UNICEF) fin 2004.

Le paludisme reste un problème d'ampleur mondiale qui prélève un tribut inacceptable sur la santé et le potentiel économique des communautés les plus pauvres de la planète. Mais d'importants progrès ont été réalisés depuis quatre ou cinq ans grâce à la mise en place de programmes de prévention et de traitement pour les personnes les plus touchées par cette maladie dévastatrice et au développement des programmes qui existaient déjà.

Pendant les années 80 et 90, la charge du paludisme s'est alourdie en Afrique en raison de la résistance du parasite aux médicaments antipaludiques utilisés habituellement, de la détérioration des services de santé primaires et de l'apparition, chez le moustique, d'une résistance aux insecticides utilisés pour lutter contre le vecteur. Ces dix dernières années, le paludisme a également réémergé ou s'est intensifié en Asie du Sud-Est après l'interruption des opérations d'éradication et est réapparu dans plusieurs pays transcaucasiens et centrasiatiques.

Dans de nombreux pays, les programmes d'accès aux méthodes et stratégies recommandées par RBM n'ont pas démarré avant 2000. Dans la plupart des pays africains où le poids du paludisme est le plus lourd, l'accès à la prévention et au traitement n'a été élargi que plus récemment encore. Il est donc encore trop tôt pour dire, compte tenu des données et méthodes scientifiques dont on dispose, si la charge mondiale du paludisme a augmenté ou diminué depuis 2000. Ce n'est qu'au bout de plusieurs années de couverture élevée par la prévention et le traitement qu'on pourra mesurer leur impact sur la mortalité due au paludisme dans le monde.

Certains pays ont déjà montré qu'il était possible de faire reculer le paludisme. L'aperçu ci-dessous rend compte, région par région, de l'intensification de la lutte antipaludique dans le monde depuis 2000.

### Accès au traitement et à la prévention : progrès dans les régions

#### AFRIQUE

En 2000, les pays africains se sont engagés à fournir d'ici à fin 2005 un traitement efficace et des moustiquaires imprégnées d'insecticide (MII) à 60% des sujets les plus exposés au paludisme, et un traitement préventif intermittent (TPI) à 60% des femmes enceintes. Cette entreprise fut gravement compromise au départ par le manque de ressources pour se procurer les articles nécessaires. Mais grâce à une récente augmentation de fonds, certains pays ont pu atteindre et même dépasser

au moins certains des objectifs. La plupart des autres pays sont sur le point de passer à la vitesse supérieure mais se heurtent encore à d'importantes difficultés.

En ce qui concerne l'accès rapide à un traitement efficace, il ressort des enquêtes qu'en moyenne, la moitié des enfants africains atteints de fièvre se voient administrer un antipaludique qui, la plupart du temps, contient la chloroquine à laquelle le parasite *P. falciparum* est très résistant. Distribuées plus largement, les associations médicamenteuses comportant de l'artémisinine (CTA), nouveau traitement extrêmement efficace contre le paludisme à falciparum, devraient améliorer les résultats thérapeutiques dans les années qui viennent. Fin 2004, 25 pays africains avaient modifié leur politique pharmaceutique nationale et adopté les CTA. En outre, afin de soigner plus vite les sujets les plus exposés à la forme grave de la maladie, 23 pays ont choisi et commencé à appliquer, comme le recommande RBM, la stratégie de prise en charge à domicile des enfants impaludés de moins de cinq ans, ce qui suppose de former les mères et de leur fournir des médicaments préemballés d'excellente qualité.

Pour ce qui est de la prévention, le nombre de MII distribuées a été multiplié par dix ces trois dernières années dans plus de 14 pays africains. Grâce à la distribution de MII à prix subventionné ou gratuites, les populations les plus vulnérables sont mieux couvertes. La distribution s'effectue souvent dans le cadre des soins prénatals et/ou des services de vaccination infantile, ou des campagnes nationales de vaccination des enfants. D'après les enquêtes menées entre 1999 et 2004, la proportion médiane d'enfants de moins de cinq ans bénéficiant d'une MII n'était que de 3% (fourchette de 0,1% à 63% dans 34 pays). On note cependant des signes d'une amélioration rapide. Les enquêtes réalisées entre 2002 et 2004 font état d'une augmentation remarquable de la couverture des moins de cinq ans par les MII, notamment en Érythrée (63%) et au Malawi (36%). Dans certaines zones du Sénégal, la proportion de ménages possédant des MII est passée de 11% en 2000 à 41% en 2004. On ne dispose encore d'aucunes statistiques récentes de la couverture par les MII à plus grande échelle dans la plupart des autres pays.

Les ménages citadins relativement aisés sont bien plus nombreux à posséder des MII que les ménages ruraux, moins nantis, mais qui sont pourtant davantage exposés au paludisme. Certains pays africains ont réussi à briser ce schéma. Les programmes de distribution de MII à prix fortement subventionné mis en place par le Ghana et le Nigéria dans les services de santé publics et la campagne nationale de distribution gratuite de MII menée par le Togo parallèlement à la vaccination des moins de cinq ans contre la rougeole ont permis d'instaurer une couverture élevée dans tous les groupes de population.

Dans la majorité des pays africains, les ménages sont bien plus souvent équipés de moustiquaires simples que de moustiquaires imprégnées d'insecticide. Il faudra donc développer les services de retraitement des moustiquaires pour augmenter la couverture par les MII.

Des partenariats entre les programmes de lutte antipaludique et les programmes de santé reproductive ont donné un nouvel élan à la prévention des infections asymptomatiques, invisibles mais dont la charge est importante, chez les femmes enceintes dans les zones où la transmission du paludisme est stable. Au total, 11 pays d'Afrique ont entrepris d'instaurer le TPI parallèlement à la distribution de MII aux femmes enceintes.



## ASIE

Le paludisme demeure un problème important dans la région de la Méditerranée orientale, surtout dans les zones où, depuis une trentaine d'années, des situations d'urgence complexes et l'effondrement des systèmes de santé qui s'en est suivi ont aggravé le problème du paludisme. Depuis 1998-1999, les sommes consacrées à la lutte antipaludique ont augmenté. Les principales stratégies sont : un traitement rapide et efficace, la pulvérisation d'insecticide à effet rémanent à l'intérieur des habitations (IRS), la préparation aux épidémies et le renforcement des systèmes de surveillance. Ces mesures ont permis d'enrayer la hausse de la morbidité voire d'amorcer une décrue dans de nombreux pays. C'est ainsi que dans une zone à haut risque du Yémen, le nombre de cas a été divisé par 10 depuis 2001 grâce à des opérations de lutte antivectorielle et à une surveillance renforcée auxquelles la communauté a activement pris part.

Le paludisme à vivax a ressurgi en Asie centrale et en Transcaucasie et le paludisme à falciparum a refait son apparition au Tadjikistan dans les années 90. Depuis 2002, cette région a recours aux MII et à l'IRS pour mieux lutter contre le vecteur. Les méthodes de surveillance et la préparation aux épidémies ont aussi beaucoup progressé dans certains pays. Par exemple, pour faire face à une épidémie en 2002, le Kirghizistan a renforcé la surveillance en procédant à des IRS ciblées et en améliorant la prise en charge des cas dans les zones impaludées. Ces efforts permettent de contenir la maladie, même si l'incidence déclarée était encore près de dix fois plus élevée en 2003 qu'en 1990. Un engagement durable et un appui financier suffisant seront indispensables pour éviter que le paludisme ne prenne plus d'ampleur.

L'Asie du Sud-Est enregistre le taux de pharmacorésistance le plus élevé du monde et la multirésistance a contribué à la résurgence du paludisme en de nombreux endroits, notamment le long des frontières. Les adultes non immunisés qui travaillent dans les zones forestières ou comme travailleurs migrants sont très exposés. Tous les pays de la région surveillent systématiquement la pharmacorésistance depuis 1998. Sur les 9 pays que compte la région, 6 ont adopté les CTA comme traitement de première intention du paludisme à falciparum non compliqué. Il reste cependant des obstacles à surmonter pour mettre les CTA à disposition dans les cliniques privées, les pharmacies et les magasins, et éviter l'usage de médicaments contrefaits et de qualité douteuse. La lutte antipaludique repose également sur le développement du diagnostic en laboratoire par examen microscopique ou tests diagnostiques rapides, surtout dans les zones reculées où le risque de paludisme est grand.

Tous les pays d'Asie du Sud-Est ont recours à l'IRS et/ou au traitement larvicide pour lutter contre le vecteur dans certaines des zones les plus impaludées et ont inscrit la surveillance et la préparation aux épidémies dans leurs stratégies de lutte nationales. L'IRS, principalement au moyen de pyréthrinoïdes, et la distribution de MII, mesures appliquées depuis peu par la plupart des pays, ont été associées à une baisse du nombre de cas déclarés dans des zones données. L'Indonésie et le Sri Lanka, par exemple, ont obtenu de bons résultats. Le Sri Lanka, qui procède à des IRS ciblées dans les zones de forte transmission, au traitement larvicide et à la distribution de MII, n'a pas connu d'épidémies depuis 1992 et a ramené l'incidence du paludisme au taux le plus bas jamais enregistré depuis 1967. Dans une zone à haut risque du centre de Java, en Indonésie, des services améliorés de diagnostic et de traitement, comprenant des services de proximité en milieu rural déshérité et la distribution de MII, ont permis de juguler une grande épidémie à la fin de



2001. Cette initiative a aussi donné l'élan nécessaire à la réhabilitation des systèmes de suivi et de surveillance du paludisme.

Dans le Pacifique occidental, la lutte antipaludique a repris avec plus d'intensité au milieu des années 90 après que le paludisme avait réapparu sous l'effet de la crise économique, des vastes mouvements de population et de l'effondrement des services de lutte contre la maladie et de soins de santé. Les grandes stratégies sont la lutte antivectorielle au moyen des MII et de l'IRS, la préparation aux épidémies et l'administration d'un traitement rapide et efficace. Le taux de morbidité déclaré a chuté progressivement entre 1992 et 2003. Au Viet Nam, le nombre de décès par paludisme a rapidement baissé après l'adoption des CTA comme traitement de première intention. Dans une zone à haut risque de Malaisie, l'incidence du paludisme a été divisée par 28 entre 1995 et 2003 grâce à la distribution de MII et aux services améliorés de diagnostic et de traitement qu'assurent des volontaires au niveau des soins de santé primaires.

## AMÉRIQUES

Le paludisme se transmet dans 9 pays de la région situés dans la forêt amazonienne et dans 8 pays d'Amérique centrale et des Caraïbes. Les mouvements de population qu'engendrent l'extraction de l'or et l'exploitation forestière ont donné lieu à des épidémies isolées. Tous les pays concernés recourent à l'IRS et/ou au traitement larvicide dans les zones à risque. Neuf pays prévoient la distribution de MII dans leurs stratégies antipaludiques nationales. La résistance à la chloroquine ayant été avérée, 8 des 9 pays de l'Amazonie ont récemment modifié leurs politiques pharmaceutiques nationales pour traiter le paludisme à falciparum au moyen des CTA. La chloroquine demeure efficace pour le traitement et la prophylaxie du paludisme à falciparum en Amérique Centrale au nord du canal de Panama, en République dominicaine et en Haïti, et pour le traitement du paludisme à vivax dans la majeure partie de la région. Un programme de "traitement ciblé" prévoyant un traitement amélioré et l'IRS dans les foyers d'infection a permis d'interrompre la transmission dans une bonne partie du Mexique, tandis que l'usage rationnel des insecticides aide à maîtriser les coûts.

### Répondre à l'augmentation de la demande et financer durablement la lutte antipaludique

On estime à US\$ 3,2 milliards environ par an le coût de l'ensemble minimum de mesures antipaludiques indispensables pour combattre efficacement la maladie dans les 82 pays les plus touchés. Un montant supplémentaire de US\$ 0,7 milliard est nécessaire pour soutenir les pays où la charge de la maladie est moins importante. L'investissement annuel se monterait au total à quelque US\$ 3 milliards (US\$ 2 milliards pour l'Afrique et US\$ 1 milliard pour le reste du monde). Or, seule une petite partie de cette somme est disponible. Le soutien financier et l'engagement en faveur de la lutte antipaludique ont augmenté depuis la création de RBM, mais surtout depuis deux ans, et le manque de financement reste énorme, en particulier dans les pays où la charge est élevée.

D'après les données disponibles, les gouvernements des pays impaludés sont actuellement la principale source de financement des programmes nationaux de lutte antipaludique. En 2002-2003, ils ont fourni 71% des fonds destinés à cet

usage en Afrique, 80% en Asie et 96% dans les Amériques. Malgré ces investissements, c'est généralement dans les pays les plus pauvres que le fardeau du paludisme est le plus lourd et les engagements financiers nationaux ne suffisent pas à répondre aux besoins. Par conséquent, une aide plus importante sera nécessaire jusqu'à nouvel ordre.

Le Fonds mondial de lutte contre le SIDA, la tuberculose et le paludisme, qui a accordé ses premiers crédits pour la lutte antipaludique en 2003, est une source de financement internationale importante. En 2003–2004, il a versé plus de US\$ 200 millions à 28 pays d'Afrique, 15 pays d'Asie et 4 pays des Amériques. Les engagements de dépenses approuvés pour 2005–2006 se montent au total à US\$ 881 millions.

Les CTA, les traitements les plus efficaces aujourd'hui contre le paludisme à falciparum, coûtent 10 à 20 fois plus cher que la chloroquine, qui était la CTA référence autrefois la pierre angulaire du traitement. La demande de CTA a augmenté rapidement depuis que le Fonds mondial a commencé à distribuer des ressources aux pays. En 2004, la hausse de la demande a entraîné une pénurie d'artéméter-luméfantrine (Coartem®), première CTA présélectionnée par l'OMS. L'augmentation de la production d'artémisinine, qui est la matière première dont se composent les CTA, est une priorité pour RBM. Il faudra mieux prévoir les besoins en médicaments et les engagements financiers des pays pour que les fabricants de CTA augmentent leur volume de production. En ce qui concerne la prévention, les subventions du Fonds mondial approuvées en 2003–2004 devraient permettre de fournir au moins 108 millions de MII aux pays.

## Collecte et notification des données

La surveillance exercée par RBM au niveau mondial s'appuie sur différentes sources d'information : programmes nationaux de lutte antipaludique, enquêtes auprès des ménages, surveillance de l'efficacité des médicaments sur des sites sentinelles et systèmes d'information sanitaire.

Les programmes nationaux de lutte antipaludique rendent compte régulièrement des stratégies et politiques locales de lutte contre la maladie, du financement des activités programmatiques et de la prestation de services. Même si la notification des indicateurs programmatiques n'est pas entièrement standardisée entre les régions et pour les différentes stratégies de lutte, elle donne des indications utiles sur l'évolution des résultats des programmes.

Ce sont les enquêtes auprès des ménages (en communauté) qui fournissent les données les plus pertinentes sur la couverture par les MII et l'accès au traitement. La plupart des données simples proviennent des enquêtes nationales en grappes à indicateurs multiples financées par l'UNICEF et des enquêtes démographiques et sanitaires effectuées tous les cinq ans dans de nombreux pays par Macro/Measure avec le concours de l'Agence des Etats-Unis pour le développement international. En 2004, RBM a conçu une série d'indicateurs des tendances pour aider à étendre la couverture de la prévention et du traitement. On peut les utiliser pour enquêter auprès des ménages en l'absence d'autres sondages ou pour combler l'intervalle entre les enquêtes démographiques et sanitaires successives ou les enquêtes en grappes à indicateurs multiples. Les enquêtes conçues sur ce modèle seront très utiles pour établir les prochains rapports sur le paludisme dans le monde. La prochaine série d'enquêtes en grappes à indicateurs multiples qui sera menée dans 30 pays d'endémie

en Afrique en 2005 et 2006 devrait fournir d'autres informations fiables sur l'augmentation de la couverture des interventions.

Dans la plupart des régions, la surveillance de l'efficacité des médicaments a fait de grands progrès depuis l'instauration, ces dernières années, de systèmes de surveillance, de sites sentinelles et de protocoles d'étude standardisés. L'action menée dans ce domaine aide les pays à actualiser régulièrement leurs politiques nationales de traitement et mérite d'être encore étendue et soutenue.

Pour les pays de la Région de l'Asie du Sud-Est et de la Région des Amériques, on considère généralement que les données provenant des systèmes d'information sanitaire fournissent des indications utiles sur les tendances de la morbidité et de la mortalité liées au paludisme. Pour pouvoir mieux les interpréter, il faudrait vérifier régulièrement suivant des méthodes standardisées si elles sont complètes dans tous les pays. Vu que, dans la plupart des pays africains, seule une minorité des patients sont vus par les services médicaux, les chiffres des systèmes d'information sanitaire ne donnent pas une image fidèle et encore moins complète de la réalité. Il faudra donc beaucoup investir dans les systèmes de santé avant même de pouvoir apprécier l'utilité des systèmes d'information sanitaire pour observer les tendances de la maladie. Des données recueillies en population sont par ailleurs indispensables. La mortalité de l'enfant toutes causes confondues ainsi que la prévalence de l'anémie et de la parasitémie chez l'enfant, obtenues par enquête, pourraient être des indicateurs utiles, tirés d'enquêtes, de la charge de la maladie.

## Conclusion

Le partenariat RBM s'est fixé pour but de diminuer de moitié la charge du paludisme dans les pays d'endémie d'ici 2010. Le présent rapport rend compte des progrès manifestes qu'ont faits de nombreux pays en étendant les interventions anti-paludiques. En Afrique, plusieurs pays atteindront au moins certaines des cibles fixées par les chefs d'état africains à Abuja en 2000. Mais, de toute évidence, il reste beaucoup à faire.

Il est absolument indispensable de renforcer les systèmes de soins de santé des pays ainsi que le suivi et l'évaluation. Il est encore trop tôt aujourd'hui pour apprécier l'impact des efforts supplémentaires de prévention et de traitement entrepris récemment, mais il y a de bonnes raisons de penser qu'une diminution mesurable de la morbidité et de la mortalité se dessinera dans la deuxième moitié de la décennie.

## **Charge mondiale du paludisme**

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Fin 2004, 107 pays et territoires comptaient des zones où il y avait un risque de transmission du paludisme. Quelque 3,2 milliards de personnes vivaient dans des régions à risque.

On estime que 350 à 500 millions d'épisodes palustres cliniques se produisent chaque année ; la plupart sont dus à *P. falciparum* et *P. vivax*. Le paludisme à *falciparum* tue plus d'un million de personnes tous les ans. Par synergie avec d'autres infections et maladies, il contribue aussi indirectement à un grand nombre de décès, principalement chez les enfants en bas âge.

Les schémas de transmission et de morbidité varient énormément selon les régions et à l'intérieur des pays. Ces variations tiennent aux différences entre les parasites et les moustiques vecteurs, aux conditions écologiques qui influent sur la transmission et à des facteurs économiques comme la pauvreté et l'accès à des soins et à des services de prévention efficaces.

Environ 60% des cas dans le monde, quelque 75% des cas de paludisme à *falciparum* et plus de 80% des décès par paludisme se produisent en Afrique subsaharienne. *P. falciparum* est responsable de la grande majorité des infections dans cette région et de 18% des décès d'enfants de moins de cinq ans. Le paludisme est aussi une cause fréquente d'anémie chez la femme enceinte et chez l'enfant de faible poids de naissance, de naissance prématurée et de mortalité infantile. Dans les pays d'endémie africains, il est à l'origine de 25% à 35% des consultations ambulatoires, de 20% à 45% des hospitalisations et de 15% à 35% des décès à l'hôpital, faisant ainsi peser une lourde charge sur des systèmes de santé déjà fragiles.

De plus en plus d'éléments montrent qu'il faut axer la prévention et le traitement du paludisme sur les enfants de moins de cinq ans et les femmes enceintes, mais aussi sur les adultes porteurs du VIH. Associé au VIH/SIDA, le paludisme contribue à la morbidité et à la mortalité dans les zones où les deux infections sont très répandues, comme en Afrique subsaharienne. En plus de leurs avantages immédiats pour la santé, la prévention et le traitement du paludisme peuvent restreindre l'augmentation momentanée de la charge virale chez les sujets VIH-positifs pendant les épisodes aigus palustres et aider ainsi à limiter la progression et la transmission du VIH.

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## RESUMEN DE ORIENTACIÓN

El presente informe es el primer informe integral publicado por la iniciativa “Hacer retroceder el paludismo” (RBM) sobre la situación de esta enfermedad en el mundo y el avance de su control mediante la prevención y el tratamiento efectivos en los distintos países. Este informe está basado en la información más significativa que la Organización Mundial de la Salud (OMS) y el Fondo de las Naciones Unidas para la Infancia (UNICEF) poseen a finales de 2004, recabada en informes sistemáticos, encuestas domiciliarias y estudios especiales.

El paludismo es un problema mundial grave que afecta de forma inaceptable la salud y el bienestar económico de las comunidades más pobres del mundo. Ahora bien, en estos cuatro o cinco años se ha avanzado bastante en la introducción y el desarrollo de programas de prevención y tratamiento para las personas más afectadas por esta enfermedad devastadora.

En África aumentó la carga de paludismo durante los años 80 y 90 debido a una resistencia a los antipalúdicos empleados habitualmente, la degradación de los servicios de atención primaria de salud en muchas regiones y el desarrollo de resistencia de los mosquitos a los insecticidas de control antivectorial. El paludismo reapareció o se intensificó en el sureste de Asia durante la última década cuando se interrumpieron las campañas de erradicación, y también reapareció en varios países de Asia central y transcaucásicos.

En el 2000 la mayoría de los países apenas empiezan a implementar programas de acceso a los instrumentos y las estrategias recomendados por la iniciativa RBM, y las acciones de extensión del acceso al tratamiento y la prevención en muchos de los países africanos más afectados por el paludismo es aún más reciente. Por tanto, todavía no es posible determinar si la carga de paludismo ha aumentado o disminuido en el mundo desde el 2000 con los datos y los métodos científicos disponibles. Sólo después de varios años de aplicación de medidas de prevención y tratamiento del paludismo con alta cobertura se podrá determinar su impacto en las tasas mundiales de mortalidad.

Algunos países han avanzado en la lucha contra el paludismo y lo han evidenciado. Los siguientes resúmenes por regiones demuestran la extensión de medidas de control del paludismo en todo el mundo desde el 2000.

### Avance de las distintas regiones en el acceso al tratamiento y la prevención

#### África

En el 2000 los países africanos asumieron el compromiso de proporcionar para finales de 2005 un tratamiento efectivo y oportuno, y mosquiteros tratados con insecticida (MTI) para un 60% de la población más expuesta al riesgo de paludismo, así como tratamiento preventivo intermitente (TPI) para un 60% de las mujeres embarazadas. En un principio la falta de recursos para adquirir productos limitó sustancialmente la implementación de estas medidas. Los nuevos recursos disponibles han permitido que algunos países alcancen o superen al menos algunos de estos objetivos.

La mayoría de los otros países ya está en condiciones de extender las medidas, pero subsisten dificultades importantes.

En lo relativo al tratamiento efectivo y oportuno, las encuestas indican que la mitad de los niños de África que padecen de fiebre reciben antipalúdicos, pero es principalmente cloroquina y el parásito *falciparum* es muy resistente a este fármaco. Probablemente la mayor disponibilidad de la terapia combinada con artemisinina (TCA), un tratamiento nuevo y muy efectivo contra el paludismo *falciparum*, mejorará los resultados del tratamiento en los próximos años. A finales de 2004, 25 países africanos habían modificado su política farmacéutica para introducir las TCA, y 23 países habían adoptado y empezado a implementar la estrategia recomendada por la iniciativa RBM para tratar en el hogar el paludismo de niños menores de 5 años (educación y formación de las madres, y suministro de paquetes de medicamentos eficaces) a fin de tratar más pronto el paludismo de la población más expuesta a un riesgo de enfermedad grave.

En cuanto al avance de la prevención, el número de MTI distribuidos se ha multiplicado por 10 en los últimos tres años en más de 14 países de África. La distribución de MTI subsidiados o gratuitos ha sido una medida eficaz para extender la cobertura de las poblaciones más vulnerables. Muchas veces se integra en los servicios de atención prenatal o de inmunización infantil, o en campañas nacionales de inmunización infantil. Las encuestas realizadas entre 1999 y 2001 indican que sólo un 3% de los niños menores de 5 años se protegen con MTI (entre un 0,1% y un 63% en 34 países). Sin embargo, los datos indican que la situación mejora rápidamente. Los estudios realizados en 2002–2004 indican un aumento sustancial en la cobertura de MTI para niños menores de 5 años en países como Eritrea (63%) y Malawi (36%). En determinadas regiones de Senegal, la proporción de familias que poseen MTI ha aumentado del 11% en 2000 al 41% en 2004. No hay todavía evaluaciones extensas y actualizadas de la cobertura de MTI para la mayoría de los demás países.

Es mucho más probable que las familias de la ciudad y relativamente acomodadas utilicen los MTI, y no las familias pobres del campo más expuestas al riesgo de paludismo. Algunos países de África han invertido esta ecuación. Ghana y Nigeria han conseguido una extensa cobertura de todos los grupos de población distribuyendo MTI fuertemente subsidiados a través de los servicios de salud pública, y también Togo mediante una campaña nacional de distribución de MTI gratuitos combinada con la vacunación de niños menores de 5 años contra el sarampión.

En la mayoría de los países de África hay muchas más familias que utilizan mosquiteros sin insecticida y no MTI. Por tanto, la extensión de los servicios de nuevo tratamiento de insecticida también será un factor importante para elevar la cobertura de MTI.

Una combinación de los programas de salud reproductiva y de lucha contra el paludismo ha resultado en una prevención más eficaz de la carga imperceptible pero significativa de infecciones asintomáticas de mujeres embarazadas en zonas de transmisión estable del paludismo. En 11 países de África se ha extendido la distribución de MTI a mujeres embarazadas y se está implementando el tratamiento preventivo intermitente (TPI) de esta población.

## ASIA

El paludismo sigue siendo un problema significativo en la subregión del Mediterráneo oriental, particularmente donde urgencias complejas y la correspondiente destrucción de los sistemas de salud han agravado la situación de esta afección en los últimos 30 años. La inversión en la lucha contra el paludismo en esta región aumenta desde 1998–1999. Las principales estrategias de control son el acceso a un tratamiento efectivo y oportuno, el rociamiento de acción residual en interiores, la preparación a epidemias y la mejora de los sistemas de vigilancia. Así se ha conseguido detener o invertir una tendencia al aumento del número de casos en muchos países. Por ejemplo, la lucha antivectorial y una vigilancia más eficaz con la participación activa de la comunidad han dividido por 10 el número de casos de paludismo en una zona de alto riesgo de Yemen desde 2001.

El paludismo vivax ha reaparecido en países de Asia central y transcaucásicos, y el paludismo falciparum en Tayikistán durante los 90. A primeros de 2002 se reforzó la lucha antivectorial en esta región mediante la utilización de MTI y el rociamiento de acción residual. Algunos países han mejorado considerablemente los métodos de vigilancia y la preparación a epidemias. Por ejemplo, Kirguizistán ha reforzado la vigilancia, ha recurrido al rociamiento de acción residual localizado y ha mejorado el tratamiento de los casos en zonas palúdicas como reacción a una epidemia en 2002. Estas medidas han contenido el avance del paludismo, pero la incidencia de 2003 es 10 veces más alta que en 1990. Para evitar la agravación del problema del paludismo hay que garantizar un compromiso firme y la financiación adecuada.

La farmacorresistencia del sureste Asia es la más alta del mundo, y la polifarmacorresistencia es uno de los factores de reaparición del paludismo en muchas zonas, especialmente en las fronteras entre países. Entre los adultos, los trabajadores forestales o migratorios no inmunes corren un alto riesgo. Todos los países de la región vienen evaluando sistemáticamente la resistencia al fármaco desde 1998. Seis de los 9 países de esta región han adoptado las TCA como política nacional para el tratamiento de primera línea del paludismo falciparum sin complicaciones, pero aún hay que facilitar el acceso a las TCA en clínicas privadas, farmacias y tiendas, y reducir la utilización de medicamentos falsificados o de calidad insuficiente. Otra de las prioridades de la lucha contra el paludismo es mejorar la capacidad de diagnóstico mediante un examen de microscopio en laboratorio o pruebas de diagnóstico rápido, particularmente en zonas distantes de alto riesgo de paludismo.

Todos los países del sureste de Asia recurren al rociamiento de acción residual o la aplicación de larvicidas para controlar los vectores del paludismo en las zonas más afectadas, y han incluido la preparación a epidemias y la vigilancia entre las estrategias de control nacionales. Las medidas de rociamiento de acción residual, principalmente con insecticidas piretroides, y la reciente distribución de MTI en la mayoría de los países han conseguido disminuir las tasas de casos señalados en determinadas zonas. Son de señalar los logros de Indonesia y Sri Lanka. El rociamiento de acción residual focalizado en zonas de alta transmisión, la aplicación de larvicidas y la distribución de MTI en Sri Lanka han evitado las epidemias desde 1992 y han reducido la incidencia del paludismo a los niveles más bajos observados desde 1967. En una zona de alto riesgo del centro de Java (Indonesia) se ha conseguido detener e invertir una epidemia importante de paludismo en 2001 mejorando los servicios de diagnóstico y tratamiento, garantizando el acceso a las zonas rurales pobres y distribuyendo MTI. Este proyecto también ha incitado a reestablecer los sistemas de supervisión y vigilancia del paludismo.



En la subregión del Pacífico occidental se reactivó el control del paludismo a mediados de los 90 como reacción a una reaparición de la enfermedad asociada a los problemas económicos, los desplazamientos masivos de población y la degradación de los servicios de control de la enfermedad y atención de salud. Las principales estrategias son el control antivectorial mediante MTI y el rociamiento de acción residual, la preparación a epidemias y un tratamiento efectivo y oportuno. Las tasas de casos señalados han disminuido gradualmente entre 1992 y 2003. El número de defunciones por paludismo ha disminuido rápidamente en Viet Nam desde la introducción y la utilización efectiva de las TCA para el tratamiento de primera línea. En una zona de alto riesgo de Malasia, la distribución de MTI y los servicios más eficaces de diagnóstico y tratamiento prestados por voluntarios de atención primaria han conseguido reducir fuertemente la incidencia de paludismo, que en 2003 es 28 veces inferior a los valores de 1995.

## LAS AMÉRICAS

Hay transmisión de paludismo en 9 países de la región que comparten la selva amazónica, y en 8 países de América Central y el Caribe. Los desplazamientos de población asociados a la explotación de minas de oro y bosques han provocado epidemias aisladas. Todos los países afectados recurren al rociamiento de acción residual y/o la aplicación de larvicidas en zonas de riesgo focalizadas. Las estrategias de control de 9 países incluyen la distribución de MTI. Teniendo en cuenta la resistencia demostrada a la cloroquina, 8 de los 9 países amazónicos han modificado recientemente sus políticas farmacéuticas para tratar el paludismo falciparum con TCA. La cloroquina sigue siendo eficaz para el tratamiento y la profilaxis contra el paludismo falciparum en Centroamérica y norte del canal de Panamá, la República Dominicana y Haití, y para el tratamiento del paludismo vivax en la mayor parte de la región. Un programa de "tratamiento focalizado", que consiste en un tratamiento más eficaz y rociamiento de acción residual en determinadas zonas ha logrado interrumpir la transmisión del paludismo en la mayor parte de México, y los costos se han controlado utilizando racionalmente los insecticidas.

### Respuesta a una mayor demanda y apoyo continuado para el control del paludismo

Se estima que el plan mínimo de intervenciones necesario para controlar efectivamente el paludismo cuesta aproximadamente 2.300 millones USD anualmente para los 70 países que tienen la mayor carga de paludismo. Serán necesarios además 700 millones USD para apoyar a los países con menor carga de paludismo. Habría que invertir anualmente 3.000 millones USD (2.000 millones USD para África y 1.000 millones USD para otras regiones), pero los fondos disponibles son muy inferiores. Hay mayor apoyo financiero y mayor compromiso en la lucha contra el paludismo desde el lanzamiento de la iniciativa RBM, pero ha sido principalmente durante los dos últimos años y los recursos todavía son muy insuficientes, especialmente en los países que tienen la mayor carga de morbilidad.

Los datos disponibles indican que la Administración nacional es actualmente la principal fuente de financiación de los programas de control en los países que padecen el paludismo. Su participación representa un 71% del total en África, un 80% en Asia y un 96% en las Américas durante el período 2002–2003. La contribución de la Administración nacional ha sido importante, pero la carga de paludismo suele ser

más alta en los países más pobres y la inversión nacional no compensa la diferencia entre las necesidades y la disponibilidad. Por tanto, en el futuro cercano será necesaria una asistencia más importante y continuada de donantes.

El Fondo Mundial de Lucha contra el Sida, la Tuberculosis y la Malaria es una fuente de financiación internacional importante desde 2003. En 2003–2004 el Fondo Mundial aportó más de 200 millones USD a 28 países de África, 15 de Asia y 4 de las Américas. Los compromisos aprobados para la lucha contra el paludismo en 2005–2006 suman 881 millones USD.

Las TCA, que son el tratamiento más efectivo disponible contra el paludismo falciparum, cuestan 10 a 20 veces más que la anterior terapia principal de cloroquina. La demanda de TCA ha aumentado rápidamente desde que existe una financiación del Fondo Mundial, a tal punto que en 2004 no había un suministro suficiente de artemetero + lumefantrina (Coartem®), la primera forma de TCA preaprobada por la OMS. El aumento de producción de artemisinina (materia prima necesaria para producir las TCA) es una de las prioridades de la iniciativa RBM. Para que la industria farmacéutica aumente la producción de TCA es preciso mejorar las previsiones de fármacos necesarios y garantizar la participación financiera de los países. En lo relativo a la prevención, se estima que las aportaciones del Fondo Mundial aprobadas en 2003–2004 permitirán proporcionar como mínimo 108 millones de MTI a los países.

## Recopilación de información y presentación de informes

Las fuentes de información fiables para el seguimiento mundial de las acciones RBM son los informes de los programas nacionales de paludismo, las encuestas domiciliarias, el seguimiento de eficacia del fármaco en lugares “centinela” y los sistemas de información de salud.

Los programas nacionales de lucha contra el paludismo presentan periódicamente las estrategias y políticas locales de control del paludismo, la financiación del programa y la prestación de los servicios. No se ha normalizado totalmente la presentación de indicadores programáticos para distintas regiones y distintas estrategias de control, pero esta información es útil para entender por qué varían los resultados de los programas.

Las encuestas domiciliarias (de comunidad) son la fuente de información más pertinente sobre la cobertura de MTI y el acceso al tratamiento del paludismo. Las nacionales Encuestas de Múltiples Indicadores por Conglomerados financiadas por UNICEF y las Encuestas Demográficas y de Salud realizadas por Macro/Measure con el apoyo de la Agencia de los Estados Unidos para el Desarrollo Internacional a intervalos de cinco años en muchos países permiten conocer la mayoría de los datos. En 2004 el programa RBM creó una Encuesta Particular con Indicador de Paludismo que permite seguir las tendencias de aumento de cobertura de prevención y tratamiento del paludismo. Esta encuesta con indicador de paludismo podrá utilizarse como encuesta domiciliaria si no hay otras opciones, o como complemento en el intervalo entre dos Encuestas Demográficas y de Salud o dos Encuestas de Múltiples Indicadores por Conglomerados. Este tipo de encuestas será muy útil para preparar futuros informes sobre el paludismo en el mundo. La próxima campaña de Encuestas de Múltiples Indicadores por Conglomerados, que se realizará en 30 países

de África endémicos para el paludismo en 2005–2006, será probablemente una fuente de información fiable adicional sobre la extensión de la cobertura.

La definición de sistemas de vigilancia, lugares “centinela” y protocolos de estudio normalizados en la mayoría de las regiones ha mejorado sustancialmente el seguimiento de la eficacia de los medicamentos en los últimos años. Estas iniciativas contribuyen a actualizar periódicamente las políticas farmacéuticas nacionales y es conveniente extenderlas y financiarlas.

En el caso de las regiones sureste de Asia y Américas, se considera en general que los datos de los sistemas nacionales de salud proporcionan una indicación útil de las tendencias de casos y defunciones por paludismo. Sería conveniente evaluar de forma sistemática los datos de los sistemas nacionales de salud en todos los países, utilizando métodos normalizados, para determinar en qué medida son exhaustivos y mejorar su interpretación. En la mayoría de los países de África los centros de salud sólo atienden a una minoría de los pacientes que padecen paludismo. Por tanto, la imagen de los sistemas de información de salud no es fiable ni, mucho menos, completa. Habrá que invertir decididamente en los sistemas de salud antes de poder siquiera evaluar la utilidad de los sistemas de información de salud para el seguimiento de las tendencias de la enfermedad, y es indispensable tener datos de población. Los datos de encuestas de mortalidad infantil por diversas causas y de prevalencia de anemia infantil y parasitemia por paludismo pueden ser indicadores útiles de la carga de morbilidad.

## Conclusión

El objetivo de la iniciativa RBM es reducir a la mitad la carga de paludismo en los países endémicos para 2010. Este informe pone de manifiesto un avance evidente en las intervenciones antipalúdicas en muchos países. Varios países de África conseguirán al menos algunos de los objetivos establecidos por los Jefes de Estado africanos en Abuja en 2000. Sin embargo, también es evidente que queda mucho por hacer.

Es fundamental consolidar los sistemas de atención de salud nacionales, así como los sistemas de seguimiento y evaluación. Aún no es posible evaluar el impacto de la reciente extensión de la prevención y el tratamiento del paludismo, pero es previsible una disminución cuantificable de la morbilidad y la mortalidad en la segunda mitad de esta década.

### **La carga de paludismo en el mundo**

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A finales de 2004 había zonas de riesgo de transmisión del paludismo en 107 países y territorios, y unos 3.200 millones de personas vivían en zonas de riesgo de transmisión del paludismo.

Se estima que hay entre 350 y 500 millones de episodios de paludismo clínico anualmente, la mayoría causados por infección por *P. falciparum* y *P. vivax*. El paludismo falciparum es la causa de más de un millón de defunciones anualmente y contribuye indirectamente a muchas otras defunciones, principalmente de niños pequeños, por sinergia con otras infecciones y afecciones.

Las características de transmisión y enfermedad por paludismo son muy variables entre regiones, incluso en un mismo país. Es el resultado de variaciones entre los parásitos del paludismo y los mosquitos vectores, las condiciones ecológicas que afectan la transmisión del paludismo y factores socioeconómicos como la pobreza y el acceso a servicios eficaces de atención de salud y prevención.

En África subsahariana se registran un 60% de todos los casos de paludismo del mundo, un 75% de los casos de falciparum y más del 80% de las defunciones por paludismo. *P. falciparum* provoca la gran mayoría de las infecciones en esta región y alrededor del 18% de defunciones de niños menores de 5 años. El paludismo también es una causa importante de anemia infantil y de mujeres embarazadas, bajo peso al nacer, partos prematuros y mortalidad infantil. En los países endémicos de África, el paludismo representa un 25–35% de las consultas ambulatorias, un 20–45% de los ingresos en hospitales y un 15–35% de las defunciones en hospitales, lo que supone una carga muy importante para sistemas de atención de salud que ya son frágiles.

Cada vez está más claro que hay que incluir a los adultos infectados por el VIH en los planes de prevención y tratamiento del paludismo, además de los niños menores de 5 años y las mujeres embarazadas. La sinergia del paludismo y el VIH/SIDA contribuye a la morbilidad y la mortalidad en las zonas de alta prevalencia de estas dos infecciones, como es el caso del África subsahariana. La prevención y el tratamiento del paludismo aporta beneficios de salud inmediatos y puede limitar los aumentos transitorios de la carga viral de VIH durante los episodios de paludismo, con lo que contribuye a limitar el avance y la transmisión del VIH.

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# INTRODUCTION

**This report is the first** comprehensive effort to compile, analyse and present available information on progress rolling back malaria in all affected countries. It outlines the epidemiological situation of malaria in all regions of the world, and reports on the status of malaria control, including control policies, service delivery and coverage of key interventions. For 24 endemic countries, the situation of malaria and malaria control and the support provided by the international community are reviewed in more detail.

Between 350 and 500 million clinical episodes of malaria occur each year, resulting in over 1 million deaths (1, 2). The disease takes an economic toll as well because of reduced productivity, which is responsible for an estimated average loss of 1.3% of economic growth annually in countries with intense transmission (3). Malaria control is increasingly recognized as playing a key role in poverty reduction in high burden countries.

Recognizing that there are proven and effective interventions against malaria, the Roll Back Malaria (RBM) Partnership was launched in 1998 by the World Health Organization (WHO), the World Bank, the United Nations Children's Fund (UNICEF) and the United Nations Development Programme (UNDP), with the overall goal of halving the burden of malaria by 2010 (4). The partnership includes malaria-endemic countries, their bilateral and multilateral development partners, the private sector, academia and international organizations. The following core technical strategies for the sustainable control of malaria have been identified:

- improved and prompt access to effective treatment;
- increased use of insecticide-treated nets (ITNs) and other locally appropriate means of vector control;
- early detection of and response to malaria epidemics;
- improved prevention and treatment of malaria in pregnant women in highly endemic areas.

Many partners at country, regional and global levels contribute to global monitoring and evaluation of RBM. This report presents data collected by key RBM partners in 2004 on the malaria situation to the end of 2003. For many countries, the primary information source is the annual reporting to WHO by regional and country offices and national malaria control programmes (NMCPs).

The writers of this report were obliged to rely on data collected in individual regions. One of the greatest challenges in preparing the report was to standardize, insofar as it was feasible, all available data, which were derived from a broad spectrum of sources. Regions currently collect variable types of data for several reasons, including local variations in clinical epidemiology, mosquito biology and intervention approaches. Not all data required for RBM's basic framework for monitoring and evaluation (5), which is outlined in Table 1, were available for all countries.

The report is an important step forward, but we recognize that better and more standardized data collection is needed. Section IV highlights ways to seek more common monitoring and evaluation methods for the future, and to improve the tracking of progress in control efforts and the consequent changes in the malaria burden. Annexes 1–4 provide additional country and regional information.

It is hoped that the recommendations for improving monitoring will facilitate documentation in future reports of progress made towards the achievement of RBM targets, and the prospects for reaching the overall RBM goal by 2010 and the targets of the United Nations Millennium Development Goals (MDGs) by 2015 (Box 1).

**Table 1.** Basic malaria monitoring and evaluation framework

Level	Area	Available information
<b>Inputs</b> (strategies, policies, guidelines, financing)	Policy and strategies Financing and disbursements	Policy, guidelines and strategies for malaria control put in place at national level (NMCPs, MoHs)
<b>Processes</b> (human resources, training, commodities)	Malaria-related commodities, including drugs	ACT procurement (UNICEF/WHO) Net/ITN/insecticide procurement (UNICEF/WHO)
<b>Outputs</b> (services delivered, knowledge, attitudes, and practice)	Services delivered	Insecticides used for malaria vector control (WHOPES from NMCPs) Drug efficacy and insecticide resistance (research studies, sentinel sites) Nets/ITNs sold or distributed (NMCPs) Nets (re-)treated (NMCPs) Antimalarial drugs distributed/used (NMCPs)
<b>Outcomes</b> (changed behaviours, coverage)	Target populations benefiting from interventions, behavioural changes	Coverage of antimalarial treatment for fevers in children under 5 years of age (household surveys) Household ITN possession and usage (household surveys) Use by pregnant women of IPT (household surveys) Malaria epidemics detected and properly controlled
<b>Impact</b> (health status, biology, quality of life)	Morbidity, mortality, socioeconomic status	Malaria case and death reports from health information system (HIS) Proportional outpatient visits, hospital admissions and hospital deaths due to malaria (HIS in Africa) All-cause under-5 mortality (household surveys) Prevalence of childhood anaemia (household surveys)

Source: Adapted from (5, 6) and from Table 1 in (7).



## **BOX 1. KEY MALARIA CONTROL GOALS AND TARGETS**

### **RBM Partnership**

- To halve malaria-associated mortality by 2010 and again by 2015.

### **Millennium Development Goals**

- Target 8: to have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

*Indicator 21.* Prevalence and death rates associated with malaria (WHO).

*Indicator 22.* Proportion of population in malaria-risk areas using effective malaria prevention and treatment measures (UNICEF/WHO).

### **Abuja coverage targets, from the African Summit on Roll Back Malaria, April 2000 (8), by 2005**

- At least 60% of those suffering from malaria should be able to access and use correct, affordable and appropriate treatment within 24 hours of the onset of symptoms.
- At least 60% of those at risk of malaria, particularly pregnant women and children under 5 years of age, should benefit from suitable personal and community protective measures such as ITNs.
- At least 60% of all pregnant women who are at risk of malaria, especially those in their first pregnancies, should receive IPT.



# SECTION I: GLOBAL MALARIA SITUATION

## I. DATA AVAILABILITY AND SOURCES

Since 2002, the WHO RBM Department has systematically compiled information on malaria burden and control in a global database. The contents of this database are available online via WHO's Global Atlas of Infectious Disease.<sup>1</sup> The present report is based on information from this database, as summarized below.

### 1. Countries with malaria

This report covers 107 malaria-endemic countries and territories, including a few that reported no malaria transmission in 2003 but which had reported malaria transmission within the time frame considered in this report (from 1990 to 2003).

Endemicity is defined as the probable presence of malaria transmission (Map 1 and Annex 5). Classifications of endemicity are not necessarily based on malaria cases and deaths reported in countries' health information system (HIS). Several countries in North Africa, the Eastern Mediterranean and Central Asia, which have recently made tremendous progress in reducing transmission and are now within reach of eliminating malaria, were considered among the malaria-endemic countries. This was done because the confirmation of a malaria-free status or the absence of transmission is often difficult, awaiting codified measures for certification and continued vigilance.

Countries that have only imported cases or occasional local transmission—introduced cases resulting from imported cases—are not included, although surveillance of malaria cases and provision of access to effective antimalarial treatment remain important in these countries as well. This report focuses on countries with endemic malaria, and thus does not include information related to the burden of malaria among travellers or on prevention and treatment for this special population.

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<sup>1</sup> [http://www.who.int/globalatlas/autologin/malaria\\_login.asp](http://www.who.int/globalatlas/autologin/malaria_login.asp)

## 2. WHO annual malaria reporting

Each year, WHO regional offices request information from country officials and the NMCPs on a variety of areas related to malaria control. These include malaria cases and deaths from national HIS reported by various categorizations, drug policies and results of drug efficacy studies. Reporting also covers malaria-related services delivered by national control programmes, such as distribution and (re-)treatment of ITNs and houses sprayed for vector control during indoor residual spraying (IRS) campaigns. In addition, countries are asked for information on funds available for malaria control activities.

The aspects reported vary between regions as a result of regional differences in capacity for monitoring, existing reporting systems, and malaria epidemiology and control measures (Table 2).

**Table 2.** Aspects included in annual reporting from countries and territories to WHO regional offices

Region	Subregion	Reported malaria cases by:				Malaria-related services delivered			Malaria financing	
		Laboratory confirmation status	Age	Sex	Sub-national area	ITNs distributed or sold	Nets (re-)treated	Households sprayed during IRS campaigns	Budgeted expenses	Actual funding received
Africa	Central	–	✓	–	–	✓	✓	✓	✓	✓
	East	–	✓	–	–	✓	✓	✓	✓	✓
	North	✓	–	–	✓	–	–	✓	✓	✓
	Southern	–	✓	–	–	✓	✓	✓	✓	✓
	West	–	✓	–	–	✓	✓	✓	✓	✓
Asia	Central Asia & Transcaucasia	✓	–	–	✓	–	–	–	–	–
	Eastern Mediterranean	✓	–	–	✓	–	–	✓	✓	✓
	South-East Asia	✓	✓	–	✓	✓	✓	✓	✓	–
	Western Pacific	✓	–	–	✓	–	✓	–	–	–
The Americas	Central America & Caribbean	✓	✓	–	✓	–	✓	✓	✓	–
	South America	✓	✓	–	✓	–	✓	✓	✓	–

– = not included; ✓ = included

## 3. Reported cases and deaths from health information systems

In most countries, reported case rates represent only part of the actual total number of malaria cases, since many people are treated at home or in private facilities that do not report to the national HIS. Nevertheless, if HIS reporting is reasonably consistent and complete over the years, trends in reported cases might give some indication of the local trend in the malaria burden. Most countries with malaria outside Africa south of the Sahara report to WHO the number of cases recorded in their HIS during each year, with the exception of one missing report each in recent years from Belize and Haiti and occasional missing reports from Indonesia, Turkmenistan, Yemen and North African countries. Few countries in Africa south of the Sahara report malaria case rates every year (Table 3).

The definition of a reported case differs between countries and regions. In the Americas and in most countries of Asia, North Africa and Transcaucasia all reported cases are confirmed by laboratory diagnosis, usually microscopy. But in most countries in Africa south of the Sahara, cases are diagnosed and reported based on purely clinical grounds without laboratory testing (Annex 1 and Table A.21). For this reason, and because many African countries do not report any annual numbers of cases to WHO, trends in reported cases are not evaluated for Africa south of the Sahara.

Only in South-East Asia and the Western Pacific were malaria deaths reported with reasonable completeness over the years and by country. This report therefore reviews trends in reported death rates for these regions only.

**Table 3.** Number of malaria-endemic countries reporting malaria cases to WHO, by region and calendar year, 1990–2003

Region	Subregion	Total no. of countries	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 <sup>a</sup>
Africa	Central	8	6	6	6	6	6	7	7	6	7	4	4	4	2	3
	East	12	5	5	7	9	9	10	9	7	10	11	10	9	9	8
	North	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2
	Southern	11	7	6	7	8	8	10	9	8	10	11	11	11	10	6
	West	16	13	13	12	13	14	16	15	16	14	14	13	10	7	3
Asia	Central Asia & Transcaucasia	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6
	Eastern Mediterranean	9	9	9	8	8	9	8	9	9	8	9	9	8	9	9
	South-East Asia	10 <sup>b</sup>	8	8	8	8	8	8	8	8	10	8	10	10	10	9
	Western Pacific	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9
The Americas	Central America & Caribbean	10	10	10	10	10	10	9	10	9	10	10	10	10	9	9
	South America	11	11	11	11	10	11	11	10	11	11	11	11	11	11	11
<b>Total</b>		<b>107</b>	<b>90</b>	<b>89</b>	<b>90</b>	<b>93</b>	<b>96</b>	<b>100</b>	<b>98</b>	<b>95</b>	<b>101</b>	<b>99</b>	<b>99</b>	<b>94</b>	<b>88</b>	<b>76</b>

<sup>a</sup> As a result of a general delay in the receipt of national reported case rates at WHO headquarters, the number of countries reporting in 2003 is not yet complete.

<sup>b</sup> The number of countries increased from 9 to 10 with the establishment of Timor-Leste in 1999.

#### 4. Monitoring antimalarial drug efficacy

Antimalarial drug resistance has become one of the greatest challenges in malaria control. In order to ensure the effective treatment of malaria, national drug policies must be regularly reviewed and revised as needed. These revisions are based on drug efficacy studies in sentinel sites that met a standardized WHO protocol (9); data from such studies are presented in this report. (Annex 1 gives definitions of drug efficacy; numbers of drug efficacy studies are in Section IV.)

## 5. Coverage of interventions through household surveys

The greatest burden of malaria and the greatest need for prevention and treatment occur in poorly accessible rural settings, where cases are often managed at home rather than in a formal health-care setting. Most people do not obtain their ITNs for protection against malaria from health facilities, and malaria patients seen in health facilities might not be representative of the people at risk of malaria in the population at large. For these reasons, household surveys are the most appropriate mechanism for monitoring the coverage of ITNs and the appropriate treatment for malaria in populations at risk.

Two major survey tools have provided the majority of population-level data for this report: Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS).

### *Multiple indicator cluster surveys*

Between 1999 and 2001, MICS were conducted in 67 countries with support from UNICEF. MICS are nationally representative, with an average of around 6000 households sampled through a two-stage cluster design (10). The standard MICS questionnaire includes questions on possession and use of ITNs and use of anti-malarial drugs for the treatment of fever for children under 5 years of age. MICS also provide data on all-cause under-5 mortality. Survey results and questionnaires are available on the Internet.<sup>2</sup>

### *Demographic and health surveys*

DHS are nationally representative household surveys that focus on reproductive and child health (11). Typically, DHS consist of interviews with 4000–12 000 women between 15 and 49 years of age living in households that are sampled in a multiple-stage cluster design. Because the questionnaires are standardized and structured, DHS results are comparable between countries and over time. Since 1998, specific questions on malaria prevention and treatment have been included in DHS, where relevant. In addition to providing information on major RBM coverage indicators, DHS are a primary source of information on all-cause under-5 mortality rates. DHS are organized by Macro International, Calverton, MD, United States of America, and are funded primarily by the United States Agency for International Development (USAID). Questionnaires and survey results are available on the Internet approximately one year after completion of field work.<sup>3</sup>

Over 50 MICS and DHS surveys contributed data on national-level ITN coverage for this report (Section IV and Annex 1). In addition, incidental national surveys conducted by health ministries were included. For countries where national surveys were lacking, high-quality cluster-sampled surveys conducted in subnational areas were considered. These included surveys conducted by the nongovernmental organizations (NGOs) NetMark (12) and Population Services International (PSI) (13).

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<sup>2</sup> <http://www.childinfo.org>

<sup>3</sup> <http://www.measuredhs.com>

## 6. Malaria-related commodities and service delivery

Service delivery measures are essential for interim progress evaluation between surveys of population coverage that occur only at approximately five-year intervals. In 2003, 41 of the 107 countries and territories with malaria reported on the number of nets (re-)treated with insecticide, 51 on nets sold or distributed, and 21 on the number of households sprayed. In addition, all WHO Member countries are asked to report annually on the quantities of insecticides used for vector control activities including against malaria vectors, according to guidelines published by the WHO Pesticide Evaluation Scheme (WHOPES). The latter information was comprehensively reported by WHO (14) and is summarized in this report.

## 7. Finances

WHO received data on national funds for malaria control from about half of the countries and territories (57 of 107) with malaria in 2003. Some of these countries also reported the different sources of the total budget. Information is not always comparable between countries because some numbers represent actually allocated funds, while others represent only budgeted funds. Interpreting available financial data is difficult given these inconsistencies, despite an overall improvement in the number of countries reporting since 2000 (Table 4).

**Table 4.** Number of countries reporting on funds for malaria control efforts, 1995–2003

Region	Subregion	Total number of countries	1995	1996	1997	1998	1999	2000	2001	2002	2003
Africa	Central	8	–	–	–	–	5	5	5	5	7
	East	12	–	2	1	1	6	8	7	8	9
	North	3	1	2	2	1	1	1	2	1	1
	Southern	11	–	–	–	–	3	4	4	7	8
	West	16	–	–	–	–	7	7	9	9	8
Asia	Central Asia and Transcaucasia	7	–	–	–	–	–	–	–	–	–
	Eastern Mediterranean	9	2	4	6	3	1	5	4	5	6
	South-East Asia	10 <sup>a</sup>	3	5	5	6	7	7	6	7	9
	Western Pacific	10	1	1	1	1	2	3	3	3	6
The Americas	Central America and the Caribbean	10	–	–	–	9	8	7	7	6	–
	South America	11	–	–	–	9	8	8	8	8	3
<b>Total</b>		<b>107</b>	<b>7</b>	<b>14</b>	<b>15</b>	<b>30</b>	<b>48</b>	<b>55</b>	<b>55</b>	<b>59</b>	<b>57</b>

<sup>a</sup> The number of countries increased from 9 to 10 with the establishment of Timor-Leste in 1999.

## 8. Presentation of results

The data described above are assembled in country profiles and regional tabulations (Annex 1 and Annex 2). In 2004, country profiles were sent to countries for comments and updating and to provide short descriptions of progress; 24 selected profiles from countries with a high malaria burden relative to the region to which they belong are included in this report. Additional profiles from all countries that provided information by 31 December 2004 to WHO are available on the RBM web site.<sup>4</sup>

This report continues with a summary of the global malaria burden, followed by an overview of global control policies and strategies. Next, malaria burden and progress in control, including intervention coverage and drug efficacy data, are described separately for Africa, the Americas and Asia (including the Eastern Mediterranean and Transcaucasia) regions. These regions differ in malaria epidemiology, in the set of appropriate intervention strategies and in monitoring and evaluation systems. Therefore, the relevant indicators also differ. Regional summaries are followed by sections on global malaria control financing and global commodities and service delivery. The last section highlights gaps and limitations in the presented data and suggests ways for improving monitoring and evaluation at country, regional and global levels.

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<sup>4</sup> <http://rbm.who.int/>



## II. MALARIA BURDEN

As of 2004, 107 countries and territories have reported areas at risk of malaria transmission (Map 1). Although this number is considerably less than in the 1950s, with 140 endemic countries or territories (15), 3.2 billion people are still at risk. Present estimates are that around 350–500 million clinical disease episodes occur annually (2). Around 60% of the cases of clinical malaria (Box 2 and Map 3) and over 80% of the deaths (1) occur in Africa south of the Sahara. Of the more than 1 million Africans who die from malaria each year (1), most are children under 5 years of age. In addition to acute disease episodes and deaths in Africa, malaria also contributes significantly to anaemia in children and pregnant women, adverse birth outcomes such as spontaneous abortion, stillbirth, premature delivery and low birth weight, and overall child mortality. The disease is estimated to be responsible for an estimated average annual reduction of 1.3% in economic growth for those countries with the highest burden (3).

The wide variation seen in the burden of malaria between different regions of the world is driven by several factors. First, there is great variation in parasite–vector–human transmission dynamics that favour or limit the transmission of malaria infection and the associated risk of disease and death. Of the four species of *Plasmodium* that infect humans—*P. falciparum*, *P. vivax*, *P. malariae* and *P. ovale*—*P. falciparum* causes most of the severe disease and deaths attributable to malaria and is most prevalent in Africa south of the Sahara and in certain areas of South-East Asia and the Western Pacific (Map 4). The second most common malaria species, *P. vivax*, is rarely fatal and commonly found in most of Asia, and in parts of the Americas, Europe and North Africa. There are over 40 species of anopheline mosquitoes that transmit human malaria (Map 2), which differ in their transmission potential. The most competent and efficient malaria vector, *Anopheles gambiae*, occurs exclusively in Africa and is also one of the most difficult to control. Climatic conditions determine the presence or absence of anopheline’s vectors. Tropical areas of the world have the best combination of adequate rainfall, temperature and humidity allowing for breeding and survival of anophelines.

The second major factor contributing to regional and local variability in malaria burden is differences in levels of socioeconomic development. Determinants include general poverty, quality of housing and access to health care and health education, as well as the existence of active malaria control programmes providing access to malaria prevention and treatment measures. The poorest nations generally have the least resources for adequate control efforts. In many poor countries, exposure to malaria of vulnerable populations is enhanced by migrations enforced by poverty and/or conflict.

As a result of differing intensities of malaria transmission, the population groups at risk of malaria also differ between world regions. The majority of deaths in tropical Africa occur in areas of stable transmission of falciparum malaria. In these areas, the two groups at highest risk are very young children, who have not yet acquired clinical immunity, and pregnant women, whose immunity to malaria is temporarily impaired. In areas of unstable or highly seasonal falciparum malaria transmission, which is common in most regions outside Africa, the lack of frequent exposure to malaria infection early in life delays the acquisition of clinical immunity, and thus older age groups remain at relatively high risk for malarial disease when

exposed (16). In fact, in some of these areas, adult groups such as forest workers in South-East Asia or migrant workers in Latin America are those most likely to be exposed to malaria and thus at highest risk for severe disease and death.

During the 20th century, human efforts to control malaria, and general socioeconomic development, including access to health care, have markedly reduced the spread of malaria. These gains are most evident in areas where transmission previously occurred only at low intensity, in the Americas, Asia, Europe and Transcaucasia. During the Global Malaria Eradication Programme between 1957 and 1972, vector control—mainly through DDT spraying combined with improved access to treatment—reduced or eliminated malaria transmission in considerable parts of these regions. In contrast, most of Africa south of the Sahara and some foci elsewhere continued to suffer malaria transmission at high intensity. In some areas malaria has resurged after interruption of eradication efforts that were not sustainable (17).

More recently, there is evidence that, compared with the 1980s, the burden of malaria increased during the 1990s in several areas in terms of proportions of population at risk, the severity of infections and the number of deaths. Malaria re-emerged in several countries in Central Asia and Transcaucasia with an increased frequency of epidemics and with the re-establishment of stable endemic transmission. In rural Africa south of the Sahara, child mortality caused by malaria is estimated to have increased by up to twofold during the 1980s and the early 1990s, while mortality resulting from other causes decreased over the same period (18, 19). Factors contributing to the increase in malaria include: (i) resistance of parasites to

## BOX 2. ESTIMATED GLOBAL DISTRIBUTION OF CLINICAL MALARIA CASES

In 2004, an improved method for estimating the incidence of clinical malaria episodes for all countries was developed by the RBM MERG task force on malaria morbidity (2). These estimates will allow regular updating for tracking trends and progress of RBM objectives and the Millennium Development Goals, as well as provide data for WHO's annual analysis of the Global Burden of Disease series.

The estimates are based on populations living at different malaria endemicity levels in urban and rural parts of all countries and by age group (Fig. 1). Standardized definitions of malaria endemicity are used to classify the world's population (21) (Map 1). For each population group, a fixed rate of incidence of clinical episodes is applied. Incidence rates were estimated based on a literature review of community-based longitudinal studies. Country-specific estimates are then adjusted for the local coverage and the impact of ITN and IRS, based on data from household coverage surveys. For countries outside Africa, resulting incidence estimates are triangulated against HIS case reports to allow adjustment in the event of major inconsistencies.

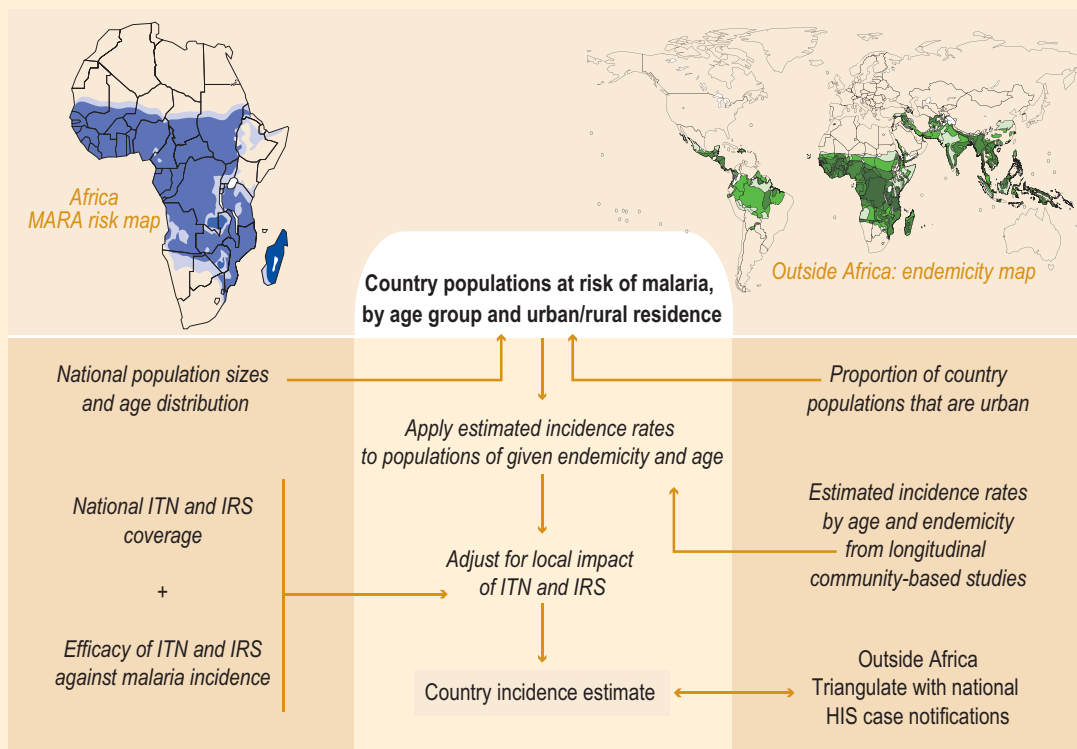
Provisional country-level estimates as of January 2005 of the rates of total clinical incidence and falciparum malaria incidence are shown in Maps 2 and 3, respectively. These are being refined based on improvements in the global endemicity map (Annex 4 and Map 1). The estimates indicate that around 59% of the world's clinical malaria cases occur in Africa, around 38% in Asia and around 3% in the Americas. For falciparum malaria specifically, the estimated regional distribution is around 74% in Africa, 25% in Asia and around 1% in the Americas.

commonly used antimalarial drugs; (ii) breakdown of control programmes; (iii) complex emergencies; (iv) collapse of local primary health services; and (v) resistance of mosquito vectors to insecticides. Within this same period, however, malaria was well-controlled in the five northernmost African countries, and elimination or a very low level of transmission was maintained in some of the islands off the coast of Africa. Throughout the past decades, malaria was generally much less intense in Central America and South America than in Africa and South-East Asia, where transmission is mostly limited to *P. vivax*—except for the Amazon basin—and a relatively low but fairly stable incidence was reported throughout the 1990s.

From the available data, it is not yet possible to determine with sufficient confidence whether the global burden of malaria has changed substantially, for better or worse, since 2000 when RBM implementation began in many countries. In some areas, fluctuations in malaria transmission from year to year potentially confound evaluations of broader trends. Therefore, conclusions typically require an analysis of epidemiological data over multiple years. For the high-burden continent of Africa, reliable data on under-5 mortality from birth history surveys and demographic surveillance will only become available after a time lag of several years (18, 20) (Annex 4).

Nevertheless, for some countries and areas throughout the world there is evidence that successful control has had an impact on malaria disease burden. These success stories are presented in the respective sections of each region.

**Figure 1.** Outline of method for estimating the incidence of clinical malaria at country level, under development at WHO/RBM (2)



### III. MALARIA CONTROL POLICIES AND STRATEGIES

Appropriate malaria control strategies vary with local malaria endemicity. The national control policies of malarious countries (Table A.1) generally conform to the key strategies advocated by RBM for their epidemiological setting (Table 5).

**Table 5.** Priority malaria control strategies, by epidemiological setting

Epidemiological setting	Control strategy
<b>Stable endemic malaria</b> <i>Examples:</i> large parts of East, Central and West Africa, Papua New Guinea, Solomon Islands and Vanuatu	<b>Prevention</b> <ul style="list-style-type: none"> <li>– ITNs for children under 5 years of age, pregnant women and people living with HIV/AIDS</li> <li>– IRS, where appropriate</li> <li>– IPT in pregnancy</li> </ul> <b>Treatment</b> <ul style="list-style-type: none"> <li>– Early and effective case management including presumptive treatment for suspected cases and home management where appropriate</li> </ul>
<b>Unstable malaria</b> <i>Examples:</i> parts of Southern Africa, Transcaucasia, Central Asia and the Americas; highland and desert fringe areas, some urban areas, plantations, irrigation schemes	<b>Prevention</b> <ul style="list-style-type: none"> <li>– IRS</li> <li>– Larviciding</li> <li>– Environmental management</li> <li>– ITNs</li> </ul> <b>Treatment</b> <ul style="list-style-type: none"> <li>– Early and effective case management in suspected cases</li> <li>– Diagnostics to confirm cases, if possible before treatment</li> </ul>
<b>Free of malaria</b> <i>Examples:</i> parts of Southern and North Africa, Ethiopian and Eritrean highlands and Transcaucasia	<b>Prevention</b> <ul style="list-style-type: none"> <li>– For travellers going to malarious areas, chemoprophylaxis and personal protective measures against mosquitoes</li> </ul> <b>Treatment</b> <ul style="list-style-type: none"> <li>– Early and effective case management in suspected cases</li> <li>– Diagnostics to confirm cases, if possible before treatment</li> </ul>

#### 1. Treatment policies

All 107 malarious countries and territories have a national antimalarial treatment policy, and most continually update the policy based on evidence of drug efficacy, safety, cost and availability.

##### ***Artemisinin-based combination therapies***

In response to widespread resistance of *P. falciparum* to monotherapy with conventional antimalarial drugs such as chloroquine and sulfadoxine–pyrimethamine (Map 5), WHO now recommends combination therapies as the treatment policy for falciparum malaria in all countries experiencing such resistance. The preferred combinations contain a derivative of the plant *Artemisia annua*, which is presently cultivated mainly in China and Viet Nam. Artemisinin-based combination therapies (ACTs) are the most highly efficacious treatment regimens now available.

Since 2001, 42 malaria-endemic countries have adopted ACTs: 38 as first-line treatment and 14 as second-line treatment (Map 6). Of these 42 countries, 23 are in Africa, although only 9 countries were actually implementing ACT treatment policies as of 2004. An additional 14 countries are in the process of changing their malaria treatment policy.

To ensure the quality of products, an international mechanism to prequalify manufacturers of ACTs and other artemisinin-based pharmaceuticals has been established by WHO and UNICEF. Products and manufacturers that comply with internationally recommended standards are included on a list that is published as a guide to those involved in procuring ACTs. To date, two ACTs and their manufacturers—artemether–lumefantrine (Coartem®) from Novartis Pharma AG and artesunate tablets from Sanofi-Synthélabo/Guilin—have been prequalified.

### ***Home management of malaria***

In areas of high malaria transmission and poor access to facility-based health care, particularly in rural Africa, RBM advocates home management of children under 5 years of age with malaria as a strategy to achieve high coverage of prompt and effective antimalarial treatment in this highly vulnerable group (22). This involves educating mothers, training community-level providers—including shopkeepers—and supplying pre-packaged quality-assured medicines. Home management is now included in the national control strategies in 22 African countries and 2 countries in the Eastern Mediterranean.

## **2. Insecticide-treated nets**

In areas of malaria transmission where sustained vector control is required, ITNs are the principal strategy for malaria prevention. All countries in Africa south of the Sahara, the majority of Asian malaria-endemic countries and some American countries have adopted ITNs as a key malaria control strategy (Table A.1). To promote the usage of ITNs, the NMCPs use various implementation methods including: (i) stimulating the growth of commercial markets; (ii) reducing taxes and tariffs; (iii) cost-sharing; (iv) social marketing subsidies; and (v) ITN distribution free of charge among vulnerable groups such as children under 5 years of age, pregnant women and the poorest or most marginalized populations. Services for (re-)treatment of existing untreated nets are another powerful means of increasing ITN coverage.

Recently developed techniques for the long-lasting insecticide treatment of nets provide a possible solution for the need to regularly re-treat nets. Although long-lasting insecticidal nets (LLINs) are more expensive than conventional ITNs, the cost of maintaining coverage is lower, since they remain effective for 4 to 5 years. Two brands of LLINs are now recommended by WHO (23), and they are rapidly being adopted in many countries. Whereas previously production of LLINs was centered in Asia, a producer in the United Republic of Tanzania began production of a WHO-recommended LLIN in November 2004. Technology transfer to high-malaria settings is seen as the way to bring prices down.

### 3. Indoor residual spraying and other methods of vector control

IRS is a highly effective method for malaria vector control that is particularly useful for achieving a rapid reduction in transmission during epidemics and other emergency situations—provided it is well timed and high coverage is achieved. In areas of intense malaria transmission, IRS could have a long-term impact similar to that of ITNs, although ITNs are generally recommended in such areas because of better sustainability.

The dwindling availability of low-risk and cost-effective insecticides is a threat to malaria vector control. This is a result of increasing vector resistance and the lack of development over the past 20 years of new insecticide compounds for public health use. In May 2004, the Stockholm Convention on Persistent Organic Pollutants became operational. While enforcing strict measures to reduce environmental damage from persistent organic pollutants, the Convention stated that DDT is still needed in some countries for disease vector control (24). WHO recommends that countries select the insecticide for IRS based on local situation analysis; DDT is one of the 12 insecticides that can be used for this purpose.

In the Americas and in Asia, vector control—mostly involving IRS—is included in the national control policies of all countries. About half of African countries also include IRS as part of their malaria control efforts.

### 4. Malaria control during epidemics and complex emergencies

Up to 1 billion people throughout the world live in areas at risk of epidemic or hypopendemic malaria (21). A considerable proportion of global malaria deaths occurs among populations affected by conflicts, currently affecting 18 countries in Africa alone. Population displacement, increased vulnerability as a result of malnutrition and concurrent infections, exposure to malaria vectors from poor or lack of housing, collapse of health services and supply lines, and environmental deterioration resulting in increased vector breeding all contribute to the increased malaria burden in populations affected by complex emergencies.

Timely prevention of malaria epidemics requires robust early warning systems. Effective control requires early detection through weekly disease surveillance, combined with adequately funded preparedness plans of action that ensure the availability of control tools—such as drugs, IRS and ITNs—for rapid deployment. Malaria early warning systems can predict the risk of epidemics from seasonal climate forecasts and from monitoring anomalies in rainfall and temperature based on satellite observations (25). Weekly disease surveillance allows early detection—within 2 weeks (8)—of any unusual increase in malaria cases and immediate action to be taken (26). Most countries in Africa and Asia with areas at risk of highly seasonal or epidemic malaria include epidemic preparedness in their malaria control policies. In Africa, weekly reporting of malaria cases is implemented in at least 15 of the 25 epidemic-prone countries, either under a system of integrated disease surveillance and response or in sentinel sites. At least 8 African countries are developing a malaria early warning system. However, the effective use of these weekly surveillance data for timely, targeted interventions remains an area of ongoing operational research.

For malaria control during complex emergencies, the challenge is to implement priority interventions that are scientifically optimal and operationally feasible, in both the short and the longer term. Case management with ACTs is recommended in complex emergencies, and ACTs must be made widely available in health facilities and through outreach to affected populations. Vector control measures should aim for high coverage to be fully effective; and coordination among implementing agencies is key.

## **5. Malaria prevention and treatment in pregnant women**

To reduce the negative consequences of malaria in pregnancy, WHO recommends the use of intermittent preventive treatment (IPT) for pregnant women in all areas with stable transmission of falciparum malaria. IPT involves provision of at least 2 treatment doses of an effective antimalarial during routine antenatal clinic visits to all pregnant women in these areas (27). As an integral part of the WHO Making Pregnancy Safer strategy, IPT is included in the control policies of 26 African countries with highly endemic malaria. Several other countries in Africa are reviewing their policies in light of the WHO recommendation, or are piloting IPT in selected areas. All malaria-endemic countries in Africa have policies for treatment of malarial illness in pregnancy, and the majority of highly endemic countries recommend that pregnant women have access to ITNs.





## SECTION II: MALARIA CONTROL, BY REGION

### I. AFRICA

- Parasitological species of malaria cases: *P. falciparum* 93%, *P. vivax* or *P. falciparum/P. vivax* mixed 7%
- Principal malaria vectors: *A. gambiae*, *A. funestus*
- Estimated proportion of population at risk of malaria: 66% (21)
- Estimated contribution to the global burden of clinical malaria cases: 59% (2)
- Estimated contribution to the global burden of clinical falciparum malaria cases: 74% (2)
- Estimated contribution to the global malaria mortality burden: 89% (1)
- Main control strategies: **prompt and effective treatment including home management of malaria, ITNs, IPT, IRS, epidemic preparedness**

#### 1. Disease burden

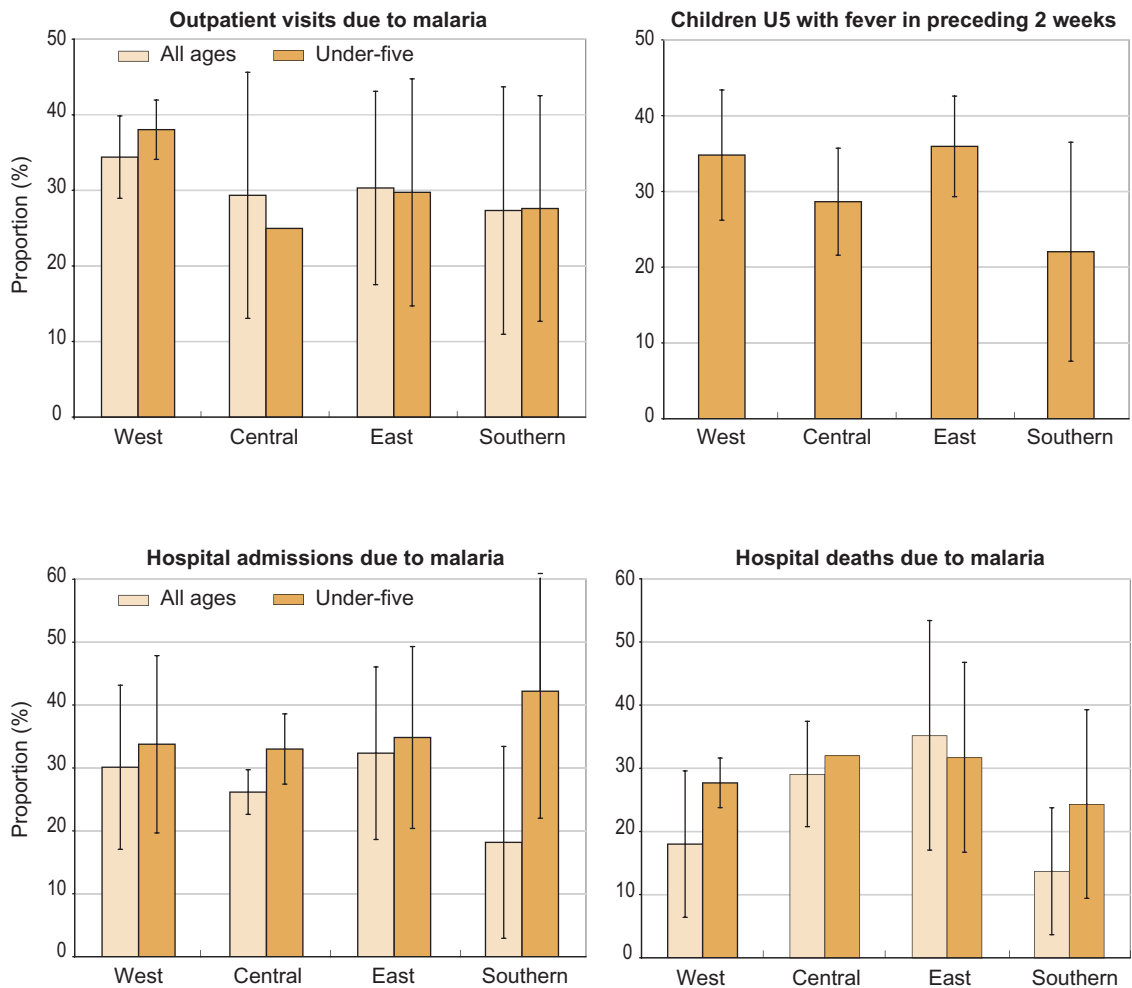
Africa remains the region that has the greatest burden of malaria cases and deaths in the world. In 2000, malaria was the principal cause of around 18%— 803 000 (uncertainty range 710 000–896 000)—of deaths of children under 5 years of age in Africa south of the Sahara (19). During the 1980s and the early 1990s, malaria mortality in rural Africa increased considerably, probably as a result of increasing resistance to chloroquine (18, 19). Malaria is also a significant indirect cause of death: malaria-related maternal anaemia in pregnancy, low birth weight and premature delivery are estimated to cause 75 000–200 000 infant deaths per year in Africa south of the Sahara (28). Malaria epidemics result in an estimated up to 12 million malaria episodes and up to 310 000 deaths per year in Africa (29).

In contrast to the endemic countries in Africa south of the Sahara, Egypt and Morocco have only residual malaria transmission and occasional imported cases. Their goal in controlling malaria is to eliminate the few remaining foci of transmission by 2006 (30). The remainder of this section focuses on countries in Africa south of the Sahara.

**Burden on health systems**

In Africa south of the Sahara, the case rates reported through national HIS represent only a minor fraction of the actual burden of malaria (31). Access to clinical care is poor, especially in the most rural areas where malaria transmission is most intense. Furthermore, reporting from facilities to districts and from districts to health ministries is incomplete, and completeness and timeliness vary between and within countries. Finally, in clinics most cases of malaria are diagnosed on the basis of clinical symptoms rather than on laboratory confirmation, which is rarely available at first-line health facilities.

**Figure 2.** Burden of malaria on health systems in Africa south of the Sahara, by subregion, 1999–2004



Proportion of outpatient visits, hospital admissions and hospital deaths due to malaria from national HIS data averaged from 2001 to 2003 or the 3 most recent years with available data since 1999 from countries in Africa south of the Sahara; proportion of children under 5 years of age with fever in the preceding 2 weeks from national DHS (11) and MICS (10) between 1999 and 2004 (median survey year 2000). Error bars indicate the standard deviation.

Given the incompleteness of case and death reporting from health facilities, the *proportions* of reported cases and deaths caused by malaria relative to the total number of cases and deaths from all causes are more informative indicators than *absolute* numbers of reported malaria cases and deaths. Across endemic countries, an average of 25–35% of all outpatient clinic visits are for (clinically diagnosed) malaria, both in children under 5 years of age and in other age groups. In these same countries, between 20% and 45% of all hospital admissions are caused by malaria. With high case-fatality rates due to late presentation, inadequate clinical management and unavailability or stock-outs of effective drugs, malaria is also a major contributor to deaths of hospital inpatients. The proportional malaria burden is somewhat lower in the Southern Africa subregion than in the Central, East and West Africa subregions (Fig. 2).

Especially among children under 5 years of age, malaria is an important contributor to demand for health care because of the high prevalence of fever in this age group. Throughout Central, East and West Africa, about 30–35% of children under 5 years of age report a fever in the 2 weeks preceding a survey (Fig. 2). The Integrated Management of Childhood Illness recommends, along with RBM, that in areas of high malaria endemicity all acute fevers in children under 5 years of age be treated presumptively with an antimalarial (32). Thus, although not all childhood fevers are in fact caused by malaria, these fevers do determine the demand for antimalarial treatments.

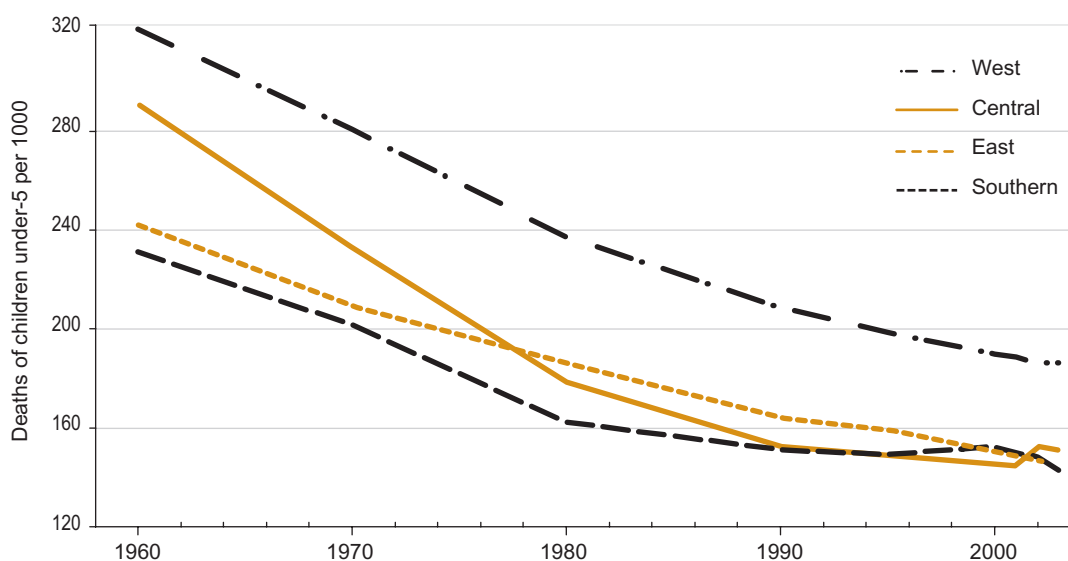
Although these data provide an indication of the continuing high burden of malaria on African health systems, annual reporting from countries to WHO is not complete enough to allow an evaluation of recent time trends.

### ***All-cause under-5 mortality***

In Africa south of the Sahara, all-cause under-5 mortality is an important indicator of the burden of malaria. Children in this age group are those most likely to develop severe disease and to be at risk of dying from malaria. In addition to the around 18% of all-cause deaths in African children under 5 years of age that are directly attributable to malaria (19), an even greater proportion of child deaths is probably indirectly related to malaria: repeated malaria infections contribute to the development of severe anaemia and make young children more susceptible to severe outcomes of other common childhood illnesses such as diarrhoea and respiratory diseases (33). In addition, malaria in pregnant women contributes to low birth weight, a major risk factor for infant mortality (34). Further demonstration of the importance of malaria as a contributor to deaths among young children is the series of community-randomized ITN trials that demonstrated a reduction in all-cause under-5 mortality by up to 25% (35). National household surveys provide more comprehensive data on all-cause under-5 mortality than is available for malaria-specific mortality, which is difficult to define and measure at a population-level with adequate specificity and sensitivity (19).

Throughout Africa south of the Sahara, the decrease in all-cause under-5 mortality that was apparent during the 1970s and 1980s levelled off in the 1990s (36) (Fig. 3). Besides HIV/AIDS, increased mortality caused by malaria in the 1990s compared with earlier decades is probably among the explanations for this trend (18).

**Figure 3.** Trend in all-cause under-5 mortality in countries in Africa south of the Sahara, by subregion, 1960–2002 (36)



## 2. Control efforts and progress towards Abuja coverage targets

At the African Summit on Roll Back Malaria in Abuja, Nigeria, in 2000, African heads of state committed themselves to halving the burden of malaria by 2010, by achieving a 60% coverage of all at-risk populations with suitable curative and preventive measures by 2005 (Box 1). However, few countries are likely to reach the 60% target for coverage of access to prompt and effective treatment for ITNs and IPT for protection of pregnant women by 2005 because, until very recently, control efforts remained too fragmented and major international investment materialized too late (37).

Around US\$ 2 billion per year—of which US\$ 1 billion is needed for ACTs—is estimated as needed to effectively combat malaria in Africa (38). Currently only about one quarter of this amount is available. However, financial support for programmes to prevent and treat malaria has increased rapidly over the past few years. Complemented by increased capacity development at all health system levels, through technical support to national control programmes and other avenues, progress is now likely to accelerate.

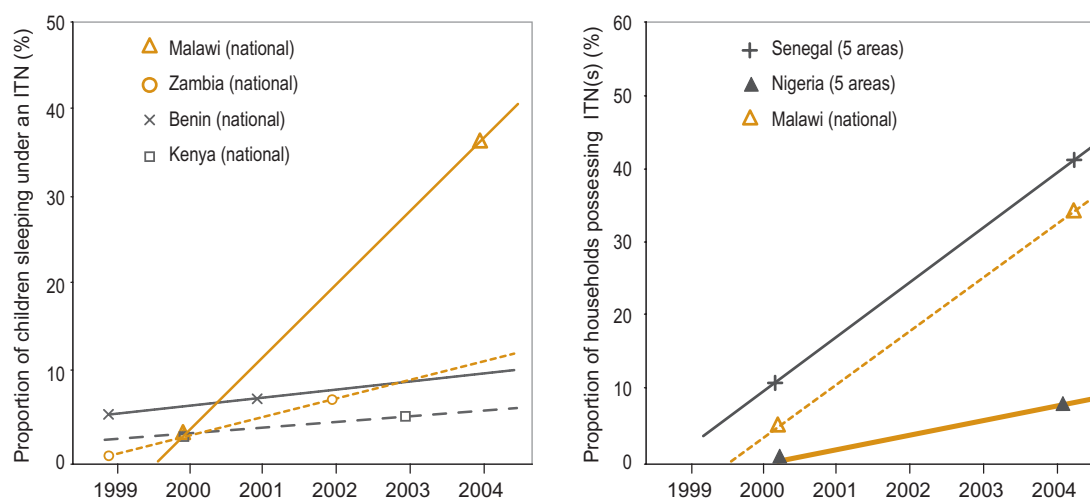
## 3. Coverage of mosquito nets and insecticide-treated nets

Increased national and international funds have boosted the deployment of ITNs. About half of the African countries have waived taxes and tariffs on nets, netting materials and insecticides. Since 2002, several countries started scaling up free of charge or highly subsidized provision of ITNs for children under 5 years of age and pregnant women (Table 6).

As a result, there has been a substantial increase in ITN coverage in several of these countries, according to household surveys conducted over time that measured either ITN usage by children under 5 years of age or household ownership of ITNs (Fig. 4).

**Table 6.** Initiatives to scale up ITN coverage started between 2001 and 2004

Togo, Zambia	Free distribution to children under 5 years of age during broader health campaigns including measles immunization (Box 4)
Malawi	Social marketing and distribution of highly subsidized ITNs through mother and child health clinics (Box 5)
United Republic of Tanzania	Subsidies in the form of discount vouchers delivered to pregnant women through antenatal clinics, in collaboration with the commercial sector
Benin, Eritrea, Ghana, Mali, Nigeria, Senegal	Distribution of free and highly subsidized ITNs through routine antenatal clinics and routine child-immunization (Expanded Programme on Immunization) clinics (Box 6); free mass (re-)treatment campaigns in Eritrea
Ghana, Malawi, Uganda, Zambia	National Child Health Days for distribution of ITNs and (re-)treatment, along with vitamin A and/or deworming medication
Benin, Kenya, Madagascar, Mali, Nigeria, Rwanda, United Republic of Tanzania	Social marketing

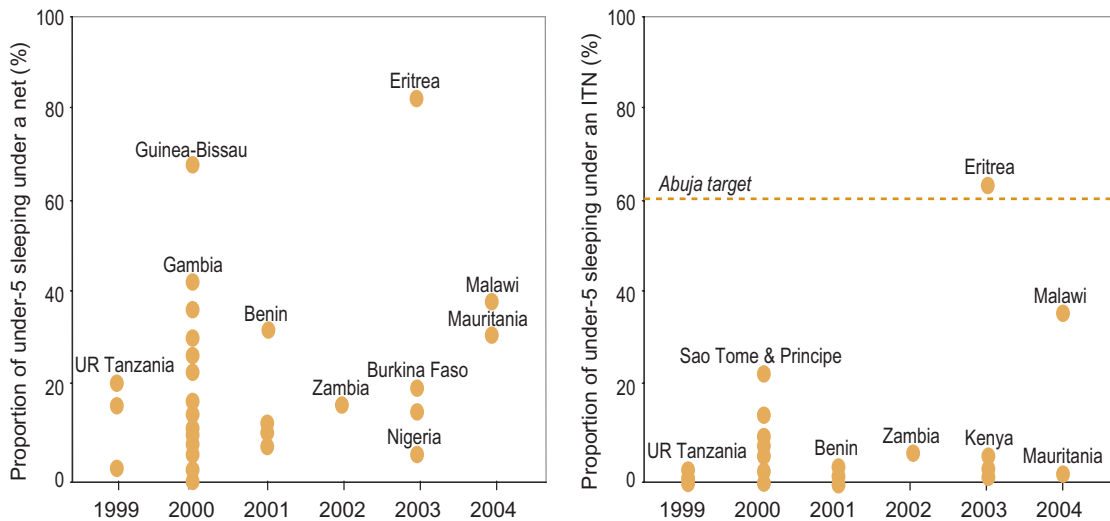
**Figure 4.** Time trends in ITN coverage in selected African countries with multiple data points, 1999–2004

Data for Benin, Kenya and Zambia from national DHS or MICS (10, 11); data for Nigeria and Senegal from Netmark surveys in selected areas with malaria (12); data for Malawi from DHS in 2000 (11) and a nationally representative survey by the MoH in 2004. Symbols indicate survey data; lines indicate estimated linear time trends based on the survey data.

On an Africa-wide scale, it is more difficult to precisely describe the current level of ITN coverage or the progress in increasing ITN coverage. Of the 45 African countries where ITNs form part of the national malaria control strategy, 36 had a representative household survey that measured child usage of nets and/or ITNs at some point between 1999 and 2004, but most of these surveys were conducted in 2000–2001. According to available surveys, only Eritrea, in 2003, reached the Abuja target of 60% ITN usage (Fig. 5). For many other countries that started scaling up ITN distribution in 2001, no data point later than 2000 is available (Table 6). It should be noted that the data presented in figure 5 and Box 3 represent national-level outcomes, except for Eritrea. In countries where malaria risk is not universal, ITN usage in those areas at actual malaria risk might be higher than the national average. There is a need for additional high-quality household surveys to measure

time trends in ITN coverage. Around 2007, more information will be available after another approximately 30 MICS and DHS planned in malaria-endemic African countries for 2005–2006 (10, 11).

**Figure 5.** Proportion of children under 5 years of age sleeping under mosquito nets and ITNs in African countries, by year of survey, 1999–2004



Data from national household surveys, except for Eritrea, which had a representative household sample survey in the three zobas with risk of malaria (39). For each country, the most recent national datapoint is presented.

Available surveys do indicate that coverage with any net is generally much higher (up to 10-fold) than coverage with ITNs: across all countries with data—taking the most recent survey point in each country—a median of only 11% of nets used by children under 5 years of age (range: 0–93%, 34 surveys) and a median of just 18% of nets owned by households (range: 1–79%, 10 surveys) were ITNs. Countries where ITN distribution was recently successfully scaled up include Eritrea, Malawi and Rwanda, where over half of nets used by young children were ITNs. A much larger number of untreated nets, compared to ITNs, are already available for at-risk populations, especially in West and Central Africa. This indicates that the provision of (re-)treatment of nets as a free public service is an important complement to the distribution of ITNs.

**BOX 3. ESTIMATED AFRICA-WIDE INSECTICIDE-TREATED NET USAGE BY CHILDREN UNDER 5 YEARS OF AGE**

Considering the most recent available national survey for each country—with the exception of the most recent survey that covered all areas at risk of malaria in Eritrea—the population-weighted coverage of ITN usage in African children under 5 years of age was 3%. This is from 34 surveys conducted in a median survey year of 2001.

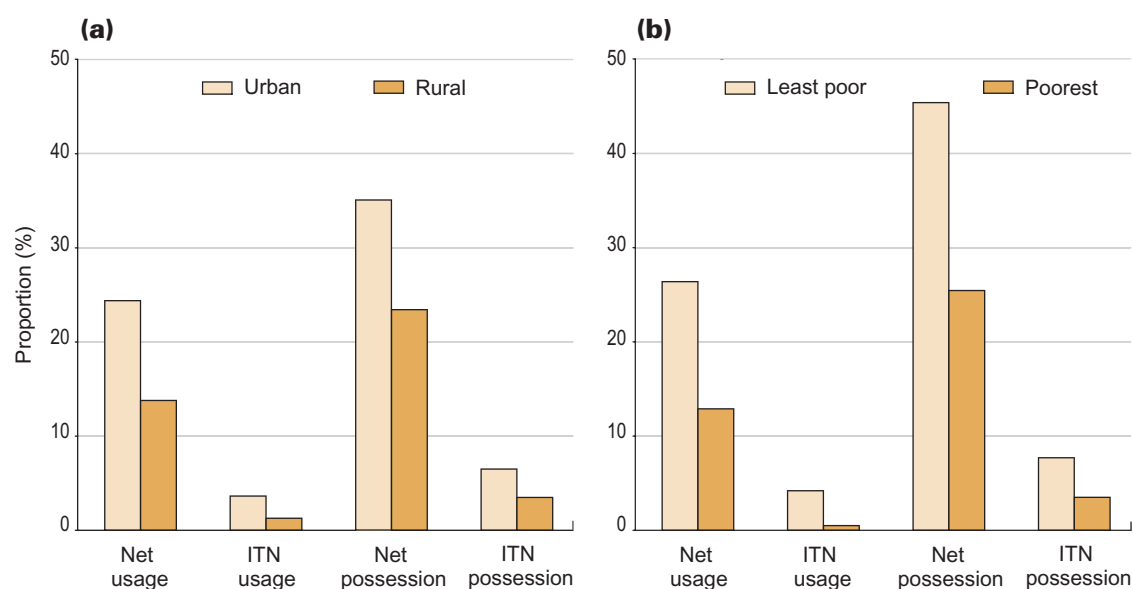
For comparison, the population-weighted coverage of ITN usage in African children under 5 years of age reported in *The Africa Malaria Report 2003* for the median year 2000 was 2% from 29 surveys (31). The difference is explained by new survey values for Burkina Faso, Eritrea, Ghana, Kenya, Mauritania and Nigeria.



### Countering inequities in ITN coverage

The cost of an ITN is a major barrier to ownership and usage for a large proportion of Africans who are among the poorest of the poor and also the most highly affected by malaria. Although the malaria burden is highest in rural areas and among the poorest people, ITN coverage tends to be generally higher in urban areas and in wealthier households. This is evident from the data from national surveys. Net and ITN possession and usage by children under 5 years of age are twofold to threefold lower in rural areas compared with urban areas. Net and ITN possession and usage are between twofold and eightfold lower in the poorest households compared with the least poor households (Fig. 6).

**Figure 6.** Median net and ITN possession (as % of households) or usage (as % of children under 5 years of age that slept under a net or ITN the night before a survey) in selected African countries by urban and rural division (a) and among the 20% poorest and 20% least poor households (b)

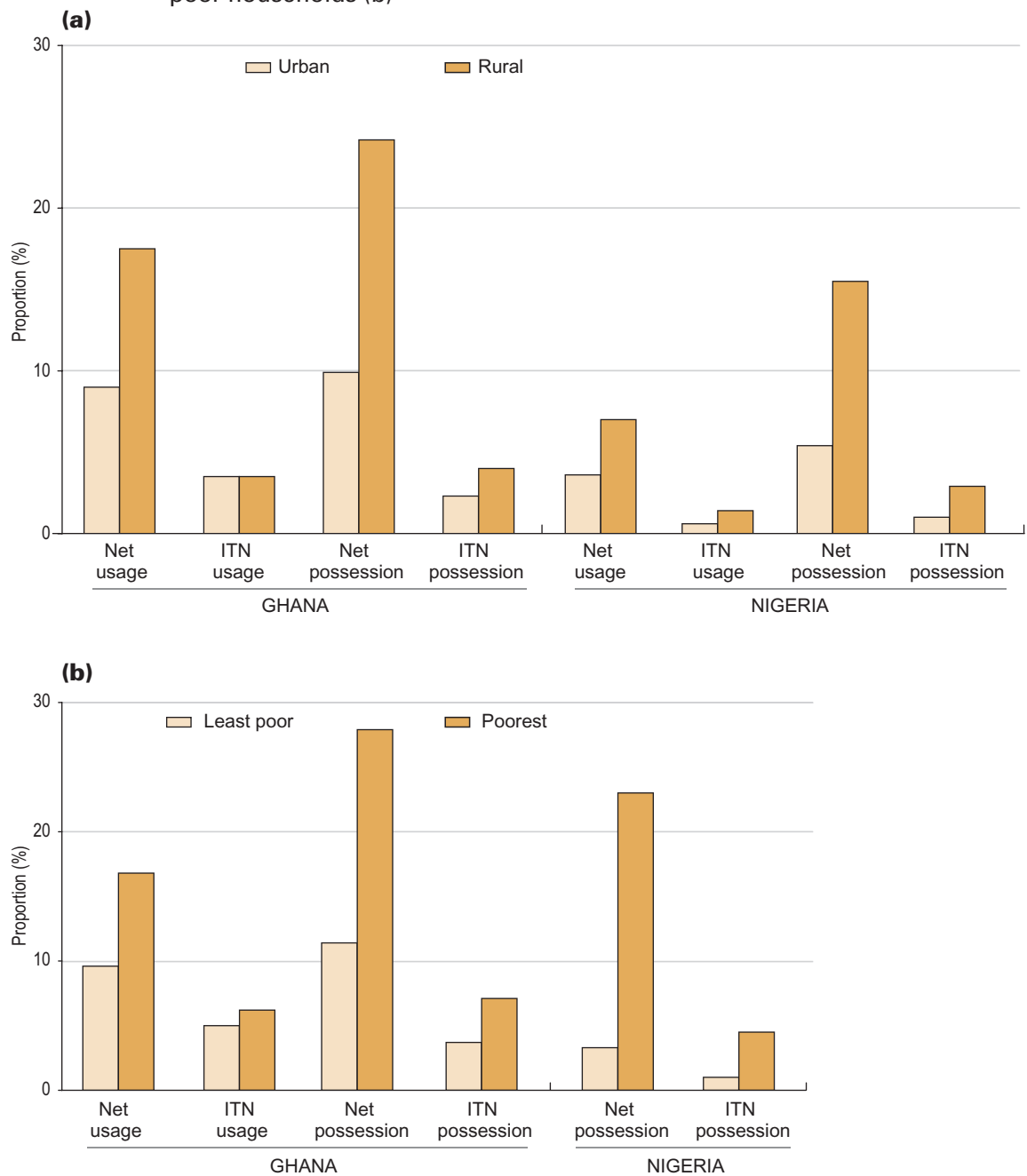


Data from national household surveys conducted between 1999 and 2004: urban/rural: net usage from 36 surveys, ITN usage from 34 surveys, net possession from 17 surveys, ITN possession from 8 surveys; poorest/least poor households: net usage from 25 surveys, ITN usage from 25 surveys, net possession from 6 surveys, ITN possession from 4 surveys.

Social marketing and subsidized or free of charge distribution of ITNs for target groups can effectively reduce this inequity, as was recently illustrated in Ghana, Nigeria and Togo (Box 4). Since 2002, in deprived areas of Ghana and Nigeria, UNICEF-supported programmes have supplied highly subsidized ITNs to pregnant women and children under 5 years of age through routine public health services. A year after the programmes began, usage of ITNs by children under 5 years of age and pregnant women in rural areas was similar to or higher than that in urban areas. Net possession in Nigeria and net possession as well as usage in Ghana were equally high or higher in the poorest households compared with the least poor households (Fig. 7). Although no ITN coverage data from earlier years are available for Ghana and Nigeria, the contrast with less favourable coverage distribution patterns in neighbouring countries that lacked subsidized distribution programmes is clear (Fig. 6).

In contrast to these inequities between urban and rural areas and between poorest and least poor households, no gender inequities are evident: in available survey data, net and ITN usage were generally similar for boys and for girls.

**Figure 7.** Median net and ITN possession (as % of households) or usage (as % of children under 5 years of age) in Ghana and Nigeria in 2003 after programmes of intensified distribution of free and subsidized nets in deprived areas, by urban and rural division (a) and among the 20% poorest and the 20% least poor households (b)



Data from national DHS surveys conducted in 2003 (11).

#### BOX 4. INTEGRATING INSECTICIDE-TREATED NET DISTRIBUTION WITH SCALED-UP IMMUNIZATION CAMPAIGNS IN ZAMBIA AND TOGO

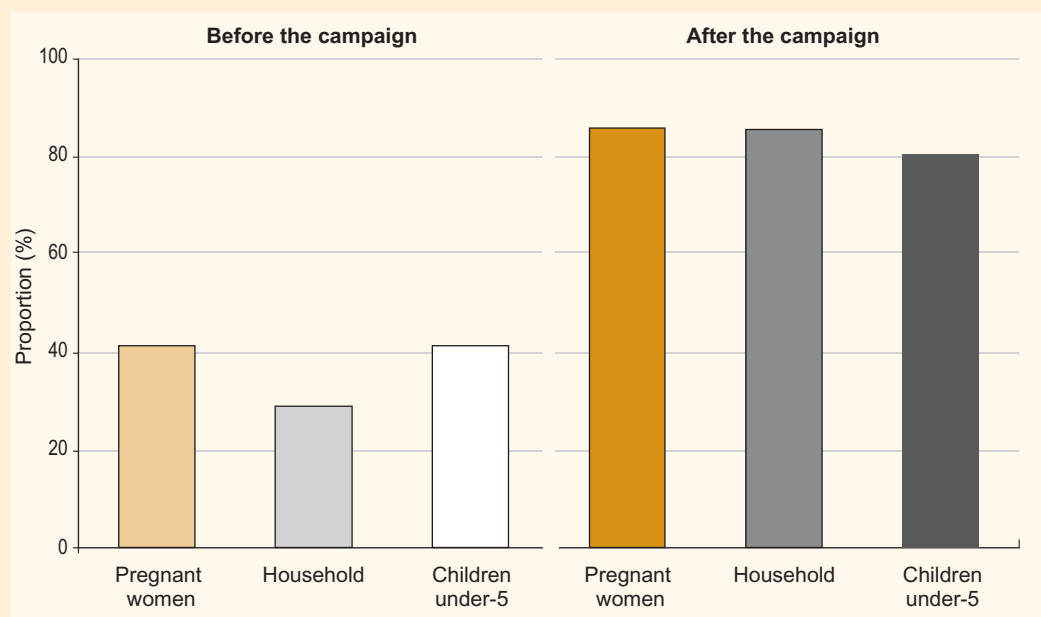
National campaigns of ITN distribution in combination with measles immunization conducted in Zambia in 2003 and in Togo in 2004 demonstrated an unprecedented successful approach of scaling up ITN coverage within only a few days.

##### Zambia

In 2003, the Zambian MoH, with support from UNICEF, the Canadian Red Cross and the Canadian International Development Agency, conducted a campaign integrating measles vaccination, ITN distribution, vitamin A supplementation and mebendazole treatment for intestinal worms in five underserved districts of Zambia. All households with children under 5 years of age were given an ITN. The Zambian Red Cross provided social mobilization and community education.

According to a survey conducted after the campaign, this resulted in greater than 80% coverage for all interventions in the five districts, which had 89 000 children under 5 years of age (Fig. 8). As part of the high and universal coverage, ITN usage was scaled up in a rapid and equitable way, reaching the poorest and most vulnerable segments of the population. Under the platform of the national measles campaign, the delivery cost per ITN was only US\$ 0.36 (and the production cost US\$ 4.41 per ITN).

**Figure 8.** Abuja target of 60% ITN usage was surpassed in 6 days in all five targeted districts of Zambia



*(continued on next page)*

### Togo

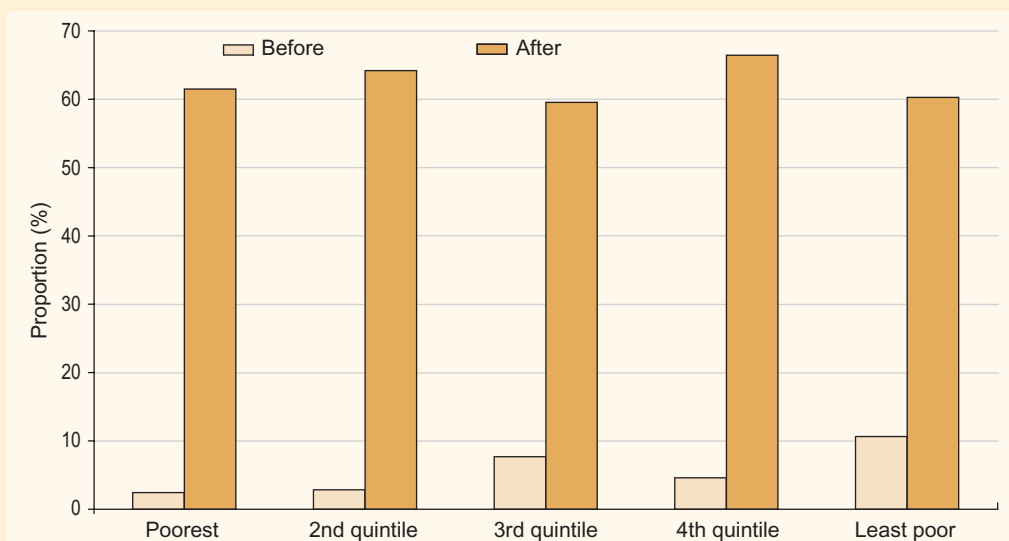
A national campaign of ITN distribution, measles and polio vaccination and deworming treatment was conducted in Togo in December 2004. About 920 000 ITNs were distributed, or one per child under 5 years of age. Preceding the campaign, volunteers from the Togolese Red Cross Society conducted door-to-door and community social mobilization campaigns informing people about the importance of protecting their children and about the location of the vaccination and distribution centres. Through monthly home visits, Red Cross volunteers advise families on the proper use of the mosquito nets, and provide additional vaccinations and free ITNs to others at risk including pregnant women, neonates and immigrant children.

In January–February 2005, staff from the Togolese MoH, the Togolese Red Cross Society and the Division of Parasitic Diseases at the United States Centers for Disease Control and Prevention, Atlanta, conducted a household survey to assess the increase in ITN coverage resulting from the campaign. Trained personal data assistants with geopositioning capacity mapped relevant sampling units. Across 12 sampled districts, covering all 6 country regions, around 2254 households with 2259 children under 5 years of age were interviewed.

Preliminary results indicate that, on a weighted basis, the campaign increased possession of ITNs from 6% to 62% averaged over all households. An estimated 98% of households with a child under 5 years of age now have at least one ITN, of which approximately 95% were obtained from the distribution campaign. The campaign had the effect of equalizing ITN ownership rates between groups of different socioeconomic status, although all groups benefited greatly (Fig. 9). Under the innovative mechanism of delivering ITNs using the platform of measles immunization, the incremental cost of delivery was less than US\$ 0.50 per ITN.

Campaigns combining immunization with other life-saving interventions such as ITN distribution are expected to become a major contribution towards achieving the Millennium Development Goal for reducing child mortality and the Abuja target of 60% ITN usage in Africa. In 2005–2006, similar campaigns are planned for areas of southern Chad, Equatorial Guinea and Niger at risk of malaria.

**Figure 9.** ITN ownership by households, before and after the integrated distribution campaign in Togo



**BOX 5. SCALING UP NET DISTRIBUTION IN MALAWI**

In 2002, the Government of Malawi scaled up the distribution of ITNs. With support from UNICEF, the MoH formed a National Malaria Policy Advisory Committee including RBM partners WHO, the United States Centers for Disease Control and Prevention, Atlanta, Malaria Alert Centre, Population Services International, Management Sciences for Health and the College of Medicine of Malawi. The resulting National Malaria Control Policy confirmed the use of ITNs as an important strategy for controlling malaria. Guidelines were developed outlining the responsibilities of key partners and addressing: (i) pricing, cost recovery and use of revenue; (ii) procurement and logistics; and (iii) monitoring and evaluation activities.

Three types of distribution channels were launched to ensure widespread equitable access:

- facility-based distribution targeting child health and antenatal services in hospitals and health centres in all districts with heavily subsidized ITNs;
- community-based distribution using trained village health committees and local NGOs supplied with ITN starter kits;
- private sector distribution, mainly in urban centres where people can afford to pay more for ITNs, of which the sales are used to subsidize ITN distribution elsewhere.

ITNs are procured and donated by UNICEF, with funding from the United Kingdom Department for International Development. Population Services International manages the delivery, storage and distribution system and promotes ITN usage and demand from the private sector through social marketing. The MoH through the NMCP coordinates annual, week-long, national insecticide (re-)treatment campaigns to ensure that nets maintain their effectiveness.

Malawi now has one of the largest ITN distribution programmes in Africa. Distribution rose from 750 000 in 2002 to more than 3 million by the end of 2004. A national survey of 10 000 households conducted in March 2004 revealed that 43% of households own at least one net, compared with only 5% in 2000. More significantly, 35% of children under 5 years of age and 31% of pregnant women sleep under an ITN, and 4 districts out of 27 have already achieved the Abuja target of 60% of children and pregnant women sleeping under ITNs. The programme demonstrates that ITNs can be scaled up on a national level and that programme cost-effectiveness improves dramatically with increasing scale.

### **BOX 6. INSECTICIDE-TREATED NET COVERAGE INCREASES IN MALI AND SENEGAL UNDER UNICEF'S ACCELERATED CHILD SURVIVAL AND DEVELOPMENT INITIATIVE**

In response to unacceptably high numbers of preventable childhood deaths in West and Central Africa, UNICEF selected a package of cost-effective interventions that could be rapidly scaled up, aiming at substantially reducing child deaths. With support from the Canadian Government and in coordination with national governments and MoHs, UNICEF began implementation of the Accelerated Child Survival and Development initiative in 11 countries in West and Central Africa in 2002.

A strengthened outreach system for the Expanded Programme on Immunization and antenatal care provides the backbone of the Accelerated Child Survival and Development programme. These far-reaching systems are then also used to provide young children and pregnant women with other life-saving interventions such as free or highly subsidized ITNs. Pregnant women and young children receive an ITN at the time of antenatal visits and routine immunizations—3 doses of the DTP vaccine—or measles vaccination.

Benin, Ghana, Mali and Senegal implemented the full package of interventions, including the Integrated Management of Childhood Illness (32), while Burkina Faso, Cameroon, Chad, Gambia, Guinea, Guinea-Bissau and Niger carried out intensified Expanded Programme on Immunization activities, ITN distribution and (re-)treatment of mosquito nets. The selection of the 11 Accelerated Child Survival and Development countries was based on high under-5 mortality rates, sound national health policies, reasonable health infrastructure, experience with health-sector reform and a commitment to poverty reduction, community participation and health empowerment. Poverty indicators and higher than national average under-5 mortality rates then determined the districts that were to receive Accelerated Child Survival and Development interventions.

By 2002, 97 districts had been selected and 16.2 million people targeted of which 2.8 million were children under 5 years of age. From 2002 to 2004, over 4 million ITNs were distributed to pregnant women and young children, and insecticide (re-)treatment campaigns took place on a regular basis.

After more than 18 months of Accelerated Child Survival and Development interventions, large-scale household coverage surveys carried out in 2003 showed significant increases in ITN use. ITN coverage among children and pregnant women rose from 1% to 46% in implementation districts in Senegal. In Mali's implementation districts, ITN coverage rose from 6% to 71% among young children and pregnant women. In both countries, the routine immunization coverage and the proportion of pregnant women attending three or more antenatal visits has doubled. Similar increases were also seen in other Accelerated Child Survival and Development countries.

#### 4. Coverage of antimalarial treatment

About two-thirds of malaria-endemic African countries have changed their antimalarial treatment policy since 1998 in response to the emergence of drug-resistant falciparum malaria; of these, 65% have done so since the Abuja Declaration of 2000. By the end of 2004, 23 countries had adopted ACTs in their antimalarial treatment policies (Box 7), while 22 countries had adopted home management of malaria in their national malaria control strategies, of which 11 are scaling up home management and 11 are piloting the strategy (Table 7).

**Table 7.** Countries that adopted and implemented the strategy of home management of malaria in Africa, by the end of 2004

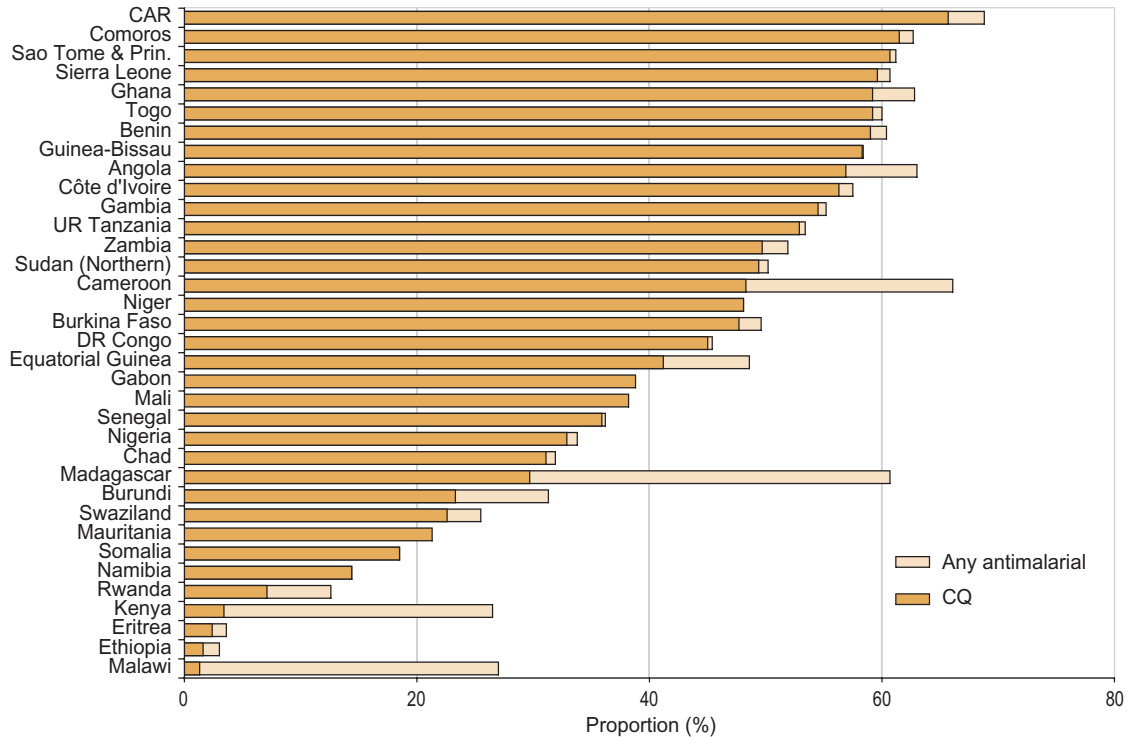
Policy being implemented and scaled up	Benin, Eritrea, Ethiopia, Gambia, Ghana, Madagascar, Nigeria, Senegal, Uganda, Zambia, Zimbabwe
Policy being implemented in pilot areas	Burkina Faso, Cameroon, Guinea Bissau, Kenya, Mali, Niger, Togo, Rwanda, Malawi, Sao Tome and Principe, Sudan

In Africa, where the vast majority of malaria cases and deaths occur in young children, WHO recommends that all acute childhood fevers in areas of high malaria endemicity be treated presumptively with an antimalarial (32). Therefore, the proportion of young children with fever who received an antimalarial drug represents a relevant survey-based indicator of the coverage of antimalarial treatment among all malaria patients with prompt and effective treatment. Between 1998 and 2004, across 35 national surveys, the median proportion of children under 5 years of age that were treated with an antimalarial drug was 49.6% (range 3.0–68.8%) (Fig. 10). However, most of these antimalarial treatments could not be considered effective since: (i) 95% were with chloroquine, against which there is a high rate of falciparum malaria resistance (Fig. 10); (ii) a significant proportion were not started within 24 hours of the onset of fever, so not all treatments were necessarily given in sufficient time to prevent a possible progression into severe life-threatening malaria (Fig. 11); and (iii) the dosages typically taken might not always have been adequate for full parasitological cure, although dosaging was not measured in national surveys. For these reasons, the coverage with prompt and effective antimalarial treatment was probably much lower than survey data indicate. However, it is likely that the proportion of fevers treated with effective antimalarial regimens is now increasing in those countries that have recently implemented a change in drug policy to combination treatment. There are as yet no wide-scale survey data available to document this, but national DHS and MICS scheduled for 2005–2006 will include detailed, standardized questions on antimalarial drug treatments.

Strengthening of primary care for children under the strategy of Integrated Management of Childhood Illness is also expected to help improve the coverage of prompt and effective antimalarial treatment among children in Africa. As part of the strategy, prompt referral of sick children with defined danger signs from primary health facilities to the next level of the health-care system should improve the coverage of life-saving treatment for severe malaria (32). As of 2004, 38 countries in Africa south of the Sahara were implementing Integrated Management of Childhood Illness, of which 36% were in the early implementation phase and 58% in the expansion phase; among countries in the expansion phase, about one quarter had more than half of their districts implementing the strategy (37).

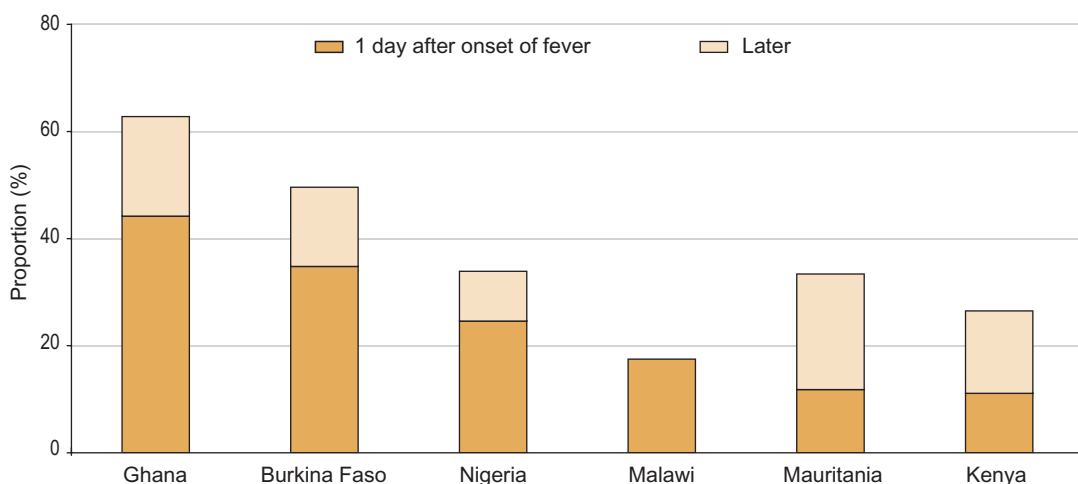


**Figure 10.** Proportion of children under 5 years of age with fever treated with any antimalarial or with chloroquine in countries in Africa south of the Sahara, 1999–2004



Data from most recent national household survey either DHS (11) or MICS (11). Median survey year is 2001.

**Figure 11.** Proportion of children under 5 years of age in selected African countries treated with an antimalarial starting within 1 day after onset of fever or later, 2003–2004



Data from most recent national household survey, either DHS (11) conducted in 2003 or 2004, and a survey by the MoH in 2004 for Malawi. In the Malawi survey, the coverage of antimalarial treatment starting more than one day after onset of fever was not measured.

**BOX 7. BURUNDI: TREATMENT POLICY CHANGE IN THE MIDST OF A COMPLEX EMERGENCY**

In September 2000, the north-eastern part of Burundi experienced one of the deadliest malaria epidemics in recent times in Africa, affecting more than half the country's population and resulting in an estimated 10 000 deaths. As the death toll mounted, speculation rose about the effectiveness of the two drugs used to treat malaria—chloroquine and sulfadoxine–pyrimethamine. With support from UNICEF and other partners, the government of Burundi assessed the efficacy of chloroquine and sulfadoxine–pyrimethamine in four sites across the country in 2001. Treatment failure rates ranged from 51% to 74% for chloroquine and from 9% to 49% for sulfadoxine–pyrimethamine. The MoH therefore removed chloroquine from its antimalarial treatment guidelines.

Subsequent studies demonstrated the safety and effectiveness of two alternative therapies: the ACTs artesunate+amodiaquine and artemether–lumefantrine (Coartem®) (50). Based on cost and simplicity to administer, artesunate+amodiaquine was chosen to replace sulfadoxine–pyrimethamine as the first-line national treatment policy. Because no co-formulated (i.e. multiple components combined in a single pill) or co-packaged artesunate+amodiaquine combination was available from a prequalified supplier, interim guidelines were established to ensure that available medicines met WHO's manufacturing and quality standards. A national commission, including officials from the MoH, Doctors Without Borders, WHO and UNICEF, was established to guide and monitor implementation of the new policy.

Initially, the cost of the combination therapy, which at US\$ 2.80 per adult treatment course was higher than estimated during the planning stage, created a problem. Subsequently, the European Commission's Humanitarian Aid Office and the USAID Office of Foreign Disaster Assistance committed funding for an initial supply. To cover procurements for an initial 6 months, La Coopération Belge and the USAID Regional Economic Development Services Office for East and Southern Africa bridged the remaining gap.

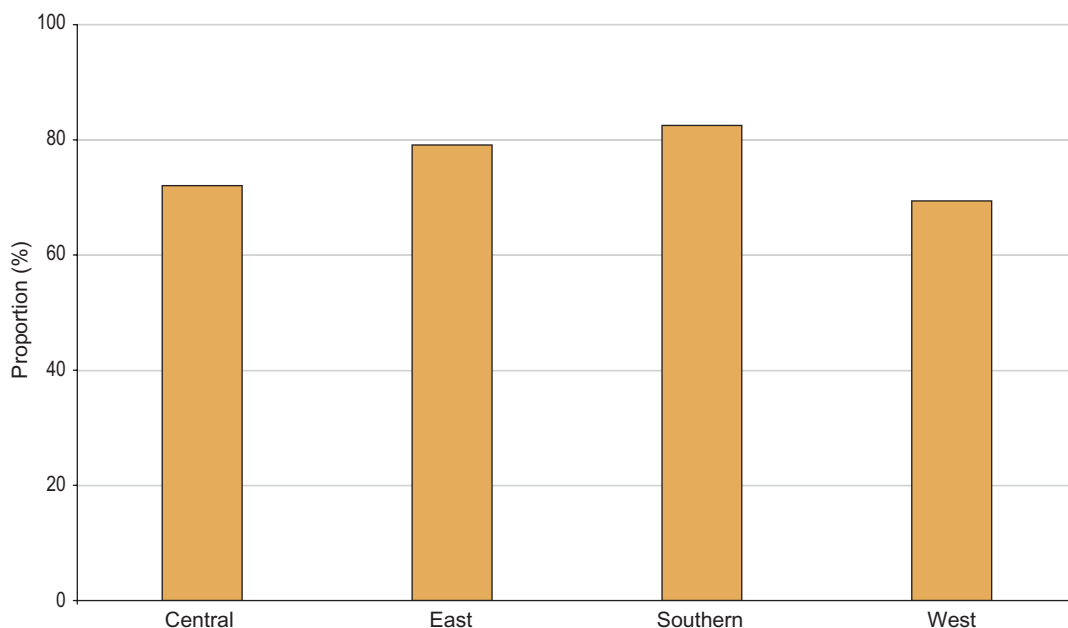
A national drug stock was created, stored and managed by UNICEF. All provincial health centres were provided with an initial 2-month supply of drugs. Before the launch, clinicians, nurses, and community health workers in the public sector and those working for NGOs in all provinces were trained in the use of the new treatment. To ensure equitable access at health facilities, the government developed a scaled pricing scheme, including free distribution to the very poor. Finally, the Health Promotion Service of the MoH launched a national communication strategy several months before the new drug was introduced to inform the population and practitioners about the new protocol.

The new treatment policy was successfully launched in November 2003. A rapid initial evaluation in six provinces suggested that the incidence of malaria had decreased over the first 9 months of 2004. A US\$ 13 million grant from the GFATM—half of which was earmarked for the purchase of ACT, the cost of which had dropped to US\$ 1.24 as of November 2004—will ensure the continued supply of drugs through 2006.

## 5. Malaria prevention and treatment in pregnant women

In all subregions of Africa, well-timed antenatal clinic attendance is key for delivering the malaria prevention package to pregnant women, since surveys have consistently shown that at least two thirds of pregnant women in malaria-endemic countries use antenatal care, and most of them attend antenatal clinics at least twice (Fig. 12). Since approximately 40% of these women present for the first time to an antenatal clinic in the second trimester of pregnancy, the first dose of IPT could be given in time to most pregnant women.

**Figure 12.** Proportion of pregnant women in Africa who receive antenatal care at least twice, based on national surveys, by subregion, 1995–2004



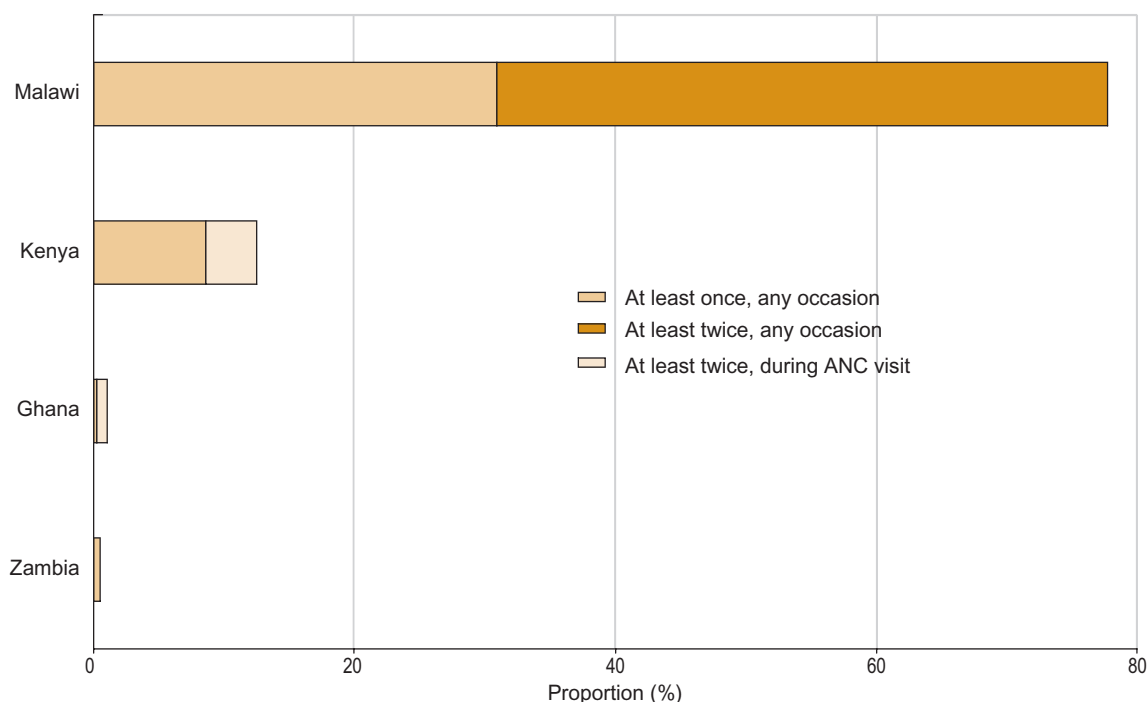
Data are from the most recent DHS ( $n = 29$  surveys); median survey year is 2000.

While initially few countries were using antenatal care services for IPT, the integration of IPT into these services became part of the national malaria control strategy in 21 countries by the end of 2004. However, only 11 of these countries are at some stage of actually implementing IPT. In Kenya, Malawi, Uganda, United Republic of Tanzania and Zambia, implementation covers the whole country or scaling up towards countrywide coverage is on track.

Coverage of pregnant women with IPT using sulfadoxine–pyrimethamine, according to national surveys in Ghana, Kenya and Zambia, generally remains below 10% (Fig. 13). An exception is 47% coverage in Malawi, the first country to adopt IPT in its national malaria control policy. The interpretation of these data is complicated because some surveys measured the receipt of sulfadoxine–pyrimethamine specifically during antenatal clinic visits, while other surveys measured any usage during pregnancy regardless of the occasion or source; the latter would include both preventive and curative treatments and thus overestimate IPT programme coverage. Moreover, for both outcomes some surveys reported use of sulfadoxine–

pyrimethamine regardless of the number of doses, while others reported coverage only for those women who received at least 2 doses during the pregnancy, which is the WHO-recommended frequency for IPT policy. Recent progress in standardizing assessment of IPT coverage in household surveys will address these inconsistencies.

**Figure 13.** Proportion of pregnant women receiving sulfadoxine–pyrimethamine based on national surveys conducted in African countries, 2002–2004



Median survey year is 2003 and includes countries where IPT implementation is currently underway or planned for the whole country. Surveys reflect DHS 2002 (Zambia), DHS 2003 (Ghana, Kenya) and MoH 2004 (Malawi). IPT was adopted in Ghana in 2004 and implementation began at the end of the year.

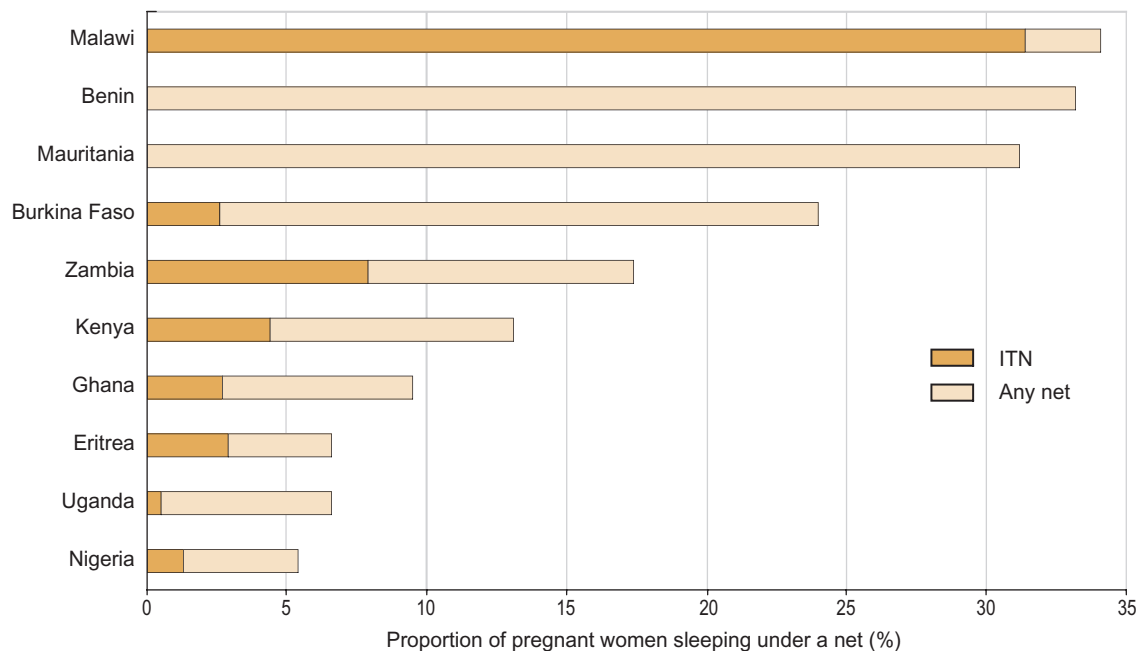
IPT coverage was fairly equally distributed between urban and rural areas and between less poor and poorer women, reflecting that antenatal clinic services are widely used among all socioeconomic levels of African populations and thus providing a major opportunity for delivery of IPT.

National-level surveys indicate that use of mosquito nets among pregnant women in malaria-endemic countries remains unacceptably low (Fig. 14). The proportion of pregnant women sleeping under a net (irrespective of the net's treatment status) was a median of 15% (range 5.4–34.1%) across 10 surveyed countries. Coverage with ITNs was a median of 2.8% (range 0.5–31.4%) across 8 national surveys.

## 6. Coverage of indoor residual spraying

About half of the endemic countries, mainly in Southern and East Africa, include targeted IRS in their NMCP strategy. An increasing number of African countries use IRS for mosquito control, and the reported number of households or units sprayed rose from around 2.7 million in 1999 to over 4 million in 2003.

**Figure 14.** Proportion of pregnant women sleeping under a mosquito net and ITNs in countries in Africa south of the Sahara, based on national surveys, 2001–2004



Median survey year is 2003.

## 7. Coverage of epidemic detection and control

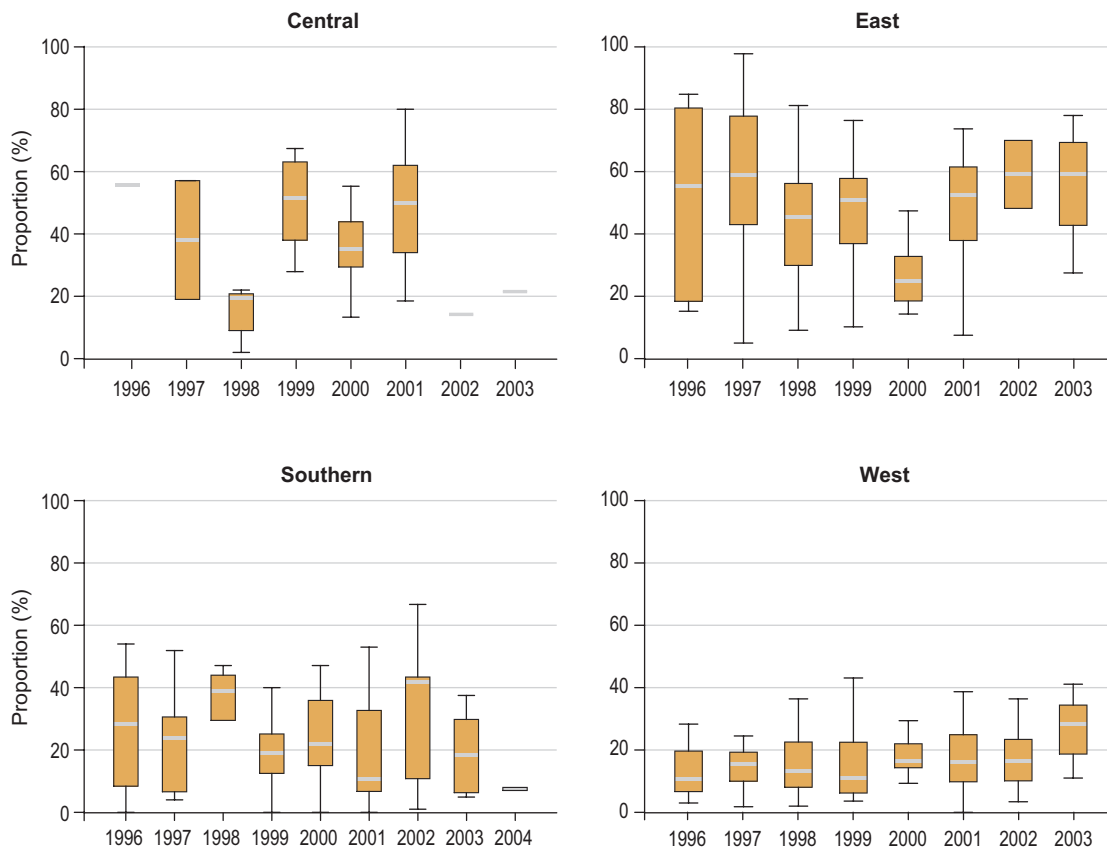
Of 17 countries that reported at least one malaria epidemic between 1999 and 2004 (totalling 119 epidemics), 9 report using a weekly surveillance system that allowed them to detect ongoing epidemics and, subsequently, to respond within 2 weeks (37).

## 8. Drug efficacy

Chloroquine failure rates were between 50% and 60% in East and Central Africa in recent years, respectively. In West and Southern Africa, typically between 10% and 30% of treatments with chloroquine fail (Fig. 15). These failure rates are similar to those in the 1990s, confirming that chloroquine resistance had already spread widely throughout Africa more than a decade ago. The fluctuation in median failure rates from 1994 to 2004 reflects that sites sampled for efficacy testing varied over the years: not every site was repeatedly sampled to track the actual local time trend (Fig. 15).

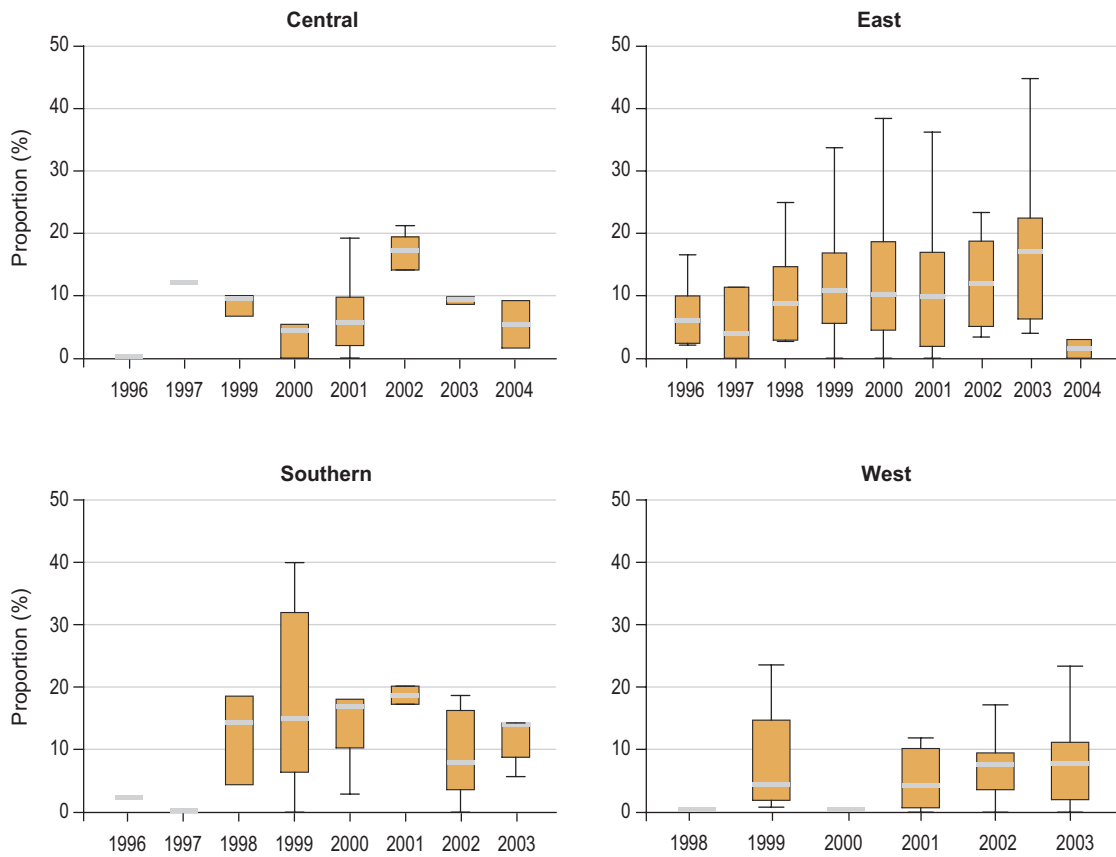
Resistance of *P. falciparum* against the most affordable alternative drug, sulfadoxine–pyrimethamine, is typically 10–20% in East and Southern Africa and around 10% in Central and West Africa (Fig. 16). The few available studies of chloroquine combined with sulfadoxine–pyrimethamine from just 6 countries show failure rates ranging from 3% in Comoros to 13% in Rwanda (Fig. 17). Amodiaquine resistance is found at low levels in East and Central Africa.

**Figure 15.** Treatment failure of chloroquine for falciparum malaria in Africa, by subregion, 1996–2004



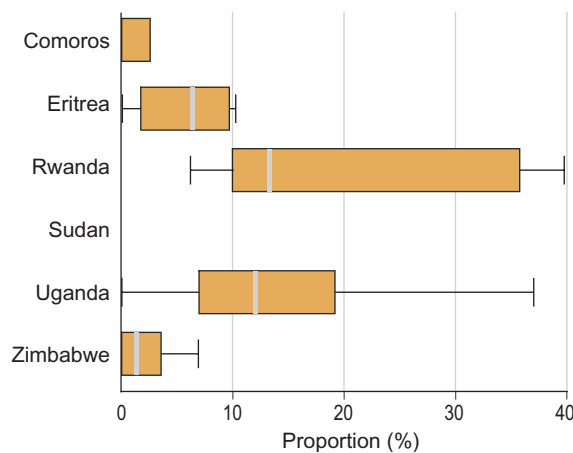
Drug efficacy expressed as clinical treatment failure with 14-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median. Excludes years with fewer than five studies.

**Figure 16.** Treatment failure of sulfadoxine-pyrimethamine in Africa by subregion, 1996–2004



Drug efficacy expressed as clinical treatment failure with 14-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median. Excludes years with fewer than five studies.

**Figure 17.** Treatment failure of chloroquine+sulfadoxine-pyrimethamine in Africa south of the Sahara, by country, averaged over 1996–2004



Drug efficacy expressed as clinical treatment failure with 14-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median. Excludes years with fewer than five studies.

## 9. Malaria and HIV/AIDS

Malaria and HIV/AIDS mutually reinforce each other and contribute synergistically to morbidity, mortality and burden on health systems. Especially in Southern Africa, where HIV is highly prevalent and malaria is unstable and therefore affects a relatively large proportion of adults, HIV infection has probably contributed to observed increases in malaria cases during the 1990s (40, 41).

In Central Africa, where large areas of countries have malaria transmission at high intensity, malaria is likely to be an important contributor to morbidity and mortality in HIV/AIDS patients.

In areas of unstable malaria transmission, HIV infection augments the risk of developing severe and fatal malaria (42, 43). In areas of stable endemicity, HIV infection among adult men and non-pregnant women increases the incidence of clinical malaria and its severity and case fatality (44). These effects are most pronounced in HIV/AIDS patients with advanced immunosuppression. Pregnant women who have high rates of both HIV and malaria infection are a particularly vulnerable group. Coinfected pregnant women are at very high risk of anaemia and malarial infection of the placenta, which contributes to poor birth outcomes (28).

Conversely, there is some evidence that malaria may exacerbate HIV infection. Acute malaria episodes temporarily increase viral replication and hence HIV viral load, which may accelerate disease progression and contribute to heterosexual HIV transmission (45). In addition, as an important cause of anaemia, malaria frequently leads to blood transfusions, which is a potential risk factor for HIV infection.

The increased disease burden resulting from coinfection with HIV and malaria highlights the need for better integration of health services for both diseases. HIV-infected adults should be targeted for free or subsidized distribution of ITNs (46). The recurrent non-malarial fevers in HIV/AIDS patients could cause considerable overuse of antimalarial drugs under the policy of presumptive antimalarial treatment of all acute fevers (47). To reduce costs and the risk of drug resistance, capacity for laboratory diagnosis of febrile disease should be increased in countries with high HIV prevalence and high malaria incidence. Prompt and effective combination treatment is particularly important for HIV-infected individuals who might be prone to treatment failure with conventional antimalarial drugs (48, 49). By preventing acute increases in viral load, good coverage of antimalarial treatment could contribute to limiting HIV disease progression and transmission (45).



## II. ASIA

- Parasitological species of recorded malaria cases: *P. falciparum* 35%, *P. vivax*
- Principal malaria vectors: *A. culicifacies*, *A. minimus*, *A. annularis*, *A. dirus*, *A. fluviatilis*, *A. maculipennis*, *A. sacharovi*, *A. superpictus*, *A. farauti*
- Estimated proportion of population at risk of malaria: 49% (21)
- Estimated contribution to the global burden of clinical malaria cases: 38% (2)
- Estimated contribution to the global burden of clinical falciparum malaria cases: 25% (2)
- Estimated contribution to the global malaria mortality burden: 10% (1)
- Main control strategies: prompt and effective treatment, (focal) IRS, larviciding, epidemic preparedness, ITNs

### 1. Disease burden and control efforts in:

#### • Eastern Mediterranean

In major parts of the Eastern Mediterranean, the malaria situation had deteriorated over the 30 years before the inception of RBM (30). A chronic shortage of resources for the health sector and complex emergencies had nearly stopped malaria control in some of the affected countries, and resistance to commonly used insecticides—except pyrethroids—and antimalarial drugs had emerged.

As of 2004, over 40% of the population in this subregion is at risk of malaria. The malaria problem is most serious in Afghanistan, a complex emergency situation (51), and Yemen, where up to 60% of the population might be at risk of falciparum malaria (21) and where internal resources for malaria control are limited (Table 8).

**Table 8.** Malaria control targets in the Eastern Mediterranean

Countries	Type of malaria situation	Target
Afghanistan, Yemen	Severe malaria	Halve malaria incidence, severity and mortality by 2010
Iraq, Islamic Republic of Iran, Pakistan, Saudi Arabia, Turkey	Low-to-moderate endemicity	Prevent malaria deaths and halve malaria incidence by 2010
Oman, Syrian Arab Republic	Small foci of transmission	Eliminate the few remaining foci of malaria transmission by 2006
Other countries	Malaria-free	Prevent (re-)introduction of malaria

Source: (30).

Countries with low-to-moderate endemicity include the Islamic Republic of Iran and Saudi Arabia, which have functional health systems and relatively well-established control programmes. In the complex emergency situations of Afghanistan and Iraq, the malaria problem is aggravated by the displacement of populations caused by civil strife resulting in an increased risk of epidemics, and by the destruction of health facilities and shortages of supplies and trained staff.

Oman and Syrian Arab Republic have only residual malaria transmission and imported cases (30). High rates of population movements complicate the control of malaria in border areas of affected countries such as between Iraq, Syrian Arab Republic and Turkey, between Saudi Arabia and Yemen, and between Afghanistan, Islamic Republic of Iran and Pakistan. These countries have therefore started coordinating their control activities in border areas.

Between 1998–1999 and 2002–2003, total expenditure on malaria increased from less than US\$ 3 million to over US\$ 8 million. The governments of Afghanistan (51), Pakistan and Yemen (Box 8) revitalized their malaria control programmes since the inception of RBM, with support from United Nations agencies, bilateral agencies and recently from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). All countries in which malaria is still transmitted have national-level multi-year strategic plans. Control strategies in all countries include diagnosis and prompt and effective antimalarial treatment, IRS, epidemic preparedness and strengthening surveillance systems. Afghanistan, Pakistan, Saudi Arabia and Yemen have national strategies for ITNs. In 2003, Pakistan introduced a malaria early warning system, based on weekly reporting of cases in epidemic-prone districts.

The reported case rates pooled across countries remained fairly stable between 1990 and 2003 (Fig. 19). Actual case rates are likely to be much higher—e.g. up to an estimated 20-fold in Yemen—since many of the cases are treated outside the public health system, which in most countries remains the main or only source of health statistics. However, in certain high-risk areas targeted for the most intense malaria control such as in Saudi Arabia and Yemen, malaria case rates have started to fall in recent years. The proportion of cases reported to be caused by falciparum malaria infection was reasonably constant over time within each country, but varied from 12% in Afghanistan to 97% in Yemen. In Turkey, the reported case rate has continued to fall gradually since its peak in 1994; control activities carried out since 2002–2003 include capacity building, disease management and prevention, drug-efficacy monitoring, malaria surveillance, health education and community participation.

Some of the challenges for the Eastern Mediterranean countries include expanding successful programmes begun in specific high-risk areas to other areas, improving monitoring and surveillance systems, and ensuring continued financial support needed to fund effective antimalarials and their availability from local providers (30). There is a need for cross-border coordination between Iraq, Syrian Arab Republic and Turkey to reduce malaria (re)introduction from highly endemic southern Turkey.

### BOX 8. VECTOR CONTROL AND STRENGTHENED SURVEILLANCE IN SOCOTRA ISLAND, YEMEN

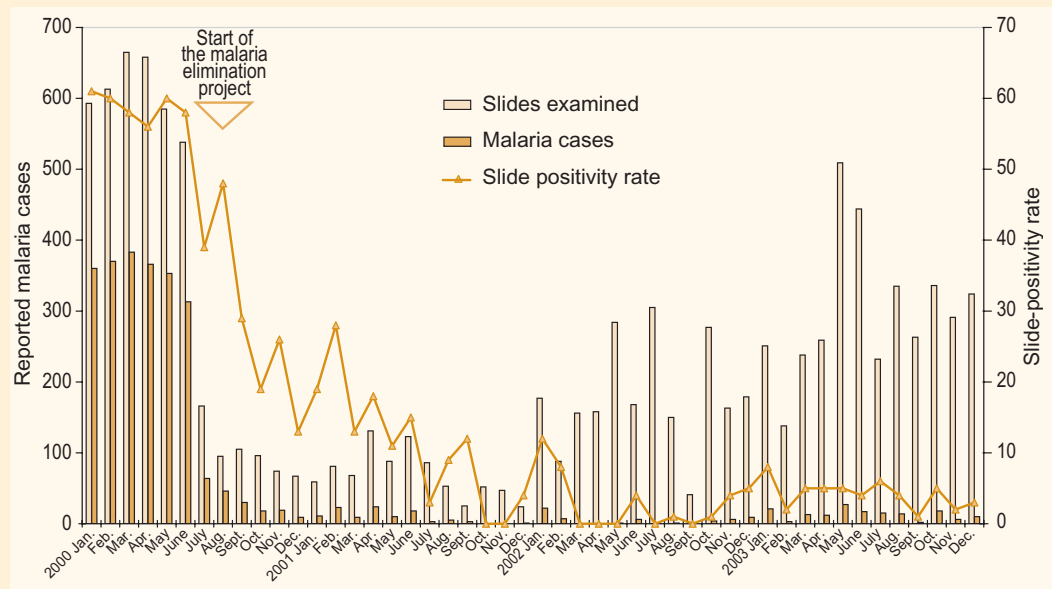
In Yemen, the reported malaria case rate rose from 1 per 1000 person per year in 1990 to a high of 160 per 1000 person per year in 1999. Social unrest during the 1990s brought about an almost full halt to antimalarial activities, and heavy rainfalls contributed to malaria epidemics in 1996 and 1998.

In October 2000, the NMCP reinstated malaria control with assistance from WHO, GFATM and various NGOs. A community-wide effort identified high-risk areas suitable for vector control by weekly larviciding and biannual IRS. In the high-risk area of Socotra Island, control measures also included increased surveillance and improved training and health education campaigns.

Active community participation in these efforts was essential. Key community leaders, United Nations agencies and other interested partners provided guidance through public health education campaigns and coordinated the control efforts. Trained community members, who were offered a daily rate for increased incentive, carried out vector control campaigns. The NMCP and responsible agencies provided intensified supervision of activities.

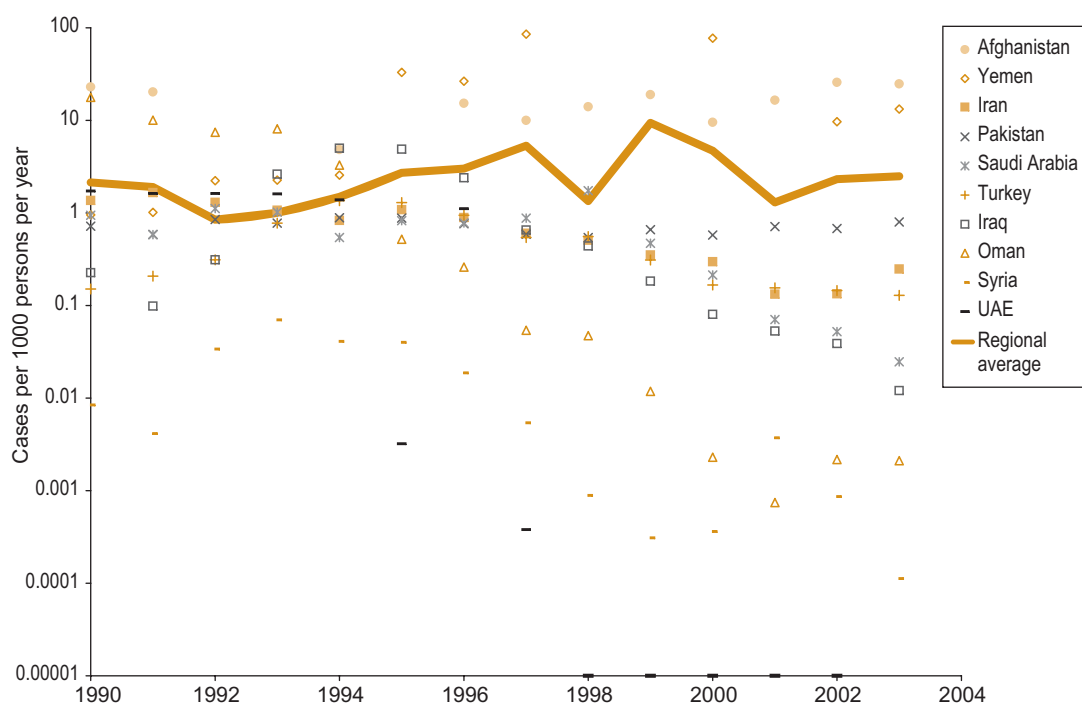
The reported burden of malaria in Socotra Island has remained low in the subsequent three malaria seasons (Fig. 18), despite intensified efforts to identify cases through active case detection and microscopy.

**Figure 18.** Reported slide-confirmed malaria cases and slide-positivity rates from Socotra Island, Yemen, 2000–2003



Source: Yemen NMCP.

**Figure 19.** Standardized reported case rates in malaria-endemic countries in the Eastern Mediterranean, by calendar year, 1990–2003



Numerators are based on confirmed autochthonous cases. Country-specific rates are shown for countries that reported a non-zero number of cases or deaths; the regional average is based on these countries weighted by population size (52).

### • Central Asia and Transcaucasia

Central Asia and Transcaucasia have long been subject to seasonal malaria transmission, which even the historic malaria eradication campaign of the 1960s never completely interrupted. Since the early 1990s, the incidence of malaria, which is mostly caused by *P. vivax*, has risen. The residual reservoir of malaria infection, aggravated by political and socioeconomic situations, mass population migration, extensive development projects and a nearly complete discontinuation in activities for malaria prevention and control, created conditions favourable for malaria transmission. As a result, epidemics of relatively large scale for this region occurred in Azerbaijan and Tajikistan, while Armenia, Georgia, Kyrgyzstan and Turkmenistan faced smaller-scale epidemics. In recent years, endemic falciparum malaria has returned to Tajikistan and is now well established in the southern part of the country, although still focal and primarily affecting the most remote rural areas. In 2004, the first autochthonous cases of falciparum malaria were reported in the southern part of Kyrgyzstan bordering Uzbekistan. Sporadic cases of autochthonous malaria are reported every year in Kazakhstan, Uzbekistan and some parts of the Russian Federation, and these countries remain vulnerable to a resumption of malaria transmission.

A scaling up of RBM interventions in Central Asia followed the epidemic that occurred in Kyrgyzstan in 2002. The emphasis has been on Kyrgyzstan, Tajikistan and Uzbekistan. In 2003–2004, these countries, as well as Kazakhstan and Turkmenistan, reaffirmed their commitment towards implementing malaria control based on well-defined national and regional priorities. Key elements of national

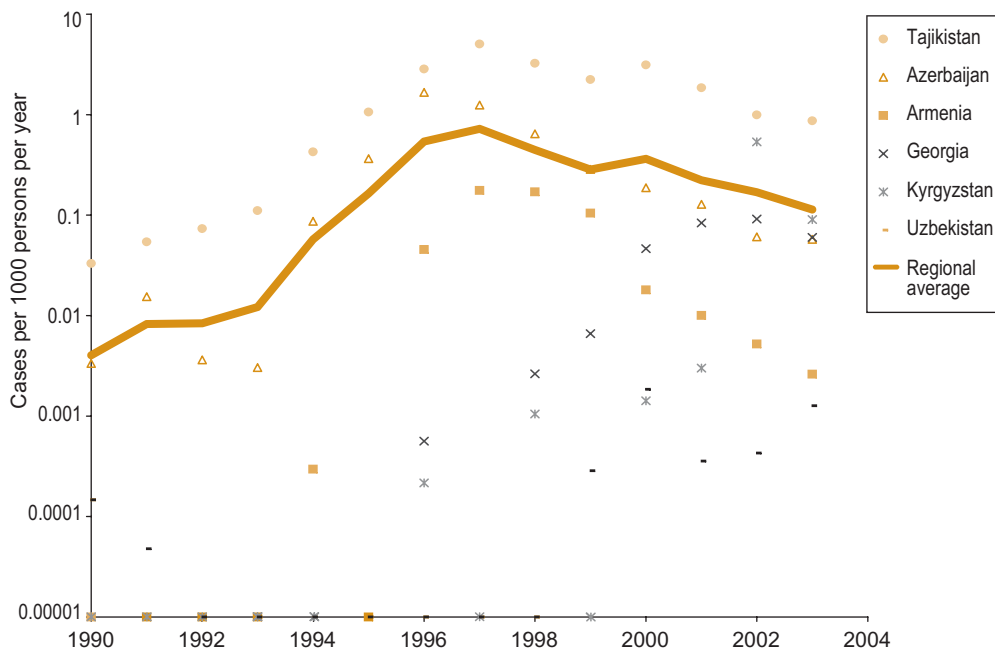
control policies are vector control by IRS and epidemic preparedness, as well as ITN use in Armenia, Azerbaijan, Kyrgyzstan and Tajikistan.

Grants from the GFATM will help strengthen malaria control in Uzbekistan (more than US\$ 2.5 million over 5 years) and Georgia (more than US\$ 800 000 over 3 years), where the reported case rate rose steeply until 2002. In contrast, Armenia and Azerbaijan still have insufficient resources available to manage the malaria problem.

In response to the 2002 epidemic, Kyrgyzstan reinforced surveillance, targeted IRS and improved disease management on a large scale in malaria-affected areas. In 2003, the number of reported malaria cases decreased substantially (Fig. 20).

Averaged over the region, after a peak incidence of around 0.45–0.72 annual reported cases per 1000 between 1996 and 1998—reflecting peaks in Armenia, Azerbaijan and Tajikistan—the rate of reported cases steadily declined to around 0.11 per 1000 in 2003. This is around 10-fold higher than the level recorded in 1991–1992, but completeness of reporting is likely to have varied during the decade due to socioeconomic and political changes (Fig. 20).

**Figure 20.** Standardized reported case rates in malaria-endemic countries in Central Asia and Transcaucasia, by calendar year, 1990–2003



Numerators are based on confirmed, autochthonous cases. Country-specific rates are shown for countries that reported a non-zero number of autochthonous cases or deaths; the regional average is based on these countries weighted by population size (52).

## • South-East Asia

In the 1960s and early 1970s, the Global Eradication Programme reduced malaria incidence to low levels by extensive IRS and large-scale use of antimalarial drugs, but transmission never completely ceased. The disease re-emerged in the 1980s and 1990s, when vector control became less intensive and resistance to most of the commonly used conventional drugs (chloroquine, sulfadoxine-pyrimethamine) and insecticides (DDT, malathion) spread rapidly. Epidemics occurred along the Thai-Cambodian border between 1979 and 1983 coinciding with population movements during the civil war in Cambodia in 1987 and in Sri Lanka in 1990-1992. In India, urban malaria has emerged as a serious health problem in several states. Rapid urban growth and labour migration led to some of the epidemics that have occurred with increasing frequency since 1995. Labour-related movement of non-immune migrants into forests has contributed to epidemics in Myanmar and Thailand, and adult men are the main group at risk in such areas. Currently, Bangladesh, Bhutan, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand and Timor-Leste have endemic falciparum malaria, and transmission of vivax malaria reappeared in the Democratic People's Republic of Korea in the 1990s.

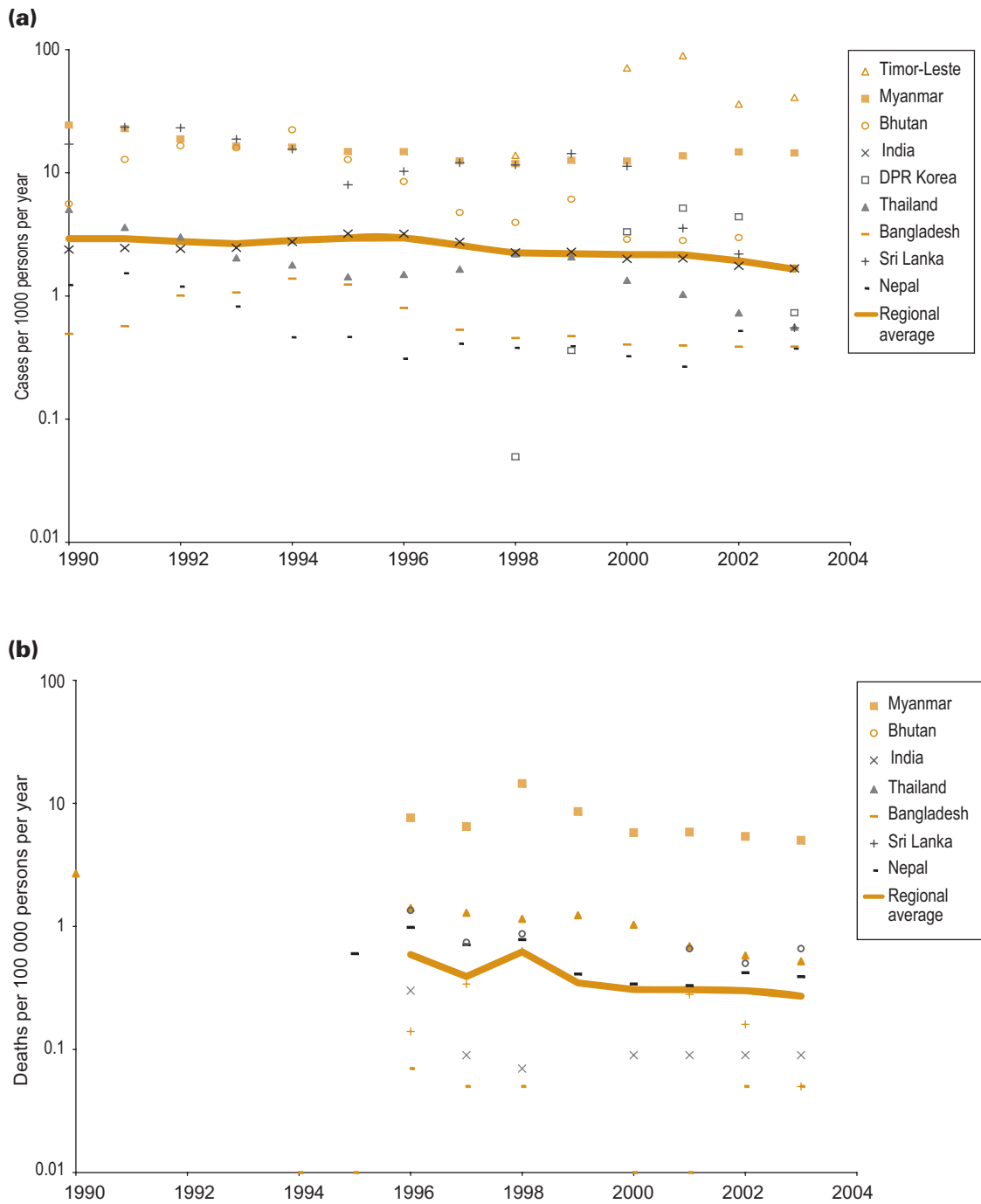
Malaria control was resumed or reintensified in Thailand in the early 1980s, in Maharashtra State in India in 1995, in the Democratic People's Republic of Korea in 1999, in Bangladesh in 1998, on central Java in Indonesia in 2001 (53) (Box 9) and in Sri Lanka in 2003 (Box 10). The total budget, from national funds and other sources, increased from US\$ 66 million across 6 countries reporting such data in 1998 to US\$ 122 million across 9 countries reporting data. As of 2004, 5 countries have received support from the GFATM for malaria control.

South-East Asia has the highest rates of drug and insecticide resistance in the world. Multidrug resistance emerged earliest in this part of the world and is particularly prevalent near international borders. All countries monitor drug resistance in surveillance sites. In light of drug resistance, Bangladesh, Bhutan, Indonesia, Myanmar and Thailand have now adopted ACT as the national policy for first-line treatment of uncomplicated falciparum malaria. Drug policies for the public health sector alone are not enough; a large proportion of patients obtain treatment in private health facilities or from pharmacies or local shops, where the sale of counterfeit and substandard drugs is common. Timely revisions and effective implementation of treatment guidelines, coupled with improved access through specialized malaria clinics, have been crucial for reducing malaria mortality and clinical incidence in Thailand over the past two decades. Under RBM, rapid diagnostic tests were introduced for malaria diagnosis in remote areas in Nepal and Thailand.

Vector control through IRS for selected areas and epidemic preparedness and surveillance are key control strategies in all affected countries. In addition, larvivorous fish are used for vector control in some areas of India, Myanmar and Sri Lanka. Over the past 7 years, Bhutan, Indonesia, Myanmar and Thailand switched from using DDT and/or organophosphates to using pyrethroids; Sri Lanka decreased the use of DDT, while increasing the use of pyrethroids.

ITN distribution has begun in all endemic countries except Nepal. Since 1999, at least 3.6 million nets were distributed and over 4.3 million existing nets were (re-) treated. An ITN distribution programme in the Khagrachari Hill District of Bangladesh halved the number of reported clinical cases within 3 years of scaling up ITN coverage.

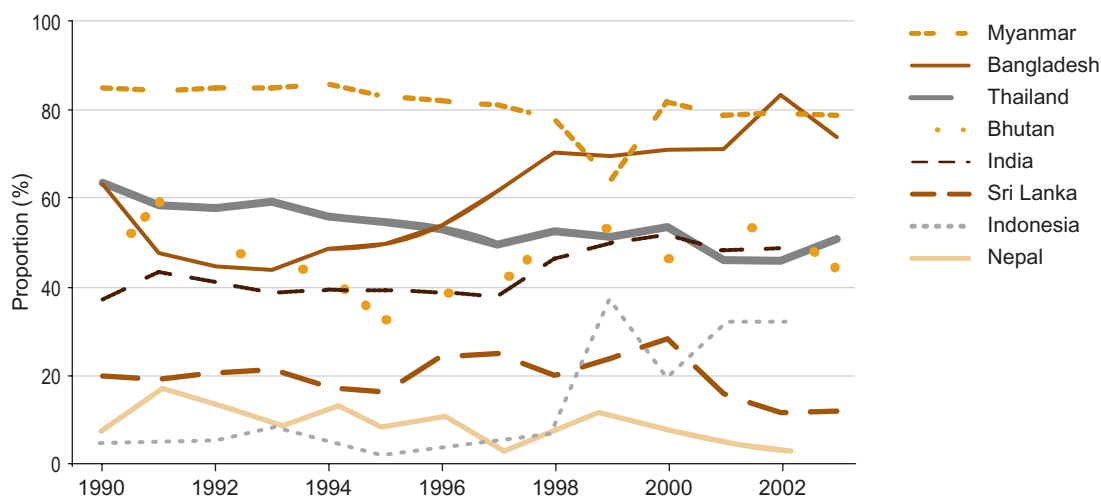
**Figure 21.** Standardized rates of reported malaria cases (a) and deaths (b) in malaria-endemic countries in South-East Asia, by calendar year, 1990–2003



Numerators are based on confirmed, autochthonous cases. Country-specific case rates are shown for malaria-endemic countries that provided feedback during the preparation of this report and that reported a non-zero number of cases; country-specific deaths rates are shown for all countries with a rate of > 0.1 per 100 000 persons per year in at least one year. Regional averages are based on all countries including those not providing feedback to WHO, weighted by population size (52). No data are available for the period 1990–1994.

In India, the national reported malaria case rate had by 2003 fallen to below the 1990 level, after a peak in 1995–1996, when many malaria outbreaks occurred. Across most other countries, the case reporting rate has slightly fallen since 1990–1991. For Bhutan, India and Thailand, this decline was paralleled by a decrease in the death reporting rate between 1995 and 2003 (Fig. 21). The proportion of cases caused by falciparum infection remained reasonably constant between 1990 and 2003 in Bhutan, Myanmar, Nepal and Sri Lanka, slightly decreased in Thailand, but tended to increase in Bangladesh, India and Indonesia (Fig. 22).

**Figure 22.** Percentage of cases reported as *P. falciparum* or as mixed infection with *P. falciparum* and another *Plasmodium* species, for selected countries in South-East Asia, 1990–2003



A major challenge for malaria control programmes in South-East Asia is to ensure access to high-quality-assured drugs according to updated national drug policies through all types of providers. Furthermore, rapid diagnostic tests or microscopy and pre-packaged ACT are to be provided through public health systems, including in remote rural villages.

The tsunami of 26 December 2004 raised concern about an increased risk of epidemics in some coastal areas of India, Indonesia, Myanmar and Sri Lanka. Accumulations of mixed salt and fresh water might encourage breeding of *A. sundaicus*, an important vector in many affected coastal areas. The fact that survivors of the tsunami are living under crowded and makeshift conditions is likely to increase exposure to these malaria vectors (54). Initial actions of larviciding appear to have prevented immediate outbreaks and, as of March 2005, there is no evidence of an increase in malaria cases. Active surveillance is ongoing to assess the longer-term impact of the tsunami on malaria transmission and disease burden.

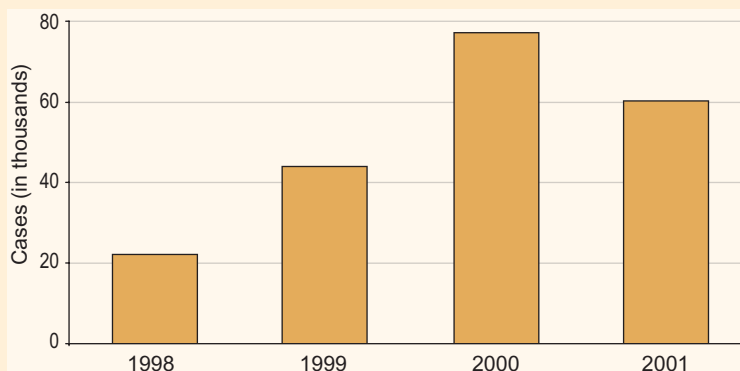


### BOX 9. INDONESIA CONFRONTS MALARIA EPIDEMICS THROUGH OUTREACH IN POOR RURAL AREAS

The 1997 economic crisis in Indonesia brought increased poverty, a reduction in health spending, the breakdown of malaria control efforts—in particular a dramatic cutback in IRS—and the re-emergence of malaria in areas where the disease was previously under control. There was also a decrease in surveillance and monitoring, leading to insufficient knowledge about malaria transmission and failure to diagnose the disease early. Many village health clinics lacked sufficient supplies of drugs and skilled staff to administer them and monitor their use. The districts of Kulonprogo, Magelang and Purworejo in the Menoreh Hills area on the island of Java were the most affected by the epidemic (53).

The Menoreh Hills Malaria Control Project was carried out between May and December 2001, with support from WHO and USAID. Communities were mobilized, local people were trained as malaria workers and community members were educated on how to manage epidemics. Village health workers played an important role in early diagnosis and treatment of the disease among poor rural populations. Health workers also introduced IRS and the new habit of sleeping under ITNs, which were distributed free of charge. Village elders and local teachers were engaged in information campaigns to promote the use of ITNs. In 2001, close to 4500 ITNs were distributed by district administrations and 8000 houses were sprayed.

By the end of 2001, the malaria epidemic in the Menoreh Hills had been halted and reversed (Fig. 23). Commitment on the part of the district authorities was crucial for supporting action at community level and for negotiating adequate domestic and external funds. Indonesia's decentralization programme, initiated in 2001, gave more responsibility and autonomy to the districts. But investment in health—both from domestic and external sources—is low, thus many district governments rely on user fees from public health facilities as a source of local revenue, without exempting even the poor or the most basic services.



**Figure 23.** Malaria cases decrease in the Menoreh Hills, Indonesia

A crucial factor in controlling the epidemic was establishing monitoring and surveillance systems. Mass blood surveys were carried out in Kulonprogo and Purworejo during September and October of 2001. Mass fever surveys were conducted in all three districts from October 2001 to April 2002, with treatment for those fever cases subsequently found infected on blood slides.

District authorities from the sectors of agriculture and public works helped to ensure that the rapid opening of land plantations did not aggravate the spread of malaria, by enforcing good agricultural practices and adherence by farmers to planting schedules. Intervillage cooperation involved notifying residents working in other villages to be careful not to spread malaria. Neighbouring villages were given IRS concurrently to maximize the impact on mosquito populations.

### BOX 10. FOCUSED INDOOR RESIDUAL SPRAYING CONTROLS MALARIA IN SRI LANKA

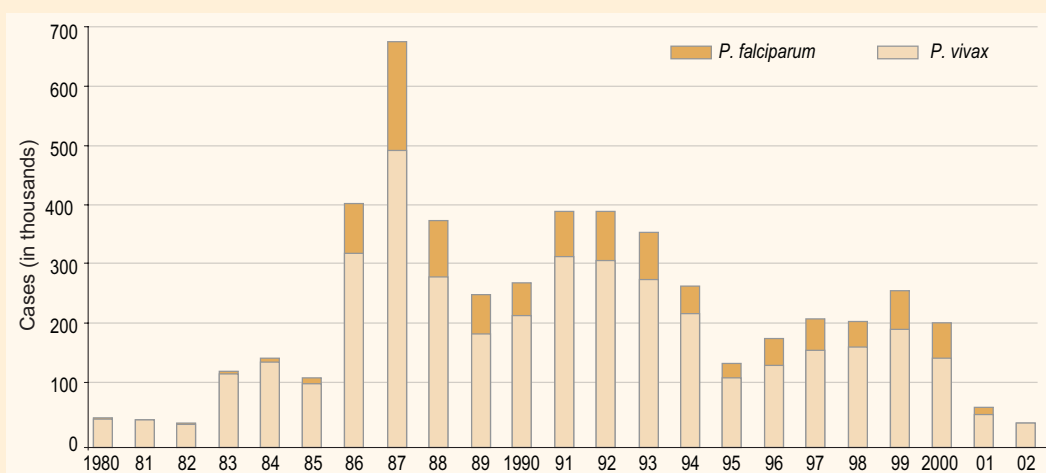
During the 1970s and the 1980s, malaria caused very high morbidity levels and regularly broke out in epidemic form in Sri Lanka. In 1992, the NMCP drastically revised its control strategy, in keeping with the New Global Malaria Control Strategy introduced that year.

As during the eradication programme in the 1960s and 1970s, IRS was a major activity of the new control programme. But instead of aiming for universal and frequent IRS coverage, which during the eradication programme had failed to stop transmission and met community resistance in some areas, vector control was targeted to carefully stratified malaria-risk areas. Varying frequencies of IRS were implemented according to malariogenic potential, i.e. year-round, seasonal or exclusively at times of observed transmission. This resulted in better acceptability in the communities and higher cost-effectiveness.

To further reduce the number of villages where IRS was needed, the use of larvivorous fish was introduced and, under a project funded by the International Development Association/World Bank between 1997 and 2002, ITNs were provided to villages with a very high risk of malaria. Entomological activities were reoriented with a view to helping predict and prevent epidemics. Furthermore, early detection and prompt treatment through outreach-type Mobile Malaria Clinics was implemented. Chloroquine resistance of falciparum malaria, which was prevalent in some areas and foci, was managed well by temporarily changing to sulfadoxine–pyrimethamine as the first-line drug treatment in these areas.

In 2003, recorded malaria incidence fell to the lowest level observed since 1967 (Fig. 24). Another remarkable achievement is that epidemics have been averted since the last epidemic of 1990–1992.

**Figure 24.** Microscopically confirmed malaria cases detected by surveillance in Sri Lanka, 1980–2003



## • Western Pacific

Malaria control was revitalized in the 1980s in China and in the 1990s in most other Western Pacific countries, following resurgence in the 1980s and early 1990s (Box 11). The resurgence was related to a general economic decline and reduced budget for malaria control, resulting in deterioration of health care in general—such as in Viet Nam—and breakdowns in drug supplies and the arrest of vector control in rural areas—such as in Papua New Guinea. Large-scale population movements and emergence of drug resistance contributed as well. With transmission of vivax malaria reappearing in the Republic of Korea in the 1990s, the region now includes 10 endemic countries.

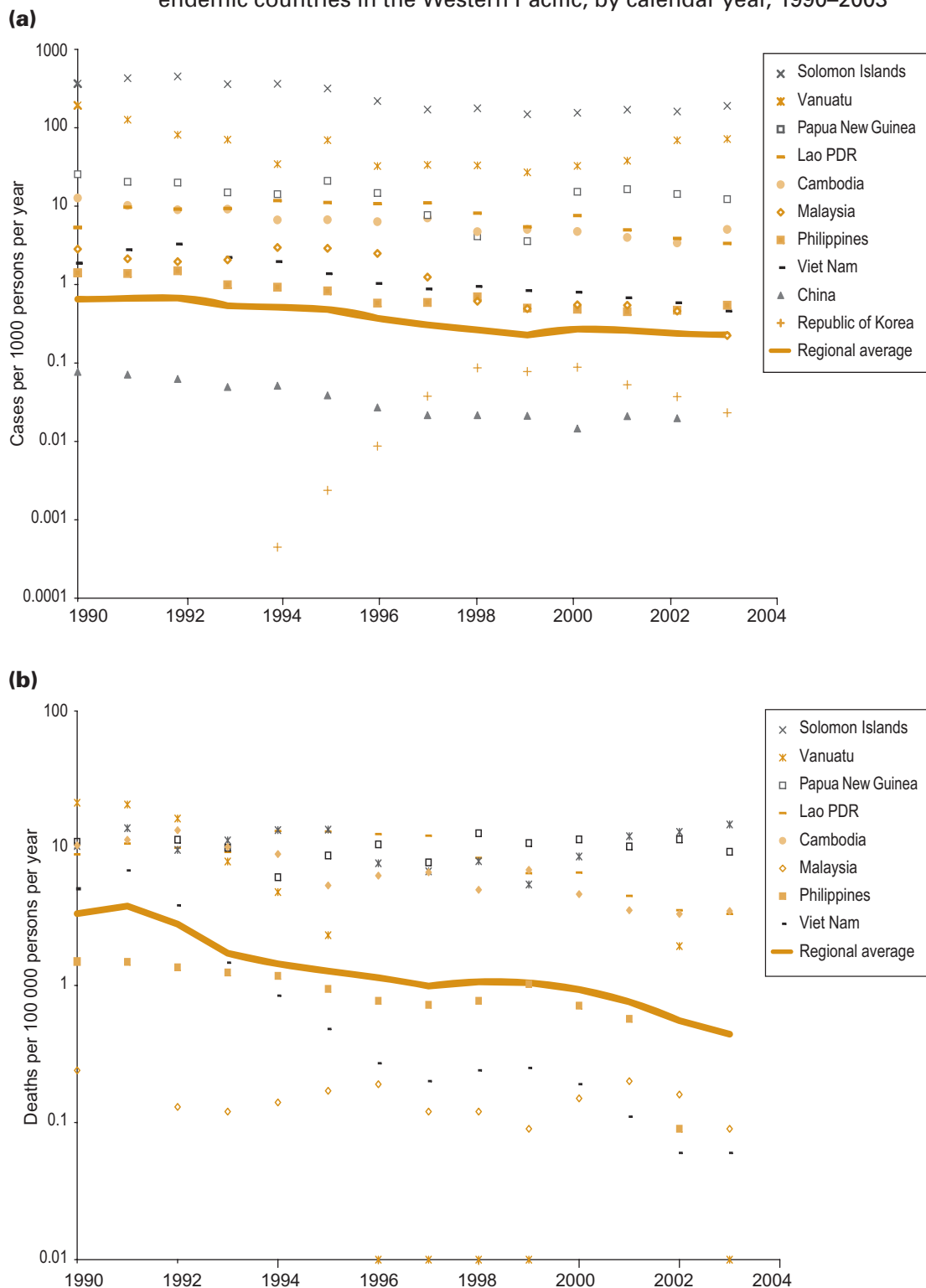
Parts of Papua New Guinea and Vanuatu (55) continue to suffer from hyperendemic falciparum malaria. As in tropical Africa, the primary risk groups are young children and pregnant women. Elsewhere, forest workers, miners, farmers and migrants of all ages form special risk groups.

National control policies in all countries include vector control with ITNs, targeted IRS and improvement of diagnosis, and prompt and effective treatment. In the mid-1990s, China, Malaysia, the Philippines and Viet Nam replaced DDT and organophosphates with other insecticides. Since 1999, at least 1 million ITNs have been distributed and 6.4 million existing nets have been (re-)treated with insecticide.

Cambodia, China and Viet Nam were among the first countries to suffer from high-level parasite resistance to antimalarial drugs. Multidrug resistance was recorded as early as the 1980s, with the highest prevalence in border areas. These countries now use ACTs for first-line treatment. In Viet Nam, wide availability of artemisinin derivatives and later ACTs for first-line treatment contributed to a low and falling level of mortality caused by malaria since 1995–1996 (Fig. 25) (56). Under RBM, and with support from the GFATM, all countries with falciparum malaria are using rapid diagnostic tests to reduce overusage of costly antimalarials and the risk of development of resistance to the newest drugs. All countries perform drug efficacy monitoring in at least one sentinel site.

After a peak in 1991–1992, the overall case reporting rate across 10 countries fell gradually until 2003 (Fig. 25). In individual countries, year-to-year fluctuations in reported case rates are apparent, which however often reflect changes in the completeness of surveillance or reporting rather than actual epidemiological trends. For example, reporting completeness decreased in Papua New Guinea between 1995 and 1998, but it improved during the early 1990s in Lao People's Democratic Republic; in the Philippines, a varying intensity of active case detection resulted in variations in case reporting rates. In Papua New Guinea, the Solomon Islands and Vanuatu, programme success fell and morbidity rose again caused by civil unrest and human and financial constraints since 2000 (Fig. 25). However, increased funding including from the GFATM is expected to help reverse this trend.

Challenges for malaria control in the coming decade include: (i) ensuring the quality and effectiveness of available antimalarial drugs in both the public and private sectors; (ii) increasing the coverage of rapid diagnostic tests or microscopic diagnosis; and (iii) access to diagnosis and treatment in remote, high-risk rural areas. In addition, the scaling up of ITN distribution and (re-)treatment of ITNs and the distribution of LLINs require increased efforts.

**Figure 25.** Standardized rates of reported malaria cases (a) and deaths (b) in malaria-endemic countries in the Western Pacific, by calendar year, 1990–2003

Numerators are based on confirmed autochthonous cases. Country-specific case rates are shown for all countries; country-specific death rates are shown for all countries with a rate of > 0.1 per 100 000 persons in at least one year. Regional averages are weighted by population size (52).

**BOX 11. SUCCESSFUL MALARIA CONTROL IN SABAH, MALAYSIA**

The Sabah area of Malaysia accounts for approximately 70% of malaria cases in the country. Recorded incidence in this area was very high in the early 1990s. Chloroquine resistance, an insufficient control budget and lack of personnel contributed to the problem. In this forested area, which is climatically highly suitable for malaria transmission and relatively inaccessible to control efforts, aboriginal groups, soldiers, plantation and forest workers, and illegal immigrant populations are especially vulnerable.

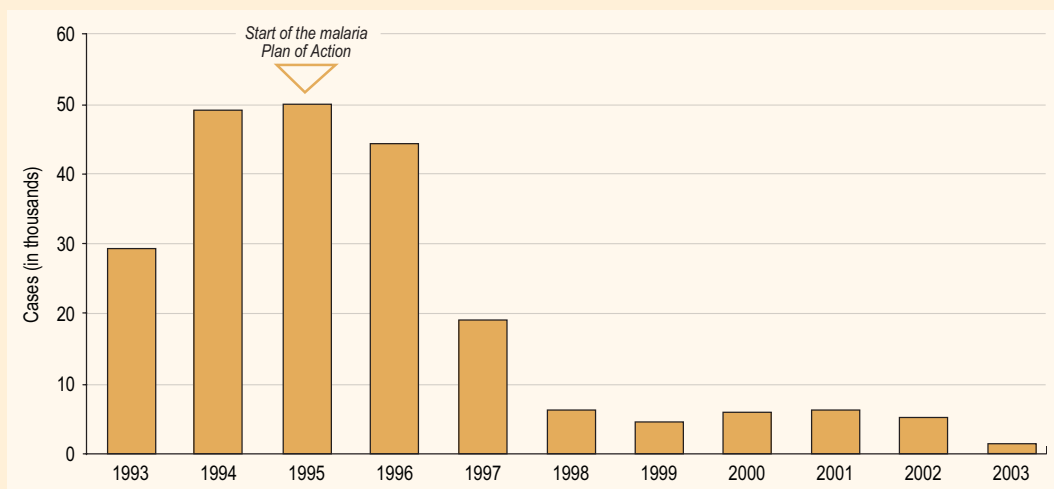
An intensified malaria control plan was launched in 1996. Districts were stratified into high, moderate and low risk, based on annual recorded malaria incidence rates. With increased budget and staff, ITNs were provided for more than 700 000 people and over 400 additional primary health-care volunteers were trained in diagnosing and treating malaria, and in improving awareness. In addition, IRS was scaled up. By 2003, all high-risk areas were reduced to moderate or low risk, and all moderate-risk areas had regressed to low risk.<sup>a</sup> The overall recorded annual number of cases fell from 49 863 in 1995 to 1770 in 2003 (Fig. 26).

Challenges ahead are to maintain the gains achieved through early recognition and control of epidemics, to prevent drug resistance and to reduce malaria transmission further in the inaccessible, hilly forested areas where transportation facilities are poor. In the longer term, infrastructural and socioeconomic developments are expected to consolidate the successful containment of malaria.

<sup>a</sup> Local definitions:

- high risk = recorded incidence >10 cases per 1000 population per year,
- moderate risk = recorded incidence 1–10 cases per 1000 population per year,
- high risk = recorded incidence <1 case per 1000 population per year.

**Figure 26.** Malaria report case rates in Sabah, Malaysia

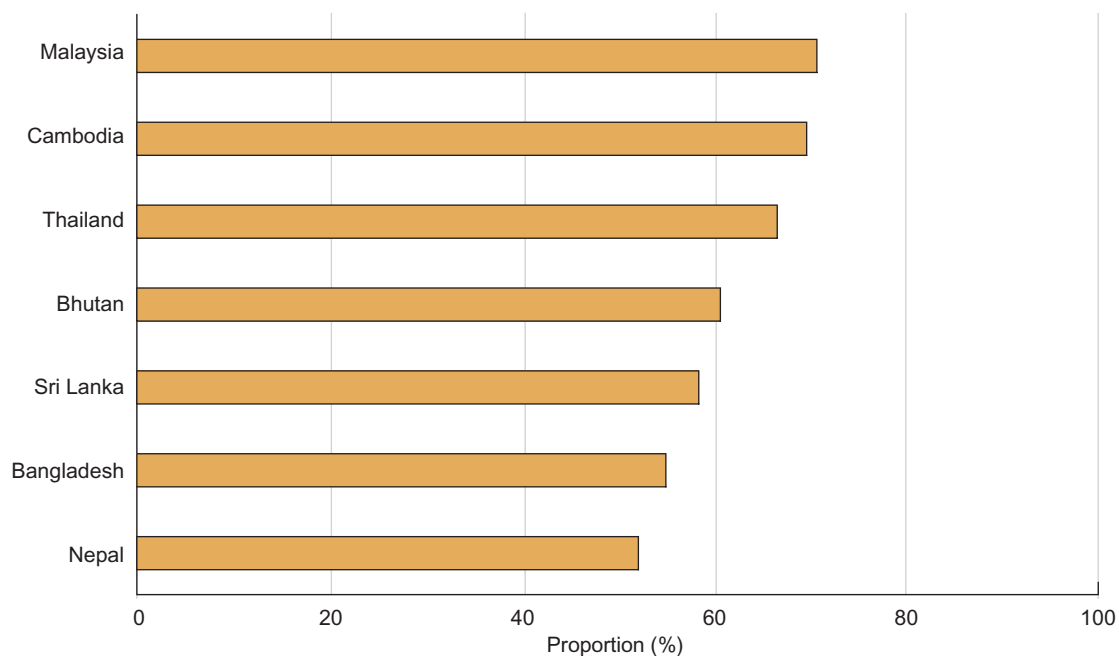


## 2. Age/sex distribution in reported cases

Few countries record the sex of reported cases. In 7 Asian countries that did, between 52% and 71% of reported cases were male (Fig. 27). The higher incidence in males compared with females in Cambodia, Malaysia and Thailand probably reflects the occupational exposure in parts of these countries, although gender differences in treatment-seeking behaviour might also be a contributing factor.

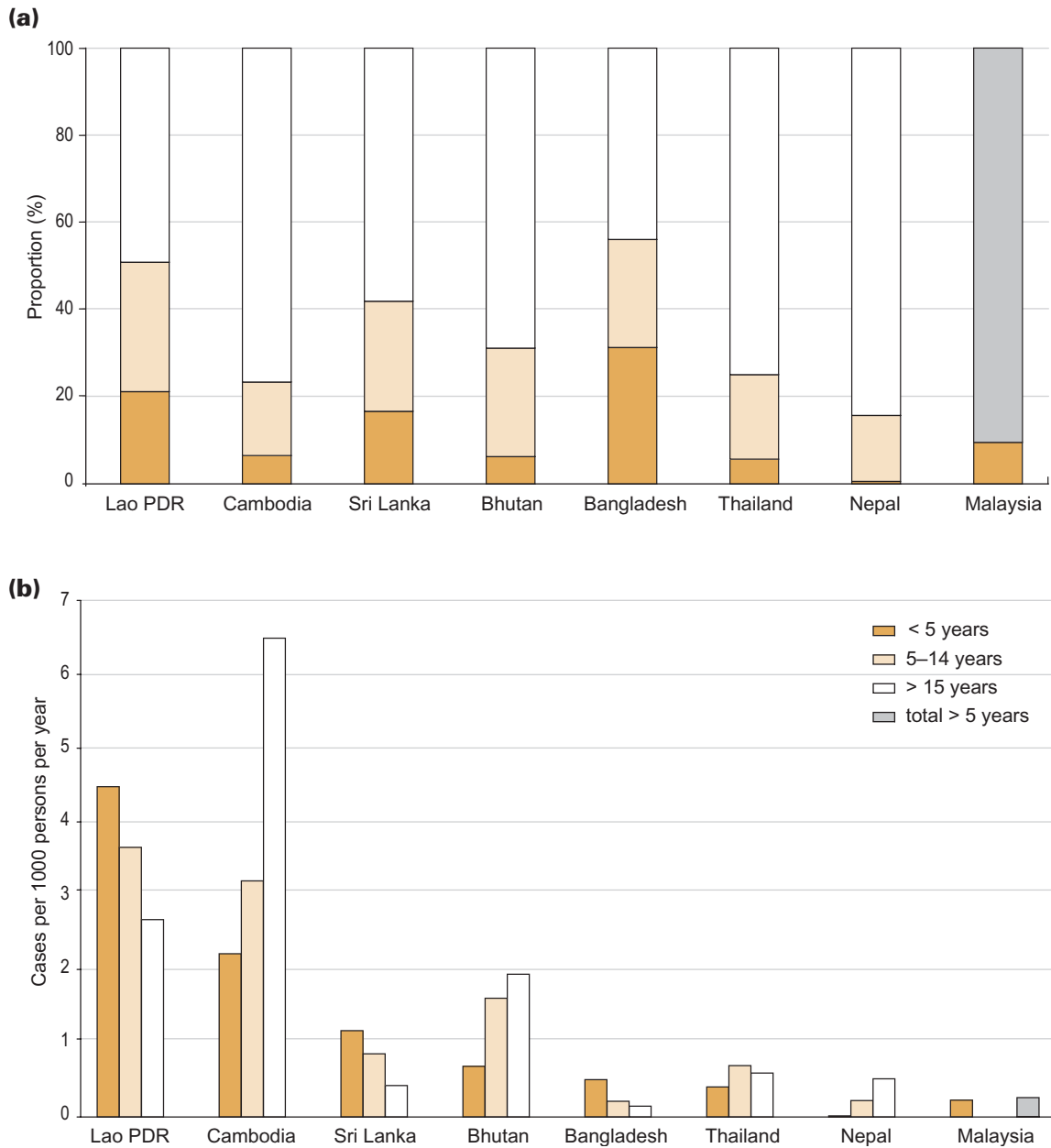
Reliable data on the age distribution in reported cases were available for 8 countries in South-East Asia. In most of these countries, adults over 15 years of age account for more than half of the total cases. However, the age pattern in reported case rates varied markedly between countries. In Bhutan, Cambodia and Nepal, the case rate increased with age, while in Bangladesh, the Lao People's Democratic Republic and Sri Lanka, children under 5 years of age had the highest case rate (Fig. 28).

**Figure 27.** Proportion of cases reported in males in Asia, 2003



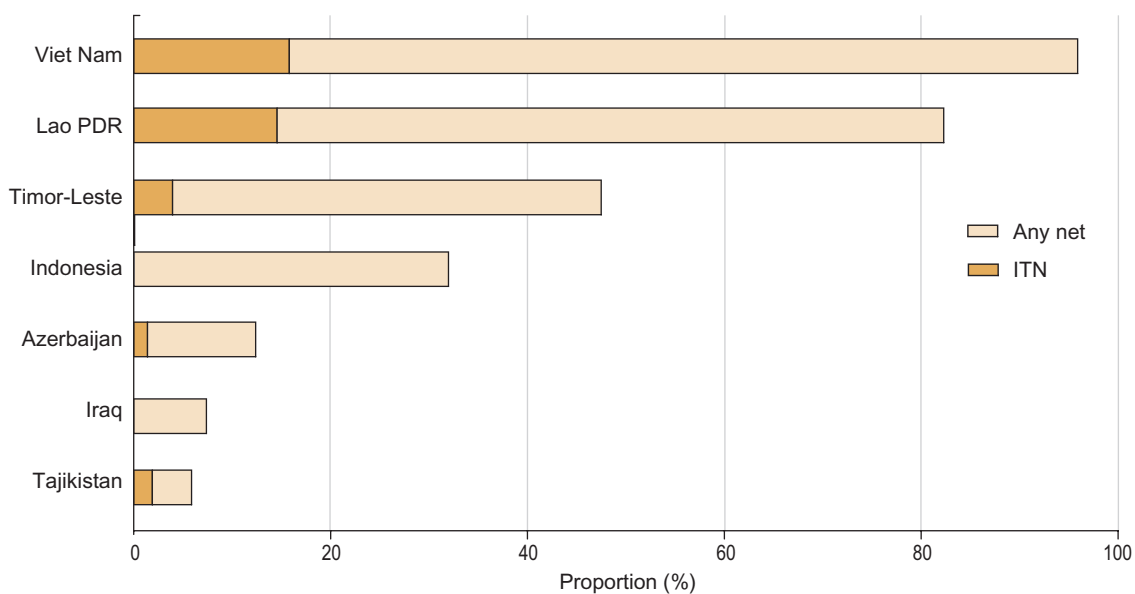
Data are from countries that reported numbers of cases for males and females separately in 2003 and for which the sum of reported cases in males and females was equal to the reported total.

**Figure 28.** Age distribution of reported cases in Asian countries, 2003; age distribution of cases (a) and age-specific case rates per 1000 persons per year (b)



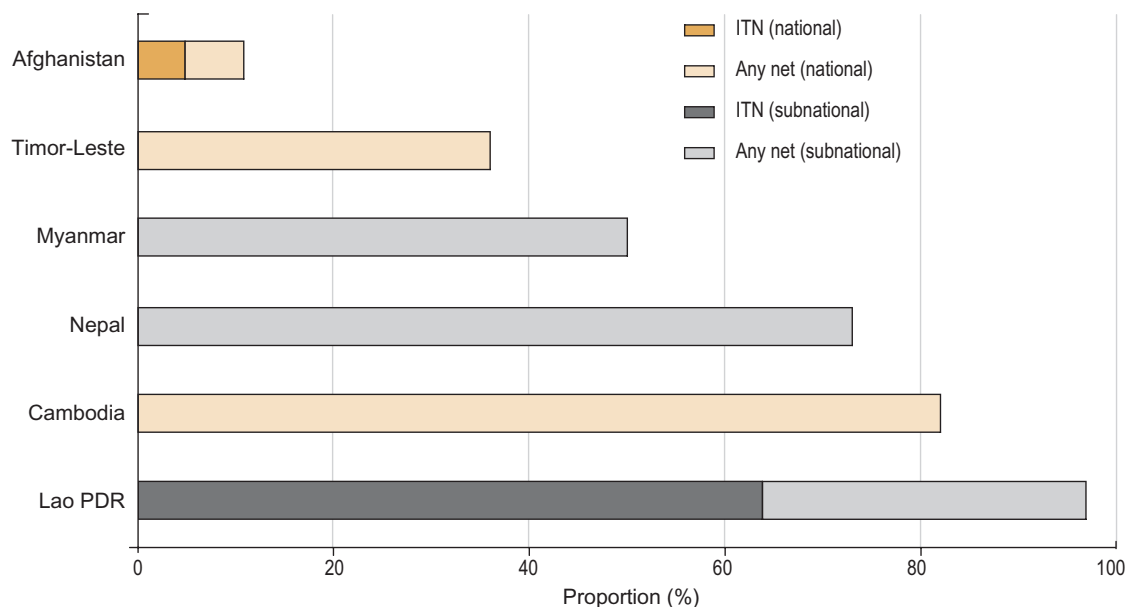
Data are from countries that reported numbers of cases by age group in 2003, and for which the sum of age-specific reported numbers of cases was equal to or smaller than the reported total.

**Figure 29.** Proportion of children under 5 years of age sleeping under mosquito nets or ITNs based on national surveys in Asian countries, 2000–2002



Median survey year is 2000.

**Figure 30.** Household possession of mosquito nets and ITNs in Asian countries



Median survey year is 2001. Results from subnational surveys are included for countries where malaria is focal and where the survey sampled selectively in areas with a relatively high burden of malaria.



### 3. Coverage of mosquito nets and insecticide-treated nets

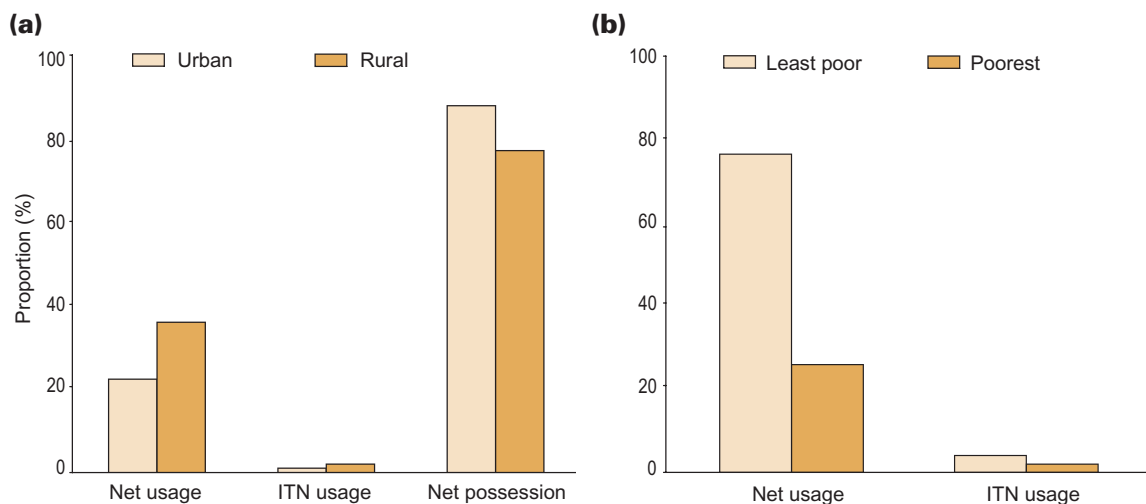
National surveys in 7 Asian countries measured a median net usage rate for children under 5 years of age of 32% (range 6–96%); for ITNs the median child usage rate was 1.9% (range 0–16%) (Fig. 29).

In many countries in Asia, given the relatively moderate transmission intensity, people of all ages are at risk and the proportion of households possessing one or more nets is a more relevant indicator than usage by young children. Surveys in Afghanistan, Cambodia, Timor-Leste and malarious areas of Lao People’s Democratic Republic, Myanmar and Nepal measured household possession levels of between 11% and 97% for any nets, whether or not these had been treated with insecticide. In Afghanistan, 4.8% of households owned an ITN in 2002, and in Lao People’s Democratic Republic 64% of households owned an ITN in 2001. In all surveyed countries, most available nets are not insecticide-treated (Fig. 30).

#### *Equity in net coverage*

In the few countries with detailed survey data available, net and ITN coverage was not consistently higher in urban or in rural areas. However, net usage and ITN usage by children were a median of threefold and twofold lower in the poorest households compared with the least poor households (Fig. 31).

**Figure 31.** Median net and ITN possession (as % of households) or usage (as % of children under 5 years of age) in Asian countries by urban and rural division (a) and for the 20% poorest and 20% least poor households (b), from national surveys conducted between 1999 and 2004



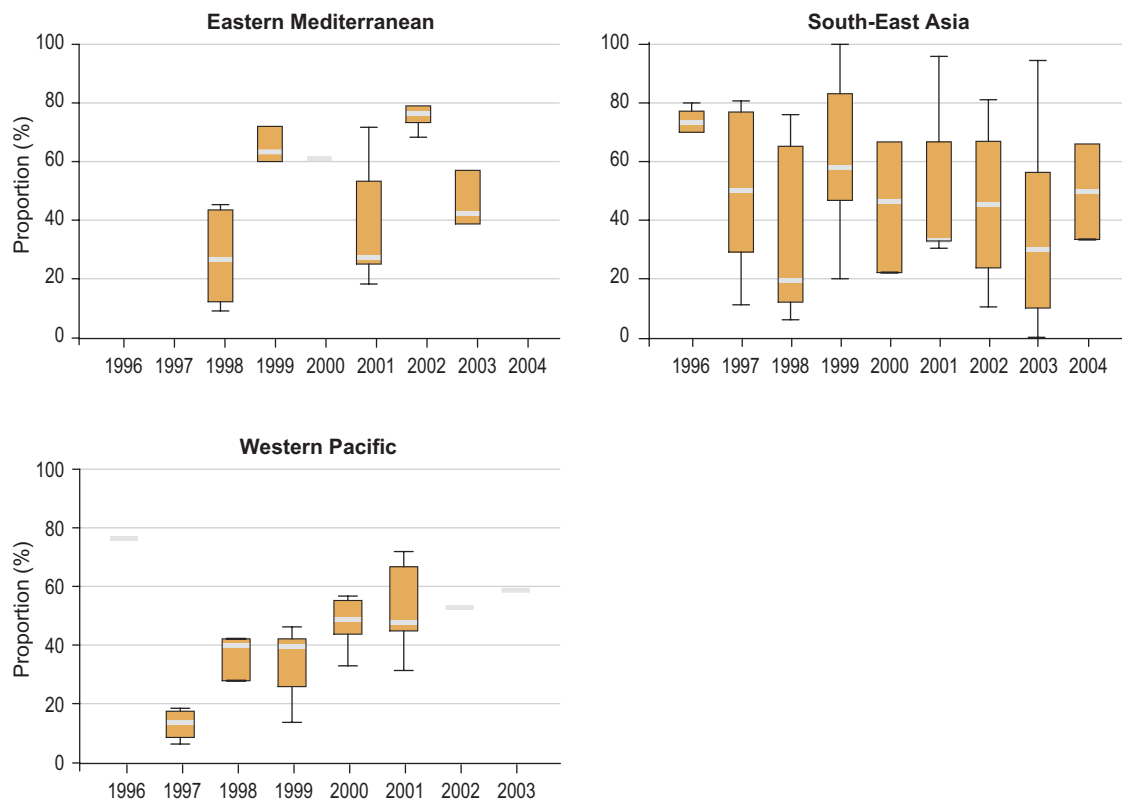
Sources: urban/rural data: net and ITN usage from seven surveys, net possession from one survey; poorest/least poor households data: net and ITN usage from five surveys, no surveys available on net or ITN possession. Countries surveyed: Azerbaijan, Indonesia, Iraq, Lao People’s Democratic Republic, Tajikistan, Timor-Leste and Viet Nam.

#### 4. Drug efficacy

Resistance of *P. falciparum* against most common antimalarial drugs as well as multidrug resistance has been widely prevalent throughout Asia. Failure rates of chloroquine are generally above 40% in the Eastern Mediterranean and Western Pacific, and around 40% in South-East Asia (Fig. 32). For sulfadoxine–pyrimethamine, failure rates remain below 20% in the Eastern Mediterranean, around 20% in South-East Asia and 20–40% in the Western Pacific (Fig. 33). Trends over time are difficult to infer because of the scarcity of studies, and because studies in different sites were conducted in different years. Mefloquine treatment failure has increased to more than 20% in South-East Asia by 2004, and between 10% and 20% in the Western Pacific (Fig. 34).

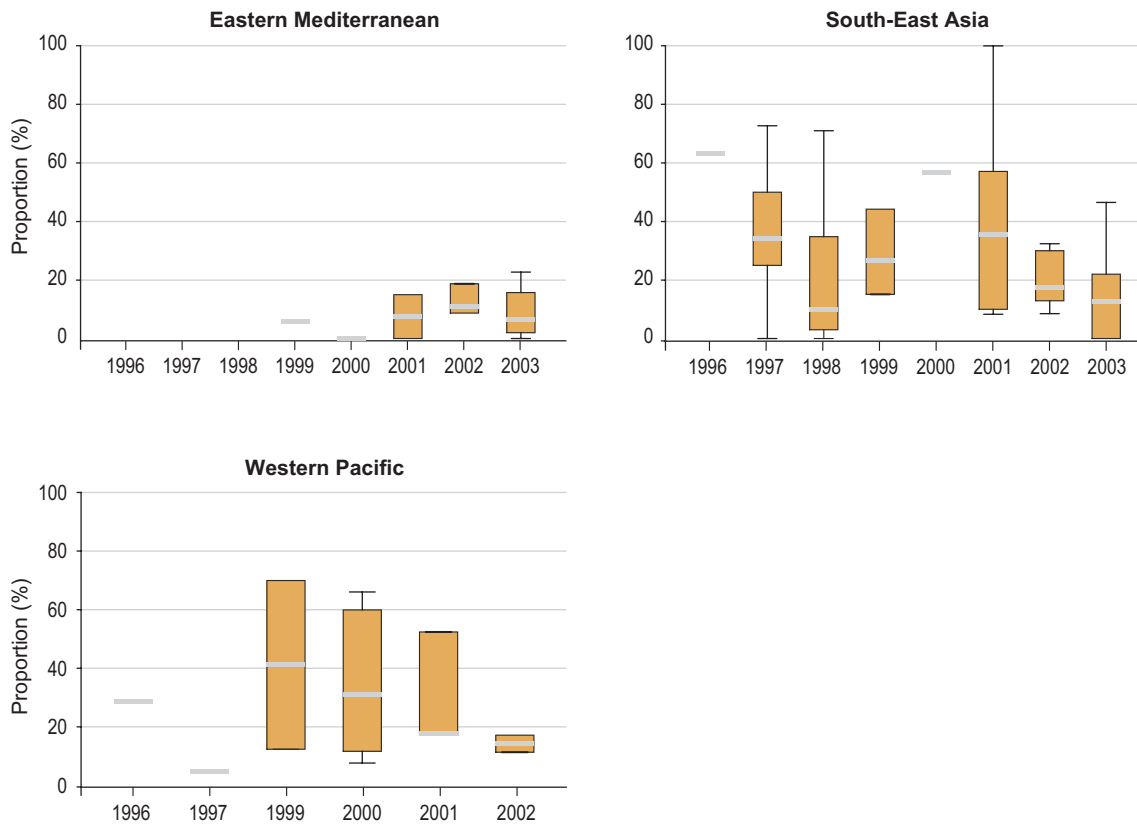
The description of drug resistance of *P. vivax* is more recent. In 1989, the first cases of chloroquine-resistant vivax malaria appeared in Papua New Guinea. *P. vivax* remains generally sensitive to the common antimalarial drugs, but chloroquine and/or pyrimethamine treatment failure has been documented in some focal areas of South-East Asia and Oceania including Irian Jaya and other Indonesian Islands.

**Figure 32.** Treatment failure of chloroquine to falciparum malaria in Asia by subregion, 1996–2004



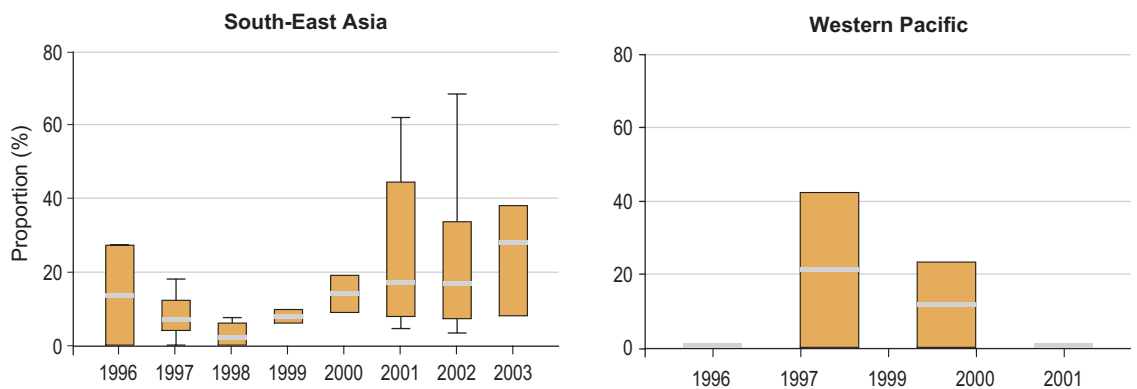
Drug efficacy is expressed as total treatment failure with 28-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median.

**Figure 33.** Treatment failure of sulfadoxine–pyrimethamine against falciparum malaria in Asia, by subregion, 1996–2003



Drug efficacy is expressed as total treatment failure with 28-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median.

**Figure 34.** Treatment failure of mefloquine against falciparum malaria in South-East Asia, 1996–2003



Drug efficacy is expressed as total treatment failure with 28-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median.

### III. THE AMERICAS

- Parasitological species of malaria cases: *P. falciparum* 18%, *P. vivax* 72%, *P. malariae*
- Principal malaria vectors: *A. albimanus* (Central America), *A. darlingi* (Amazon Basin)
- Estimated proportion of population at malaria risk: 14% (21)
- Estimated contribution to the global burden of clinical malaria cases: 3% (2)
- Estimated contribution to the global burden of clinical falciparum malaria cases: 1% (2)
- Estimated contribution to the global malaria mortality burden: <1% (1)
- Main reported control strategies: **prompt and effective treatment, vector control especially IRS and space spraying, ITNs**

#### 1. Disease burden

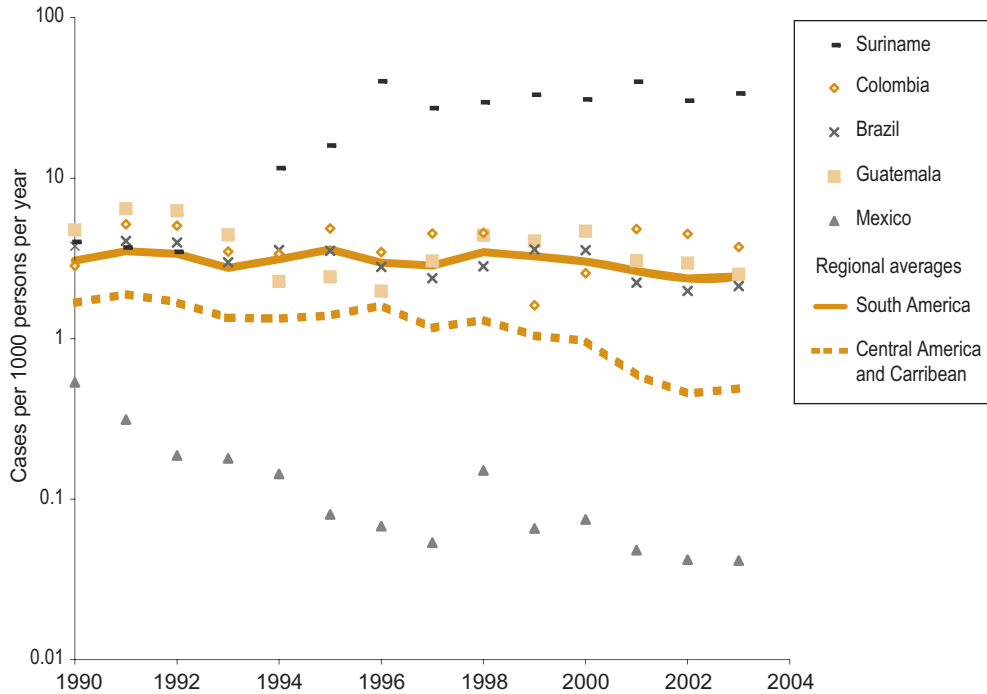
Malaria transmission occurs in 9 countries that share the Amazon rainforest in South America (Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname and Venezuela), 8 countries in Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, Mexico) and in 2 countries that share the Caribbean island of Hispaniola (Haiti and the Dominican Republic). In addition, small numbers of cases are reported from Argentina and Paraguay in South America. Population movement accounts for part of the malaria problem, causing an epidemic in 2003 in Suriname in gold mining areas near the border with Brazil. In Brazil, urban and periurban malaria associated with population movement to the periphery of large cities is increasingly contributing to the disease burden.

The reported case rate pooled across all countries has remained fairly stable since 1990. A slight decrease in recent years mainly reflects a decrease in Mexico (Box 12) and other countries in Central America (Fig. 35).

Across countries in South America, around 25% of reported cases are caused by *P. falciparum*, the remainder are *P. vivax*. In Central America and the Caribbean, an average of around 10% of reported cases are caused by falciparum malaria infection. Between 1994 and 2003, the proportion of cases caused by falciparum infection decreased in Bolivia, Colombia, Ecuador and Peru, increased in Nicaragua and was stable or fluctuating in other countries.

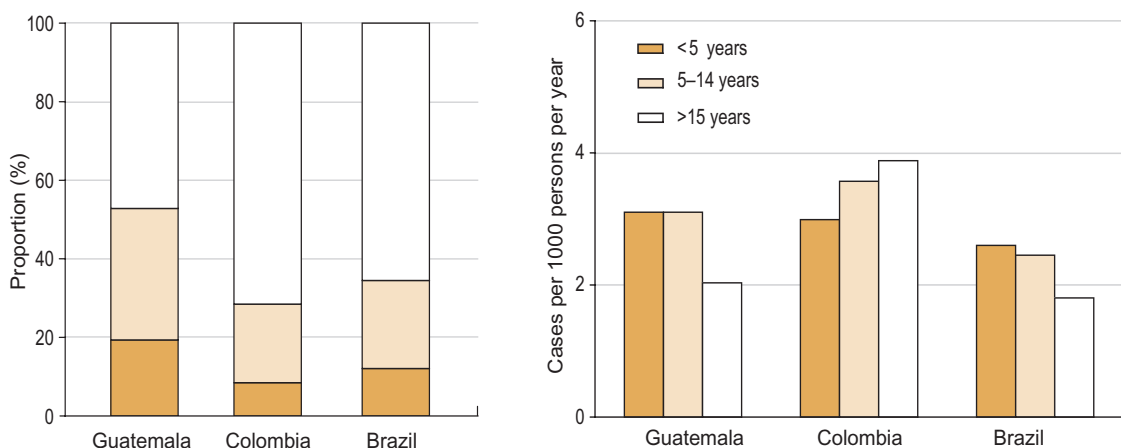
In Colombia and Guatemala, 64% and 53% of recorded cases respectively were male. Brazil, Colombia and Guatemala identified the age distribution of reported cases. Adults over 15 years of age accounted for more than half of the total number of cases in all 3 countries. The case reporting rate decreased with age in Brazil and Guatemala, but increased with age in Colombia (Fig. 36).

**Figure 35.** Standardized rates of malaria reported case rate in malaria-endemic countries in Central America and the Caribbean and in South America, by calendar year, 1990–2003



Numerators are based on confirmed, autochthonous cases. Regional averages, given for South America and for Central America and the Caribbean, are based on all countries including those not providing feedback to WHO, weighted by population size (52). Country-specific rates are shown for countries that provided feedback during the preparation of this report and for Mexico, the most populous country in Central America.

**Figure 36.** Age distribution of reported cases in the Americas, 2003; age distribution of cases (a) and age-specific case rates per 1000 persons per year (b)



Data are from countries that reported numbers of cases by age group in 2003, and for which the sum of age-specific numbers of cases was equal to or smaller than the reported total.

## 2. Control efforts

Nine countries employ ITNs as per the national malaria control strategy. Surveys in Colombia, Nicaragua and malarious areas of Bolivia measured household possession levels of 31%, 42% and 95% for any nets, respectively. In Colombia and selected areas of Bolivia, 2% and 13% of households had an ITN, respectively. The proportions of children under 5 years of age sleeping under a net according to national surveys were 24% in Colombia, 6% in Guatemala and 77% in Suriname; for ITNs, corresponding proportions ranged between 1% and 7%. The low coverage levels in some of these countries probably reflect the fact that ITN promotion, while part of the national malaria control policy, is not the highest priority intervention. It is also important to note that by 2004, coverage is likely to have increased compared with that measured in available surveys, which were conducted between 1999 and 2002.

In all countries with malaria, vector control by IRS and larviciding in focal areas form part of the national malaria control strategy. Argentina has an epidemic preparedness strategy. Most countries are striving to integrate and/or increase collaboration between the malaria control programme and the local health service in order to promote community participation in malaria control.

In addition to financial support provided by national governments, Bolivia, Guatemala, Guyana, Haiti, Honduras, Nicaragua and Suriname receive financial support for malaria control from the GFATM. Colombia, Ecuador, Peru and Venezuela are awaiting final approval from the GFATM for their jointly submitted grant proposal. Mexico and the Central American countries receive support from the Global Environmental Facility.

## 3. Drug efficacy

Recent drug efficacy studies in South America documented over 80% resistance of *P. falciparum* to chloroquine (Fig. 37), and close to 20% resistance to sulfadoxine–pyrimethamine (Fig. 38). Confirmed and/or suspected resistance of *P. falciparum* was also reported for primaquine, mefloquine and quinine. Based on these data, 8 of the 9 endemic Amazon countries (Bolivia, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname and Venezuela) have changed national drug policies and now use ACTs for the treatment of falciparum malaria. However, in several of these countries various other antimalarial drugs remain readily accessible through private pharmacies and/or informal suppliers.

In Central America north of the Panama Canal, the only case of chloroquine failure against falciparum malaria that has been documented so far was in Guatemala. Chloroquine continues to be used for prophylaxis for international travellers to the Dominican Republic and Haiti, (57) and for treatment during recent falciparum malaria epidemics in the Dominican Republic. The drug has generally retained its efficacy for the treatment of vivax malaria in the Americas, although chloroquine-resistant *P. vivax* has been reported in Brazil, Colombia, Guatemala, Guyana and Peru.

**BOX 12. IMPACT OF “FOCALIZED TREATMENT” STRATEGY IN MEXICO**

Climatic conditions such as temperature and humidity would seem to permit malaria transmission in much of Mexico, except for the mountainous and desert areas. The vast majority of cases (99% in 2003) are caused by *P. vivax*, which explains the absence of reported malaria-related deaths since 1982. Effective control measures have now restricted malaria transmission to foci that are in dispersed rural areas, in 15 of the country's 32 states. Thus, 99.8% of Mexico's population now live in areas where malaria is not a threat.

The unsuccessful eradication campaign, centred on IRS with DDT from 1956 to 1982, was followed by a transition phase during which malaria cases dramatically increased (Fig. 39). In 1989, a Plan of Intensive and Simultaneous Actions was instituted, consisting of massive drug administration and insecticide spraying in high-transmission areas. While this plan initially yielded good results, its activities were costly and malaria transmission resumed when the activities were interrupted or limited by budgetary constraints. This occurred in 1998, generating an epidemic affecting mainly Oaxaca State.

Since then, a new strategy, “focalized treatment”, was adopted consisting of:

- epidemiological surveillance and identification of “malaria reservoirs” for malaria patients and their families;
- repeated drug treatments—chloroquine and primaquine—for patients and their families over a 3-year period;
- focal, selective spraying with pyrethroid insecticides.

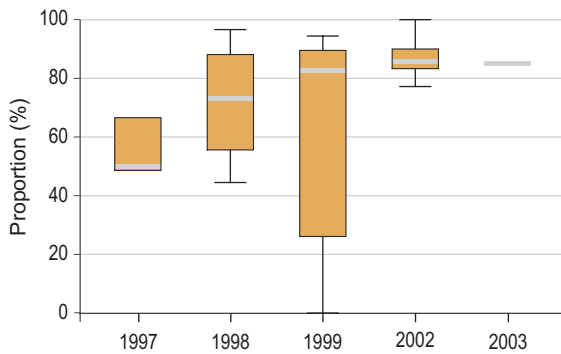
Intensive surveillance is a key activity because:

- climatically, many areas remain suitable to malaria transmission and epidemics could occur if cases are not treated promptly before the parasites spread further.
- population movements from countries south of Mexico with higher malaria endemicity represent a continuous risk of introduction of malaria parasites, including of chloroquine-resistant *P. falciparum*.

The rational use of insecticides has decreased the number of houses sprayed from 500 000 in 1997 to 100 000 in 2003. IRS is now only used in the southern border areas, which reduced the costs of the control programme.

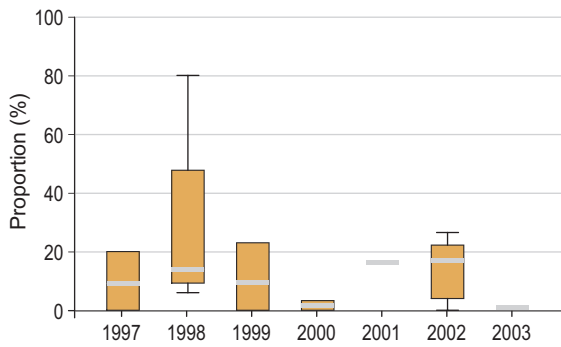
These activities have prevented epidemics and successfully interrupted transmission in 99% of the localities. Between 1985 and 2003, the numbers of reported cases decreased by 97%—3819 cases (Fig. 40). Most remaining cases occur in foci near the country's southern borders, and in four north-west states where difficult access hinders control activities. To date, no drug resistance has been reported. Eventual elimination of the disease does not appear to be an unrealistic goal; such an achievement would yield important health benefits for the country and its neighbours, as well as substantial economic dividends, particularly for Mexico's tourism industry.

**Figure 37.** Treatment failure of chloroquine against falciparum malaria in South America, 1997–2003



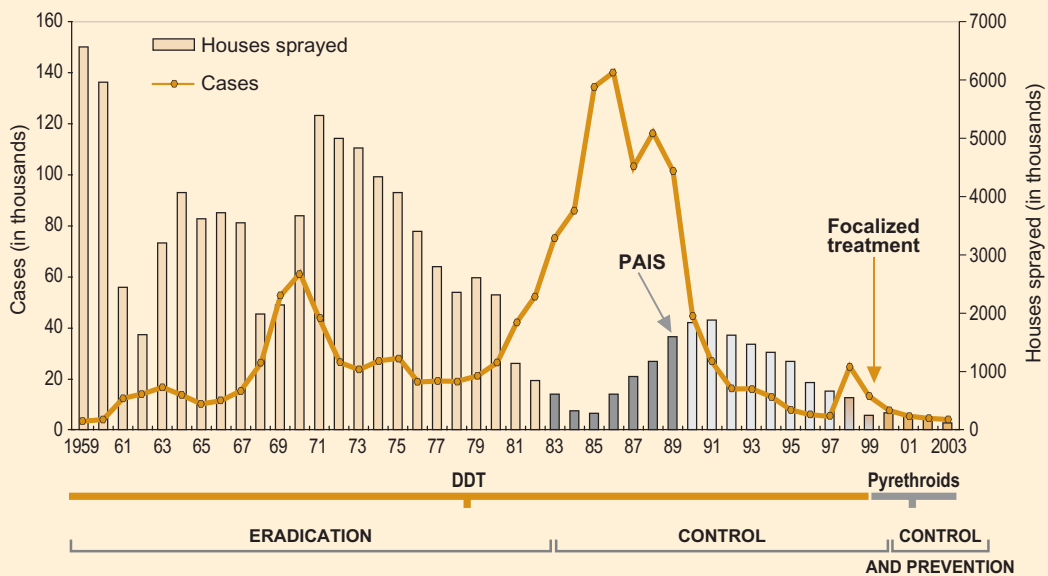
Drug efficacy expressed as total treatment failure with 28-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median.

**Figure 38.** Treatment failure of sulfadoxine–pyrimethamine against falciparum malaria in South America, 1997–2003



Drug efficacy expressed as total treatment failure with 28-day follow up (9). Boxes indicate the 25th and 75th percentile of failure rates observed across available studies, error bars indicate the upper and lower adjacent values and the grey line in each box indicates the median.

**Figure 39.** Malaria cases and insecticide sprayings in Mexico, 1959–2003



PAIS = Plan of Intensive and Simultaneous Actions – Source: Mexico Ministry of Health (Secretaría de Salud)





## SECTION III: GLOBAL FINANCING, COMMODITIES AND SERVICE DELIVERY

### I. FINANCING

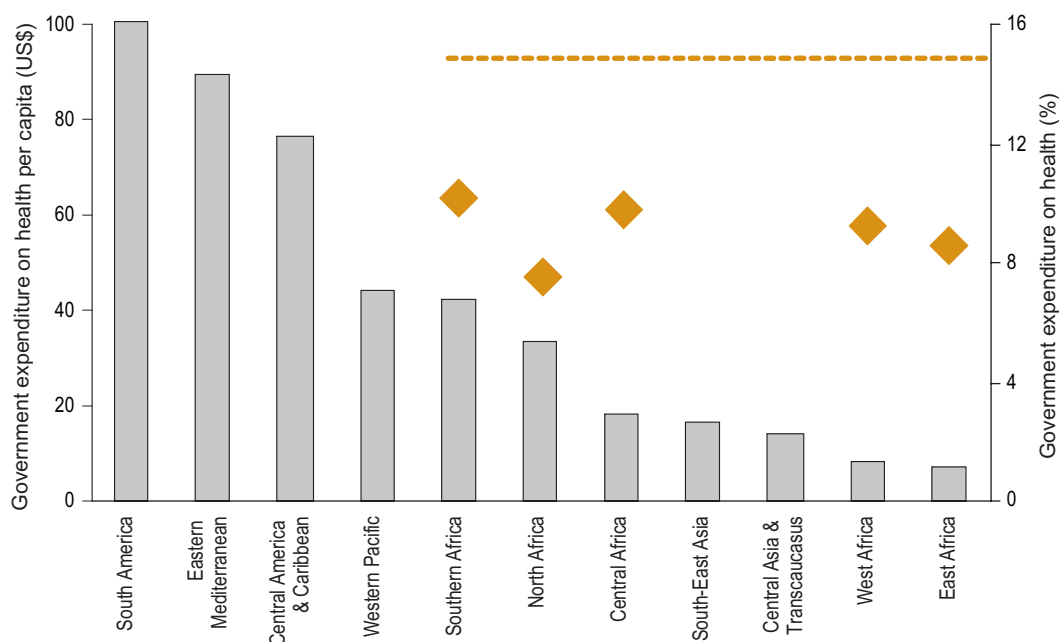
The estimated cost to support the minimum set of malaria interventions required to achieve the 2010 Abuja targets and the Millennium Development Goals for malaria by 2015 for 82 countries with the highest burden of malaria is around US\$ 3.2 billion per year (US\$ 1.9 billion for African countries and US\$ 1.2 billion for the others (38)). Earlier estimates for scaling up malaria interventions suggested that US\$ 2.5–4.0 billion was needed for 50–70% coverage (58). Of this total cost, LLINs would account for about 10%, ACTs—which as of 2004 cost over 10 times as much as conventional monotherapies—for around 36% and rapid diagnostic tests for around 17% (38). Programme costs involving improvement of health infrastructure, human resources and monitoring and evaluation would cover about 19% of costs. The remaining 17% would be directed towards specialized interventions such as against malaria in pregnant women in Africa, epidemic control and the treatment of severe and complicated episodes (38).

In most of the countries with a high malaria burden, the financial gap between what funds are needed and what are available remains large. Understanding the financial resources available for control activities is an important part of monitoring efforts. In general, government expenditures on health are lowest in those countries and regions with the highest burden of malaria, both for absolute per capita expenditures and for health expenditures as a proportion of all government expenditures (Fig. 40). The Maputo Declaration in July 2003 (59) reaffirmed the commitment of African governments to increase financial support for the health sector to a target level of 15% of all government expenditures. In most African countries, private and out-of-pocket expenditures on malaria prevention and treatment are high relative to government expenditure (60). In addition, among African households, out-of-pocket expenditures on malaria prevention and treatment as a proportion of annual income are greatest in the poorest households (61).

#### 1. Sources of national financing

From available data, governments are the main source of funding for malaria control programmes, accounting for 71% of financial contributions in Africa, 80% in Asia and 96% in the Americas (Fig. 41). The remaining contributions represent a mix of bilateral donations, foundations, multilateral lending agencies and international donations. The precise breakdown of nongovernmental contributions is not specified by all of the programmes.

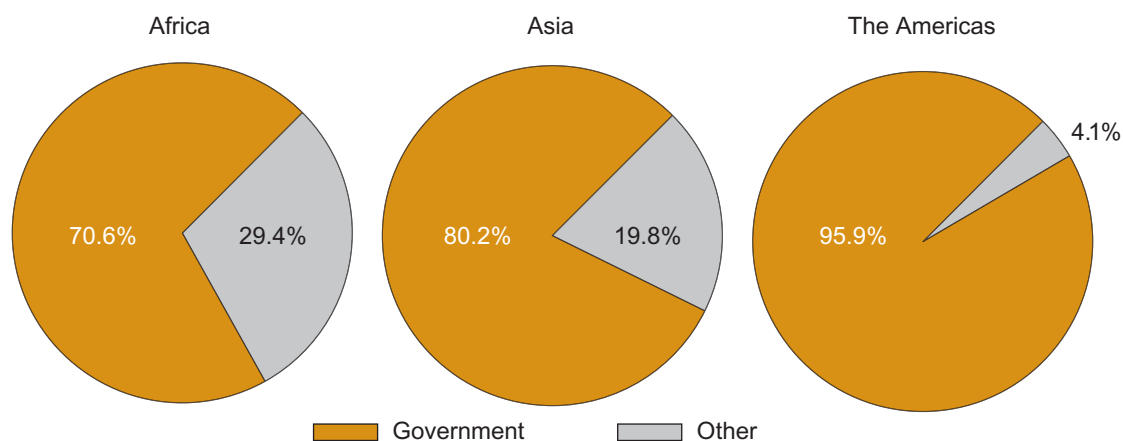
**Figure 40.** Average government expenditures on health per capita in malaria-endemic countries, 2001



Bars: absolute expenditures in US\$, for all subregions.  
 Symbols: government expenditures on health as a proportion of total government expenditures for African subregions. The dotted line indicates the target of 15% of total government expenditures spent on health agreed by African countries in the Maputo Declaration in July 2003 (59).

Source: (62)

**Figure 41.** Financial contributions to malaria control, by region and source



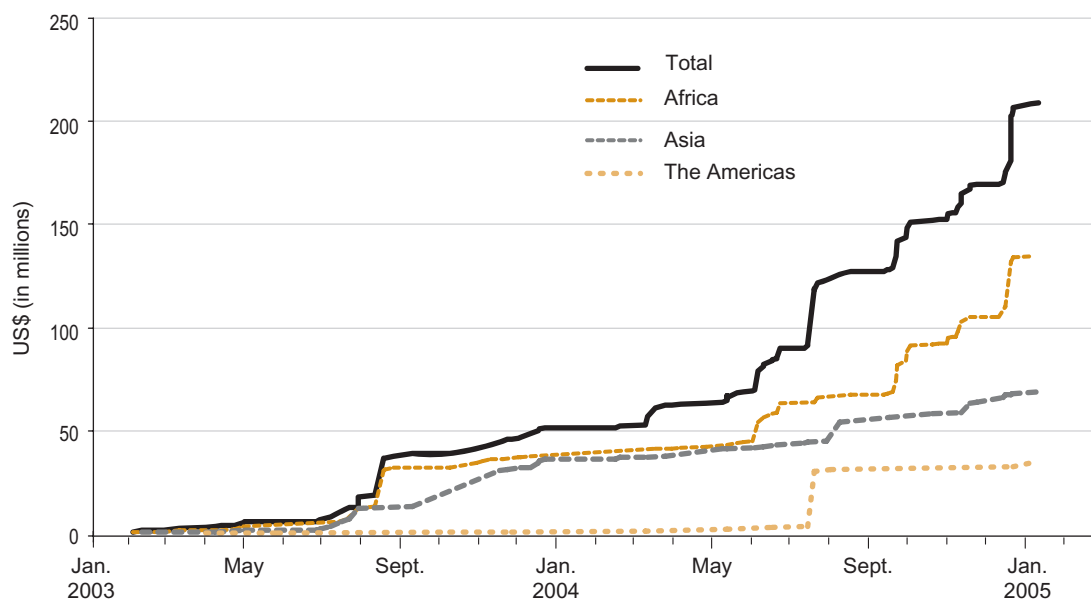
Government and other contributions for malaria control as reported by NMCPs. (Africa: 28 out of 49 programmes; Asia: 13 out of 38 programmes; the Americas: 14 out of 21 programmes). Data for Africa and Asia are from 2003 and from 2002 for the Americas.

## 2. The Global Fund to Fight AIDS, Tuberculosis and Malaria

The GFATM, which started disbursements of grants for malaria control in 2003, has become an important international source of additional funding for scaling up malaria control (Fig. 42). In accordance with the RBM recommendation, the GFATM endorses the use of ACTs as the choice of antimalarial treatment for countries affected by drug-resistant falciparum malaria, in particular in Africa.

By the end of its first four funding rounds up to the end of 2004, the GFATM had US\$ 3.1 billion dollars of committed funds, of which 31% has been targeted to support proposals for control of malaria. In 2003–2004, US\$ 200 million was disbursed to 28 countries in Africa, 15 countries in Asia and 4 countries in the Americas. Malaria allocations on a five-year basis now total about US\$ 1.8 billion, with the approved commitments for 2005–2006 totalling US\$ 881 million. Up to this point there has been a longer than anticipated time lag in the implementation of GFATM grants; by September 2004 a total of US\$ 130 million had been disbursed, but only eight malaria grants totalling US\$ 33 million had already concluded one year in operation.

**Figure 42.** Cumulative disbursements for malaria control from the GFATM up to January 2005

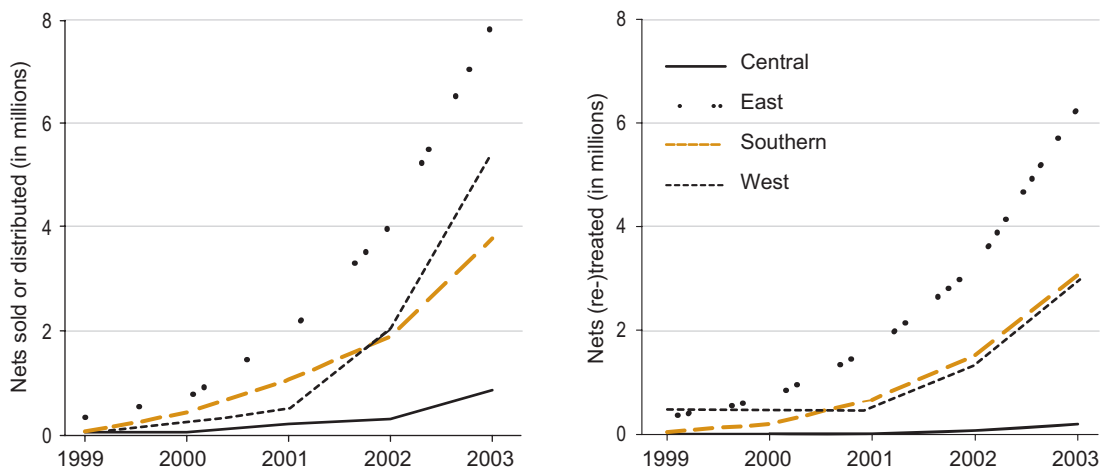


## II. COMMODITIES AND SERVICE DELIVERY

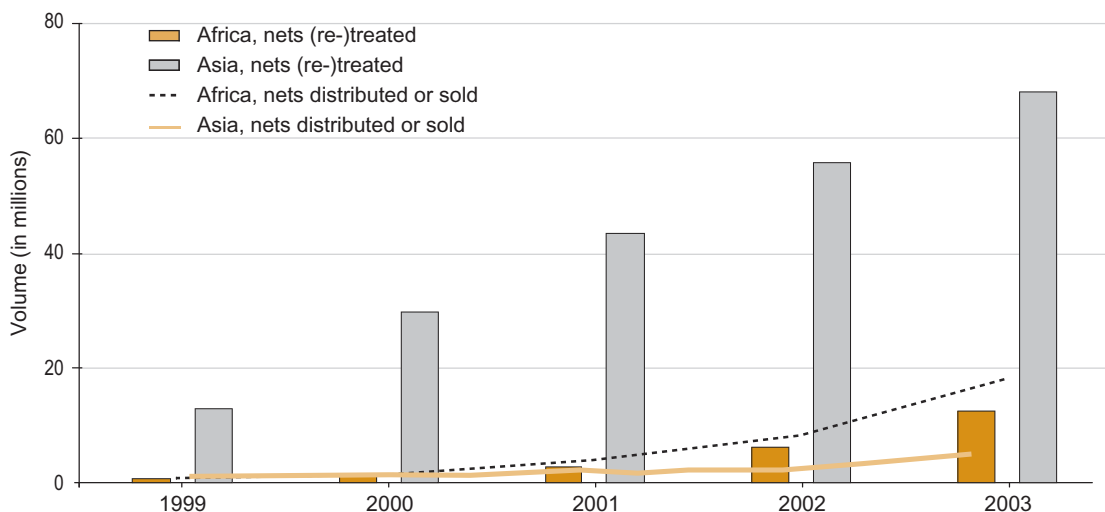
### 1. Net sales and (re-)treatments

By 2003, around 18 million mosquito nets had been sold or distributed in Africa: 8 million in East Africa, over 5 million in West Africa, close to 4 million in Southern Africa and close to 1 million in Central Africa. Around 13 million nets had been (re-)treated with insecticide, of which close to half were in East Africa (Fig. 43). Data totalled from 16 countries in Asia show that around 8 million nets had been distributed or sold and that over 65 million existing nets had been (re-)treated by 2003 (Fig. 44).

**Figure 43.** Cumulative number of mosquito nets sold or distributed and (re-)treated in Africa according to country reports, 1999–2003



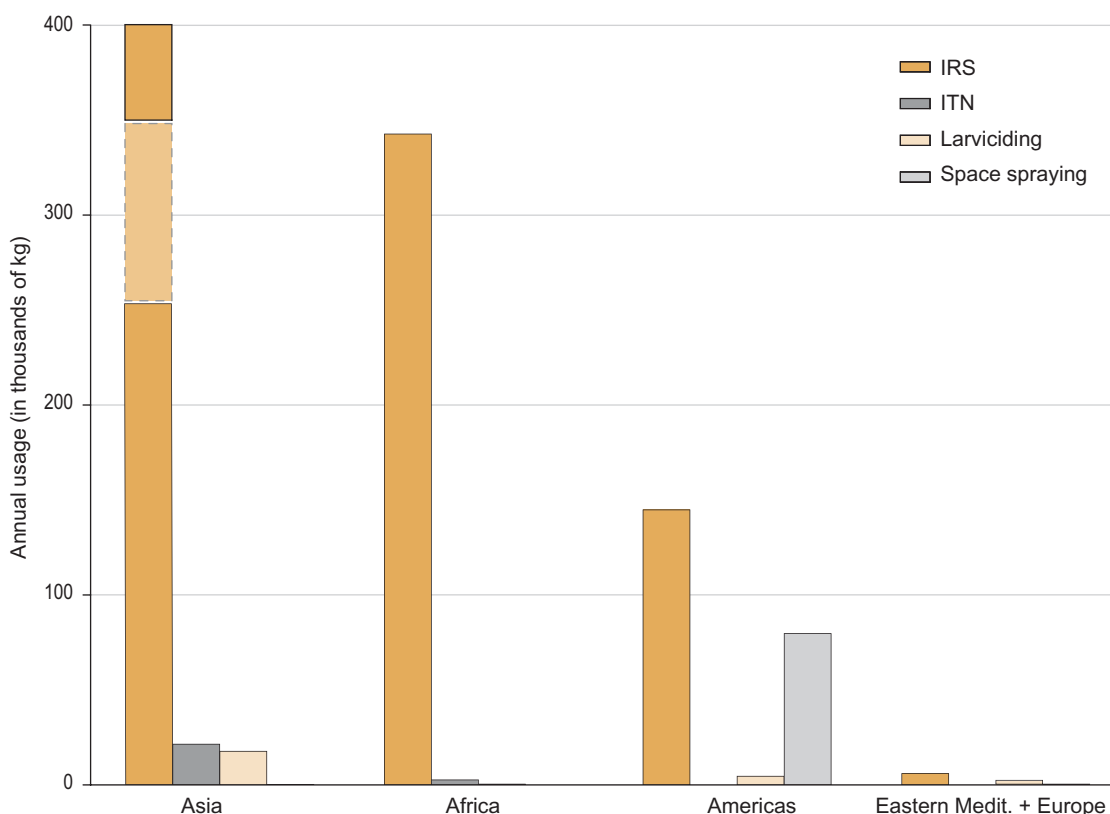
**Figure 44.** Cumulative number of mosquito nets distributed, sold or (re-)treated by region according to country reports, 1999–2003



## 2. Insecticides used for vector control

Reports to WHO from countries on quantities of insecticides used for malaria control, including ITN production and (re-)treatment, and on numbers of units, houses or rooms, sprayed with insecticides give some indication of the extent of vector control. Of all regions, South-East Asia reports by far the largest volume of insecticide usage for IRS (Fig. 45); in contrast, the reported number of units sprayed is greatest in Africa (Fig. 46). This difference indicates that reporting on units sprayed is not complete from all Asian countries; or it might be explained by different regions using different definitions of units sprayed: houses or rooms. Countries in South-East Asia reported a non-negligible amount of insecticide usage for larviciding. Some American countries reported on the use of insecticides for IRS and space spraying, but none reported on units sprayed. The lack of a standardized approach for reporting on IRS makes it difficult to compare countries and regions and to track trends over time.

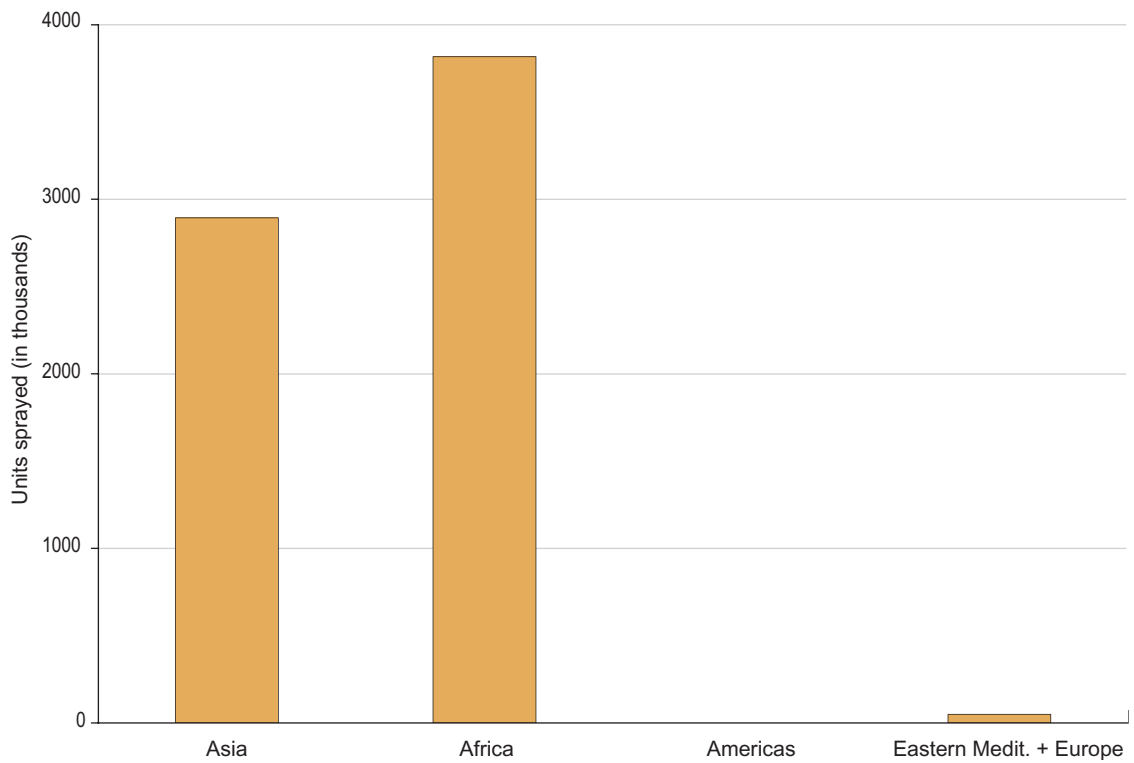
**Figure 45.** Annual insecticide usage for malaria control, by kilogramme of active ingredient, vector control strategy and world region, averaged over 2000–2002



Note: reported usage of IRS in Asia was 1 970 000 kilogrammes.  
Data from country reports to WHOPES averaged over 2000–2002 (63).

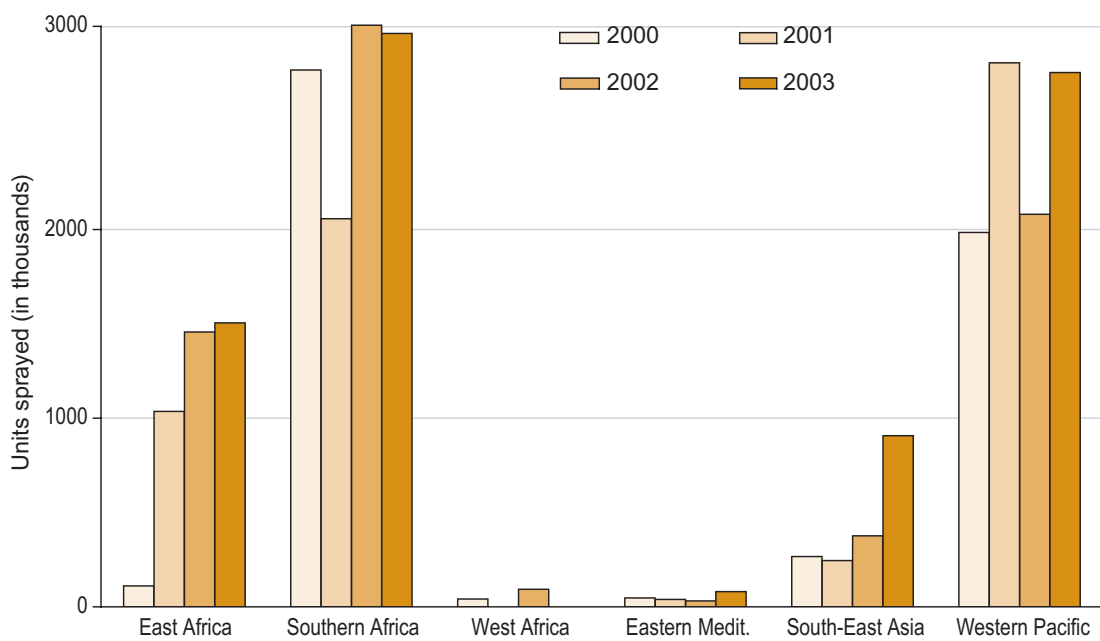
The reported number of households or units using IRS by region and by year increased between 2000 and 2003, especially in East Africa and South-East Asia (Fig. 47). This suggests that IRS activity is being intensified, even though the reporting by countries was not complete, especially in the earlier years.

**Figure 46.** Units sprayed with residual insecticide by region, averaged over 2000–2003



Data reported to WHO.

**Figure 47.** Reported use of indoor residual spraying by region, 2000–2003



### 3. Drug supplies

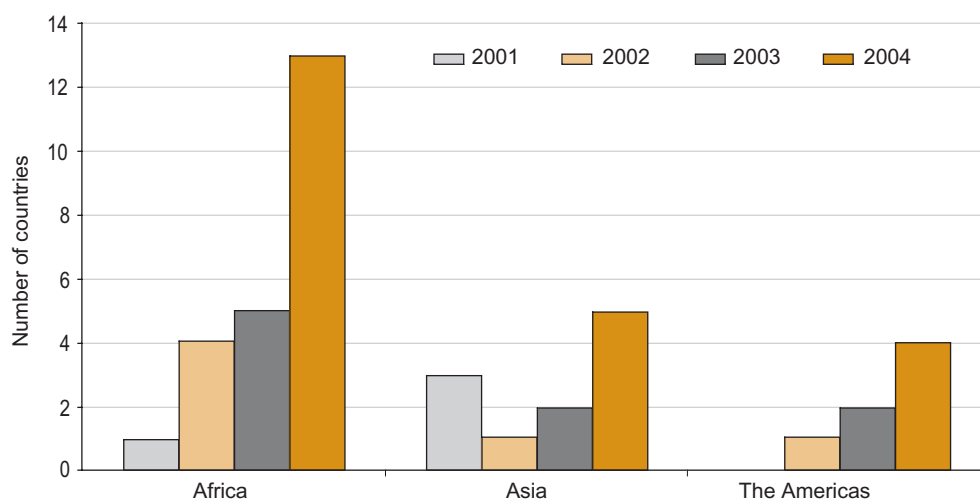
For ACTs, production and financing presents a major challenge to meet the estimated global demand for 120 million adult treatment courses in 2005 (64). An increasing number of countries adopted ACTs as their national policy and have started procuring artemether–lumefantrine (Fig. 48), with most procurements in dosages for young children (Fig. 49).

In 2004, a shortage arose of artemether–lumefantrine. Novartis Pharma AG, the manufacturer of Coartem®, has secured sufficient artemisinin derivatives for 30 million treatment courses in 2005; however, over half of this will be produced during the last 3 months of the year, which means that the drug combination will only become available after the high transmission season in many malarious areas.

Scaling up the cultivation of *A. annua* is under way in China and Viet Nam. With support from USAID, WHO and other RBM partners, the possibility of large-scale production of artemisinin in Africa is being explored. Pilot cultivation schemes in Kenya and United Republic of Tanzania are encouraging.

For antimalarial drugs other than Coartem®, global production and supply are currently not being monitored. Some countries record and report volumes of drugs procured, but these data were not available in standardized format and in sufficient completeness to permit analyses for this report.

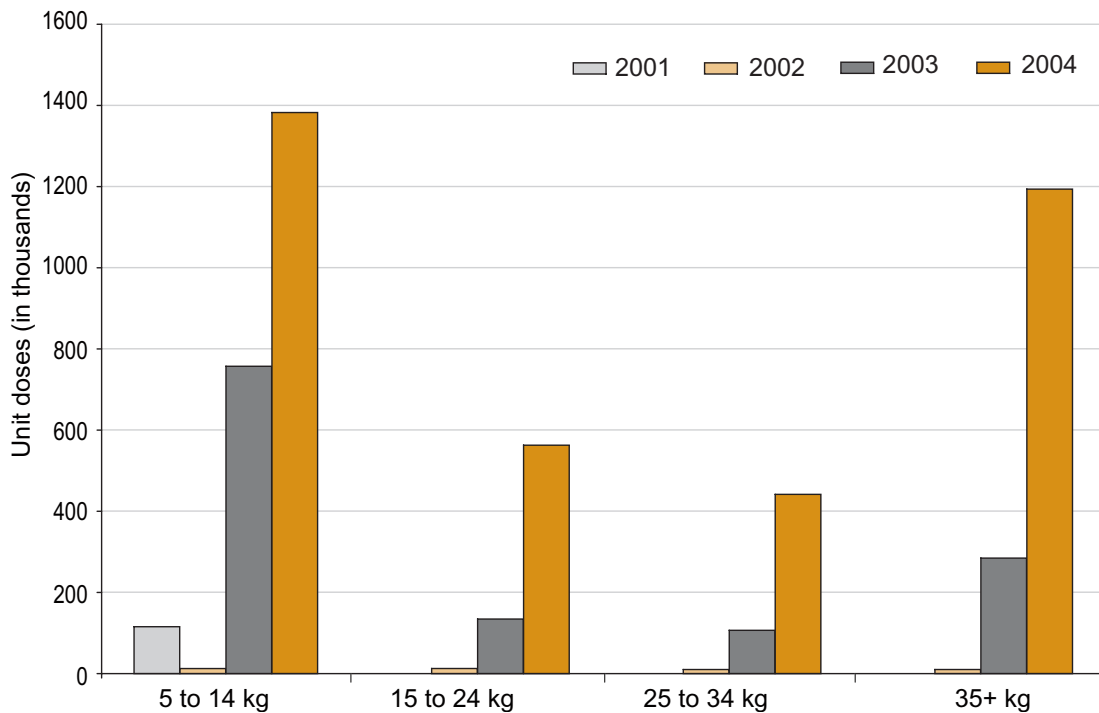
**Figure 48.** Number of countries procuring artemether–lumefantrine (Coartem®), by region, 2001–2004



Source: WHO. No procurement data are available for other ACTs.



**Figure 49.** Procurement of artemether–lumefantrine, by category of intended patients' weight, 2001–2004



Source: (64).

#### 4. Development of new drugs, diagnostics, insecticides and vaccines

Effective insecticides and drugs to prevent and treat malaria exist, but the rapid development of resistance of *Plasmodium* to most available antimalarial drugs and of *Anopheles* mosquitoes to insecticides means that currently effective tools are likely to be less effective in the future. Therefore, continuing to deliver prompt and effective prevention and treatment for malaria depends on the ongoing discovery, development and implementation of new tools.

The funding and management of the discovery, development and registration of next generations of safe, effective and affordable antimalarial drugs—including new ACTs—is being coordinated by the Medicines for Malaria Venture, which brings together public, private and philanthropic sector partners (65). Its priority is to develop drugs with low intrinsic “cost of goods”, in part by focusing on simple process chemistry and in part by manufacturing in countries such as China, India and the Republic of Korea, which are relatively competitive and where production costs are less. As of October 2004, the Medicines for Malaria Venture had 21 drug discovery and development projects for malaria in its portfolio. The organization estimates that it requires US\$ 200 million to develop one new fixed-dose ACT. The continual development of new antimalarials for populations at endemic risk, including special groups such as children and pregnant women, at the rate dictated by the development of drug resistance will cost at least US\$ 30 million per year,

possibly more after 2006 when more projects move into the expensive phases of clinical development.

For diagnosis of malaria, a considerable array of rapid diagnostic tests has become commercially available since their introduction in 1994. Rapid diagnostic tests are used increasingly in all malaria-endemic regions, particularly as a replacement to symptom-based (presumptive) diagnosis and often in the context of adopting a costly ACT as first-line malaria treatment. In Thailand, rapid diagnostic tests have been used experimentally for many years; in Botswana, Cambodia, South Africa and parts of Mozambique and Swaziland, they are now used routinely for confirmation of suspected malaria cases. In 2004, several new tests have become available, in particular tests for detecting non-falciparum malaria. There remain limitations in sensitivity and suitability of rapid tests for use in remote tropical environments, but more stable tests are under development. A planned WHO prequalification scheme will assist in purchasing good-quality tests (66).

The development of an effective antimalarial vaccine has proved more complex and more expensive than expected, although prospects improved with the completion of the genetic blueprints of the *Anopheles* mosquito and of *P. falciparum* in October 2002. In 2004, a Phase IV trial with the pre-erythrocytic vaccine RTS, S/AS02A demonstrated a 29% protection against clinical episodes of malaria in young children in the short term in Mozambique, suggesting that the development of an effective vaccine against malaria is feasible (67). The Malaria Vaccine Initiative currently supports 10 vaccine projects globally, 2 of which have clinical trials under way in Africa (68).



## SECTION IV: IMPROVING ROLL BACK MALARIA MONITORING AND EVALUATION— THE WAY FORWARD

**The data presented** in this report illustrate not only the progress made in recent years in monitoring of malaria control but also identify several gaps and limitations in available data and challenges that remain in data collection efforts. This section first reviews the overall requirements for malaria monitoring and evaluation in different world regions. Recent progress is then highlighted and recommendations are made for improving data collection and reporting in the future at country, regional and global levels. Where relevant, reference is made to the ongoing work of the RBM Monitoring and Evaluation Reference Group (MERG), which is described in more detail in Annex 4.

### 1. Overview of Roll Back Malaria monitoring and evaluation

The goal of a national RBM monitoring and evaluation system is to provide reliable information on progress in controlling malaria that can be used at local and national levels and can inform regional and global efforts. The corresponding specific objectives are:

- collect, process, analyse and report on malaria-relevant information;
- verify whether activities have been implemented as planned to ensure accountability and address problems that have emerged in a timely manner;
- provide feedback to relevant authorities to improve future planning;
- document periodically whether planned strategies have achieved expected outcomes and impacts.

The basic monitoring and evaluation framework shown in Box 1 in the Introduction outlines the inputs, outputs, processes, outcomes and impact indicators that should be tracked in a good monitoring and evaluation system. However, in limited-resource settings, experience has shown that priorities must be established. The highest priorities include tracking:

- human and financial inputs;
- malaria control services delivered to those at risk of malaria;
- the coverage of the interventions;
- measures of mortality and malaria-associated morbidity.

## 2. Key Roll Back Malaria coverage and impact indicators, by region

Given the differences in malaria epidemiology, appropriate intervention strategies and the design and quality of HIS, appropriate RBM indicators also differ somewhat between regions. The major distinction is between Africa south of the Sahara and similar environments such as Papua New Guinea where malaria is highly endemic throughout countries, and the rest of the world, where malaria is more unstable and focal in nature (Table 9).

**Table 9.** Examples of appropriate Roll Back Malaria impact and outcome indicators, by type of malaria endemicity

Indicator	Highly endemic malaria	Unstable malaria	Remarks
<b>IMPACT</b>			
All-cause under-5 mortality rate	✓		Retrospective, ideally measured every 5 years; demonstration of impact could lag up to 5 years because reported mortality reflects the average rate over the 5 years preceding surveys (20)
Anaemia prevalence in children under 5 years of age	✓		Haemoglobin below 11 g/dl or 8 g/dl, to be measured in community-based surveys; impact likely to be detectable within 1–2 years (73)
Parasite prevalence rates in community surveys	✓	✓	To be surveyed during the transmission season; impact likely to be detectable within 1–2 years
Laboratory-confirmed malaria cases seen in health facilities		✓	To be interpreted alongside annual estimates of HIS reporting completeness
Laboratory-confirmed malaria deaths seen in health facilities		✓	
Malaria-attributed deaths in sentinel demographic surveillance sites	✓	✓	Observed trend might underestimate actual impact due to limited sensitivity and specificity of verbal autopsy (18)
<b>OUTCOME</b>			
% of U5 children (and other target groups) with malaria/fever receiving appropriate treatment within 24 hours (community/health facility)	✓	✓	
% of U5 children (and other target groups) with uncomplicated malaria correctly managed at health facilities	✓	✓	
% of U5 children (and other target groups) admitted with severe malaria and correctly managed at health facilities	✓	✓	
% of health facilities with no stock-outs of nationally recommended antimalarial drugs continuously for 1 week during the last 3 months	✓	✓	
% of households with at least one ITN	✓	✓	
% of U5 children sleeping under an ITN	✓		
% of pregnant women (and other target groups) sleeping under an ITN	✓	✓	
% of pregnant women on IPT according to national policy	✓		
% of malaria epidemics detected within 2 weeks of onset and properly controlled		✓	
% of households in malarious areas protected by IRS		✓	

✓ = YES

### 3. Recent progress in monitoring

In recent years, progress has been made in standardizing core indicators between countries and regions and in setting up sustained efforts for measuring these indicators regularly over time. This section focuses on household surveys, surveillance of drug resistance and procurement data.

#### • Household surveys

Community-based (household) surveys on intervention coverage are conducted in an increasing number of malarious countries (Table 10). The national-level MICS and DHS that are conducted at 5-year intervals now include questions on malaria, specifically in relation to the coverage of ITNs and on antimalarial treatment of fevers/malaria illness in young children (10, 11). Since 2001, these questions have been grouped into standard malaria modules that are included in surveys in all malarious countries, allowing valid comparisons of coverage levels between subsequent surveys within a country as well as between countries. In 2005–2006, approximately 46 malaria-endemic countries (of which 30 are in Africa) will have an MICS and an additional 29 malaria-endemic countries (of which 16 are in Africa) will have a DHS.

#### • Service delivery

The delivery of malaria-related services to populations at risk is being monitored by many NMCPs and other agencies involved in implementing control activities in countries. Indicators include the number of ITNs distributed or sold, ITN (re-)treatments provided, quantities of insecticides used for IRS and quantities of drugs supplied (Table 11). Between 2000 and 2003, the number of countries that reported the number of households or units using IRS increased.

#### • Surveillance of antimalarial drug resistance

Surveillance systems that monitor the efficacy of locally used drugs have been set up in most countries with endemic falciparum malaria (Table 12). Standardized, high-quality drug efficacy surveillance is being promoted through subregional initiatives in the Mekong (69), the East African Network for Monitoring Antimalarial Treatment (70), the Horn of Africa Network on Monitoring Antimalarial Treatment (71) and the Amazon Network for the Surveillance of Antimalarial Drug Resistance (RAVREDA) (72). In addition, many NMCPs are developing and strengthening national networks to monitor the efficacy of antimalarial drugs—including combination therapy—for the treatment of falciparum malaria, and, to a lesser extent, of vivax malaria. RBM support for these networks includes assistance in choosing appropriate sentinel sites, training and strengthening reference laboratories for quality control and data analysis.

**Table 10.** Survey availability on mosquito net possession and use, 1999–2004

Region	Subregion	INDICATOR					
		Household possession of mosquito nets	Household possession of ITNs	Use of mosquito nets by under-5 children	Use of ITNs by under-5 children	Use of mosquito nets by pregnant women	Use of ITNs by pregnant women
NATIONAL SURVEYS							
Africa	Central	–	–	7	6	–	–
	East	7	3	11	11	3	3
	North	NA	NA	NA	NA	NA	NA
	Southern	5	3	9	7	2	2
	West	7	4	13	13	5	3
Asia	Central Asia & Transcaucasia	–	–	2	2	–	–
	Eastern Medit.	1	1	1	1	–	–
	South-East Asia	–	–	2	2	–	–
	Western Pacific	1	–	2	2	–	–
The Americas	Central America & Caribbean	1	–	–	–	–	–
	South America	1	1	2	2	–	–
SUBNATIONAL SURVEYS							
Africa	Central	3	2	2	1	2	1
	East	18	7	11	5	3	2
	North	–	–	–	–	–	–
	Southern	5	5	6	4	3	2
	West	7	9	7	9	6	8
Asia	Central Asia & Transcaucasia	–	–	–	–	–	–
	Eastern Medit.	–	–	–	–	–	–
	South-East Asia	2	–	–	–	–	–
	Western Pacific	1	1	1	–	1	–
The Americas	Central America & Caribbean	–	–	–	–	–	–
	South America	–	–	–	–	–	–

NA = not applicable because ITNs are not part of the national malaria control policy of any North African country. Surveys are classified as national or subnational based on sampling frame design and in relation to the local distribution of malaria burden. National surveys include DHS (11) and MICS (10); subnational surveys include those conducted by NetMark (in Africa) (12) and PSI (13).

**Table 11.** Number of countries reporting on status of key service-delivery activities, by national malaria control programmes, 2003

Region	Subregion	Total number of countries	No. of nets (re-)treated	No. of nets sold or distributed	No. of HHs/units sprayed
Africa	Central	8	6	7	–
	East	12	8	10	5
	North	3	–	–	–
	Southern	11	8	9	8
	West	16	7	9	–
Asia	Central Asia & Transcaucasia	7	–	–	–
	Eastern Medit.	9	1	4	4
	South-East Asia	10	4	9	4
	Western Pacific	10	7	4	5
The Americas	Central America & the Caribbean	10	–	–	–
	South America	11	–	–	–
<b>Total</b>		<b>107</b>	<b>41</b>	<b>52</b>	<b>23</b>

**Table 12.** Number of studies available of antimalarial drug efficacy against falciparum malaria that meet WHO protocol (9), by region, 1996–2004

Region	Subregion	Monotherapy				Combination therapy							All ACTs <sup>a</sup>	
		CO	SP	AQ	MQ	CO+SP	AQ+SP	ASU+CO	ASU+SP	ASU+AQ	ASU+MQ	ATM+LUM		
Africa	Central	33	28	16			9		6	5		2		<b>13</b>
	East	135	114	58	1	30	18		9	20		11		<b>40</b>
	Southern	109	64	4	1	25	1		8	2		4		<b>14</b>
	West	156	41	12			5	1	1	3	2	2		<b>9</b>
Asia	Central Asia & Transcaucasia	1	1			1								<b>0</b>
	Eastern Medit.	32	11	2			2	1	1	1				<b>3</b>
	South-East Asia	71	51		42	10			4	4	48	10		<b>74</b>
	Western Pacific	26	15		6	14	1	2	2		16	6		<b>26</b>
The Americas	South America	21	28	7	18	3	4		3		7	2		<b>12</b>
<b>Total</b>		<b>584</b>	<b>353</b>	<b>99</b>	<b>68</b>	<b>83</b>	<b>40</b>	<b>4</b>	<b>34</b>	<b>35</b>	<b>73</b>	<b>37</b>		<b>191</b>

<sup>a</sup> Includes ACTs other than those listed separately in other columns in the table.

Available results cover all countries with endemic falciparum malaria except Comoros, Djibouti, Sao Tome and Principe, all 10 Central American countries and Paraguay.



#### 4. Limitations in available data and recommended improvements

Table 13 lists a number of important limitations in the availability of data and in the interpretation of the data presented in earlier sections of this report. Based on these limitations, coordination among monitoring and evaluation stakeholders and capacity for the standardized collection of quality data should be improved. This is true for many levels but first and foremost at country level, where most of the data originate.

##### *Disease burden and impact*

In high-burden countries with poor access to health care and with inadequate disease surveillance systems—in particular in Africa—major investment would be required to improve the quality of both HIS and access to health services, before the utility of HIS case and death reports for monitoring malaria disease trends could be assessed. Malaria case reporting under the system of Integrated Disease Surveillance and Response is in various phases of implementation in 36 African countries (36); this system remains to be evaluated for its reliability and completeness.

Apart from access to care and information systems, an inherent problem of malaria case reports in high-endemic Africa is that the appropriate definition of what a case report consists of is not obvious. In the absence of laboratory capacity in those areas where malaria is most prevalent, most diagnoses and treatments occur presumptively (on purely clinical grounds); for the vulnerable group of children under 5 years of age, presumptive treatment is in fact recommended in order not to delay potentially life-saving treatments (32), although clinical malaria might not be the most appropriate definition for purposes of monitoring. However, even if all clinical diagnoses were confirmed by parasitaemia testing, the diagnosis would still not have optimal specificity, because asymptomatic parasitaemia is common, so that a fever accompanied by parasitaemia does not necessarily indicate a fever that is caused by malaria. Despite these problems, HIS data are useful for local programme planning, in particular for forecasting drug supplies needed for delivery through the public sector, in all countries.

For disease trend monitoring in high-endemic countries, population-level data are thus indispensable. To supplement available data on all-cause under-5 mortality, the prevalence of childhood anaemia and malarial parasitaemia are potentially useful survey-based indicators. Because under-5 mortality measured in cross-sectional surveys refers to the mortality rate over the 5 years preceding a survey and thus lags behind for the detection of any trends that started less than 5 years before, anaemia and parasitaemia prevalence would allow for a more rapid detection of impact (20, 73). For surveys of parasite infection rates to be useful, these should be conducted during or immediately after the peak transmission season (Annex 4).

For African countries that are approaching the Abuja targets of 60% coverage with ITNs and prompt and effective treatment, evaluating the trend in malaria-specific mortality will also become relevant. This could be done in representative, small-scale sentinel demographic surveillance sites based on verbal autopsies (18) (Annex 4).

In areas where overall health-care systems are more developed, where the majority of patients with malaria access the formal health-care system, and where malaria

diagnoses are generally laboratory-confirmed, malaria cases and deaths reported through HIS are important burden and impact indicators. Case reports split by age group are useful for forecasting drug supply needs in different dosages and formulations.

It is crucial, however, to understand the completeness of HIS reporting and how the completeness might change over time. Between 2000 and 2003, the global annual number of reported cases averaged 48.3 million. These case reports came from between 77 and 100 of the 107 malaria-endemic countries and territories in a given year (Table 2). Compared with WHO's estimate of 350–500 million cases in 2004, HIS would detect globally 10–14% of actual malaria cases (2). However, this percentage would be the average in some countries where HIS overreports malaria and in most other countries where HIS detects much less than 10–14% of cases.

In comparison, of the 107 malarious countries and territories, 10 provided their own reliable estimate of HIS reporting completeness in 2003 (Annex 1). These estimates ranged from 20% to 100%, but the definition of completeness was not always specified and probably varied between countries.

WHO is planning to assist countries in establishing standard definitions and methods for assessing the completeness of HIS reporting. Such assessments should take account of the extent to which the national HIS covers malaria cases that are treated in the private and informal sectors. The number of districts or other relevant subnational units with malaria that reported on malaria cases each month should also be considered. Rapid diagnostic tests, as an additional tool for laboratory-confirmation of malaria diagnosis, may in future years help to ensure the quality of malaria case and death reports (66).

Vital registration systems that record causes of deaths are an important complement to HIS data, and the coverage and quality of vital registration must be promoted (Annex 4).

### ***Intervention coverage***

RBM is working with WHO, UNICEF, Macro/DHS and other international survey agencies to coordinate household survey activities and to further standardize methods, questionnaires and analysis plans for assessing relevant malaria indicators. Planning and implementation of household surveys are being monitored through the RBM MERG for identification of countries that need assistance and financial support (Annex 4). To supplement the data collection from DHS and MICS, in 2004 the Malaria Indicator Survey (MIS) was developed for the standardized assessment of core RBM coverage indicators.<sup>5</sup> The MIS package contains standardized, best-practice survey methods, questionnaires and analysis plans. A MIS could be used to design malaria surveys in countries where no other surveys are being conducted, or to fill gaps within the 5-year intervals between subsequent DHS or MICS, for a more rapid detection of progress. A scaled-down version of MIS is also available, called the standardized “lean malaria module”, with standard questions on malaria intervention coverage that could be added to other planned household surveys.

Recent improvements in the questionnaires of DHS, MICS and MIS included the addition of standardized questions on promptness and dosages of antimalarial treatment. The next round of MICS, in 2005–2006 in around 46 countries with malaria,

<sup>5</sup> <http://rbm.who.int/merg>

is therefore expected to provide the first multiple-country dataset allowing a valid assessment of the coverage of prompt and effective treatment of young children. Also, levels of household possession of ITNs, the most important ITN coverage indicator in countries outside Africa, will be routinely collected from 2005 onwards.

Available surveys and survey designs do not fully address the need for coverage data. First, there is presently no standardized tool for measuring the coverage of antimalarial treatment in Asia and the Americas. Unlike in Africa, survey data on the treatment of children with fever are not optimally informative in areas where only a small proportion of reported fevers are actually caused by malaria, and where children under 5 years of age are not the only or main risk group for malaria. In these settings, surveys should measure treatment-seeking behaviour in older age groups as well, and using "all fever episodes" as the denominator would be less appropriate.

Second, for IPT coverage, a control strategy that is still in its first few years of scaling up, facility-based surveys in selected areas where the policy has already been implemented may at present be a more appropriate measurement method than are national surveys. Because antenatal clinic attendance is high (>80%) in many of the African countries where IPT is policy (Fig. 12), antenatal clinic attendees can be expected to be a representative sample of the population targeted with IPT. A further advantage of facility-based surveys above household surveys is that the former provide more timely data. This is because surveys typically have to rely on data about previous pregnancies, since the number of respondents being pregnant at time of the survey is small.

### ***IRS delivery and coverage***

Also urgently lacking is a standardized measurement and operational definition of IRS coverage, which is why this report did not present data on this issue. Several countries conducting IRS reported an estimated IRS coverage for at-risk areas to WHO regional offices, and many centralized IRS programmes maintain detailed household listings of targeted spray areas. However, the definition of IRS coverage is not yet standardized across the world. Countries and regions vary in whether to define "coverage" in terms of geographical area, numbers of houses or household structures sprayed or numbers of people living in sprayed houses. They also vary in whether populations at no or low risk are included in the denominator, in the definitions of population at risk and the source of population data used, and in whether to apply a minimum threshold frequency of IRS.

In the absence of data on houses sprayed, IRS coverage could alternatively be estimated from quantities of insecticide used for IRS, by assuming a specific application rate for each insecticide and an average sprayable area per house, e.g. 250 m<sup>2</sup> (74). However, annual collection by WHO of country data on this service delivery indicator was very incomplete from 2000 to 2003 (63). In areas where spraying programmes are highly decentralized or where monitoring efforts at the national level are less developed, the inclusion of questions on IRS coverage in MIS might prove useful.

***Drug efficacy***

A challenge for drug efficacy monitoring, especially in countries not covered by the above initiatives, is to ensure appropriate documentation of studies to allow determination of whether study designs followed the recommended WHO protocol (9). In regard to the massive implementation of ACTs, the effectiveness of these therapies must be closely monitored. Reference laboratories must be set up that can coordinate with the NMCPs. Finally, if possible, countries should also use in vitro testing and molecular markers to study the resistance to each of the component drugs individually and as an early warning system that could detect the development of resistance earlier and with greater sensitivity than clinical testing.

***Forecasting supply needs***

The Malaria Medicines and Supplies Service, an initiative of the RBM Partnership established in 2004 to facilitate access to high-quality and affordable antimalarial medicines and other essential supplies, will set up a monitoring system for the manufacturing and global sales of drugs (64). Whereas the Malaria Medicines and Supplies Service now provides a unique oversight on pricing and supply management at global level, particularly with respect to drug production, at country level greater efforts are needed, especially in the area of monitoring drug usage, demand and regulation of drug supplies. An evidence-based, standardized approach to forecasting drug supplies should be developed. The forecasts should consider the needs for treatment services through the formal health sectors—public and private—as well as through channels such as home management.

***Financial resources***

Monitoring financial resources for malaria control activities is important for ensuring that adequate resources are committed and sustained, and that health budgets are allocated among districts and programmes proportional to disease burden. Raising the estimated annual US\$ 3.2 billion necessary to support the minimum set of malaria interventions in the 82 most malarious countries (38) will require coordinating financial information from national governments, the GFATM, the corporate for-profit sector, bilateral agencies, NGOs, international foundations and multilateral development organizations.

At country level, it is particularly difficult to track out-of-pocket expenditures for treatment and prevention and public funding embedded in the provision of general public health services, including, for example, health centres and hospitals where malaria cases are treated. For African countries, finance monitoring should include tracking progress towards the target reaffirmed in the Maputo Declaration of July 2003: 15% of national budgets should be allocated to the health sector (59). For donors, monitoring of financial resources for malaria is essential to ensure that the pledged resources are in addition to current assistance levels (57). This is explicitly acknowledged in the mission statement of the GFATM, which “only finances programmes when it is assured that its assistance does not replace or reduce other sources of funding, either those for the fight against AIDS, tuberculosis and malaria or those that support public health more broadly”.<sup>6</sup>

<sup>6</sup> <http://www.theglobalfund.org/en/>

**Table 13.** Selected issues related to the interpretation of available data on malaria monitoring presented in this report

Area	Data available	Limitations	Recommendations
Burden and impact	Case and death reports from HIS or Integrated Disease Surveillance and Response	<ul style="list-style-type: none"> <li>National totals do not cover all districts and all months of the year (especially in Africa)</li> <li>Completeness of reporting varies over time and between countries, making comparisons difficult</li> <li>Burden in health facilities frequently does not cover the total burden in the population (especially in Africa)</li> </ul>	<ul style="list-style-type: none"> <li>Instead of absolute numbers of cases and deaths, African countries should focus on reporting proportions of outpatient visits, hospital admissions and hospital deaths that are caused by malaria, from sentinel HIS sites rather than nationwide</li> <li>Countries should regularly (e.g. every 2 years) evaluate the completeness of HIS reporting</li> <li>WHO should advise on a standardized definition and measurement method for completeness of HIS reporting</li> </ul>
	All-cause under-5 mortality (in Africa) from DHS and MICS	<ul style="list-style-type: none"> <li>Not specific to malaria</li> <li>Mortality data from birth history surveys reflect the situation an average 2.5 years before the survey, delaying the detection of intervention impact</li> </ul>	<ul style="list-style-type: none"> <li>Add anaemia testing and parasite prevalence testing to community-based surveys</li> <li>Conduct regular surveys (e.g. every 2 years) for these acutely responding indicators</li> </ul>
Control policies	Reports from NMCPs and MoHs on national malaria control policies	<ul style="list-style-type: none"> <li>Adoption of a policy does not necessarily mean that the policy is being implemented</li> </ul>	<ul style="list-style-type: none"> <li>Report separately on adoption and on implementation of policies</li> </ul>
ITN coverage	DHS, MICS and other household surveys	<ul style="list-style-type: none"> <li>Not all countries are covered</li> <li>MICS and DHS only every 5 years, thus available data are on average 3 years outdated</li> <li>In countries with only part of the population at risk of malaria, national coverage might underestimate effective coverage in populations at risk</li> </ul>	<ul style="list-style-type: none"> <li>Conduct additional MIS in the interim between DHS and MICS surveys and where DHS and MICS are not conducted</li> <li>Where applicable, over-sample focal areas at malaria risk</li> </ul>
Coverage of antimalarial treatment	DHS, MICS and other household surveys	<ul style="list-style-type: none"> <li>Using children under 5 years of age with fever as the denominator is not appropriate for populations outside Africa where all age groups are at similar risk of malaria, and where fewer of the fevers are actually caused by malaria</li> <li>Not all countries are covered</li> <li>MICS and DHS only every 5 years, thus available data are on average 3 years outdated</li> </ul>	<ul style="list-style-type: none"> <li>Use questionnaire as recommended in MIS package</li> <li>Outside Africa, consider using self-reported malaria instead of fever as the denominator group in surveys</li> <li>Conduct MIS in the interim between DHS and MICS surveys and where DHS and MICS are not conducted</li> </ul>
IPT coverage	DHS, MICS and other household surveys	<ul style="list-style-type: none"> <li>Not relevant to measure in areas and years where IPT has not (yet) been implemented</li> </ul>	<ul style="list-style-type: none"> <li>Include in HIS reporting and conduct facility-based surveys in selected areas where IPT has been implemented</li> </ul>
IRS delivery and coverage	Reports from countries	<ul style="list-style-type: none"> <li>Reporting to WHO/WHOPES incomplete</li> <li>Definitions of IRS coverage variable and unclear</li> </ul>	<ul style="list-style-type: none"> <li>Improve reporting to WHO/WHOPES of quantities of insecticides used</li> <li>WHO should develop standardized definitions of "population at risk of malaria", "the denominator for IRS coverage", and "IRS coverage"</li> <li>Countries should specify the definition when reporting on IRS coverage</li> <li>Include questions on IRS coverage for piloting in household surveys</li> </ul>
Drug resistance	Surveillance in sentinel sites	<ul style="list-style-type: none"> <li>The selection of sites varies between years and few sites are sampled repeatedly over time, thus it is difficult to infer time trends as these may be confounded by geographical variation</li> </ul>	<ul style="list-style-type: none"> <li>Sample selected sites repeatedly over time</li> <li>Properly document study protocols</li> <li>Include ACTs among therapies tested</li> </ul>
Control, financing and procurement of drugs and commodities	Reports from countries and international donor organizations	<ul style="list-style-type: none"> <li>Reporting to WHO incomplete and not standardized</li> </ul>	<ul style="list-style-type: none"> <li>WHO should recommend standardized indicators and definitions</li> </ul>

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Additional resources are provided in Annex 6.



# ANNEX 1. SELECTED COUNTRY PROFILES

## Overview of country profiles

Profiles are presented for 24 selected high-malaria burden countries relative to the region to which they belong—Africa, Asia and the Americas. Profiles for these countries and all other countries reporting malaria are available on the Internet.<sup>7</sup> The profiles are continually updated as part of the global RBM reporting process.

Country profiles are organized in six sections, based on data availability and national policy.

**1. Key issues related to programme progress and activities:** a brief summary of key strategies and policies used by the NMCP, including: (i) the existence of a national malaria control manual or treatment guidelines and the year of latest publication or update; (ii) the number of sentinel sites currently monitoring antimalarial drug efficacy and insecticide resistance; and (iii) the antimalarial drug policy in 2004.

The antimalarial drug policy as at the end of 2004 is presented separately for treatment of falciparum malaria and vivax malaria. For falciparum malaria, separate policies are defined for: (i) the treatment of uncomplicated (confirmed and unconfirmed) cases; (ii) the treatment of cases that failed first-line treatment (treatment failure); (iii) the treatment of severe malaria; and (iv) the prevention and/or treatment of malaria in pregnant women.

Source of data: WHO annual reporting forms and country presentations, reports and publications.

**2. Reported cases and deaths** include the number of annual malaria cases and deaths recorded in HIS and reported to WHO—separately for laboratory-confirmed, clinically diagnosed and imported cases as well as by age, gender and subnational division. This section also lists the total number of slides and rapid diagnostic tests taken, a proportion of which would have resulted in a confirmed case, as recorded and reported by countries.

*Probable or clinically diagnosed cases:* for countries where access to laboratory confirmation of cases is severely limited—such as in most of Africa south of the Sahara—this term denotes patients who are suspected to have malaria based on clinical signs and symptoms and who receive treatment for malaria. For countries where routine laboratory confirmation is widely available and where cases are reported as having been confirmed or not, this term applies to patients clinically diagnosed and treated for malaria but who were not diagnosed by a laboratory test. One exception is Pakistan, where the term refers to all patients with fever. For countries in the Western Pacific and selected countries in eastern Asia, this denotes the number of suspected malaria cases minus the subset of those patients who were laboratory tested and found to be infected with malaria.

<sup>7</sup> <http://www.rbm.who.int/>

*Probable or clinically diagnosed severe cases* denotes, for areas reporting only clinically diagnosed cases, patients who were clinically diagnosed and required hospitalization for signs and/or symptoms of severe malaria and who received antimalarial treatment.

*Probable or clinically diagnosed malaria deaths* denotes, for areas reporting only clinically diagnosed malaria cases, deaths among patients diagnosed with probable severe malaria.

*Laboratory-confirmed malaria cases* denotes, for areas performing laboratory confirmation of malaria diagnoses, all patients with signs and/or symptoms of malaria and laboratory-confirmed diagnosis who received antimalarial treatment. Laboratory diagnosis consists of either slide microscopy or a rapid diagnostic test. Of these:

*P. falciparum or mixed* denotes those cases laboratory-diagnosed as caused by infection with *P. falciparum* or a mix of *Plasmodia* species including *P. falciparum*.

*P. vivax* denotes those cases confirmed by laboratory diagnosis as caused by infection with *P. vivax*.

*Laboratory-confirmed severe cases* denotes, among patients whose malarial illness was confirmed by a laboratory test, the number who required hospitalization for signs and/or symptoms of severe malaria and who received antimalarial treatment.

*Laboratory-confirmed malaria deaths* denotes deaths among patients with laboratory-confirmed diagnosis of severe malaria.

*Imported cases* denotes malaria episodes in which the infection was acquired outside the country where it was diagnosed, implying that the origin could be traced to a known malarious area.

*Estimated reporting completeness* denotes the completeness of HIS data in malaria case reporting, estimated by the country.

Where available, reported cases are also provided by age, gender and subnational area. The percentages of cases in each of these subgroups are based on the number of total annual reported cases in the corresponding year, which is not necessarily the most recent year for which the total number of cases was available. Subnational reported cases are displayed for areas whose reported burden represents at least 2% of the national total, up to a maximum of 15 areas.

The *standardized reported malaria* rate plotted in the time-trend graph is a standardized rate, per 1000 people per year, calculated against national population sizes in each calendar year estimated by the United Nations Population Division (52). The numerator of the standardized rates was based on the number of reported cases and the proportion of these cases that were laboratory-confirmed. For countries where none of the reported cases were confirmed, as in most of Africa south of the Sahara, the rate was based on probable or clinically diagnosed cases. For countries where all cases are laboratory-confirmed, the rate was based on laboratory-confirmed cases minus imported cases. For the few countries where some cases were laboratory-confirmed ("Some" in column 6 of Table A.21 for Afghanistan, Somalia, Sudan and Yemen), the standardized rate was based on the sum of the reported categories "probable/clinically diagnosed" and "laboratory-confirmed", which were mutually exclusive for these countries.

*All cause under-5 mortality* is the number of children who died before the age of exactly 5 years per 1000 live births. This information is from the UNICEF report on the State of the World's Children 2005 (36) and included for African countries only.

Source of data: WHO annual reporting forms and country presentations, reports and publications.

### 3. Estimated coverage of the key RBM interventions according to the core indicators recommended by the RBM MERG:<sup>8</sup>

- the percentage of households possessing at least one mosquito net and possessing at least one ITN;
- the percentage of children under 5 years of age and pregnant women who slept under a net or an ITN during the night before a survey;
- for African countries, the percentage of febrile children under 5 years of age who received treatment with any antimalarial, with chloroquine or with sulfadoxine–pyrimethamine.

Each outcome is reported as the national estimate and where applicable and available, disaggregated by the background characteristics urban/rural, male/female and by wealth quintile.

The treatment of febrile children with antimalarials is reported only for African countries; the period-prevalence of fevers in African children under 5 years of age in the 2 weeks preceding a survey is reported as the denominator against which use of antimalarials is evaluated.

Source of data: reports from household surveys, including DHS and MICS (10) or, if no nationally representative surveys were available, cluster-sampled subnational surveys were used. Only surveys with appropriate documentation of dates of field work, sampling design and sample sizes were included. For countries with multiple national surveys available, the most recent survey was used.

### 4. Drug efficacy rates for relevant antimalarial drugs: each profile includes the number of relevant drug efficacy studies, the range of years in which they were conducted and the minimum, maximum, median and 25th and 75th percentile efficacy rates, where applicable.

Efficacy studies included in this report are those that used one of the protocols recommended by WHO in 1996 or later (9). The WHO protocol recommends the assessment of in vivo efficacy against *P. falciparum* in patients under 5 years of age presenting with uncomplicated falciparum malaria (9). For countries where such studies have not been conducted, this report included other studies that were judged to be of high quality. Both published and unpublished studies were considered for inclusion.

For countries in Africa, study results are expressed as proportions of clinical failure, which is defined as the proportion of patients who present either with fever in the presence of parasitaemia on day 3 after onset of treatment (early treatment failure) or with recurrent fever 14 days after onset of treatment (late clinical failure). For Asia, the Americas, Southern Africa and moderate-to-low transmission areas in Sudan, the presented results are proportions of total treatment failure, which is the sum of clinical failure and late parasitological failure. Late parasitological failure in these countries is defined as asymptomatic parasitaemia at 28 days after onset of treatment.

All studies are weighted equally irrespective of their differing sample sizes. Percentile calculations are based on  $N = P/100 * (k + 1)$ , where: k = total numbers of values in the dataset; P = percentile (25th or 75th); and N = index number in the dataset that corresponds to the percentile chosen. If N equals an index number, the formula will bring back the failure rate observed in the study with that index number. If N is not equal to an index number, the formula returns the average of the two failure rates associated with the two studies with indexes that N lies between. If N is greater than the highest index number, the failure rate observed in the study with the highest index number (i.e. the maximum failure rate across all studies) is returned.

Source of data: WHO annual reporting forms and country presentations, reports and publications, published studies.

<sup>8</sup> <http://www.rbm.who.int/merg>

**5. Services delivered by the NMCPs**, specifically the annual:

- number of nets and/or insecticide kits sold or distributed;
- number of nets (re-)treated with insecticides;
- number of insecticide treatment kits for mosquito nets sold or distributed;
- quantities of insecticides used for malaria vector control activities;
- number of households or units sprayed during IRS campaigns.

Quantities of insecticides used for malaria vector control activities were based on annual reporting to WHOPES (63). All figures are reported by the NMCPs and do not necessarily include services delivered to countries by other RBM partners. Numbers of households or units sprayed for IRS are not fully standardized between countries, as some countries consider units to be rooms rather than houses, and not all countries specify their definition of unit.

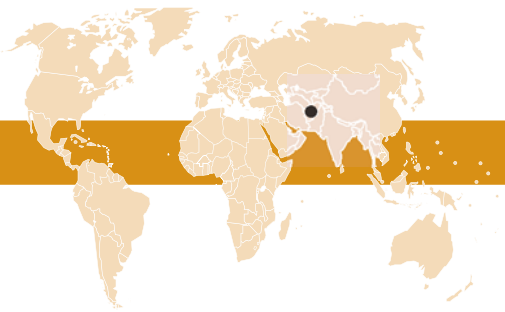
Source of data: WHO annual reporting forms and country presentations, reports and publications.

**6. Finances available for malaria control:** represents reported national resources—such as annual fiscal year budget allocations from the Ministry of Health (MoH)—and other resources budgeted and allocated for NMCP efforts. Some countries separately report budgeted and allocated malaria resources. For figures reported in currencies other than US\$, a standard annual exchange rate conversion based on the World Development Index published by the World Bank was used.

For GFATM financing, data on malaria funds committed for approved proposals and disbursed from rounds 1–4 of proposal submission and review are presented, with specification of the dates when grant agreements were signed and the amounts of disbursements to date.

Source of data: WHO annual reporting forms (malaria and WHOPES), country presentations, reports and publications, and the GFATM.





# AFGHANISTAN

## Malaria situation

Malaria accounts for approximately 10% of all reported febrile illnesses. Anaemia is widespread in Afghanistan—12% of the population and nearly 30% of children under 5 years of age have haemoglobin levels less than 11 g/dl—and malaria is a contributing factor in many areas. A national malaria prevalence survey conducted by the MoH and the Institute of Malaria and Parasitic Diseases between October and November 2002—the peak period for *P. falciparum* transmission—revealed that 10% of the population living at an altitude below 1500 m is infected with *Plasmodium* parasites. In 2003, 591 441 suspected and confirmed cases were reported, for an annual national incidence of 197/10 000. Incidence ranged from less than 7/10 000 to 1955/10 000 population per year. *P. vivax* accounted for 93% of all confirmed malaria cases, and *P. falciparum* accounted for 7% of all confirmed malaria cases, ranging from 0.002% in Wardak Province to 31% in Takhar Province.

## National policy and planning

Since the beginning of 2002, the MoH has taken steps towards building an integrated control programme against malaria and leishmaniasis as part of the evolving health-care delivery structure. A Basic Package of Health Services was initiated and is delivered by contracted NGOs at four levels of health service delivery. Coupled with the installation of the Integrated Management of Childhood Illness programme in 2003, opportunities for effective malaria control are progressively expanding.

## Progress in malaria control activities

Malaria/leishmania directorates were established in 14 priority malaria provinces, including appropriate malaria staffing. The national malaria institute was reinforced with eight medical doctors. The needed investment for this new cadre was obtained through intensive capacity building programmes both within the country and from abroad.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2003
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	4
• Home-based management of malaria:	No
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	No
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	CQ+SP
– <i>P. falciparum</i> (laboratory confirmed):	ASU+SP*
– <i>P. vivax</i>	CQ
• Treatment failure:	Q(7d)
• Severe malaria:	Q/ATM(7d)/(3d)+SP
• Pregnancy:	
– prevention	
– treatment	Q or ASU+SP (Pf) - CQ (Pv)

## Financial support

With funds from donors and other partners—for example, USAID and the Government of Kuwait—the RBM control programme was expanded and significant activities were planned and/or conducted to complement developments in the primary health sector of the country. The GFATM committed a grant for the control of HIV/AIDS, tuberculosis and malaria totalling US\$ 3.1 million.



AFGHANISTAN

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

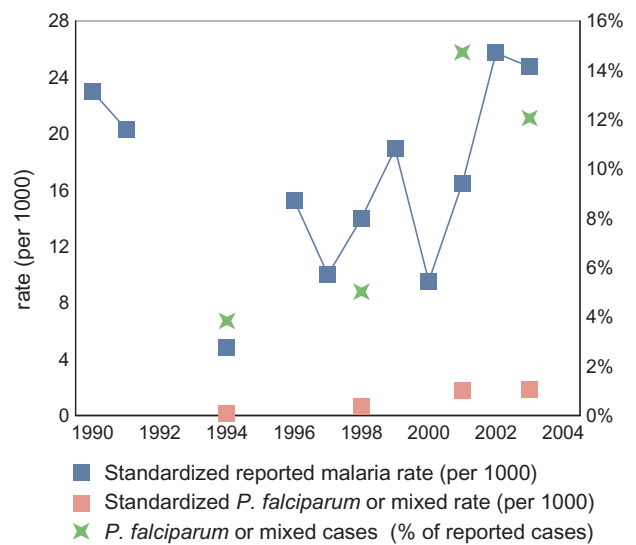
**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
317 479	297 605			88 302		303 955	202 767	288 070	395 581
2000	2001	2002	2003	Date of last report: 25 May 2004					
203 911	364 243	590 176	591 441						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	591 441
Reported malaria deaths	
<b>Probable or clinically diagnosed</b>	
Malaria cases	224 662
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	
Rapid diagnostic tests (RDTs) taken	
<b>Laboratory confirmed</b>	
Malaria cases	366 779
<i>P. falciparum</i> or mixed	44 243
<i>P. vivax</i>	322 536
Severe (inpatient or hospitalized) cases	
Malaria deaths	
<b>Investigations</b>	
Imported cases	
<b>Estimated reporting completeness (%)</b>	



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	203 911	364 243	590 176	591 441	100

**Reported malaria cases by selected subnational area**

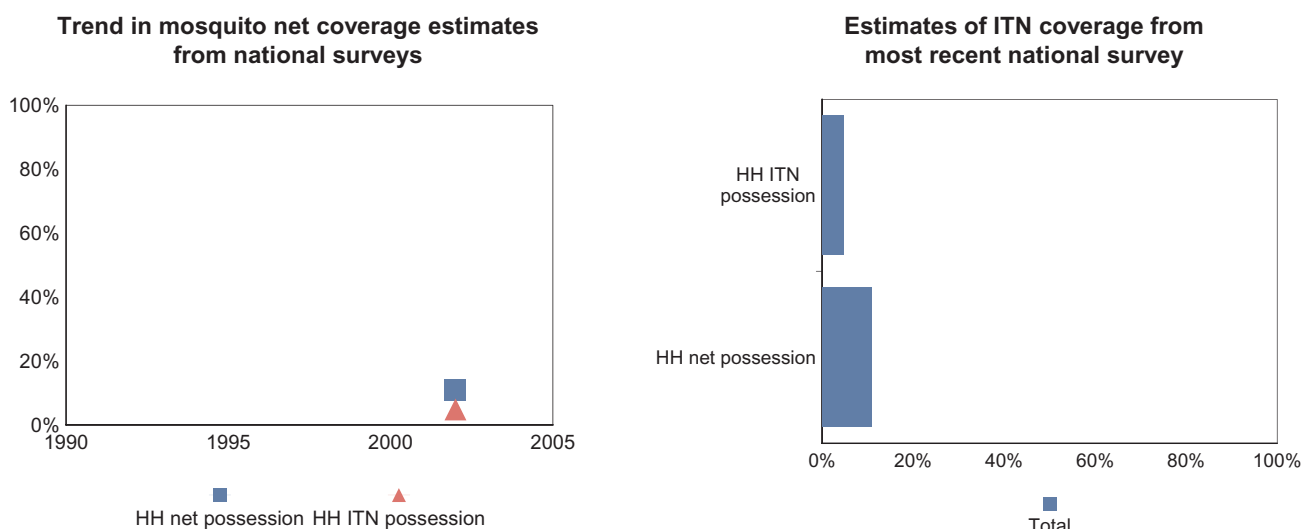
15 of 25 areas	2000	2001	2002	2003	%
Takhar				135 237	23
Kundoz				75 798	13
Baghlan				72 787	12
Nangarhar				45 418	8
Badghis				40 464	7
Faryab				37 894	6
Kabul				32 029	5
Badakhshan				30 252	5
Gazni				27 409	5
Laghman				21 175	4
Kunar				18 187	3
Khost				15 904	3
Herat				10 982	2
Balkh				6 331	1
Paktia				5 272	1

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

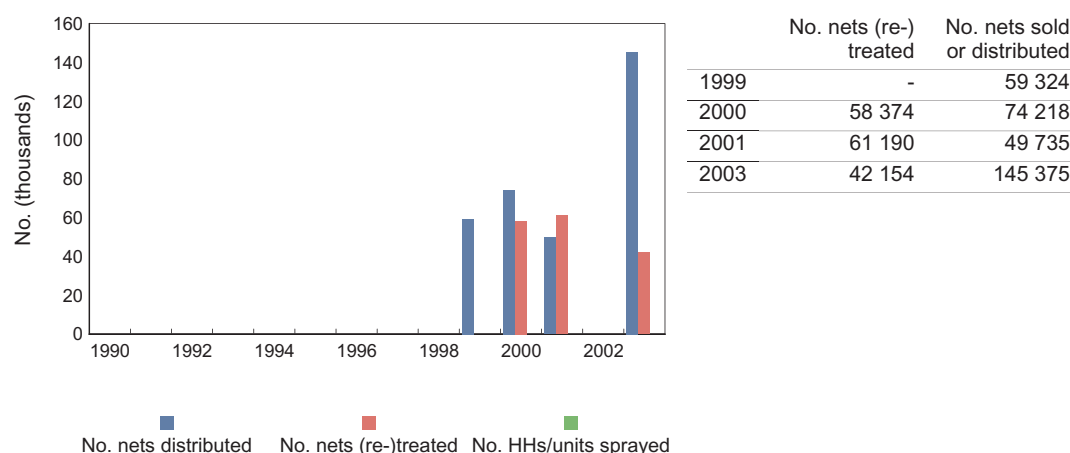
ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.



## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

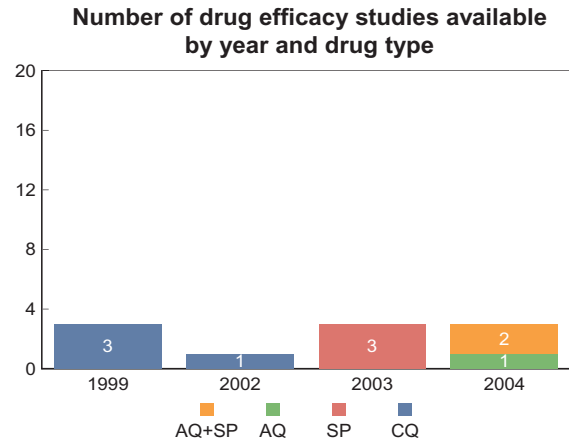


AFGHANISTAN

**MONITORING ANTIMALARIAL DRUG EFFICACY**

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

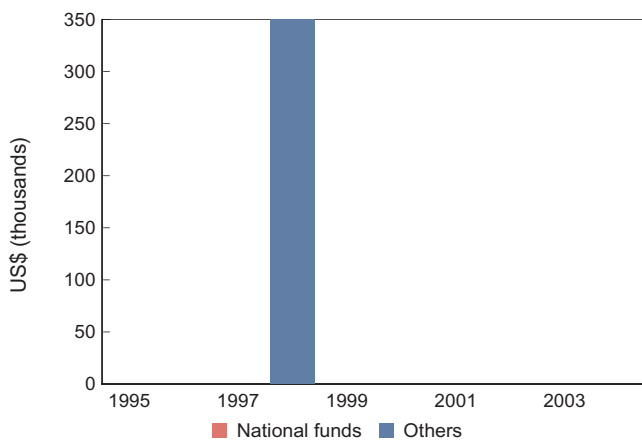
Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1999-2002	4	67.7	60.0	89.5	61.7	80.8
<b>SP</b>						
2002-2003	3	8.7	4.0	22.7	4.0	22.7
<b>AQ</b>						
2004	1	37.7				
<b>AQ+SP</b>						
2003-2004	2	2.0	1.0	3.0	1.0	3.0



**FINANCING FOR MALARIA**

**Annual funding for malaria control**

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		350
1999		
2000		
2001		
2002		
2003		
2004		

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	3 125 605	MoH	Yes	25-Oct-04	3 125 605	1	1 687 514	54.0%

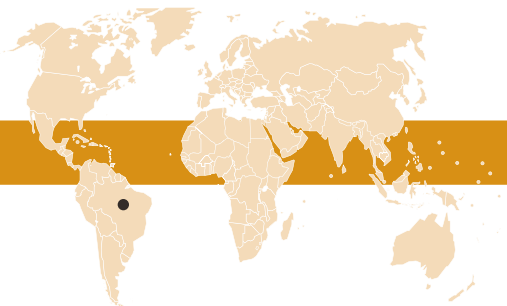
Integrated proposal includes HIV and tuberculosis committed funds.

**General notes and remarks**

See explanatory notes at the beginning of the report.

The antimalarial drug policy for treatment of malaria in pregnant women includes Q in the first trimester and ASU+SP in the 2nd and 3rd trimesters for suspected or confirmed uncomplicated falciparum malaria. For vivax malaria, CQ is used for treatment of uncomplicated cases in pregnant women.

\* policy adopted, not presently being deployed, implementation process ongoing



## Malaria situation

In 2002, Brazil reported approximately 40% of the total number of the malaria cases in the Americas. Almost 99% of cases occur in the Legal Amazon Region, where no more than 12% of the country's population resides. An increase in the number of cases began in the 1980s. In 1992, 572 000 cases were reported and a peak of 610 878 cases was reported in 2000. By 2002, the number of cases was reduced to 349 873 among 2.12 million slides examined, giving a 16.5% smear positivity rate. A slight rebound to 379 500 cases in 2003 was reportedly associated with population movement to the periphery of large cities as well as to the Legal Amazon Region.

## National policy and planning

The NMCP promotes prompt diagnosis and appropriate treatment of malaria and is implementing other aspects of the Global Malaria Control Strategy. A lack of human and other resources, as well as technical and managerial weakness at local level and little information to guide activities, limit the coverage of effective interventions in controlling the disease.

## Progress in malaria control activities

The improvement in the epidemiological situation between 2000 and 2002 was related to a new action plan called the Plan for Intensification of Control Measures in the Amazon (PICAM) that was initiated in June 2000. The number of municipalities at risk of malaria declined from 160 in 1999 to 76 in 2002, with a 69% reduction in the number of hospitalized cases and a 36% reduction in hospital deaths caused by malaria. Malaria studies were initiated in Acre, Amapa, Amazonas, Maranhão, Mato Grosso, Pará and

Rondônia to measure drug efficacy, anopheline mosquitoes' resistance to insecticides, risk factors for transmission including in urban areas, and piloting rapid diagnostic testing. Drug efficacy studies involve MQ, Q+D for *P. falciparum* and CQ for *P. vivax* in multiple sites.

## Financial support

The MoH provides the vast majority of financial support for malaria control. The total budget for 2003 was just over US\$ 40 million, although part of the funding was made available from external sources in the context of the PICAM.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2001
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	7
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	
– <i>P. falciparum</i> (laboratory confirmed):	Q(3d)+D(5d)+PQ(day6) Q(3d)+D(5d)+PQ (Amazon)
– <i>P. vivax</i>	CQ+PQ(7d)
• Treatment failure:	MQ15/20+PQ(day2) MQ15/20+PQ (Amazon)
• Severe malaria:	ASU vs ART or Q
• Pregnancy:	
– prevention	
– treatment	Q (Pf) or CQ (Pv)

BRAZIL

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
560 396	614 431	609 860	466 190	564 406	565 727	455 194	392 976	471 892	609 594
2000	2001	2002	2003	Date of last report: 7 December 2004					
610 878	388 658	349 873	379 551						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	379 551
Reported malaria deaths	30

**Probable or clinically diagnosed**

Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	1 474 656
Rapid diagnostic tests (RDTs) taken	

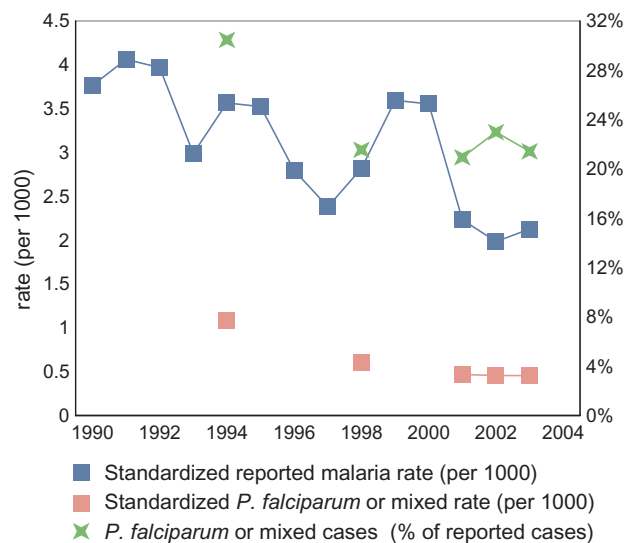
**Laboratory confirmed**

Malaria cases	379 551
<i>P. falciparum</i> or mixed	81 343
<i>P. vivax</i>	297 962
Severe (inpatient or hospitalized) cases	10 719
Malaria deaths	30

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	610 878	388 658	349 873	379 551	100
Age	<1 year				6 635	2
	1-4 years				36 191	10
	5-14 years				79 583	21
	15+ years				232 834	61

**Reported malaria cases by selected subnational area**

9 areas	2000	2001	2002	2003	%
Amazonas		43 716	68 621	133 299	35
Para		181 181	137 339	101 560	27
Rondonia		55 356	68 634	92 925	24
Amapa		22 586	15 839	14 565	4
Acre		4 590	6 300	9 881	3
Maranhao		33 247	9 164	8 990	2
Roraima		14 936	6 508	8 538	2
Mato Gros		6 200	4 556	4 173	1
Tocantins		448	215	4 013	1

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

*A survey to evaluate effectiveness of ITNs in three different populations of the Amazon region is currently being planned.*

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

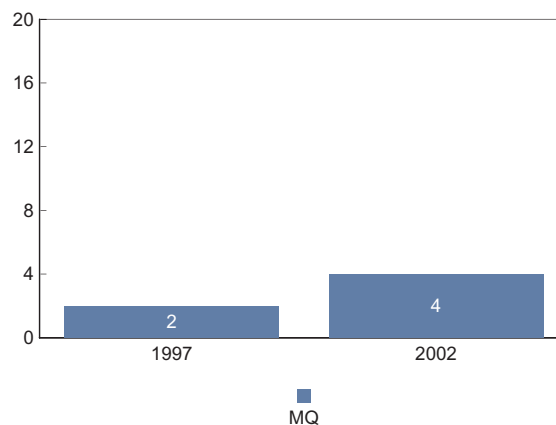
*No data are currently available.*

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>MQ</b>						
1996-2002	6	5.2	0.0	9.7	0.5	7.9

Number of drug efficacy studies available by year and drug type

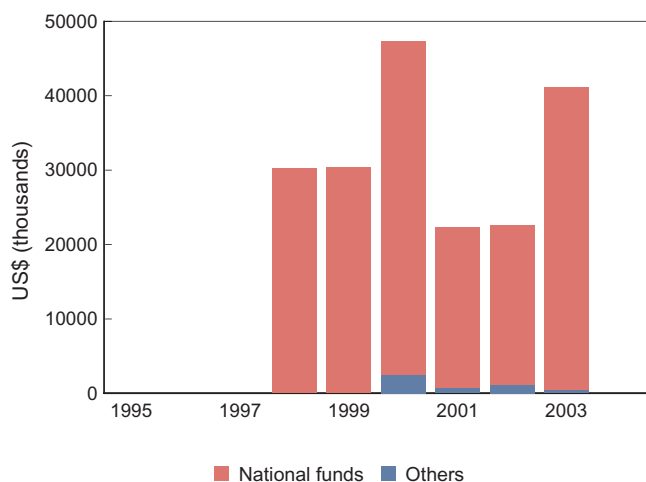


## BRAZIL

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998	30 189	
1999	30 308	
2000	44 767	2 478
2001	21 517	805
2002	21 412	1 138
2003	40 696	524
2004		

## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

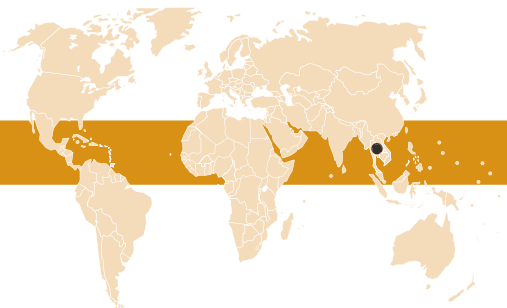
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

*No funding was approved for malaria control by the GFATM.*

## General notes and remarks

See explanatory notes at the beginning of the report.





## Malaria situation

Malaria is a major concern for people living in Cambodia's hilly forests and forest fringes. The number of reported malaria cases has decreased gradually between 1993 and 2003. However, in 2003 the report of treated cases, severe cases and deaths as well as the case-fatality rate started to increase again. This apparent increase is in part attributed to improving access to public health facilities in remote areas because of improved infrastructure, improved referral systems and more regular and reliable reporting. Of particular concern is the high level of multidrug resistance.

Strains of *P. falciparum* are resistant to most antimalarial drugs, and the quality and usage pattern of antimalarial drugs are suboptimal. Recent studies show that counterfeit and substandard drugs are frequent in Cambodia, especially Q and ASU. Furthermore, a survey of antimalarial drug use in 2002 showed problems of delayed treatment-seeking behaviour, widespread use of many antimalarial drugs for one malaria episode and non-adherence to treatment.

## National policy and planning

The main focus of the NMCP is to strengthen clinical management of malaria cases, provide surveillance and health education, and promote the use of ITNs. Good-quality drugs and improvement in treatment access and patient compliance also are essential to combat the emergence and spread of resistant strains of *P. falciparum*. The NMCP attempts to increase access to early diagnosis and treatment through the adoption of a three-pronged approach: (i) standardized malaria diagnosis and treatment based on RDTs or microscopy and prepackaged ASU+MQ combination treatment in the public health system; (ii) provision of RDTs and ACT in remote hyperendemic communities through local village malaria workers; and (iii) social marketing of RDTs and ACT through the private sector. ITNs are the mainstay of malaria prevention in Cambodia. Currently, the programme is shifting implementation responsibilities to the provincial level. The NMCP targets people living within 200 m of forest areas where malaria generally occurs.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	Yes
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 8
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	Yes
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria – <i>P. falciparum</i> et non - <i>P. falciparum</i> (unconfirmed):	ASU(3d)+MQ
– <i>P. falciparum</i> (laboratory confirmed):	ASU(3d)+MQ
– Non - <i>P. falciparum</i>	CQ
• Treatment failure:	Q(7d)+T(7d)
• Severe malaria:	ATM(IM)+MQ
• Pregnancy: – prevention	
– treatment	Q(7d)or ASU+MQ

## Progress in malaria control activities

In 2003, the ITN coverage was estimated to be 49% in areas at risk of malaria, and efforts are under way to conduct more reliable survey-based estimates. Over the past several years, the NMCP has built strong partnerships with USAID, the World Bank, DFID, the GFATM and WHO. The GFATM partners are planning to introduce LLINs through free distribution in remote rural areas and social marketing in towns. In addition, socially marketed hammock nets and tablets for insecticide impregnation are sold at strategic points through the private sector targeted at mobile populations of forest workers. Community awareness will be strengthened through community-based and school-based health activities with support from the GFATM.

## Financial support

Delays in financial support to control efforts in 2003 might have contributed to the increase in malaria reports that year. Two grants from the GFATM that began in December 2003 will provide over US\$ 10 million in additional funding, of which US\$ 2.3 million had been disbursed as of July 2004.



CAMBODIA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
123 796	102 930	93 595	98 956	74 190	76 923	74 883	85 661	58 874	64 679
2000	2001	2002	2003	Date of last report: 31 August 2004					
62 439	53 601	46 902	71 258						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	71 258
Reported malaria deaths	492

**Probable or clinically diagnosed**

Malaria cases	
Severe (inpatient or hospitalized) cases	4 936
Malaria deaths	
Slides taken	106 302
Rapid diagnostic tests (RDTs) taken	54 024

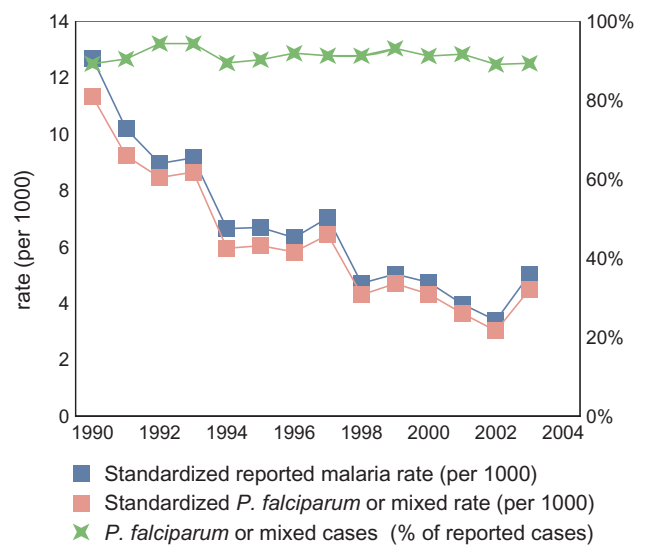
**Laboratory confirmed**

Malaria cases	71 258
<i>P. falciparum</i> or mixed	63 739
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	492

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	62 439	53 601	46 902	71 258	100
*Gender	Male				38 310	54
	Female				16 679	23
Age	<5 years				4 650	7
	5-14 years				12 019	17
	15-49 years				49 075	69
	>49 years				5 514	8

**Reported malaria cases by selected subnational area**

15 of 24 areas	2000	2001	2002	2003	%
Baat Dambang	3 860	4 253	5 221	10 227	14
Kampong Speue	4 892	4 353	3 321	7 898	11
Pousaat	4 455	5 152	4 748	7 032	10
Preah Vihear	4 807	4 664	5 270	6 865	10
Siem Reab	6 355	4 790	3 701	6 256	9
Kampot	4 010	2 603	2 624	4 640	7
Oddar Mean Chey	1 488	2 014	2 391	4 029	6
Pailin	3 642	3 678	2 432	3 762	5
Kampong Thum	2 440	1 774	1 930	3 435	5
Kampong Chaam	3 774	4 537	3 119	2 956	4
Stueng Traeng	4 835	3 306	2 179	2 935	4
Rotana Kiri	2 739	2 078	3 011	2 793	4
Kracheh	4 133	3 304	2 311	2 340	3
Mondol Kiri	2 779	1 925	1 320	1 807	3
Kampong Chhnang	1 828	1 452	690	1 181	2

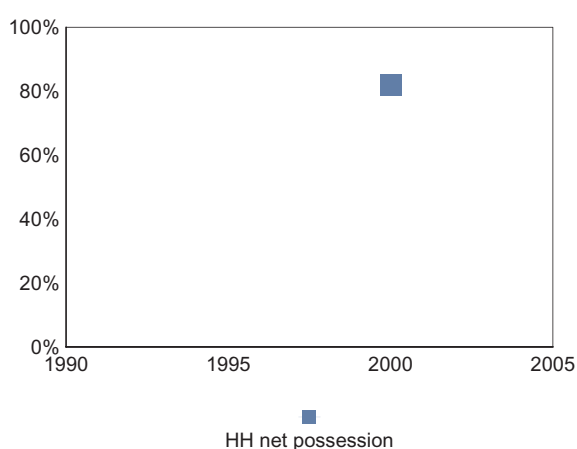
## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

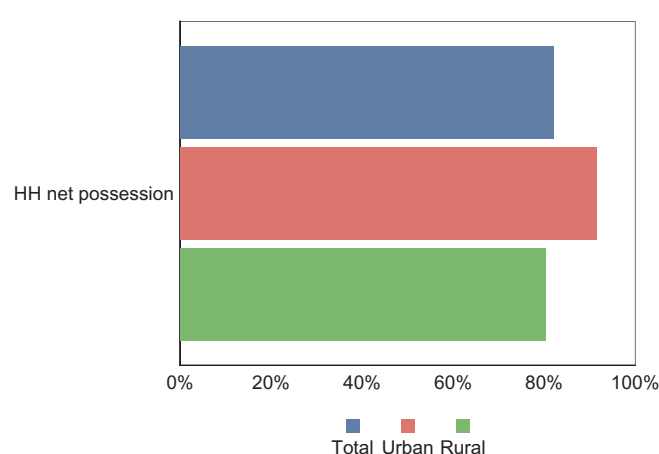
### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

Trend in mosquito net coverage estimates from national surveys



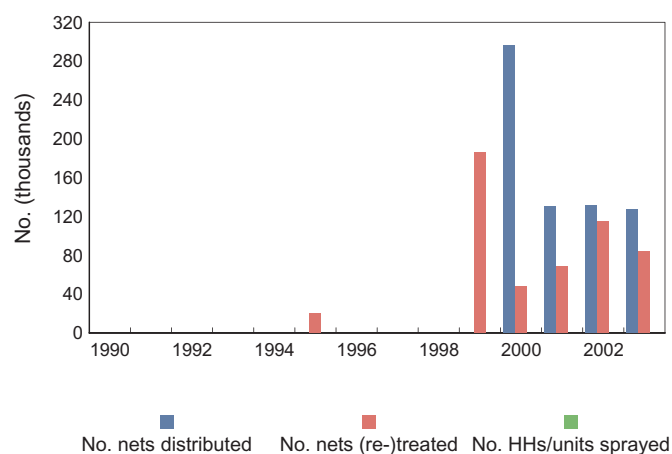
Estimates of ITN coverage from most recent national survey



## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



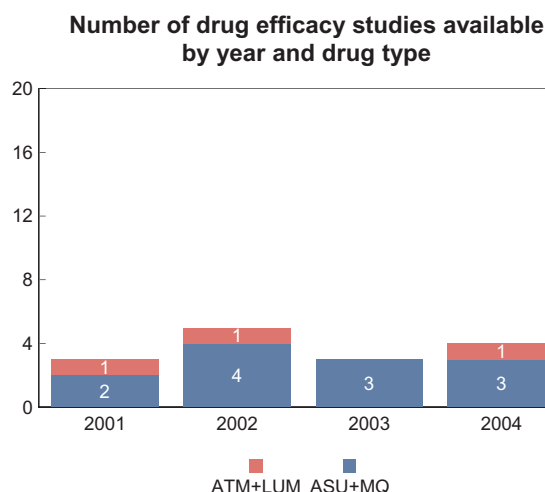
Year	No. nets (re-) treated	No. nets sold or distributed
1995	20 000	
1999	185 556	
2000	48 013	296 337
2001	68 230	130 726
2002	115 163	131 673
2003	83 688	127 035

## CAMBODIA

**MONITORING ANTIMALARIAL DRUG EFFICACY**

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>ATM+LUM</b>						
2001-2004	3	26.9	13.5	30.0	13.5	30.0
<b>ASU+MQ</b>						
2001-2004	12	3.7	0.0	18.8	1.1	8.1

**FINANCING FOR MALARIA****Annual funding for malaria control**

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).

*No data are currently available.*

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

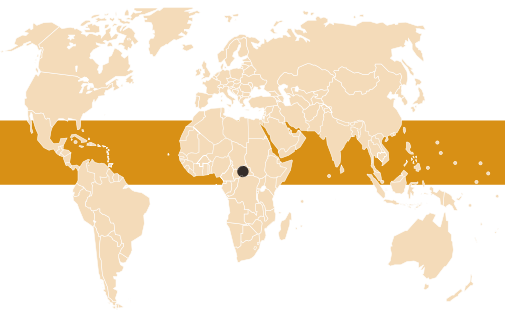
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	5 013 262	<b>MoH</b>	Yes	14-Oct-03	5 013 262	4	2 779 989	55.5%
CCM	4	5 221 242		No					

**General notes and remarks**

See explanatory notes at the beginning of the report.

\*Reported malaria cases by gender for 2003 is only provided for patients over 14 years of age.



# CENTRAL AFRICAN REPUBLIC

## Malaria situation

Malaria is one of the major public health burdens and is endemic throughout the Central African Republic. It is responsible for an estimated 40% of all outpatient visits and 45% of hospital deaths in public health facilities. A situation analysis conducted in 2001 showed that appropriate management of those with malaria symptoms in public facilities and at home was unacceptably low, ranging from 12.8% to 17.3%. In the 1990s, the situation has worsened as a result of increasing resistance to CQ.

## National policy and planning

The national control strategy includes: (i) proper management of malaria cases and integrated management of child malaria in the home and in health facilities; (ii) prevention of malaria through improved sanitation, vector control measures—in particular ITN usage—and IPT for pregnant women; (iii) operational research; and (iv) strengthening the HIS and the monitoring and evaluation system. It is recognized that these strategies can only be realized with improved structural and institutional capacities of the MoH and by developing lasting partnerships that involve NGOs, the public and private sectors and development partners.

## Progress in malaria control activities

Several important policy steps have been made for changing the first-line antimalarial drug policy from CQ to more effective combination therapy, and for adopting IPT with SP for prevention of malaria during pregnancy. From 2001 to 2004, more than 40 000 ITNs were distributed.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2004
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	5
• Home-based management of malaria:	No
• Vector control using insecticides:	No
• Monitoring insecticide resistance	No
– number of sites currently active:	0
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	No
• Epidemic preparedness:	No
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	CQ
– <i>P. falciparum</i> (laboratory confirmed):	CQ
– <i>P. vivax</i>	
• Treatment failure:	SP
• Severe malaria:	Q(7d)
• Pregnancy:	
– prevention	CQ weekly
– treatment	Q(7d)

## Financial support

In addition to resources made available by the government, several partners support the fight against malaria including WHO, UNICEF and the European Union. The GFATM recently committed over US\$ 10 million to support malaria control activities.

CENTRAL AFRICAN REPUBLIC

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
174 436	125 038	89 930	82 072	82 057	100 962	95 259	99 718	105 664	127 964
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>						
89 614	140 742		95 644	Date of last report: 22 November 2004					

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	95 644
Reported malaria deaths	

**Probable or clinically diagnosed**

Malaria cases	95 644
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	
Rapid diagnostic tests (RDTs) taken	

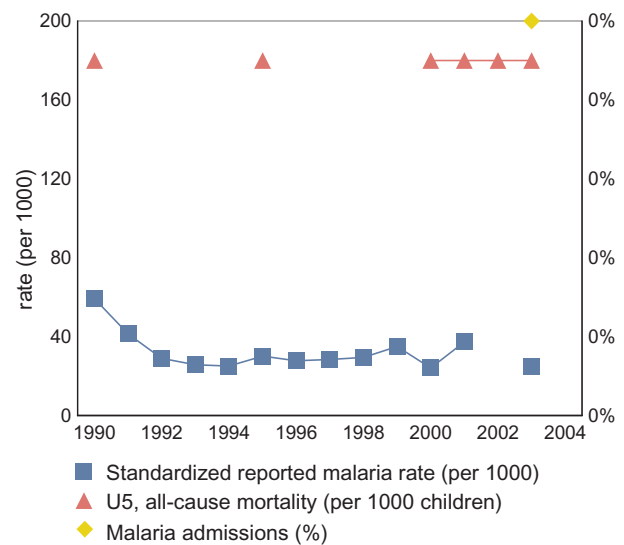
**Laboratory confirmed**

Malaria cases	
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases	
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Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	89 614	140 742		95 644	100
Age	<5 years	53 665	82 787		53 134	56
	5> years	35 949	57 955		42 510	44

**Reported malaria cases by selected subnational area**

15 of 17 areas	2000	2001	2002	2003	%
Ville de Bangui	25 225	27 472		36 601	38
Mbomou	5 344	2 514		10 339	11
Mambéré Kadéï	9 446	17 635		8 583	9
Ouham Pendé	7 804	12 365			9
Ouham	5 404	10 716			8
Ombella Mpoko	3 374	5 612		7 124	7
Ouaka	10 978	16 710		6 860	7
Lobaye	3 467	4 062		4 072	4
Kémo	3 255	5 446		3 916	4
Nana Mambéré	2 808	9 434		3 807	4
Sangha Mbaéré	3 044	5 457		3 133	3
Haute Kotto	1 392	5 466		2 880	3
Haut Mbomou	1 093	4 781		2 696	3
Basse Botto	1 387	2 514		2 201	2
Bamingui Bangoran	702			1 885	2

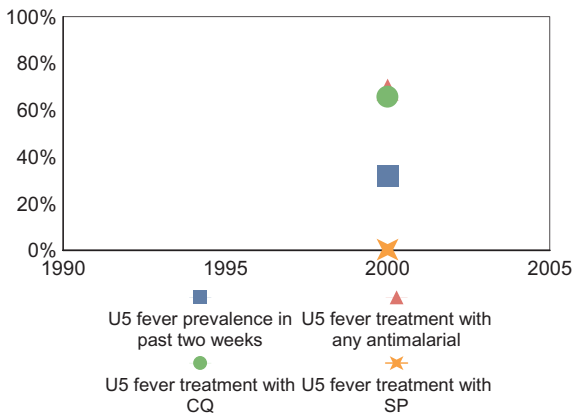
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

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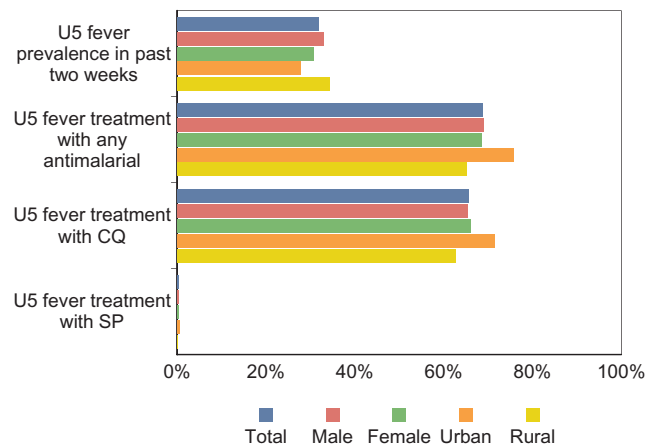
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



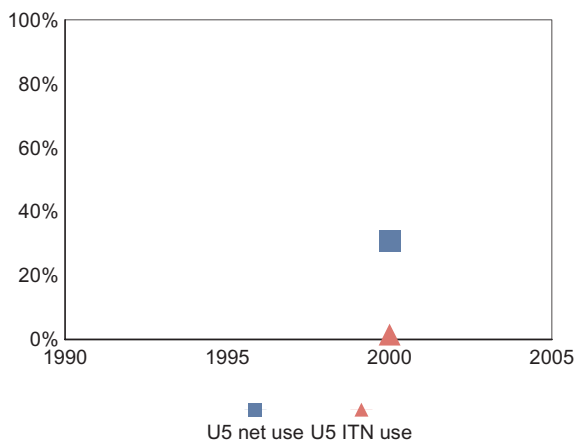
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



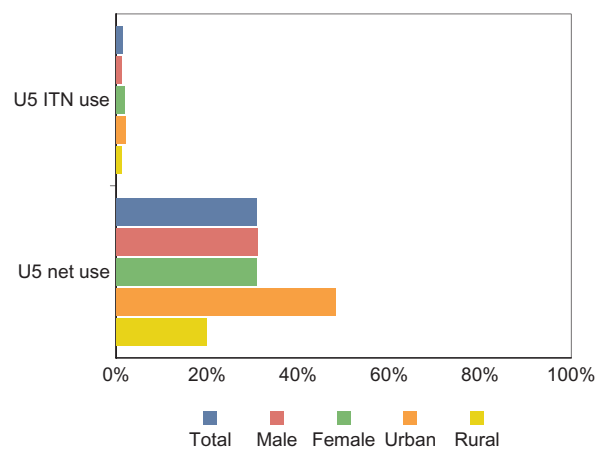
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



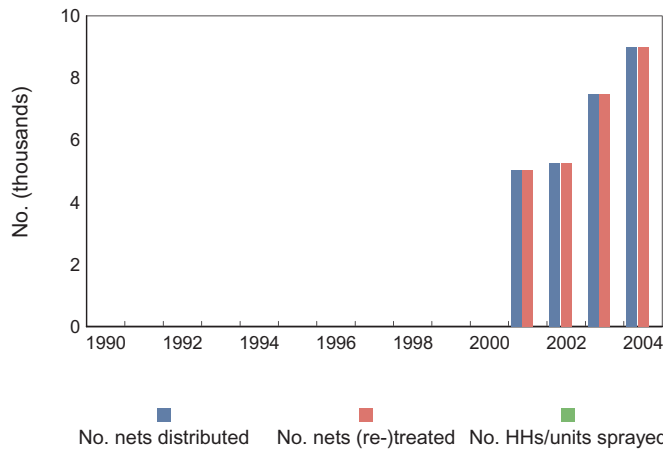
**Estimates of ITN coverage from most recent national survey**



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

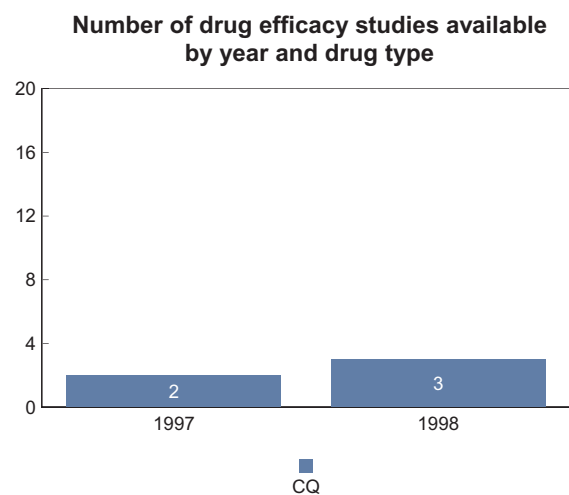


	No. nets (re-) treated	No. nets sold or distributed
2001	5 050	5 050
2002	5 250	5 250
2003	7 500	7 500
2004	9 000	9 000

**MONITORING ANTIMALARIAL DRUG EFFICACY**

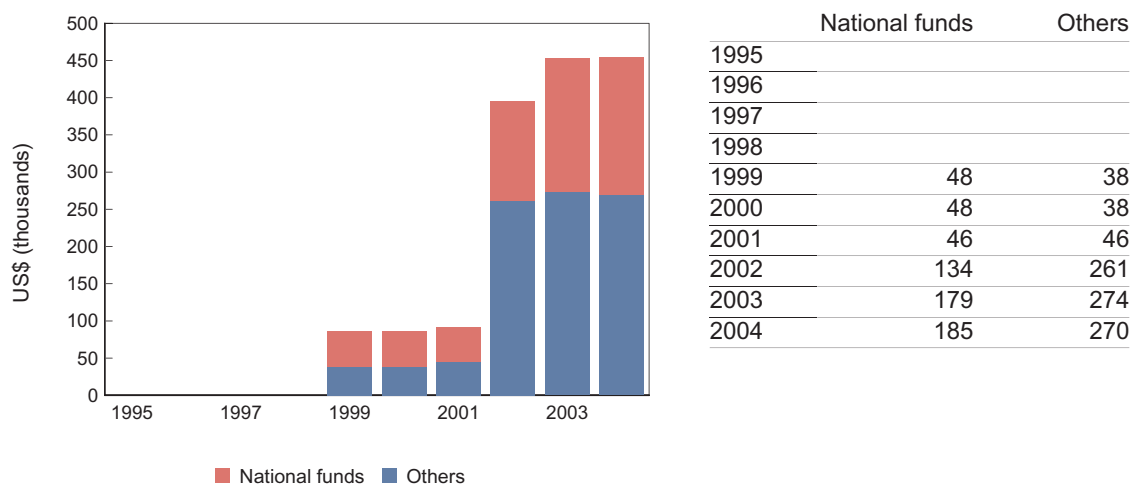
Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1997-1998	5	20.8	19.0	57.1	19.3	39.6



**FINANCING FOR MALARIA****Annual funding for malaria control**

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

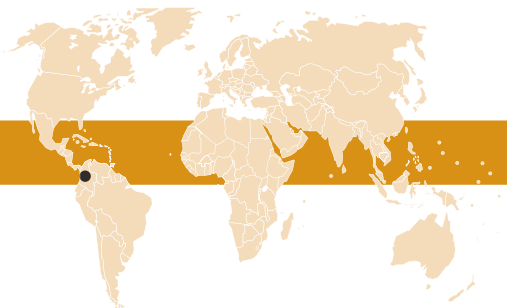
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	4	10 592 816		No					

**General notes and remarks**

See explanatory notes at the beginning of the report.







## Malaria situation

Colombia ranks among the higher-incidence countries of the Americas with a relatively high proportion of *P. falciparum* cases. Given security concerns, the NMCP does not cover many areas of the country. Areas particularly at risk of malaria include the low Cauca River Region, tropical areas of the Pacific Coast, the high Sinú River Region and the Urabá Region. More than 160 000 cases were reported in 2003.

## National policy and planning

In accordance with the Global Malaria Control Strategy and the principles of RBM Partnership, the MoH launched an NMCP in 1998. Its elements include: (i) improved diagnosis and treatment; (ii) selective vector control including use of ITNs or mosquito-repellant chemicals; (iii) mosquito breeding control and targeted IRS; (iv) strengthening of public health surveillance including entomological and vector resistance surveillance; and (v) intersectoral and social participation.

## Progress in malaria control activities

Institutional strengthening for the sustainable prevention and control of malaria has occurred at all levels: (i) expansion of diagnostic and treatment services in high-risk areas; (ii) mobilization and social communication; and (iii) community participation, particularly in municipalities with high-transmission rates. Multiple studies have recently been conducted to assess treatment efficacy of AQ, CQ and SP. Results of drug trials for AQ and ASU+SP are expected to become available soon.

## Financial support

Financial support for malaria control activities comes almost exclusively from the MoH, which contributed over US\$ 13 million to malaria control in 2003.

## National malaria policy & strategy environment

### Malaria strategy overview for 2003

Malaria strategy overview for 2003	Strategy
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2004
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	

### Antimalarial drug policy, end 2004

Antimalarial drug policy, end 2004	Current policy
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	
– <i>P. falciparum</i> (laboratory confirmed):	AQ(3d)+SP+PQ
– <i>P. vivax</i>	CQ+PQ
• Treatment failure:	Q(3d)+C20(5d) MQ(3rd line)
• Severe malaria:	
• Pregnancy:	
– prevention	
– treatment	AQ (Pf)

COLOMBIA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
99 489	184 156	184 023	129 377	127 218	187 082	135 923	180 898	185 455	66 845
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 13 October 2004					
107 616	206 195	195 719	164 722						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	164 722
Reported malaria deaths	24

**Probable or clinically diagnosed**

Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	520 980
Rapid diagnostic tests (RDTs) taken	

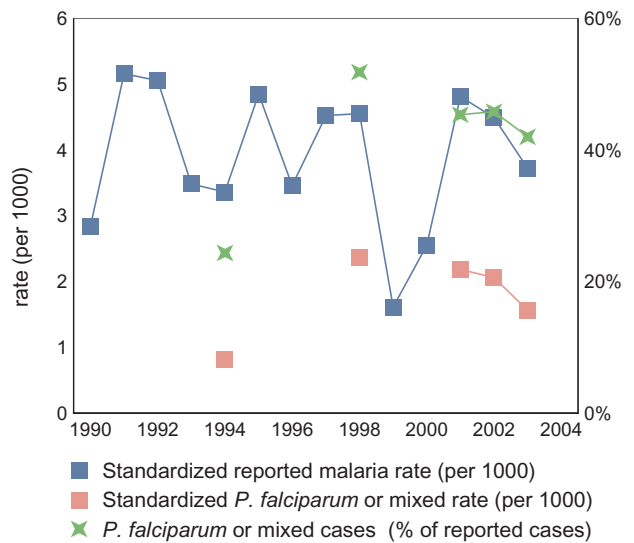
**Laboratory confirmed**

Malaria cases	164 722
<i>P. falciparum</i> or mixed	69 238
<i>P. vivax</i>	95 484
Severe (inpatient or hospitalized) cases	
Malaria deaths	24

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	107 616	206 195	195 719	164 722	100
Gender	Male				104 783	64
	Female				59 939	36
Age	<1 year				165	0
	1-4 years				13 771	8
	5-14 years				32 944	20
	15-44 years				108 618	66
	>44 years				9 224	6

**Reported malaria cases by selected subnational area**

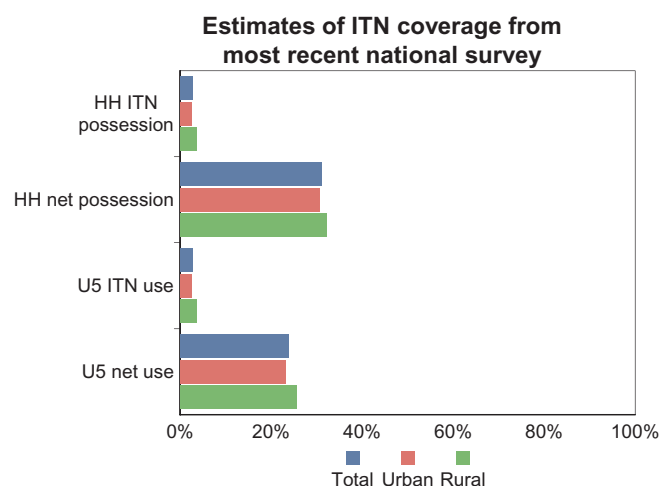
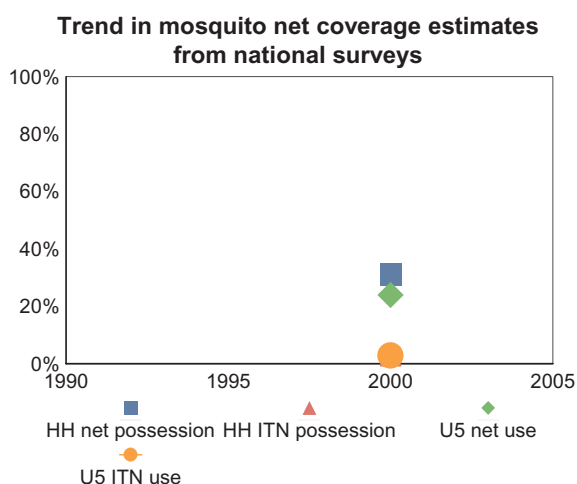
4 areas	2000	2001	2002	2003	%
Uraba – Bajo Cauca			85 437	77 373	47
Pacific			70 008	54 787	33
Amazon			12 527	3 713	2
Orinoco – East plains			24 141	981	1

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.



## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

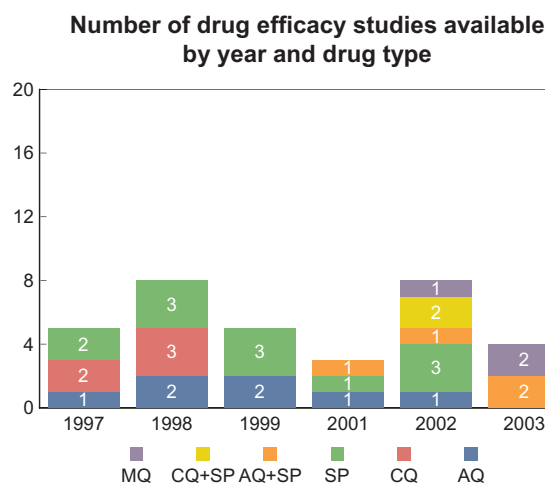
Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

*No data are currently available.*

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1997-1998	5	66.6	44.5	96.6	47.3	83.7
<b>SP</b>						
1997-2002	12	10.8	0.0	26.5	1.9	15.8
<b>AQ</b>						
1997-2002	7	11.5	0.0	50.0	3.2	27.3
<b>MQ</b>						
2002-2003	3	2.2	0.0	6.4	0.0	6.4
<b>CQ+SP</b>						
2002	2	17.4	12.1	22.6	12.1	22.6
<b>AQ+SP</b>						
2001-2003	4	2.3	0.0	10.8	1.1	6.6

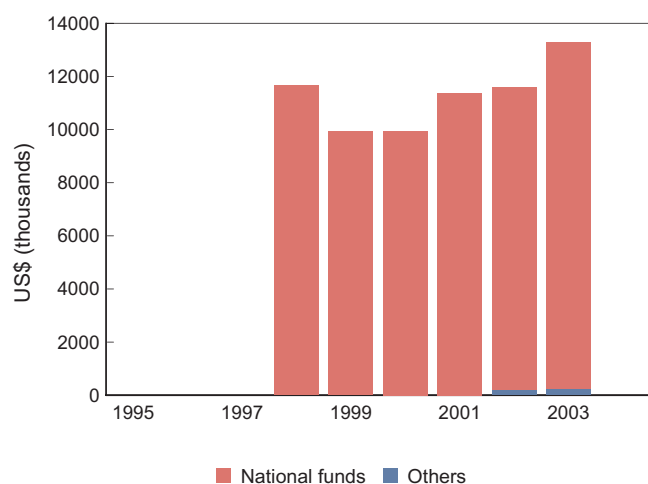


## COLOMBIA

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998	11 661	
1999	9 930	
2000	9 950	
2001	11 364	
2002	11 364	225
2003	13 050	225
2004		

## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

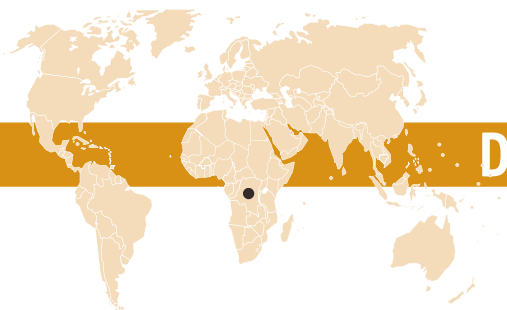
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
Reg.Org.	3	15 909 000		No			-		

Multicountry proposal which includes Colombia, Ecuador, Peru, and Venezuela

## General notes and remarks

See explanatory notes at the beginning of the report.



# DEMOCRATIC REPUBLIC OF THE CONGO

## Malaria situation

Stable endemic transmission of malaria occurs all year round throughout the Democratic Republic of the Congo. Seasonal fluctuations in transmission intensity occur in the east and south of the country where the rainy season lasts from September/October to May, with a short dry season in February/March. Malaria remains one of the primary causes of mortality and morbidity, especially among pregnant women and young children. Furthermore, malaria is thought to contribute indirectly to HIV transmission through transfusions with unscreened blood for patients with severe malarial anaemia. The complex emergency circumstances in certain areas of the country have worsened the malaria situation. The disease accounts for an estimated 25–30% of child mortality, and is responsible for 68% of outpatient visits and 30% of hospital admissions averaged over the country. In 2003, sentinel sites reported 4 386 638 cases of malaria, which resulted in 16 498 reported malaria deaths.

## National policy and planning

In 1998, an NMCP was created with six administrative divisions. The primary control strategies are: (i) appropriate case management in both community and health infrastructures; (ii) scaling up the use of ITNs; (iii) providing IPT for pregnant women; and (iv) epidemic prevention and control. Efforts to strengthen malaria surveillance, operational research, community involvement and health education are also promoted through the RBM Partnership. Additional activities carried out by other RBM partners include strengthening human resources in health care through training, improving the supply of drugs and medical equipment, ITN distribution, supervision and monitoring and evaluation.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 8
• Home-based management of malaria:	
• Vector control using insecticides:	
• Monitoring insecticide resistance – number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	SP
– <i>P. falciparum</i> (laboratory confirmed):	SP
– <i>P. vivax</i>	
• Treatment failure:	Q(7d)
• Severe malaria:	Q(7d)
• Pregnancy:	
– prevention	SP (IPT)
– treatment	

## Progress in malaria control activities

Based on demonstrated high treatment failure rates for SP, the first-line antimalarial until 2004, the country is in the process of replacing it with an ACT as the first-line antimalarial treatment. Scaling up the delivery of ITNs to target populations has accelerated since 2000, with more than 360 000 ITNs distributed in 2003 alone.

## Financial support

The total needed budget estimated in the RBM 5-year strategic plan 2002–2006 exceeds US\$ 143 million. The GFATM will supply almost US\$ 54 million from a grant commissioned in its third round. It is anticipated that the remaining gap will be met by the government, multilateral and bilateral cooperation, the World Bank and the GFATM in future rounds.

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
						198 064		141 353	1 508 042
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>						
964 623	2 199 247	2 640 168	4 386 638	Date of last report: 15 December 2004					

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	4 386 638
Reported malaria deaths	16 498

**Probable or clinically diagnosed**

Malaria cases	4 386 638
Severe (inpatient or hospitalized) cases	
Malaria deaths	16 498

Slides taken  
Rapid diagnostic tests (RDTs) taken

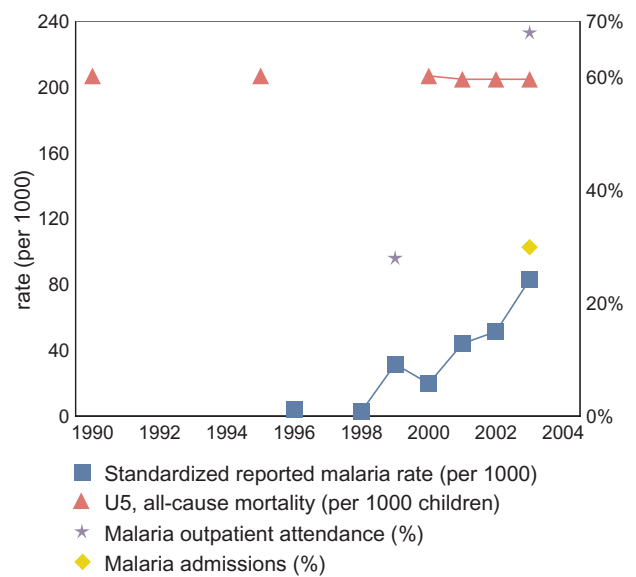
**Laboratory confirmed**

Malaria cases	
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	964 623	2 199 247	2 640 168	4 386 638	100

**Reported malaria cases by selected subnational area**

11 areas	2000	2001	2002	2003	%
Katanga	26 293	394 761	53 592	640 191	15
Nord Kivu	74 246	321 779	345 077	626 616	14
Kinshasa	359 544	506 716	1 034 822	537 378	12
Sud Kivu	241	54 086	252 791	468 325	11
Equateur	54 818	93 624	130 208	465 636	11
Bas-Congo	462	314 967	135 952	453 860	10
Bandundu	35 822	207 330	208 047	323 603	7
Kasai Oriental	9 393	86 873	157 019	255 195	6
Orientale		33 224	101 947	235 180	5
Maniema	117 373	79 999	69 421	212 200	5
Kasai Occident	45 387	105 888	151 292	168 458	4

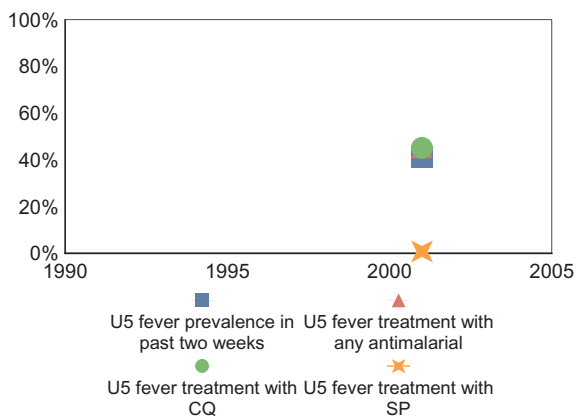
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

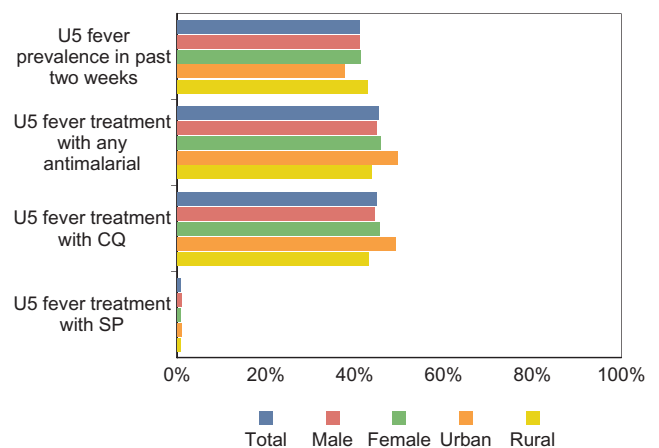
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



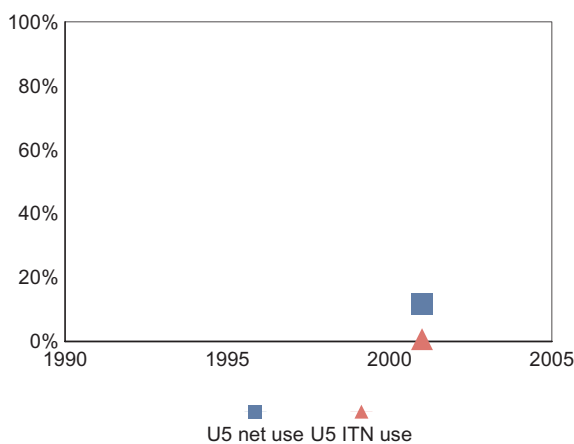
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



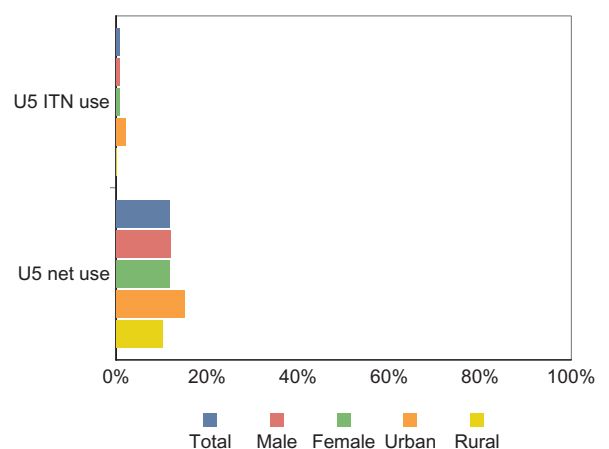
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



**Estimates of ITN coverage from most recent national survey**

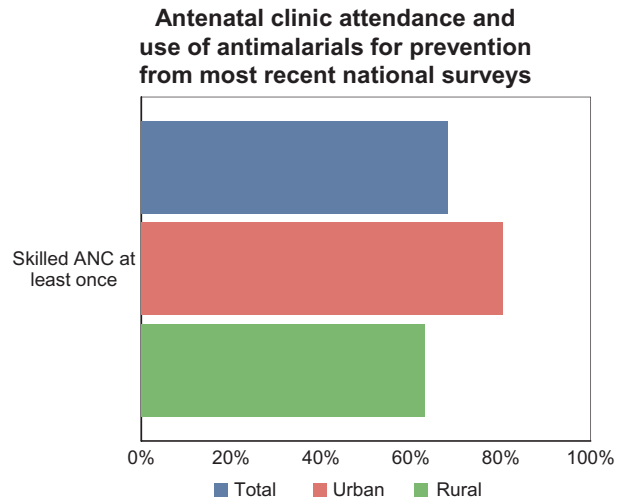
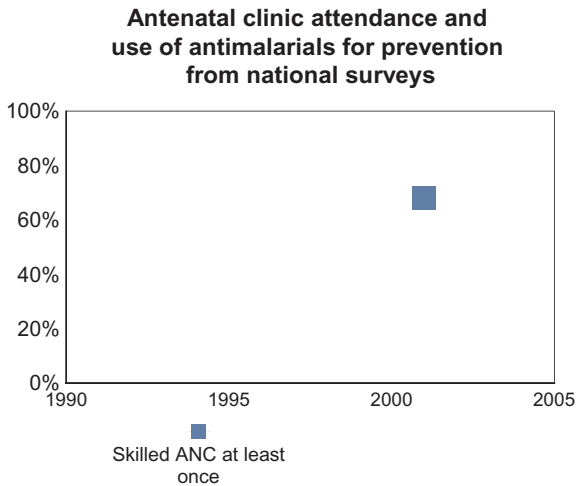




DEMOCRATIC REPUBLIC OF THE CONGO

**Intermittent preventive treatment during pregnancy**

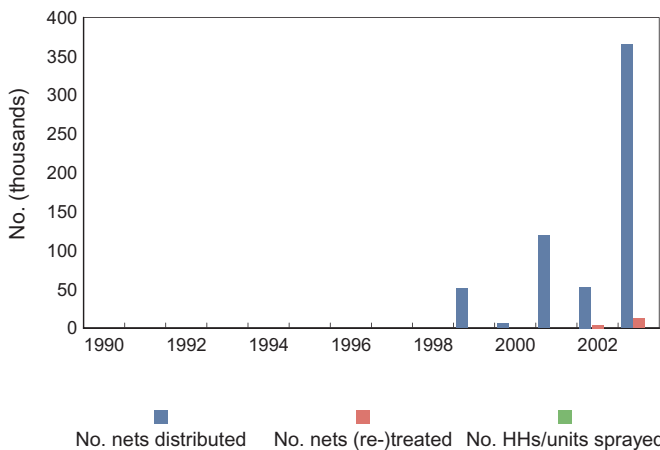
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



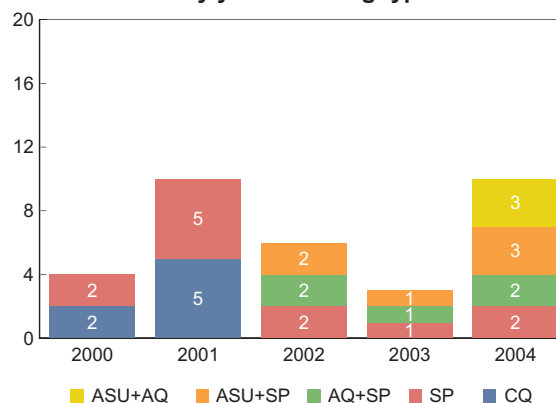
Year	No. nets (re-) treated	No. nets sold or distributed
1999		50 600
2000		6 000
2001		119 186
2002	4 092	53 000
2003	12 223	365 100

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
2000-2001	7	48.0	29.4	80.0	34.0	50.0
<b>SP</b>						
2000-2004	12	9.3	0.0	30.2	4.4	18.3
<b>AQ+SP</b>						
2002-2004	5	1.7	0.0	6.0	0.7	4.4
<b>ASU+AQ</b>						
2003-2004	3	0.0	0.0	1.4	0.0	1.4
<b>ASU+SP</b>						
2002-2004	6	0.0	0.0	5.6	0.0	3.4

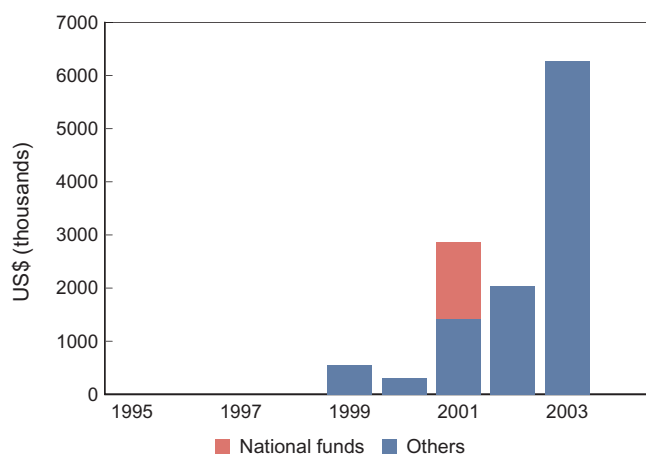
Number of drug efficacy studies available by year and drug type



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999		552
2000		315
2001	1 431	1 431
2002		2 035
2003		6 269
2004		

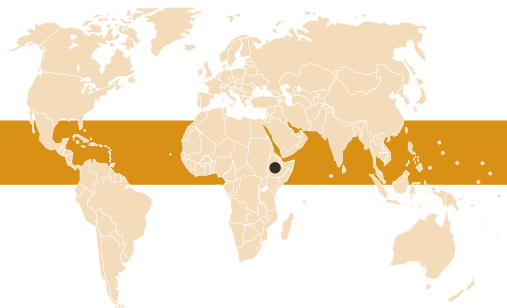
### Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	3	24 966 676	<b>UNDP</b>	Yes	7-Sep-04	24 966 676	1	1 441 186	5.8%

#### General notes and remarks

See explanatory notes at the beginning of the report.



## Malaria situation

Malaria is a leading public health problem in Ethiopia, where an estimated 48 million people (68% of the population) live in areas at risk of malaria. In 2002–2003, the disease was the primary cause of reported morbidity and mortality, accounting for 16% of outpatient visits, 20% of hospital admissions and 27% of hospital deaths. Malaria transmission in Ethiopia is unstable and characterized by frequent and often large-scale epidemics. In 2003, large-scale malaria epidemics occurred from April to December resulting in 2 million clinical and confirmed cases and 3000 deaths, affecting 3368 localities in 211 districts. However, as a large majority of cases and deaths that occur at community level are not included in health facility reports, the actual number of cases and deaths that occur during epidemics is likely to be much higher.

## National policy and planning

Prevention and control activities are guided by the national strategic plan (2001–2005) developed in cooperation with the Health Sector Development Programme and in accordance with the objectives of RBM partners. The commitment of the government, participation of communities and donors and other partners' support have created a conducive environment. A Health Extension Package was launched in 2004 to expand basic health services to the rural population at large, where most malaria transmission occurs. RBM partners provide technical and financial support to scale up implementation of malaria prevention and control activities. Strategies include: (i) early diagnosis and prompt treatment with safe and effective drugs; (ii) vector control in selected areas mainly through the use of ITNs and IRS; (iii) epidemic monitoring; (iv) preparedness and response; and (v) cross-cutting strategies that include information, communication and education materials, human resource development and monitoring and evaluation.

## Progress in malaria control activities

Major recent achievements include: (i) an evidence-based change in antimalarial drug policy from SP to ACTs; (ii) development of new malaria

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	1995
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	No
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	ATM-LUM
– <i>P. falciparum</i> (laboratory confirmed):	ATM-LUM
– <i>P. vivax</i>	CQ
• Treatment failure:	Q(7d)
• Severe malaria:	Q(7d)
• Pregnancy:	
– prevention	
– treatment	

treatment guidelines and associated training materials for regional-, district- and health facility-level implementation; (iii) development of a national strategic plan for scaling up the distribution and use of ITNs; and (iv) revision of guidelines on prevention and control of malaria epidemics. Procurement of ACTs and ITNs has been greatly enhanced with funding from the GFATM. Resource limitations for employing and training skilled staff and lack of capital for commodities and operational costs—especially in peripheral health facilities—present ongoing challenges that require coordinated support from partners and donors.

## Financial support

In 2003, Ethiopia reported that almost US\$ 5 million in national funds was available for malaria control efforts. The GFATM committed US\$ 37.9 million for malaria control in 2003, of which almost half was disbursed by the end of 2003.

ETHIOPIA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)\***

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
		206 262	305 616	358 469	412 609	478 411	509 804	604 960	647 919
2000	2001	2002	2003	Date of last report: 15 December 2004					
383 382	400 371	427 831	565 273						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	565 273
Reported malaria deaths	

**Probable or clinically diagnosed**

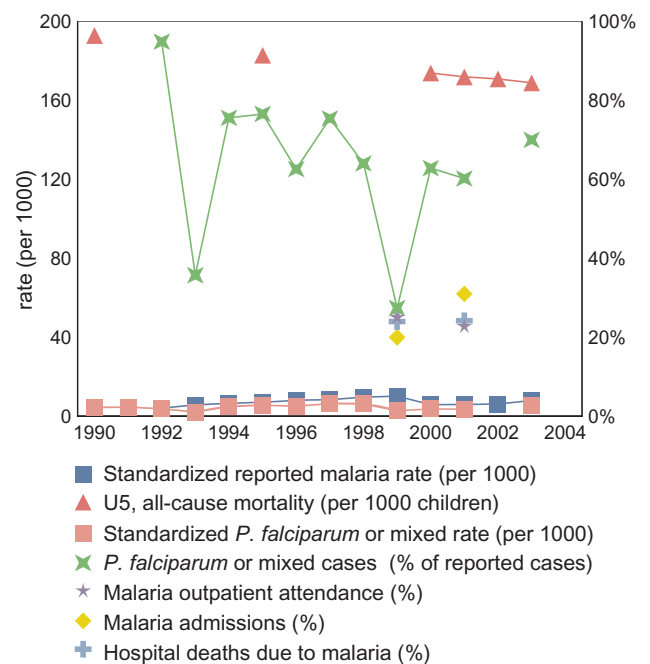
Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	1 210 868
Rapid diagnostic tests (RDTs) taken	

**Laboratory confirmed**

Malaria cases	565 273
<i>P. falciparum</i> or mixed	395 964
<i>P. vivax</i>	158 115
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases	
Estimated reporting completeness (%)	



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	383 382	400 371	427 831	565 273	100

**Reported malaria cases by selected subnational area**

2000	2001	2002	2003	%
------	------	------	------	---

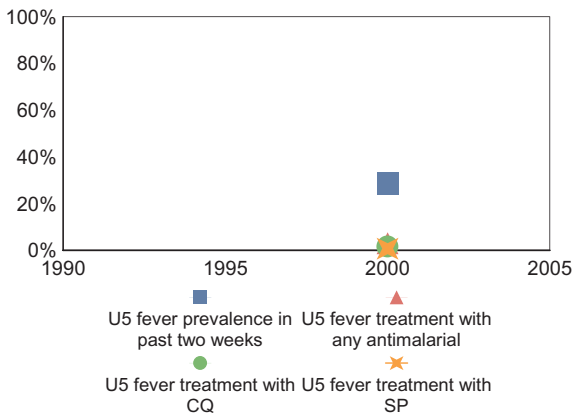
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

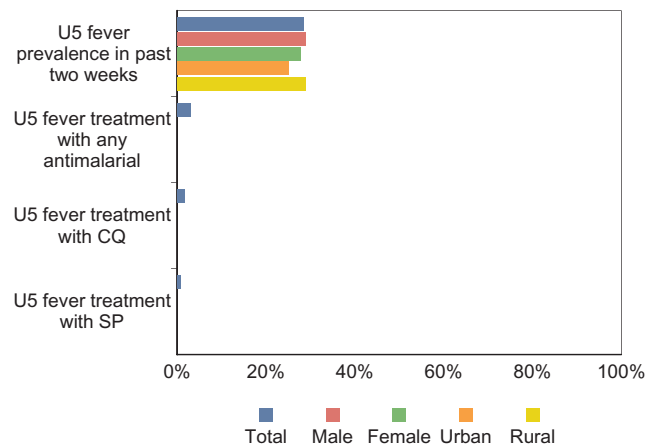
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



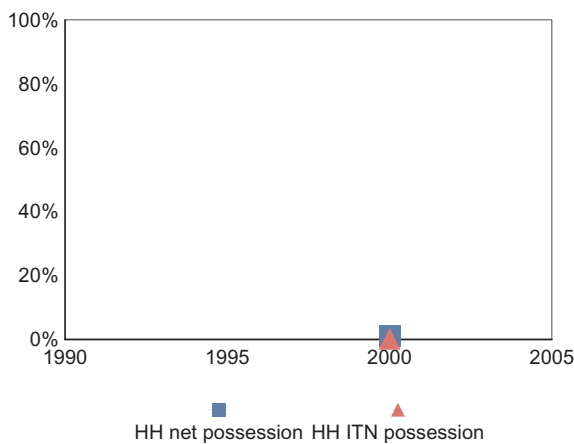
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



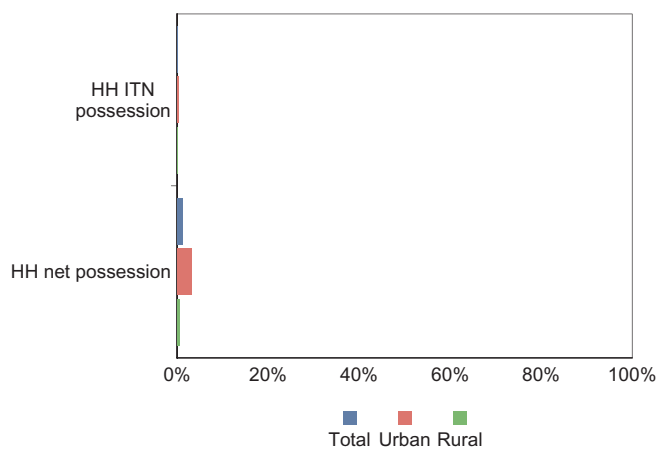
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



**Estimates of ITN coverage from most recent national survey**

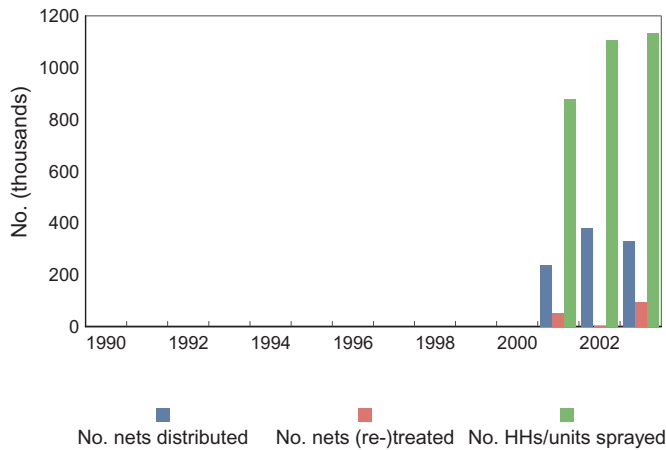


ETHIOPIA

**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

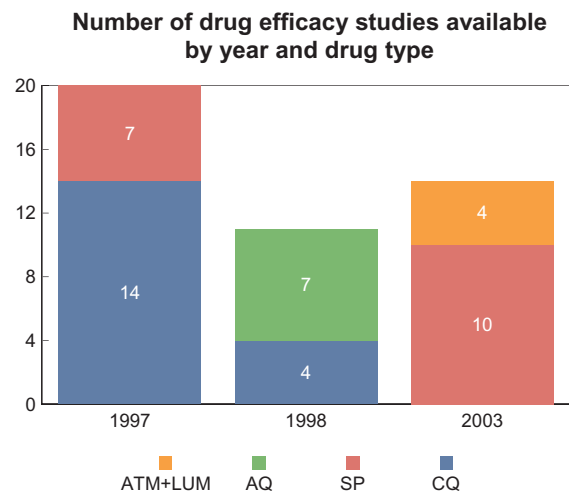


	No. HHs/units sprayed	No. nets (re-) treated	No. nets sold or distributed
2001	877 761	52 800	237 000
2002	1 105 833	2 300	378 900
2003	1 131 950	93 200	331 900

**MONITORING ANTIMALARIAL DRUG EFFICACY**

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

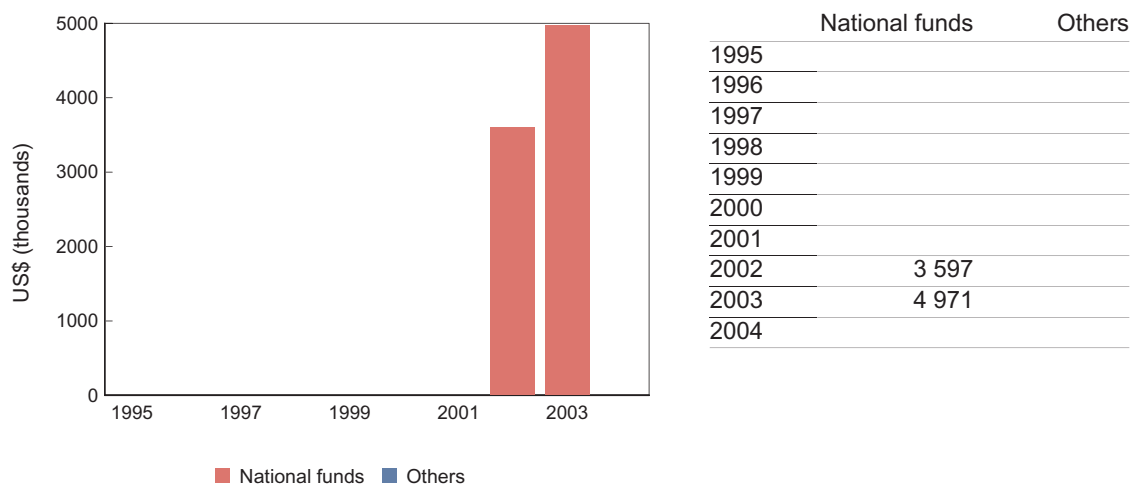
Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1996-1998	18	70.0	5.0	97.8	55.8	85.2
<b>SP</b>						
1997-2003	17	10.3	0.0	44.9	2.0	26.1
<b>AQ</b>						
1998	7	18.9	6.2	66.7	6.5	45.8
<b>ATM+LUM</b>						
2003	4	0.0	0.0	0.0	0.0	0.0



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



### Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	37 915 011	MoH	Yes	01-Aug-03	37 915 011	1	17 891 589	47.2%

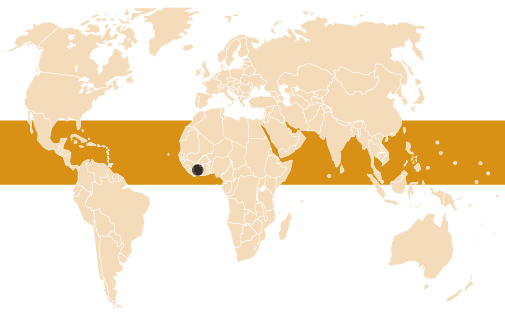
### General notes and remarks

See explanatory notes at the beginning of the report.

\*Reporting in Ethiopia is based on roughly a July to June annual cycle. Reported malaria cases for 2003 presented here are for the July 2003–June 2004 cycle, and so on.







## Malaria situation

Malaria, one of the major causes of poverty and low productivity, is hyperendemic and accounts for over 44% of reported outpatient visits and an estimated 22% of under-5 mortality in Ghana. Of infections detected by blood slide examination, *P. falciparum* accounts for about 90%, *P. malariae* for 9.9% and *P. ovale* for 0.1%. Of malaria cases reported at outpatient visits in public health facilities, 36–40% are typically in children under 5 years of age. Reported malaria cases represent only a small fraction of the actual number of malaria episodes in the population because the majority of people with symptomatic infections are treated at home and are not reported.

## National policy and planning

The Ghanaian RBM Partnership emphasizes strengthening health services in general and making effective prevention and treatment strategies more widely available. Ghana's malaria control strategy, which has been adopted by the RBM Partnership, involves multisectoral and intersectoral partnerships working together on an agreed plan with the goal of reducing death and illness caused by malaria by 50% by 2010.

## Progress in malaria control activities

Progress was recently made in improving access to prompt and effective treatment, supply of ITNs and using IPT with SP. Based on evidence from drug efficacy studies, Ghana has recently changed from CQ to ASU+AQ for treatment of uncomplicated malaria. Several collaborative ITN campaigns were conducted with RBM partners including WHO, UNICEF, NetMark and bilateral agencies. In collaboration with ExxonMobil Ghana Ltd, an ITN voucher programme was launched in 2004 targeting pregnant women in the Greater Accra and Kumasi metropolitan areas.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2004
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	6
• Home-based management of malaria:	Yes
• Vector control using insecticides:	
• Monitoring insecticide resistance	
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	ASU+AQ*
– <i>P. falciparum</i> (laboratory confirmed):	ASU+AQ*
– <i>P. vivax</i>	
• Treatment failure:	Q(7d)
• Severe malaria:	Q(7d)
• Pregnancy:	SP (IPT)
– prevention	
– treatment	Q or ASU+AQ (2nd & 3rd trim.)

This project resulted in over 76 000 vouchers redeemed for ITNs in ExxonMobil fueling shops. IPT for pregnant women was initiated in 20 districts, including training for health staff, with funds from the GFATM. On Africa Malaria Day 25 April 2005, Ghana will launch a wide-scale ITN voucher programme and will use high-impact media and advocacy pieces to raise awareness about malaria at community level.

## Financial support

Financial support to implement all of the activities of the strategic plan is not currently in place. The GFATM has committed over US\$ 23 million in two grants and started disbursement in 2003. The NMCP did not provide information on routine programme finances.

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
1 438 713	1 372 771	1 446 947	1 697 109	1 672 709	1 928 316	2 189 860	2 227 762	1 745 214	2 895 079
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 30 November 2004					
3 349 528	3 383 025	2 830 784	3 552 869						

**Reported malaria by type and quality**

For most recent year 2003

Reported malaria cases	3 552 869
Reported malaria deaths	3 245

**Probable or clinically diagnosed**

Malaria cases	3 552 869
Severe (inpatient or hospitalized) cases	478 960
Malaria deaths	3 245

Slides taken  
Rapid diagnostic tests (RDTs) taken

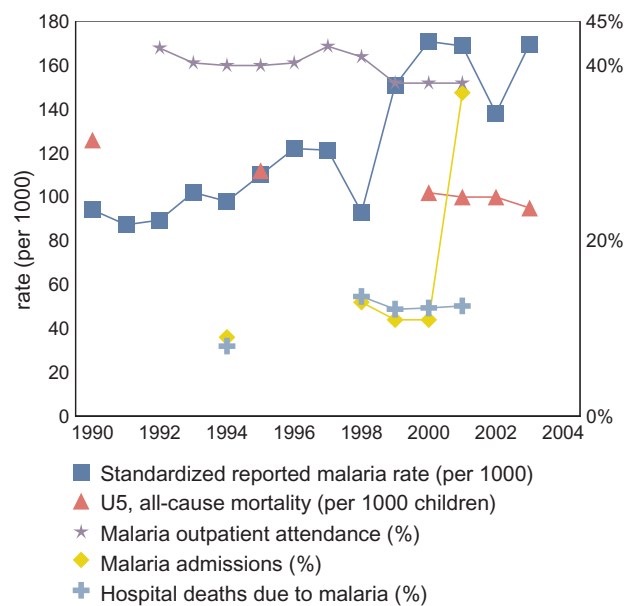
**Laboratory confirmed**

Malaria cases	478 960
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	3 349 528	3 383 025	2 830 784	3 552 869	100
Age	<5 years	1 303 685	1 316 724	966 923	1 421 148	40
	5> years	2 045 845	2 066 303	1 863 861	2 131 721	60

**Reported malaria cases by selected subnational area**

10 areas	2000	2001	2002	2003	%
Ashanti				774 641	22
Brong Ahafo				575 480	16
Greater Accra				414 881	12
Volta				332 875	9
Eastern				298 056	8
Northern				291 496	8
Central				257 533	7
Upper East				250 888	7
Western				226 623	6
Upper West				130 396	4

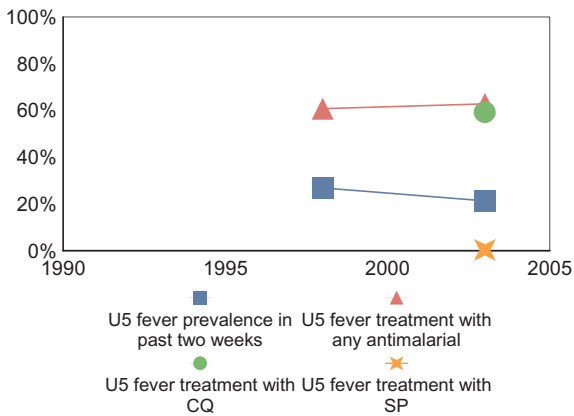
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

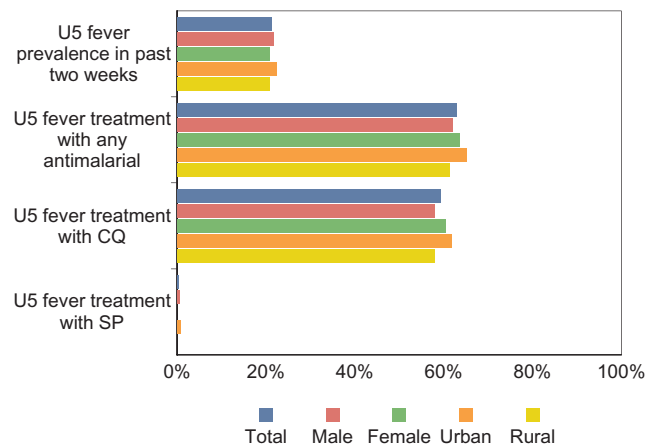
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



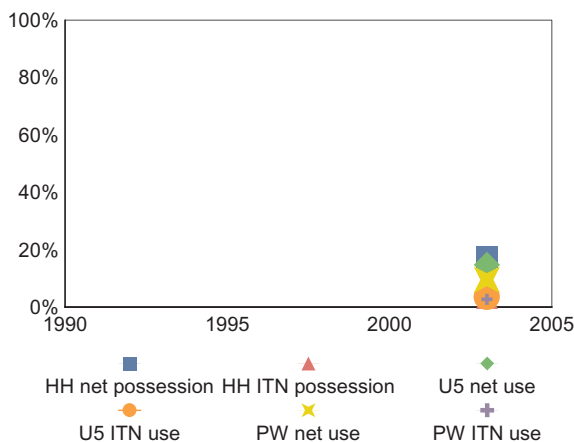
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



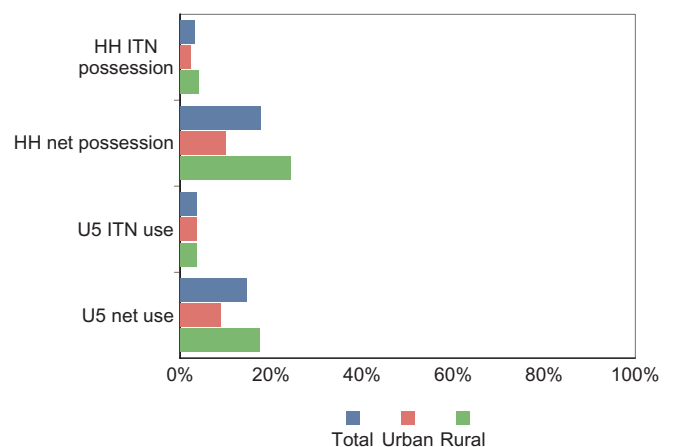
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**

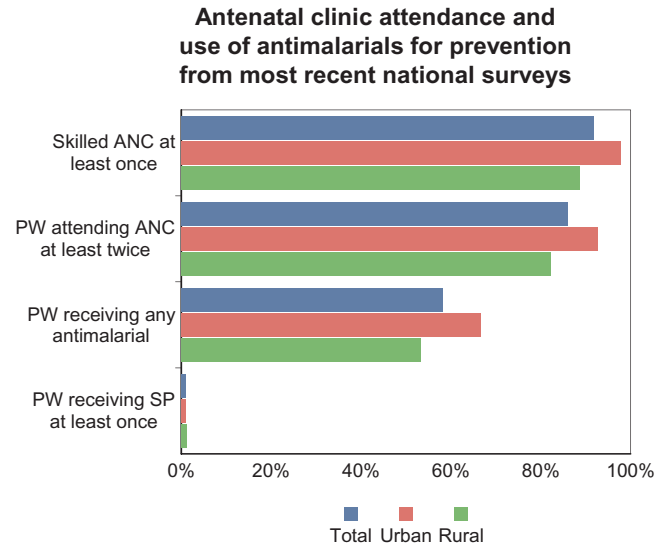
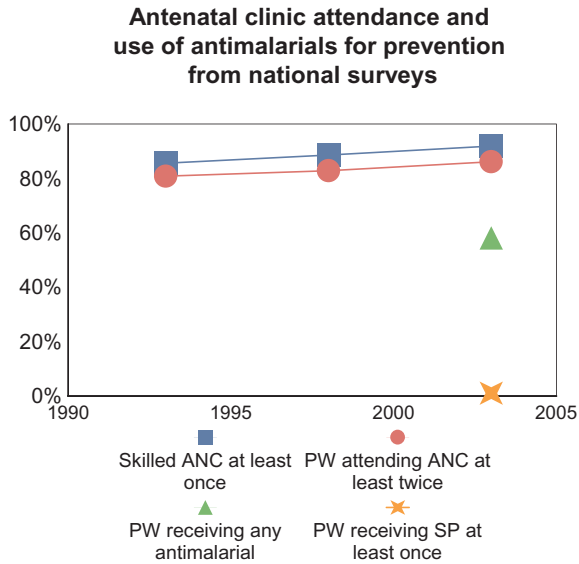


**Estimates of ITN coverage from most recent national survey**



**Intermittent preventive treatment during pregnancy**

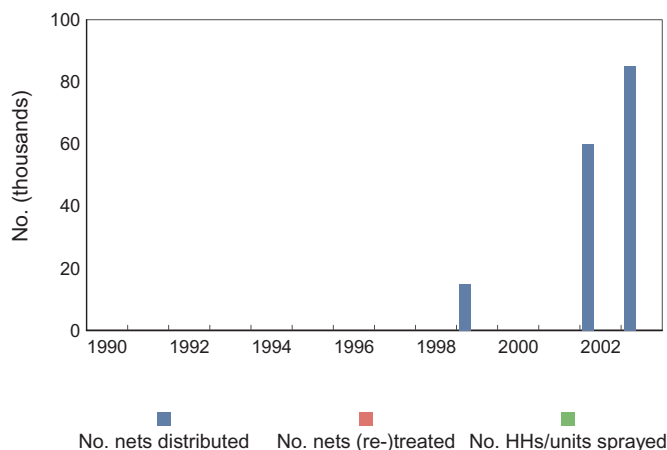
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

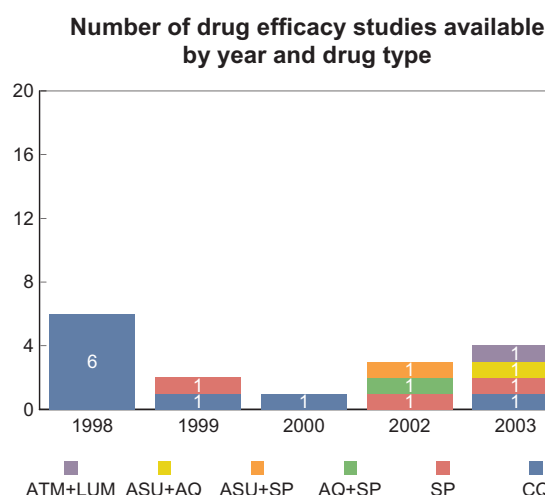


No. nets sold or distributed	
1999	15 000
2002	60 000
2003	85 030

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1998-2003	9	23.2	9.0	31.3	15.8	29.7
<b>SP</b>						
1998-2003	3	3.0	0.0	5.2	0.0	5.2
<b>AQ+SP</b>						
2002	1	1.4				
<b>ATM+LUM</b>						
2003	1	0.0				
<b>ASU+AQ</b>						
2003	1	0.0				
<b>ASU+SP</b>						
2002	1	0.8				



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).

*No data are currently available.*

### Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

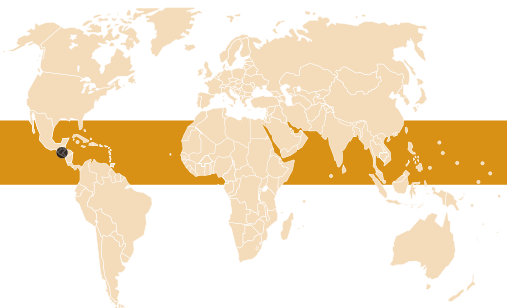
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	4 596 111	MoH	Yes	03-Jul-03	4 596 111	3	2 921 110	63.6%
CCM	4	18 561 367		No			-		

### General notes and remarks

See explanatory notes at the beginning of the report.

\* policy adopted, not presently being deployed, implementation process ongoing





## Malaria situation

The 31 127 cases registered in Guatemala in 2003 were similar to the number reported the previous year, but represent a reduction in comparison with the number of cases reported in 2000. Alta Verapaz, Baja Verapaz, Costa Sur, Ixcán, Izabal and Petén Sur Occidental are the areas with the greatest incidence of malaria. The majority of cases occurred among those older than 15 years of age. Factors associated with malaria transmission in the country include poor environmental conditions, migration, favourable climatic conditions, insufficient human and financial resources and limited community participation and health promotion.

## National policy and planning

Funding for malaria control in Guatemala is decentralized; the national malaria control office provides technical assistance, and district officials are responsible for implementing activities from budgeted funds. Control activities endorse the Global Malaria Control Strategy and the RBM initiative and include strengthening of the health system in general, selective vector control, access to prompt, effective treatment and community participation through information, education and communication materials.

## Progress in malaria control activities

Since July 2004, a project promoting sustainable vector control with alternative insecticides to DDT or other persistent organic pollutants has been piloted in seven health areas in Alta Verapaz, Ixcán and Petén Sur Occidental. Recently revised guidelines for epidemiological surveillance of malaria were disseminated among

affected areas. A number of operational studies were undertaken in 2002, including in the Aldea El Zapote and Aldea El Jícaro, El Progreso, where it was found that deltamethrin was not highly efficacious against local malaria vectors.

## Financial support

The MoH finances the majority of the NMCP activities. In 2004, Guatemala was granted an additional US\$ 9.7 million by the GFATM for malaria, which will be disbursed in 2005 and 2006.

## National malaria policy & strategy environment

### Malaria strategy overview for 2003

	Strategy
• Treatment and diagnosis guidelines – published/updated in:	
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	
• Insecticide-treated mosquito nets:	No
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	

### Antimalarial drug policy, end 2004

	Current policy
• Uncomplicated malaria – <i>P. falciparum</i> (unconfirmed): – <i>P. falciparum</i> (laboratory confirmed): – <i>P. vivax</i>	CQ+PQ
• Treatment failure:	
• Severe malaria:	
• Pregnancy: – prevention – treatment	



GUATEMALA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
41 711	57 829	57 560	41 868	22 057	24 178	20 268	32 099	47 689	45 098
2000	2001	2002	2003	Date of last report: 13 October 2004					
53 311	35 824	35 540	31 127						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	31 127
Reported malaria deaths	0

**Probable or clinically diagnosed**

Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	156 227
Rapid diagnostic tests (RDTs) taken	

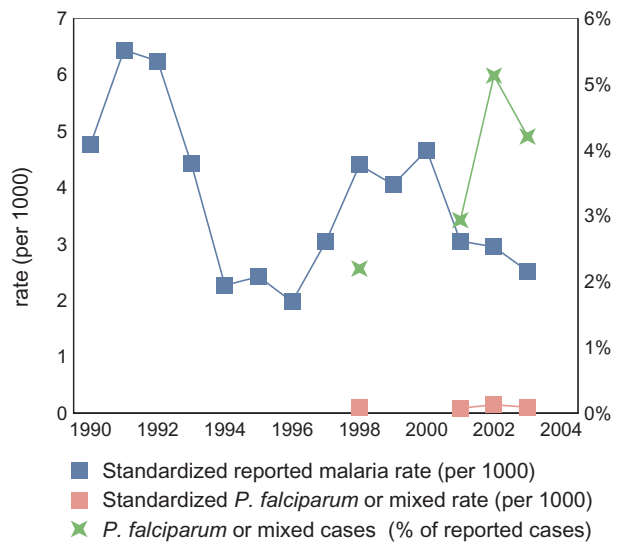
**Laboratory confirmed**

Malaria cases	31 127
<i>P. falciparum</i> or mixed	1 310
<i>P. vivax</i>	29 817
Severe (inpatient or hospitalized) cases	5
Malaria deaths	0

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	53 311	35 824	35 540	31 127	100
Gender	Male				16 450	53
	Female				14 548	47
Age	<1 year				724	2
	1-4 years				5 264	17
	5-14 years				10 383	33
	15-49 years				13 019	42
	>49 years				1 608	5

**Reported malaria cases by selected subnational area**

7 areas	2000	2001	2002	2003	%
Alta Verapaz				12 388	40
Peten				9 826	32
Ixcán				1 932	6
Baja Verapaz				1 423	5
Huehuetenango				1 160	4
Escuintla				1 116	4
Izabal				1 058	3

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

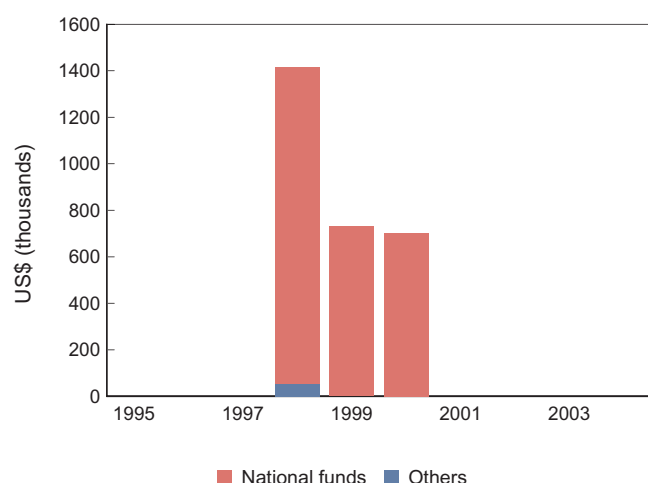
Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

*No data are currently available.*

## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998	1 360	53
1999	730	
2000	703	
2001		
2002		
2003		
2004		

### Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

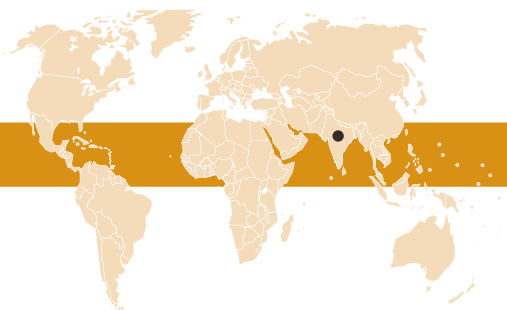
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	4	9 713 853		No					

### General notes and remarks

See explanatory notes at the beginning of the report.





## Malaria situation

Areas of India that are highly endemic for malaria include the north-eastern region and tribal forested and hilly areas of several states including Maharashtra, and selected non-tribal districts. Nearly one quarter of all reported cases are from Orissa State, and 80% of reported cases originate from 20% of the population. During 1995–1996, malaria outbreaks and deaths caused by malaria were reported from tribal parts of Maharashtra State. Nationwide, the reported incidence of laboratory-confirmed cases has declined from 3.0 million in 1996 to 2.1 million in 2001 to 1.78 million in 2003 during a time when there were no changes in laboratory diagnostic or reporting procedures. Around 47% of cases are caused by *P. falciparum*, with some fluctuation but no consistent trend over time. About 1000 deaths are reported annually, but these figures do not include cases treated in private and not-for-profit health facilities. CQ-resistant *P. falciparum* and insecticide-resistant malaria vectors are prevalent in some areas.

## National policy and planning

The NMCP operates under the National Vector-Borne Disease Control Programme in 5-year strategic plans (current plan 2002–2007) and coordinates strategic decisions with the National Technical Advisory Committee on Malaria and with state health authorities. The National Health Policy of 2002 reinforced the commitment to malaria control and set as goals the reduction of malaria mortality by 50% by 2010 and the efficient control of malaria morbidity. Malaria control in India relies heavily on active case detection: every year nearly 100 million blood smears are taken from fever cases identified in the home, and patients are treated promptly if a diagnosis of malaria is confirmed. Access to prompt diagnosis and treatment and education is further provided through village health workers, drug distribution depots and fever treatment depots. In selected areas, there is targeted vector control through IRS, larviciding and ITNs.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>		<i>Strategy</i>
• Treatment and diagnosis guidelines	– published/updated in:	Yes 2001
• Monitoring antimalarial drug resistance:	– number of sites currently active:	Yes 13
• Home-based management of malaria:		NA
• Vector control using insecticides:		Yes
• Monitoring insecticide resistance	– number of sites currently active:	Yes 72
• Insecticide-treated mosquito nets:		Yes
• Intermittent preventive treatment:		NA
• Epidemic preparedness:		Yes
<i>Antimalarial drug policy, end 2004</i>		<i>Current policy</i>
• Uncomplicated malaria		CQ
– <i>P. falciparum</i> (unconfirmed):	ASU(3d)+SP (5 provinces)	
– <i>P. falciparum</i> (laboratory confirmed):		CQ+PQ
– <i>P. vivax</i>	ASU(3d)+SP (5 provinces)	CQ+PQ
• Treatment failure:		SP
• Severe malaria:		Q(7d)
• Pregnancy:		
– prevention		CQ
– treatment		CQ

## Progress in malaria control activities

Malaria is currently under control in vast areas of India, covering almost 80% of the population despite increasing population density and aggregation, rapid and unplanned urbanization and increased migration. However, developmental activities, expansion of agriculture and deforestation have the potential for increasing anopheline mosquitoes' breeding sites. A survey in Orissa State in 2003 demonstrated coverage with the drug distribution depots and fever treatment depots of 98.7% of villages. About half of fever cases sought treatment at the drug distribution depots and fever treatment depots, about 36% from a health worker or primary health centre, and only about 13% from other sources such as private medical practitioners. This represents a considerable increase in the proportion of people with fever seeking treatment from government sources compared

with observations in the National Sample Survey in 1995–1996. Following the 1995–1996 malaria outbreak, Maharashtra State introduced intensified active surveillance, prompt radical treatment, selective IRS with pyrethroids and larviciding in high-risk areas. ITNs were distributed in areas of medium transmission.

Under the MoH's Enhanced Malaria Control Project, which aims to control malaria in eight states including Andhra Pradesh, Gujarat and Maharashtra, malaria morbidity dropped in the project's districts by 46% compared with 1997. Before 2004, approximately 1.8 million ITNs had been distributed and an additional 3.8 million ITNs are being procured. Over the same period, the population covered by IRS decreased by more than 50%.

### **Financial support**

The Ministry of Finance allocates funds to the Ministry of Health and Family Welfare for the various national health programmes, including

malaria, a portion of which is released to state governments. Over US\$ 49 million was allocated to malaria control from the MoH in 2003. In addition, many states allocate significant budgets for malaria control activities from state resources. The World Bank has supported the Enhanced Malaria Control Project since 1997, disbursing approximately US\$ 140 million to date; however, the project is expected to close in October 2005. Starting in 2005, the GFATM will provide an additional US\$ 30 million for malaria control activities for 2 years in states that are not covered by the Enhanced Malaria Control Project, primarily those in the north-eastern part of the country. In addition, the Government of India has recently requested funding from the World Bank for a Vector Borne Disease Control Project that is due to begin mid-2006 and is expected to significantly expand the number of states covered.

## EPIDEMIOLOGICAL DATA

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

### Reported malaria cases (annual)

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
2 018 783	2 117 460	2 125 826	2 207 431	2 511 453	2 988 231	3 035 588	2 660 057	2 222 748	2 284 713
2000	2001	2002	2003	Date of last report: 4 October 2004					
2 031 790	2 085 484	1 842 019	1 781 336						

### Reported malaria by type and quality

For most recent year

Reported malaria cases	1 781 336
Reported malaria deaths	990

#### Probable or clinically diagnosed

Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	97 874 977
Rapid diagnostic tests (RDTs) taken	280 000

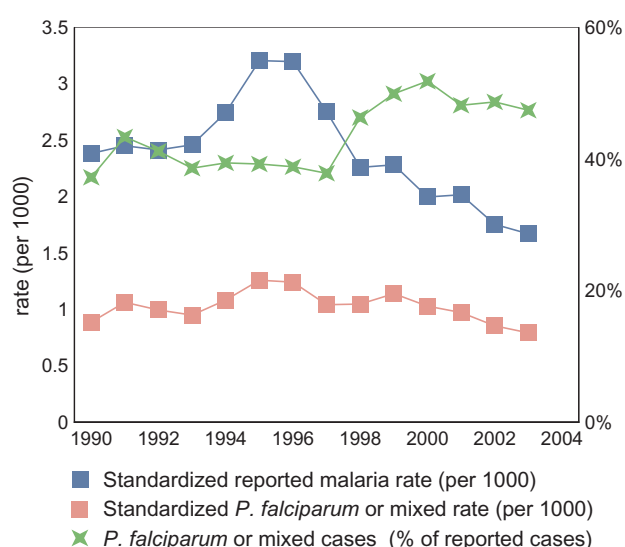
#### Laboratory confirmed

Malaria cases	1 781 336
<i>P. falciparum</i> or mixed	845 173
<i>P. vivax</i>	936 163
Severe (inpatient or hospitalized) cases	
Malaria deaths	990

#### Investigations

Imported cases

Estimated reporting completeness (%)



### Reported malaria cases by age and gender

Group	Subgroup	2000	2001	2002	2003	%
	Total	2 031 790	2 085 484	1 842 019	1 781 336	100
Gender	Male	1 125 591		1 081 849		59
	Female	825 174		760 170		41
Age	1-4 years	130 896				6
	<5 years			150 605		8
	5-14 years			462 062		25
	10-14 years	468 379				23
	15+ years			1 229 352		67
	15-19 years	1 351 490				67

### Reported malaria cases by selected subnational area

15 of 35 areas	2000	2001	2002	2003	%
Orissa	454 541	468 046	417 276		23
Chhattisgarh	290 666	245 365	194 419		11
West Bengal	345 053	181 272	175 739		10
Rajasthan	129 233	68 627	142 738		8
Gujarat	81 347	80 983	130 744		7
Jharkhand	130 784	126 539	112 740		6
Karantaka	197 625	132 584	100 220		6
Madhya Pradesh	183 118	108 818	99 708		6
Uttar Pradesh	94 524	90 188	81 853		5
Assam	95 142	89 601	76 570		4
Maharashtra	56 043	45 568	62 947		4
Tamil Nadu	31 551	27 337	43 604		2
Andhra Pradesh	57 735	38 053	35 995		2
Arunachal Pradesh	56 030	46 431	34 810		2
Meghalaya	20 630	17 918	18 366		1

INDIA

**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

**Insecticide-treated nets**

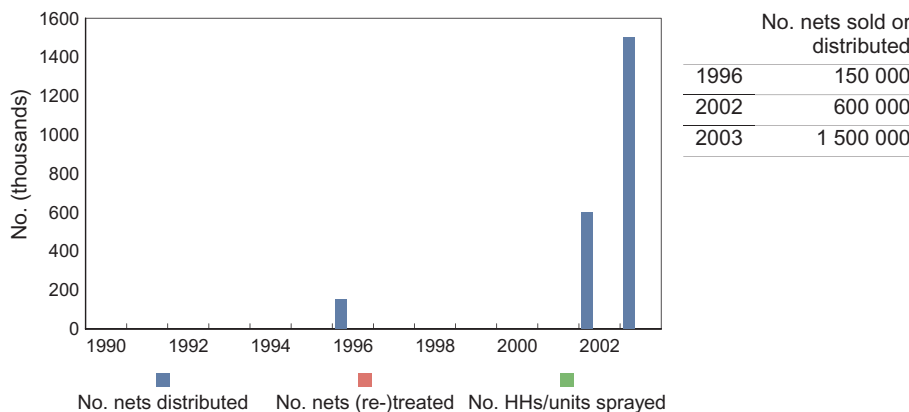
ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

*No survey-based estimates of mosquito net or ITN coverage are currently available.*

**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

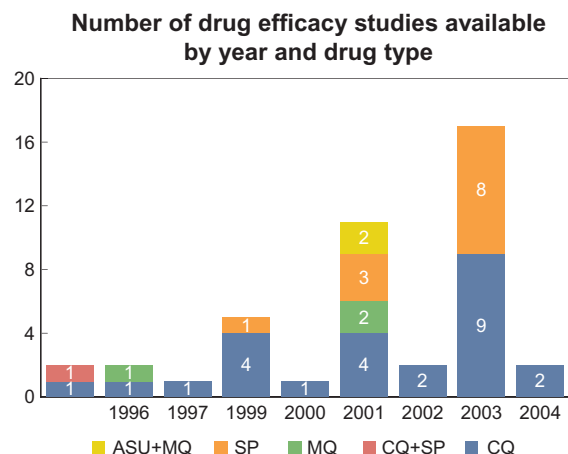
Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



**MONITORING ANTIMALARIAL DRUG EFFICACY**

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

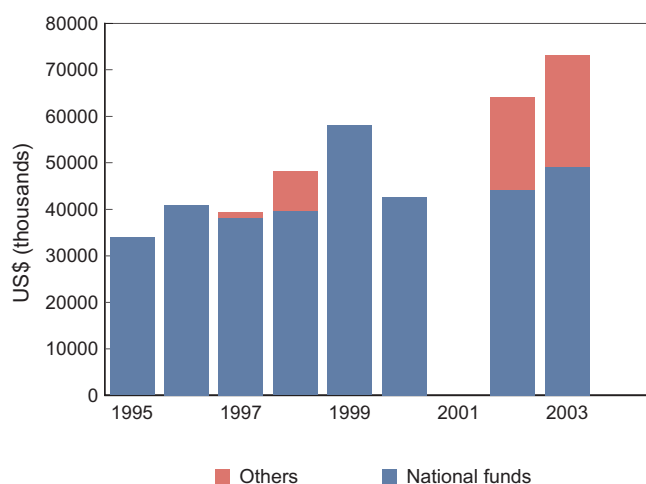
Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1996-2004	25	34.0	0.0	95.9	23.6	65.4
<b>SP</b>						
1999-2003	12	17.9	0.0	68.2	3.0	45.4
<b>MQ</b>						
1996-2001	3	4.5	0.0	7.8	0.0	7.8
<b>CQ+SP</b>						
	1	6.5				
<b>ASU+MQ</b>						
2001	2	6.4	1.9	10.9	1.9	10.9



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995	33 922	-
1996	40 922	-
1997	38 107	1 140
1998	39 749	8 483
1999	58 065	-
2000	42 690	-
2001	44 160	19 820
2002	49 100	23 910
2003	49 100	23 910
2004		

### Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	4	30 167 781		No					

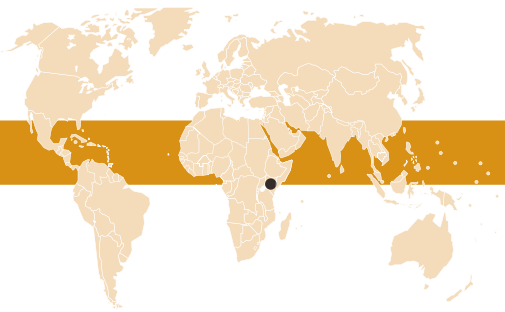
### General notes and remarks

See explanatory notes at the beginning of the report.

Reported malaria cases for 2003 and all subnational reported malaria data are provisional. Preventive treatment during pregnancy is only recommended in high-risk areas. The number of nets distributed for 2002 and 2003 reflect fiscal years April–March 2002–2003 and 2003–2004, respectively.







## Malaria situation

Malaria is a major public health problem in Kenya, with malaria burden and transmission patterns varying across the country. Four malaria epidemiological zones have been identified: (i) perennial high transmission near Lake Victoria and the south coast; (ii) high transmission with seasonal fluctuations adjacent to the areas with perennial transmission; (iii) stable transmission with seasonal peaks in most of the semi-arid and western highland regions; and (iv) low transmission risk in the arid and mountain regions.

## National policy and planning

A national malaria strategy was launched in 2001 and the malaria control programme was upgraded to a full division with its own budget line. The national malaria control strategy adopted a bottom-up approach for mobilizing districts; 50 out of 70 malaria-endemic districts have developed business plans with malaria components that reflect four strategic approaches: (i) access to prompt and effective treatment; (ii) management and prevention of malaria during pregnancy; (iii) use of ITNs and other vector control methods; and (iv) epidemic preparedness and response in 16 epidemic-prone districts. Monitoring and evaluation and information, education and communication materials are used to support implementation across these strategic approaches. The district plans were consolidated into a single national business plan from 2003 to 2007, which identified the following key interventions: (i) Integrated Management of Childhood Illness to implement case management at health facilities and through home management of fever; (ii) focused antenatal care for IPT delivery; (iii) targeted ITN distribution to pregnant women and children under 5 years of age; and (iv) IRS for selective vector control in the 16 epidemic-prone districts.

## Progress in malaria control activities

Districts are at different stages of implementation of the national malaria control strategy,

depending on local capacity and degree of organization and coordination in planning and implementation. Six sentinel districts received priority support for scaling up most interventions, so as to provide the necessary feedback for monitoring and evaluation of RBM control impact. Drug efficacy testing for first-line and second-line drugs is conducted in eight sentinel sites, two for each of the four epidemiological zones. Advocacy campaigns and information, education and communication messages are disseminated through electronic and print media, performances and sporting activities.

## Financial support

Funding for malaria control efforts is improving with increased contributions from various RBM partners and two grants from the GFATM totalling over US\$ 91 million, of which close to US\$ 1 million was disbursed in 2003.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 6
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	No 0
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria – <i>P. falciparum</i> (unconfirmed): – <i>P. falciparum</i> (laboratory confirmed): – <i>P. vivax</i>	ATM-LUM* ATM-LUM* Q(7d)
• Treatment failure:	Q(7d)
• Severe malaria:	Q(7d)
• Pregnancy: – prevention – treatment	SP (IPT) Q(7d)

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
				6 103 447	4 343 190	3 777 022		80 718	122 792
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>						
74 194	132 590	124 197		Date of last report: 1 November 2004					

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	124 197
Reported malaria deaths	135

**Probable or clinically diagnosed**

Malaria cases	124 197
Severe (inpatient or hospitalized) cases	9 584
Malaria deaths	135
Slides taken	6 211
Rapid diagnostic tests (RDTs) taken	6 280

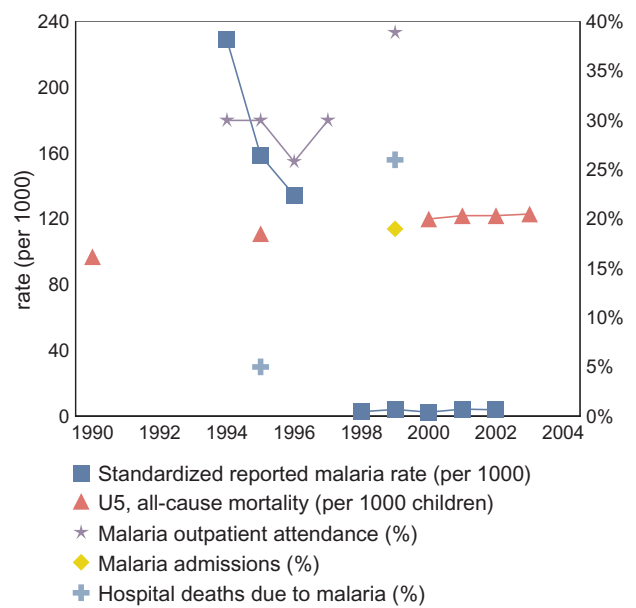
**Laboratory confirmed**

Malaria cases	
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases	
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Estimated reporting completeness (%) 40



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	74 194	132 590	124 197		100
	PW	1 364	5 061	3 620		3
Age	<5 years	29 541	50 839	38 426		31
	5> years	51 990	76 690	82 151		66

**Reported malaria cases by selected subnational area**

9 areas	2000	2001	2002	2003	%
Kitale district hospital	22 108	20 166	32 911		26
Kericho district hosp.	9 679	11 011	19 054		15
Kapsara HC	5 847	4 184	5 859		5
Chempkemel HC	5 106	4 951	5 761		5
Kipsitet dispensary	2 446	2 868	3 369		3
Londiani sub-dist. hosp.	1 534	1 072	3 014		2
Chepchoina dispensary	2 458	2 440	1 939		2
Kimini cottage hosp.	1 075	1 226	1 150		1
Kipchimchim mis. hosp.	448	445	515		<1

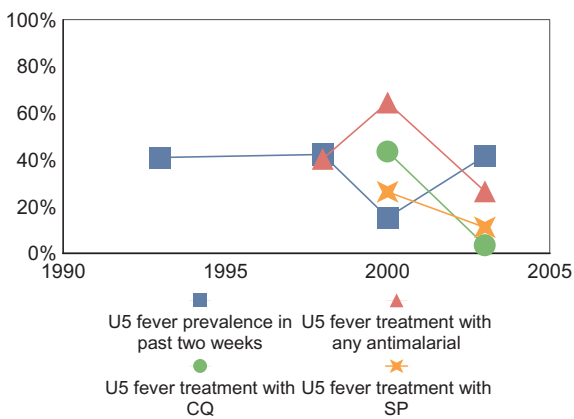
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

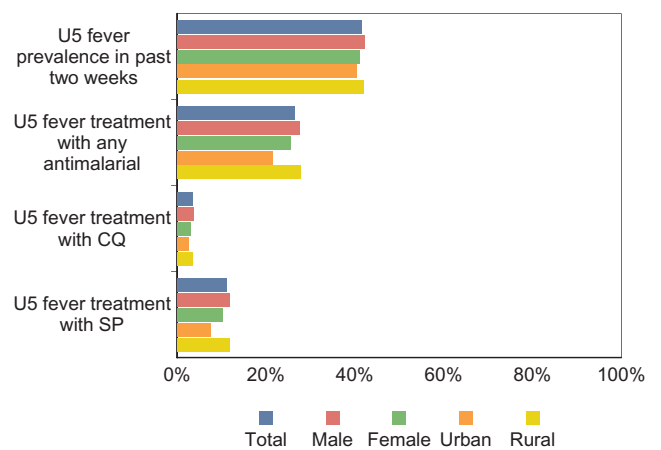
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



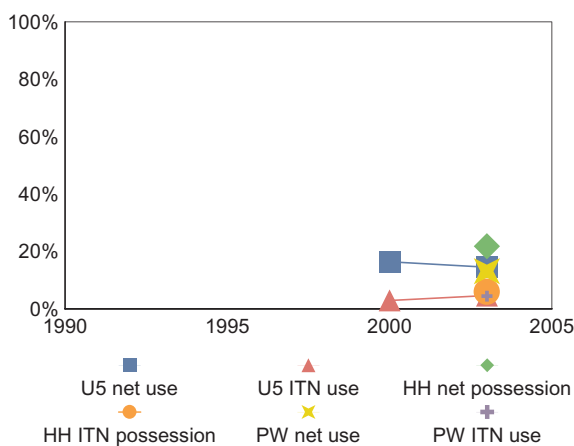
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



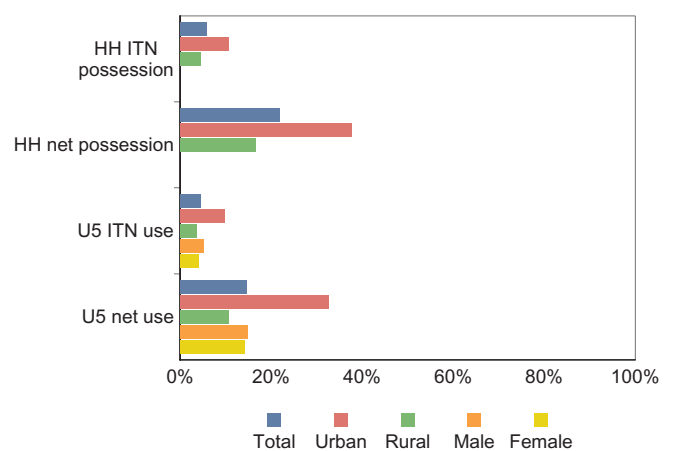
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**

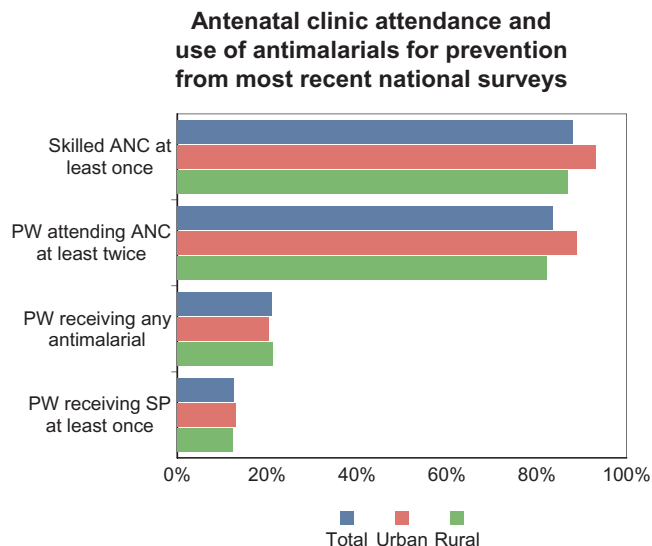
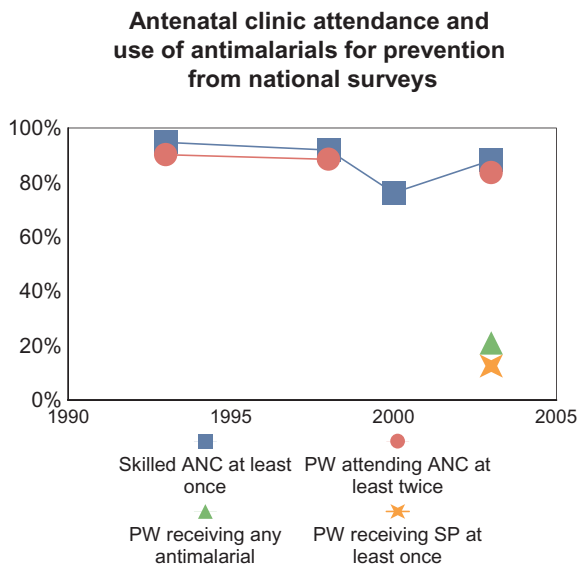


**Estimates of ITN coverage from most recent national survey**



**Intermittent preventive treatment during pregnancy**

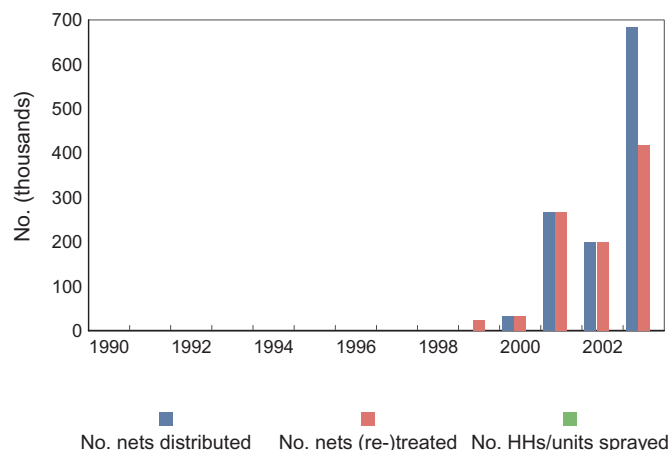
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



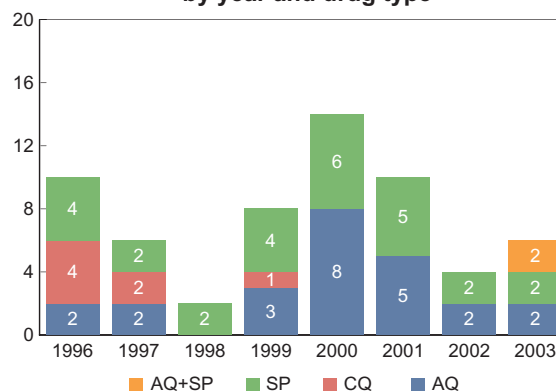
	No. nets (re-) treated	No. nets sold or distributed
1999	23 000	
2000	32 300	32 300
2001	267 200	267 200
2002	200 000	200 000
2003	418 500	684 850

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1996-1999	7	65.8	15.2	84.8	31.7	80.4
<b>SP</b>						
1996-2003	27	8.4	0.0	51.6	3.4	17.9
<b>AQ</b>						
1996-2003	24	2.4	0.0	23.1	0.0	8.3
<b>AQ+SP</b>						
2003	2	2.0	1.6	2.4	1.6	2.4

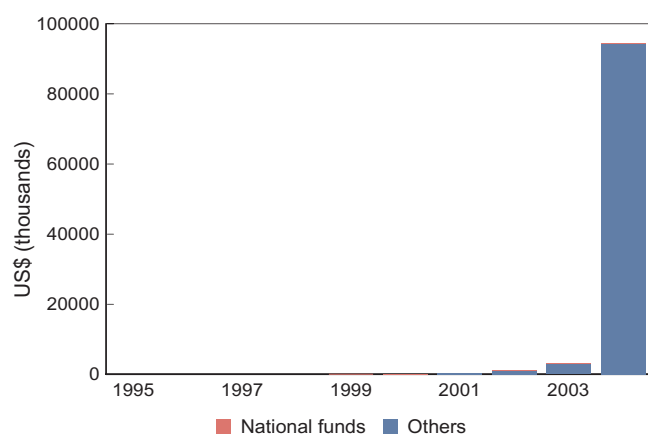
Number of drug efficacy studies available by year and drug type



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999		
2000	39	
2001	83	
2001		418
2002	128	917
2003	82	3 130
2004	192	94 175

## KENYA

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

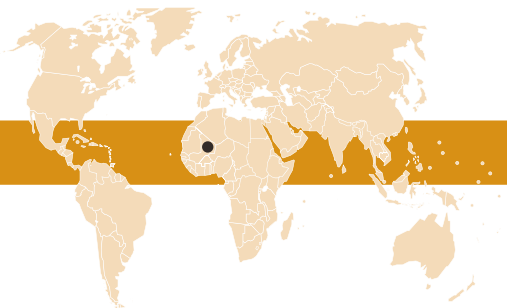
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	10 526 880	MoF	Yes	23-Jun-03	10 526 880	2	4 640 447	44.1%
CCM	4	31 972 711		No					

**General notes and remarks**

See explanatory notes at the beginning of the report.

Malaria reporting for slides and RDTs taken, probable inpatient cases, probable malaria deaths and parasitological confirmations refer to information received from Kitale district hospital. Subnational area data for Kitale and Kericho district hospitals reflect outpatient attendance and inpatient admissions, whereas all other areas are outpatient attendance only.

\* policy adopted, not presently being deployed, implementation process ongoing



## Malaria situation

Malaria is one of the principal causes of morbidity and mortality in Mali and is responsible for over 30% of outpatient visits. Mali experiences three types of malaria transmission each year: (i) 6 months of seasonal transmission in the south; (ii) 3 months of transmission in the Sahelian area; and (iii) irregular transmission with epidemics in the north.

## National policy and planning

The national 5-year strategic plan for malaria control from 2001 to 2005 aims to reduce malaria burden by 30% by 2005 and by 50% by 2010. Strategies include: (i) access to prompt and effective treatment; (ii) prevention especially among pregnant women and children under 5 years of age; (iii) epidemic control; (iv) operational research; (v) information, education and communication materials; and (vi) inter-sectoral collaboration. Many partners are involved, including WHO, UNICEF and several bilateral agencies and NGOs.

## Progress in malaria control activities

Many activities related to the prevention of malaria were recently undertaken. A massive ITN campaign was conducted that included a promotional campaign in health facilities and the participation of NGOs such as NetMark. A national network for the prevention of malaria among pregnant women was created. Educational materials regarding the use of IPT with SP for pregnant women were developed and distributed in 2004.

In 2003–2004, five collaborative workshops were organized in order to revise the national malaria control strategy profile to include new approaches for the distribution of ITNs, a reformulation of the national treatment policy including the introduction of ACTs and a restructuring of the policy for malaria prevention in

pregnant women through IPT. ATM+LUM and ASU+SP are the ACTs adopted in the new treatment policy. The NMCP recently established two oversight committees to address availability, forecasting, production and pharmacovigilance for the planned deployment of ACTs. Data for monitoring and evaluation are provided by the national HIS, weekly epidemic surveillance, sentinel sites and research studies by various organizations.

## Financial support

The annual budget for 2003 for the NMCP of US\$ 1.1 million was supplied by the MoH and RBM partners. The GFATM granted an additional US\$ 2.5 million for malaria for 2 years, almost half of which was disbursed in 2004.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 4
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria – <i>P. falciparum</i> (unconfirmed): – <i>P. falciparum</i> (laboratory confirmed): – <i>P. vivax</i>	ATM-LUM* ATM-LUM*
• Treatment failure:	ASU+SP
• Severe malaria:	Q(7d)
• Pregnancy: – prevention – treatment	SP (IPT) Q(7d)



**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
248 904	282 256	280 562	295 737	263 100	95 357	29 818	384 907	12 234	530 197
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 25 November 2004					
546 634	612 895	723 077	809 428						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	809 428
Reported malaria deaths	1 309

**Probable or clinically diagnosed**

Malaria cases	809 428
Severe (inpatient or hospitalized) cases	
Malaria deaths	1 309

Slides taken  
Rapid diagnostic tests (RDTs) taken

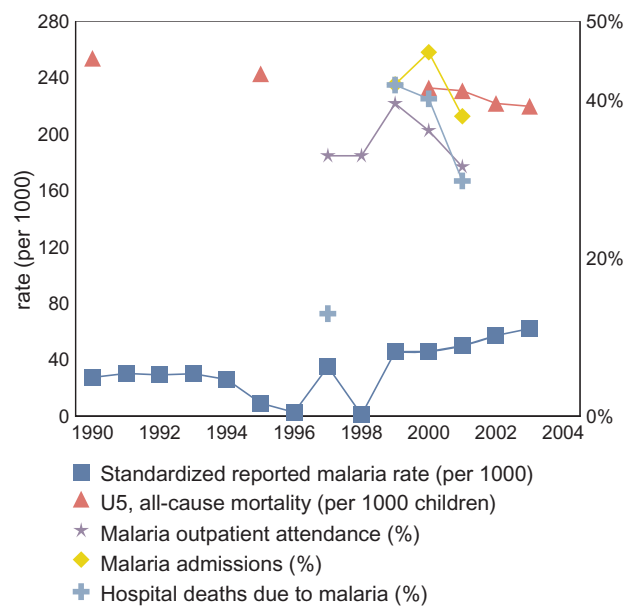
**Laboratory confirmed**

Malaria cases	
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	546 634	612 895	723 077	809 428	100
Age	<5 years	177 969	211 018	243 390	266 833	33

**Reported malaria cases by selected subnational area**

2000	2001	2002	2003	%
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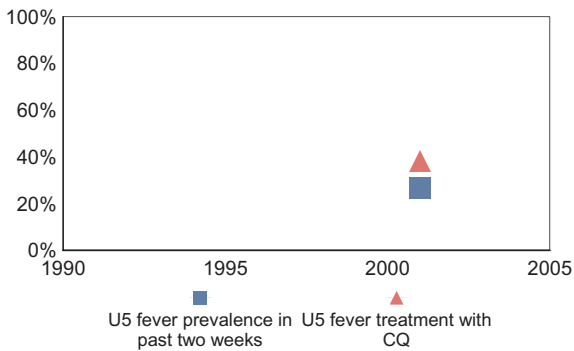
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

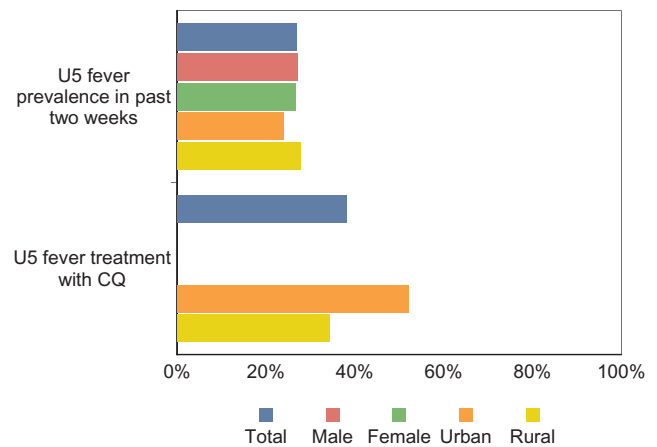
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



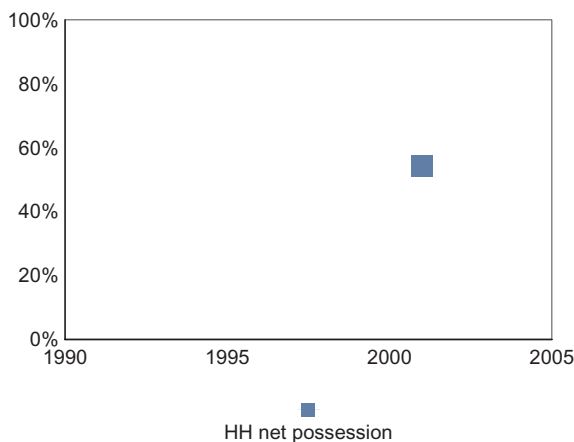
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



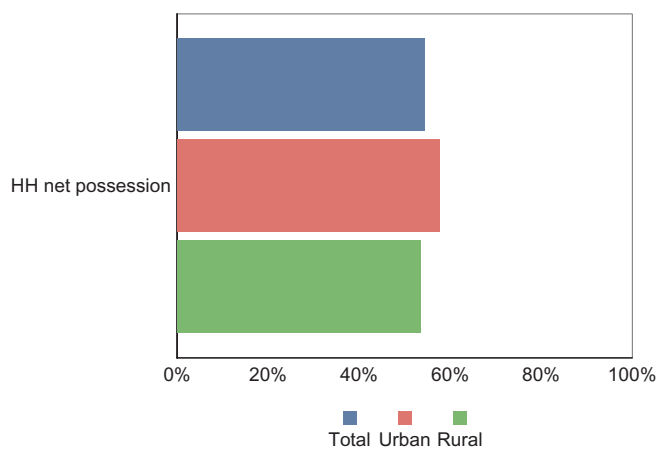
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**

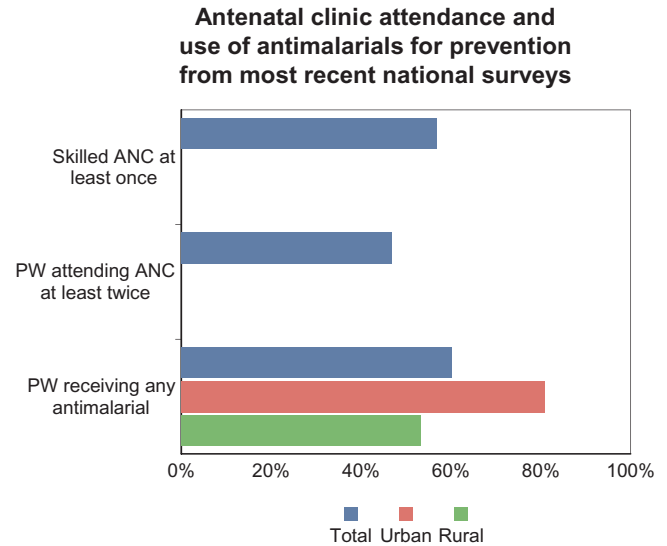
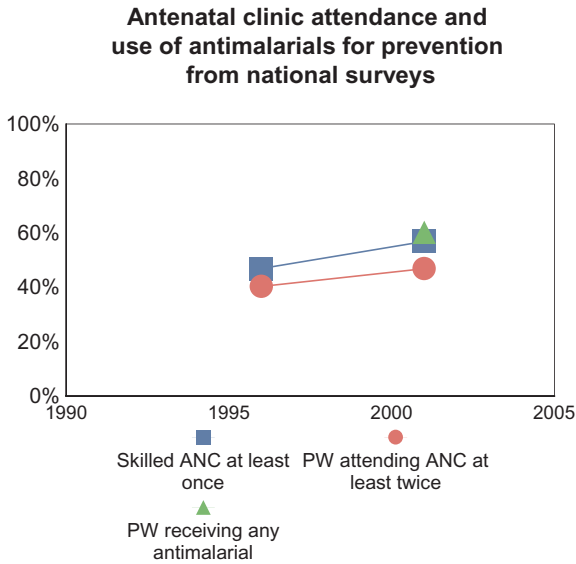


**Estimates of ITN coverage from most recent national survey**



**Intermittent preventive treatment during pregnancy**

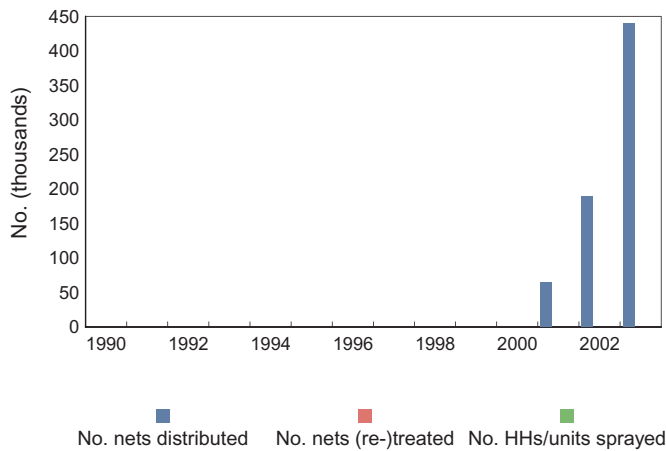
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



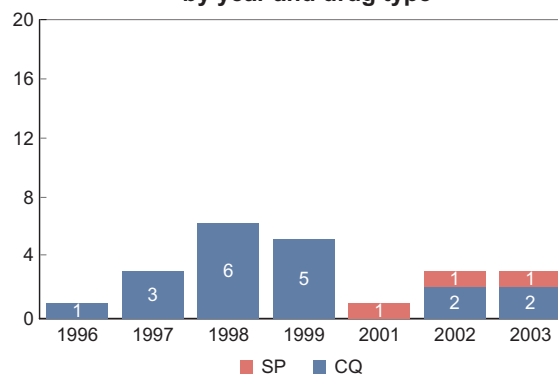
No. nets sold or distributed	
2001	64 000
2002	189 000
2003	439 897

### MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1996-2003	19	11.0	2.0	24.3	4.2	13.0
<b>SP</b>						
2001-2003	3	0.6	0.0	2.0	0.0	2.0

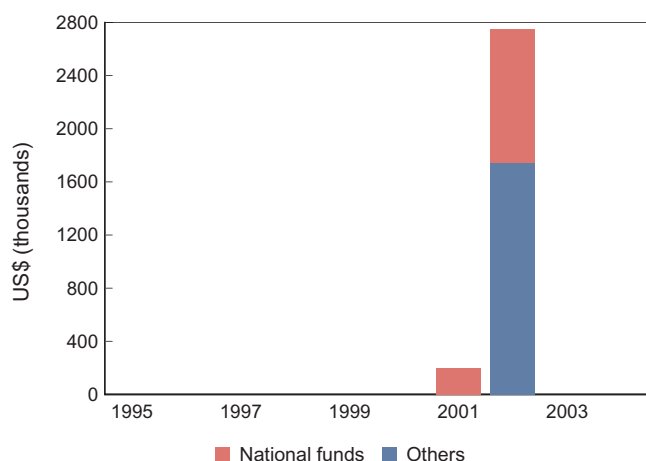
Number of drug efficacy studies available by year and drug type



### FINANCING FOR MALARIA

#### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999		
2000		
2001	202	
2002	1 007	1 744
2003		
2004		

MALI

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

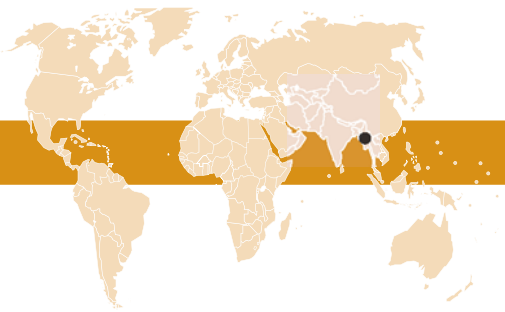
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	1	2 023 424	<b>MoH</b>	Yes	25-Aug-03	2 023 424	2	945 120	46.7%

**General notes and remarks**

See explanatory notes at the beginning of the report.

\* policy adopted, not presently being deployed, implementation process ongoing



## Malaria situation

Malaria is one of the major public health problems in Myanmar and is reported as the leading cause of morbidity and mortality. A major risk group is non-immune adult migrants in forests who work in gem mining, logging, agriculture, plantations and construction. In addition to their lack of immunity against clinical malaria, poor access to laboratory and treatment services and language barriers contribute to the vulnerability of migrant workers. As a result, about 70% of reported malaria cases in Myanmar are older than 15 years of age, and about 60% of cases are related to forestry work. Myanmar experienced 56 malaria outbreaks between 1991 and 2000, with international migration being the most important factor of those outbreaks. Given poor access to health care in remote areas where most cases originate, the total malaria burden is likely to be much higher than reported. Moreover, self-treatment is common, and malaria reporting does not include cases treated in the private sector or through traditional medicine practices.

## National policy and planning

Malaria control is integrated into the general health services and is part of the National Health Plan. At national level, malaria control is part of the Vector Borne Disease Control Programme, which is responsible for technical guidance planning and monitoring and evaluation. The national strategies are in accordance with the Global Malaria Control Strategy.

## Progress in malaria control activities

The focus in improving malaria control is on increasing access to diagnostic and treatment services in remote rural areas, improving the use of effective drugs as the result of the increasing prevalence of multidrug-resistant *P. falciparum* malaria and the availability of counterfeit drugs, and vector control using effective insecticides. Drug and insecticide efficacy monitoring occurs in selected sentinel sites.

The changing behaviour of mosquitoes threatens the effectiveness of vector control measures. *A. dirus* has adapted to certain village environ-

ments by breeding in village domestic wells. Although *A. minimus* does bite humans outdoors and early in the evening, indoor biting remains more frequent; thus, IRS and ITNs should continue to be effective in preventing malaria. The local vectors *A. annularis* and *A. culicifacies* are resistant to DDT.

Since 1999, reported malaria mortality has declined, but the number of reported cases has increased. The latter is probably explained by improved availability and use of malaria treatment services, although most increases in malaria case rates are seen in some development project areas relating to the movement of non-immune migrant workers.

## Financial support

Myanmar reported over US\$ 23 million of government financing for malaria control in 2003; an additional US\$ 0.6 million was supplied by external sources, which represents an increase since the mid-1990s. The GFATM will provide an additional US\$ 9.4 million for malaria control activities.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2002
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	6
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	Yes
– number of sites currently active:	1
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	CQ+SP or ASU(3d)+MQ
– <i>P. falciparum</i> (laboratory confirmed):	ATM-LUM or ASU+MQ
– <i>P. vivax</i>	CQ+PQ
• Treatment failure:	Q(7d)+Doxy(7) or ASU(7d)+Doxy(7)
• Severe malaria:	Q(7d)+Doxy(7) or ASU(7d)+Doxy(7)
• Pregnancy:	
– prevention	not recommended
– treatment	Q(1st trim.)+CD; ASU+CD (2nd & 3rd trim.)+CD

MYANMAR

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
989 042	939 257	789 672	702 239	701 043	656 547	664 507	568 262	548 066	591 826
2000	2001	2002	2003	Date of last report: 7 October 2004					
592 354	661 463	721 739	716 100						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	716 100
Reported malaria deaths	2 476

**Probable or clinically diagnosed**

Malaria cases	539 929
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	473 267
Rapid diagnostic tests (RDTs) taken	376 250

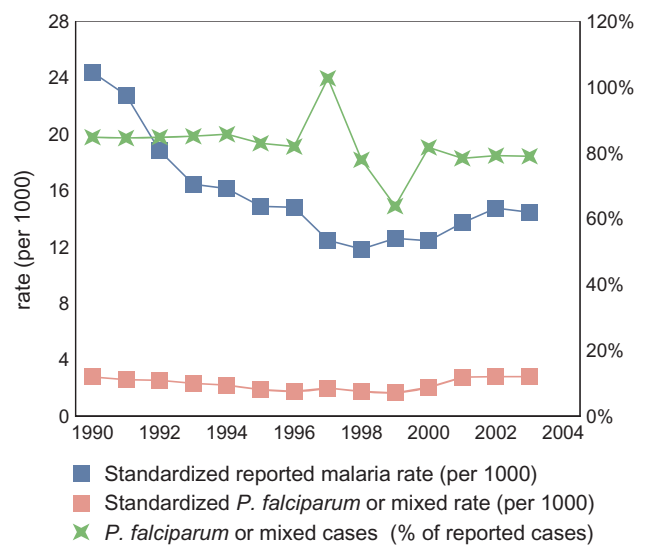
**Laboratory confirmed**

Malaria cases	176 171
<i>P. falciparum</i> or mixed	139 315
<i>P. vivax</i>	74 833
Severe (inpatient or hospitalized) cases	12 962
Malaria deaths	2 476

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
Age	Total	592 354	661 463	721 739	716 100	100
	PW	5 580	5 075	5 558		
	<1 year	2 152	20 262	18 086		
	1-4 years	7 094	3 820	4 026		
	5-9 years	10 943	24 750	21 696		
	10-14 years	16 508	25 132	22 522		
	15+ years	83 332	96 538	106 767		

**Reported malaria cases by selected subnational area**

14 areas	2000	2001	2002	2003	%
Rakhine	26 096	62 611	77 315	91 754	13
Sagaing	19 308	20 077	19 921	13 681	2
Kachin	6 550	9 256	13 299	12 981	2
Shan	21 478	16 821	16 363	11 302	2
Chin	7 392	10 813	11 874	9 951	1
Mandalay	8 273	8 328	7 877	7 392	1
Magway	3 365	4 675	2 863	6 240	1
Tanintharyi	7 058	19 327	5 950	6 009	1
Mon	5 346	4 586	5 573	5 674	1
Ayeyarwaddy	4 123	3 798	3 877	3 577	<1
Bago	4 948	4 999	3 852	3 575	<1
Kayin	3 015	2 664	2 693	2 046	<1
Kayah	1 912	1 318	799	1 574	<1
Yangon	1 165	1 229	840	415	<1

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

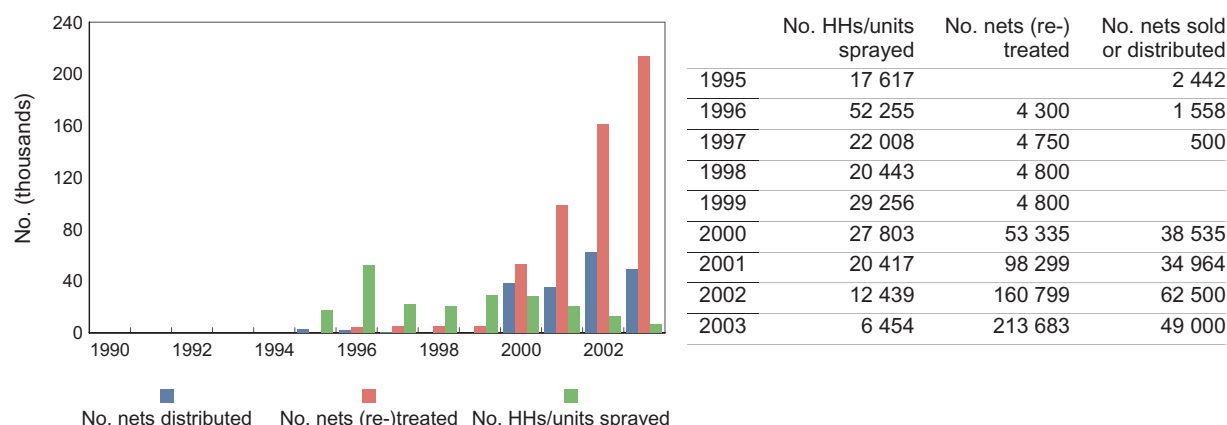
### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

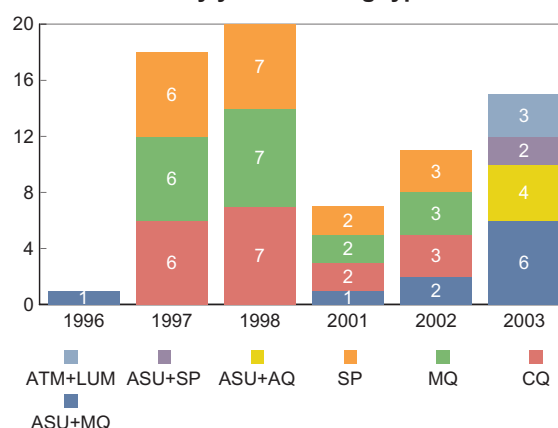


## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1997-2002	18	24.7	6.0	76.0	12.5	34.7
<b>SP</b>						
1997-2002	18	27.8	0.0	100.0	7.9	37.7
<b>MQ</b>						
1997-2002	18	6.0	0.0	44.4	0.0	16.4
<b>ATM+LUM</b>						
2003	3	2.0	0.0	2.0	0.0	2.0
<b>ASU+AQ</b>						
2003	4	4.0	3.0	7.0	3.5	5.5
<b>ASU+SP</b>						
2003	2	0.0	0.0	0.0	0.0	0.0
<b>ASU+MQ</b>						
1996-2003	10	1.5	0.0	8.0	0.0	5.1

Number of drug efficacy studies available by year and drug type



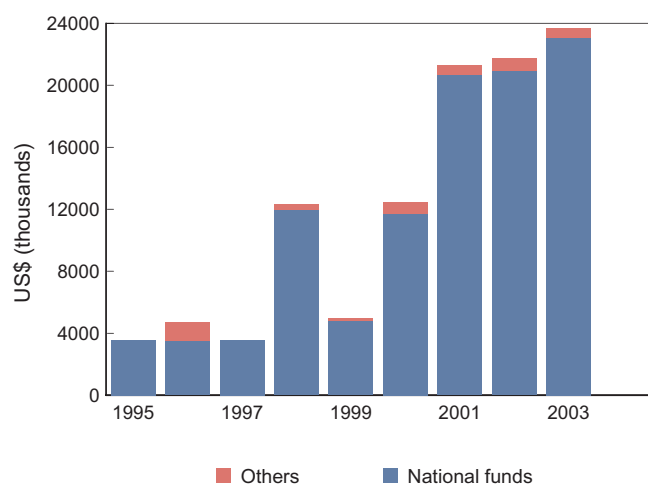


## MYANMAR

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995	3 577	
1996	3 551	1 159
1997	3 561	
1998	11 986	371
1999	4 837	163
2000	11 703	753
2001	20 698	585
2002	20 945	800
2003	23 041	622
2004		

## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

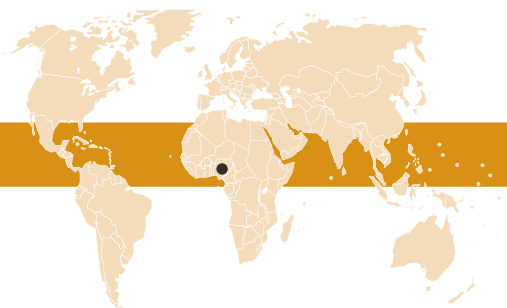
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	3	9 462 062		No			-		

## General notes and remarks

See explanatory notes at the beginning of the report.

Confirmed severe malaria cases and deaths for 2003 include those from probable and confirmed malaria cases.

Age and subnational reported malaria for 2002–2003 are for confirmed malaria cases only. The number of cases presented for pregnant women is estimated.



## Malaria situation

Malaria is a major public health problem in Nigeria, with stable transmission throughout much of the country and with the largest population at risk in Africa. Coverage of the key RBM interventions remains unacceptably low.

## National policy and planning

Malaria control and finances are decentralized in Nigeria. At national level, with the collaboration of RBM partners, the emphasis is placed on development of key control policies and guidelines, allocation of resources and resource mobilization, and monitoring and supervision. State-level efforts are concerned with interpreting policy, resource mobilization, support and supervision for implementation, and establishing links between local government agencies and the NMCP. Local-level activities focus on resource mobilization and implementing community-based activities. All levels are involved in monitoring and evaluation. A country strategic plan of action for 2001–2005 was developed that outlines six priority areas for malaria control: (i) case management; (ii) prevention; (iii) information, education and communication materials and community mobilization; (iv) partnerships and overall health system development; (v) operational research; and (vi) monitoring and evaluation.

## Progress in malaria control activities

Activities since 2003 include coordination with many RBM partners, procurement of ACTs using funds from the GFATM and efficacy testing of ASU, AQ and ATM+LUM. An advocacy tool for sharing information on malaria progress and control was developed for influencing state policy-makers and for communicating current strategies and activities. Collaboration on an epidemic preparedness project is planned for the

regions of the country on the fringes of the Sahel. The NMCP is still faced with limited capacity—for example, in personnel and logistics—for implementing planned activities and for assisting state and local officials. A further challenge is promoting the collection and use of high-quality data and to promote evidence-based decision-making. Often cumbersome bureaucratic processes hamper the programme's efforts for improving collaboration.

## Financial support

Nigeria reported US\$ 3.5 million in government funding for malaria control in 2003, with an additional US\$ 2.3 million from other sources. The GFATM will contribute a further US\$ 40 million under two grants.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2001
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	6
• Home-based management of malaria:	Yes
• Vector control using insecticides:	No
• Monitoring insecticide resistance	Yes
– number of sites currently active:	1
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	No
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	ATM-LUM*
– <i>P. falciparum</i> (laboratory confirmed):	ATM-LUM*
– <i>P. vivax</i>	NA
• Treatment failure:	Q(7d)
• Severe malaria:	Q(7d)
• Pregnancy:	
– prevention	SP (IPT)
– treatment	ACT (2nd & 3rd trim.)

NIGERIA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1 116 992	909 656	1 219 348	981 943	1 175 004	1 133 926	1 149 435	1 148 542	2 122 663	1 965 486
2000	2001	2002	2003	Date of last report: 10 November 2004					
2 476 608	2 253 519	2 605 381	2 608 479						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	2 608 479
Reported malaria deaths	5 343

**Probable or clinically diagnosed**

Malaria cases	2 608 479
Severe (inpatient or hospitalized) cases	
Malaria deaths	5 343

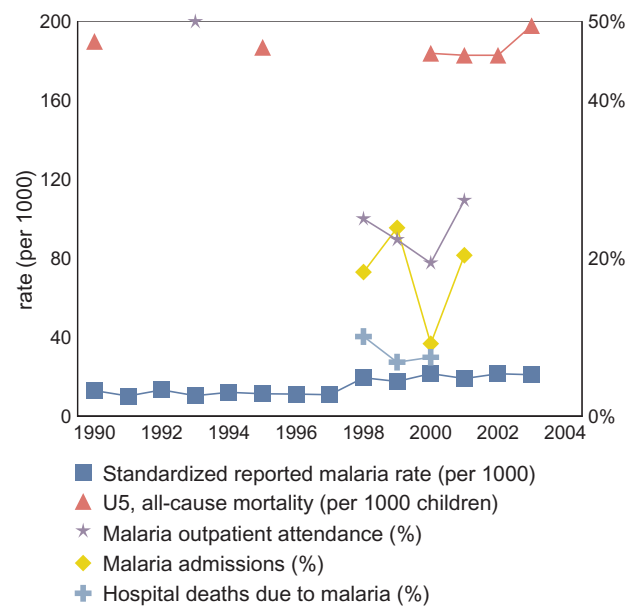
Slides taken  
Rapid diagnostic tests (RDTs) taken

**Laboratory confirmed**

Malaria cases	
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases	
Estimated reporting completeness (%)	73



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	2 476 608	2 253 519	2 605 381	2 608 479	100
	PW	956				0
Age	<5 years	1 128 435	996 938	1 118 598		43
	5> years	1 348 178	1 256 580	1 486 783		57

**Reported malaria cases by selected subnational area**

	2000	2001	2002	2003	%
--	------	------	------	------	---

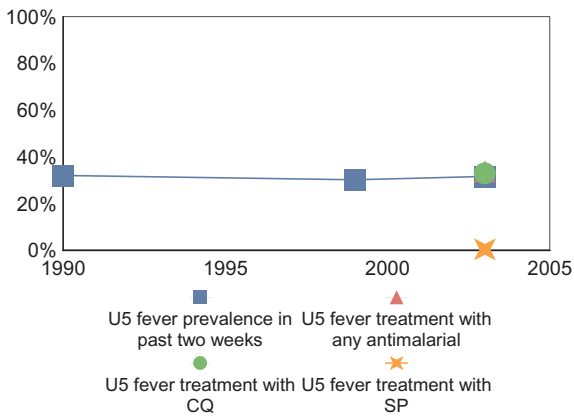
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

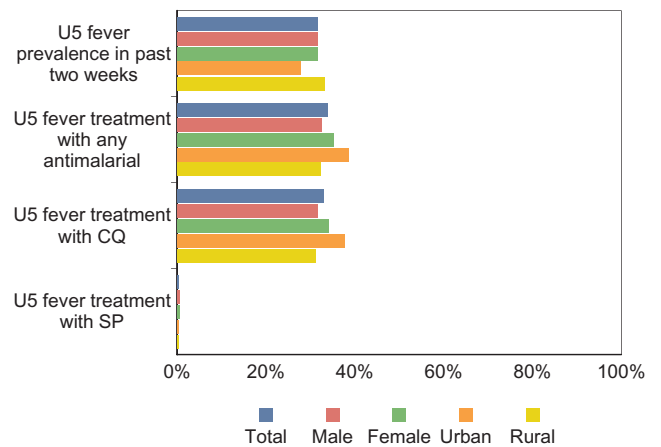
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



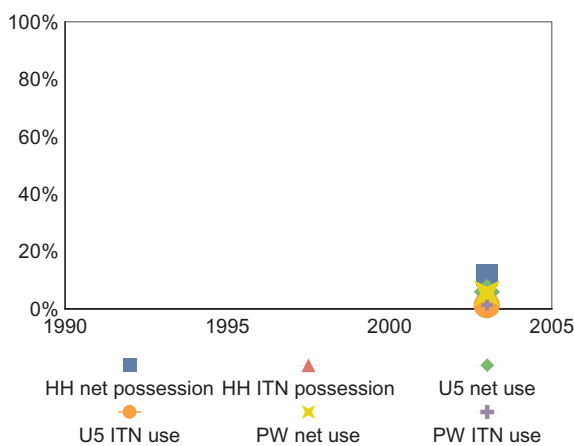
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



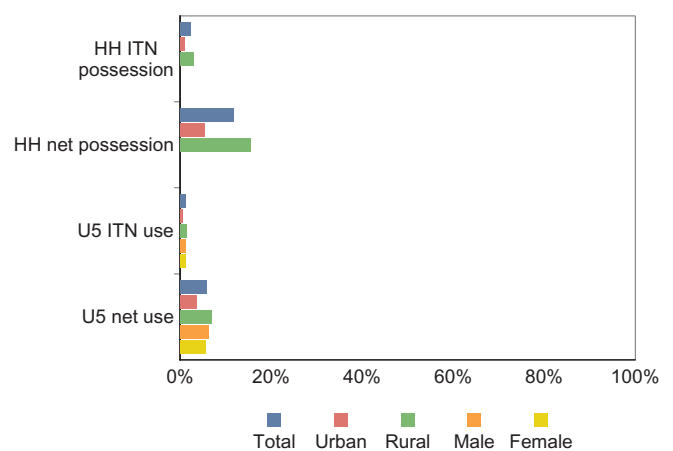
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



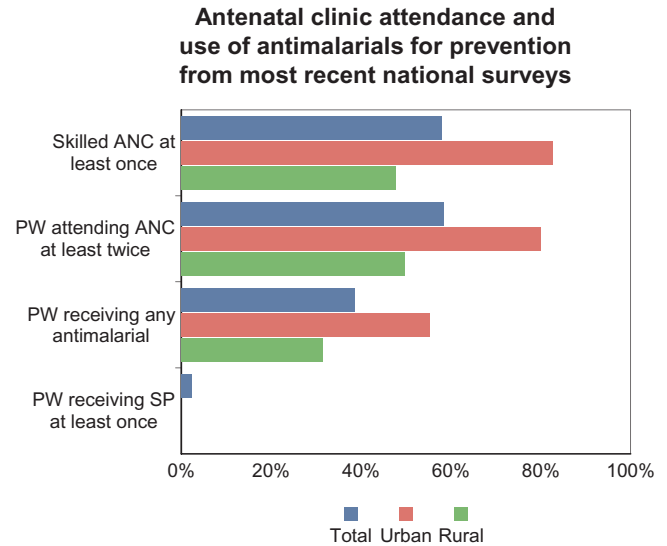
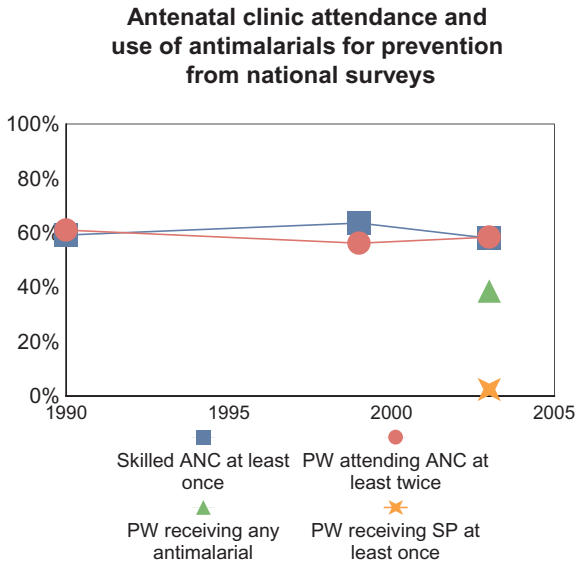
**Estimates of ITN coverage from most recent national survey**



NIGERIA

**Intermittent preventive treatment during pregnancy**

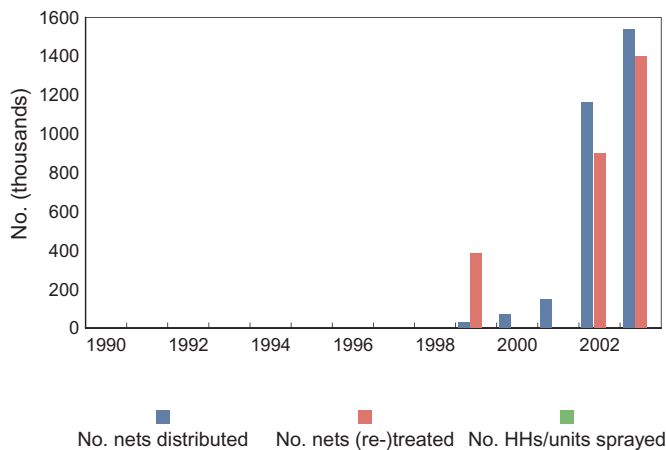
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



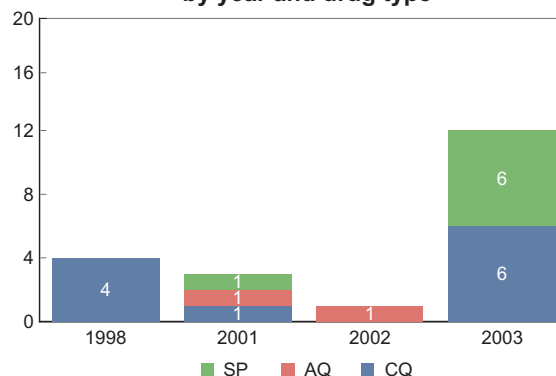
	No. nets (re-) treated	No. nets sold or distributed
1999	384 286	30 000
2000		70 000
2001		145 000
2002	900 000	1 161 925
2003	1 400 000	1 535 718

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1998-2003	11	25.8	2.0	53.7	13.6	38.7
<b>SP</b>						
2001-2003	7	9.3	5.7	43.5	7.7	40.5
<b>AQ</b>						
2001-2002	2	1.5	0.0	2.9	0.0	2.9

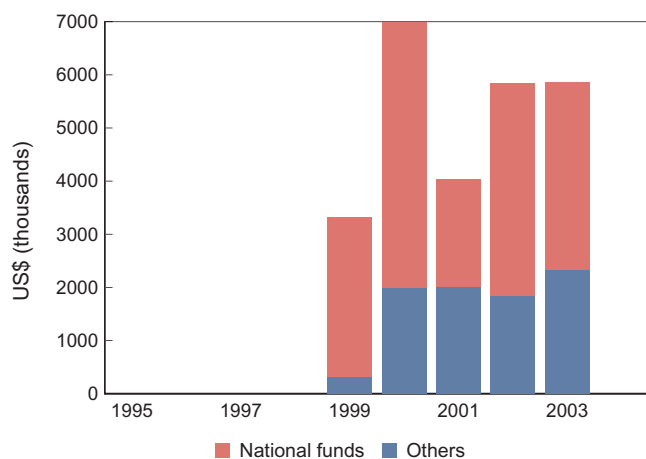
Number of drug efficacy studies available by year and drug type



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999	3 000	320
2000	5 000	2 000
2001	2 020	2 020
2002	4 000	1 850
2003	3 530	2 330
2004		

## NIGERIA

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

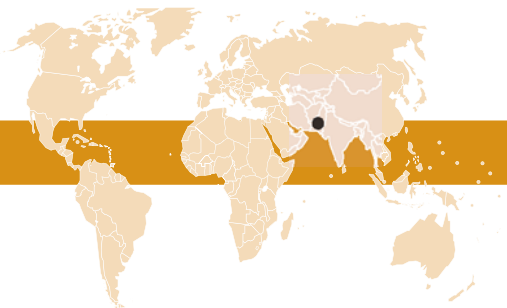
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)							
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed	
CCM	2	20 994 149	<b>Yakubu Gowon Center</b>	Yes	22-Oct-04	20 994 149	1	4 582 319	21.8%	
CCM	4	20 467 000	<b>Yakubu Gowon Center</b>	Yes	03-Dec-04	20 467 000	1	4 268 800	20.9%	

**General notes and remarks**

See explanatory notes at the beginning of the report.

\* policy adopted, not presently being deployed, implementation process ongoing



## Malaria situation

Malaria continues to be a major public health problem in Pakistan. Extensive agricultural practices, a vast irrigation network and monsoon rains contribute to the malariogenic potential in many areas. Both *P. falciparum* and *P. vivax* are widely prevalent. The primary vector species are *A. culicifacies* and *A. stephensi*. In most parts of the country, the transmission occurs post-monsoon, between July and November. The quality of malaria control varies greatly across the largely decentralized regions of the country, with notable challenges in implementing control efforts in Balochistan and North-West Frontier Province. Resistance of *P. falciparum* to CQ and of vectors to insecticides is common.

## National policy and planning

Since its adoption of the RBM control strategy in 1999, Pakistan has prioritized malaria control with increased federal spending, the development of a 5-year strategic action plan for the malaria control programme (2002–2006) and increased attention at the provincial level. A phased implementation of RBM activities began in 19 districts in 2002–2003 and is now extended to 28 districts. Notable achievements include the development of district implementation plans and the development and distribution of national treatment guidelines in 2002. Steps are also being taken to establish a malaria early detection system.

## Progress in malaria control activities

Challenges that the control programme continues to face include: (i) adherence to and awareness of available guidelines; (ii) weak technical leadership at both federal and provincial levels; and (iii) staffing constraints. Despite an overall increase in the number of malaria control staff, a number of key posts remain vacant and the National Institute of Malaria Research and Training urgently requires strengthening. Provincial-level control programmes still struggle with phasing out old “eradication” strategies such as

active case detection, while access to rapid diagnosis and prompt treatment in health facilities remains inadequate. Monitoring and evaluation must be improved, especially in districts where RBM activities have been initiated. This includes establishing a system for quality assurance of laboratory diagnosis and strengthening the existing surveillance system in collaboration with the HIS. ASU+SP is being adopted for antimalarial treatment policy in 26 high-risk districts, with the support of the GFATM.

## Financial support

The national government contributes the majority of funding for malaria control efforts, although reporting on financing is inconsistent. The GFATM committed almost US\$ 6 million for malaria control in 2003–2004, of which over US\$ 650 000 had been disbursed by December 2003.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	Yes
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 4
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	Yes
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	CQ
– <i>P. falciparum</i> (laboratory confirmed):	CQ+PQ(3d)
– <i>P. vivax</i>	CQ+PQ(5d)
• Treatment failure:	SP
• Severe malaria:	Q
• Pregnancy:	
– prevention	
– treatment	CQ



PAKISTAN

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
79 689	66 586	99 015	92 634	108 586	111 836	98 035	77 480	73 516	91 774
2000	2001	2002	2003	Date of last report: 15 December 2004					
82 526	104 003	101 761	125 152						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	125 152
Reported malaria deaths	29

**Probable or clinically diagnosed**

Malaria cases	3 985 915
Severe (inpatient or hospitalized) cases	
Malaria deaths	29
Slides taken	4 145 290
Rapid diagnostic tests (RDTs) taken	

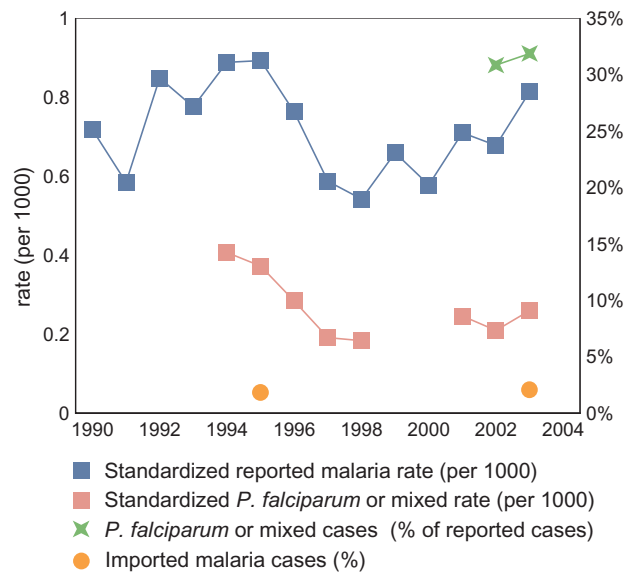
**Laboratory confirmed**

Malaria cases	125 152
<i>P. falciparum</i> or mixed	39 944
<i>P. vivax</i>	85 240
Severe (inpatient or hospitalized) cases	
Malaria deaths	14

**Investigations**

Imported cases	2 592
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Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	82 526	104 003	101 761	125 152	100

**Reported malaria cases by selected subnational area**

5 areas	2000	2001	2002	2003	%
Sind			22 458	37 612	30
Baluchistan			33 994	36 794	29
NWFP			20 774	26 791	21
Fata			14 681	13 996	11
Punjab			9 854	9 959	8

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

*No survey-based estimates of mosquito net or ITN coverage are currently available.*

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

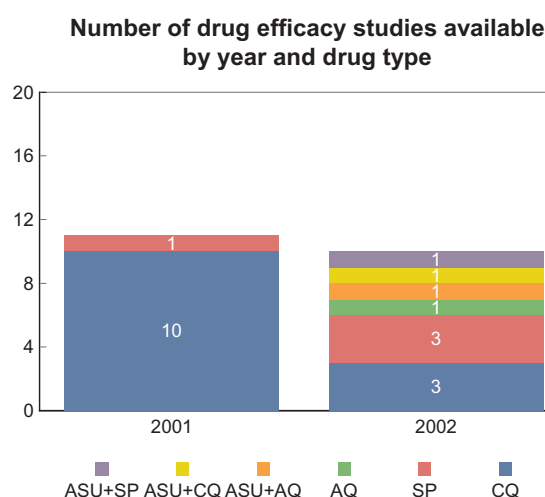
Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

*No data are currently available.*

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
2001-2002	13	28.9	18.2	79.0	25.9	66.6
<b>SP</b>						
2001-2002	4	13.0	8.7	18.7	9.8	16.9
<b>AQ</b>						
2002	1	83.3				
<b>ASU+AQ</b>						
2002	1	18.0				
<b>ASU+CQ</b>						
2002	1	28.8				
<b>ASU+SP</b>						
2002	1	0.0				

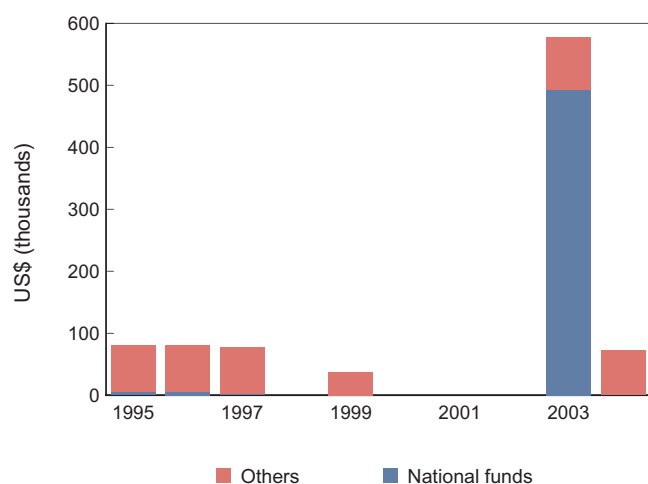


## PAKISTAN

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995	6	75
1996	5	75
1997	3	75
1998		
1999		38
2000		
2001		
2002		
2003	492	84
2004		72

## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

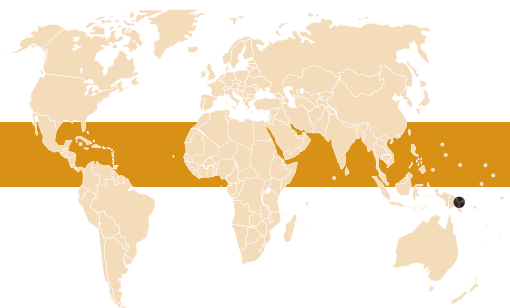
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	4 407 000	MoH	Yes	06-Aug-03	4 407 000	2	1 464 162	33.2%
CCM	3	1 548 636	MoH	Yes	12-Oct-04	1 548 636	1	454 800	29.4%

## General notes and remarks

See explanatory notes at the beginning of the report.

ASU+SP is being adopted as the first-line treatment in 23 high-risk districts with support from GFATM. Malaria cases clinically diagnosed are reported as patients with fever only. The increase in malaria incidence in 2003 as compared with 2002 was mainly because of the high incidence in a few of the districts in Balochistan and Sindh provinces in Pakistan, where heavy floods after prolonged draught resulted in intense transmission. The NMCP in collaboration with provincial malaria control programmes succeeded in controlling the outbreaks through advanced prediction and implementation of control measures.



## Malaria situation

Malaria is the leading cause of illness and death in Papua New Guinea. Areas of perennial, very high intensity transmission of *P. falciparum* malaria, such as are common in tropical Africa, are found throughout the country.

## National policy and planning

Papua New Guinea is dedicated to halving the number of deaths and illness caused by malaria between 2001 and 2010. The NMCP has implemented strategies to: (i) improve diagnosis and treatment; (ii) implement vector control through ITNs, IRS and (where feasible) environmental modification; and (iii) information, education and communication materials about malaria. Targets set for these strategies include ensuring that 80% of the population in endemic areas are sleeping under an ITN by 2010 and conducting annual spraying in the highland regions prone to epidemics.

## Progress in malaria control activities

Before 2003, little progress was made because of financial constraints. With funds from the GFATM granted in that year, the NMCP adjusted its targets for 2008: (i) more than 80% of the population in malaria-endemic areas should be consistently using LLINs; (ii) over 70% of suspected malaria cases should be laboratory-confirmed by rapid diagnostic tests or microscopy; (iii) the case rate should be reduced from 504/100 000 in 2001 to 300/100 000; and (iv) the mortality rate should be reduced from 12.8/100 000 in 2001 to 7/100 000.

The GFATM grant will finance the free distribution of LLINs in all malarious areas of

Papua New Guinea, covering at-risk populations in endemic as well as epidemic-prone areas. The GFATM malaria control programme will also strengthen malaria diagnosis through the expansion of microscopy services and rapid diagnostic tests in health centres, subcentres and urban clinics in peripheral areas. Malaria treatment will be based on ACT.

## Financial support

The GFATM granted just over US\$ 6 million for 2 years; implementation of the GFATM malaria control programme began in August 2004.

## National malaria policy & strategy environment

### Malaria strategy overview for 2003

	Strategy
• Treatment and diagnosis guidelines – published/updated in:	
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 4
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	

### Antimalarial drug policy, end 2004

	Current policy
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	CQ / AQ+SP
– <i>P. falciparum</i> (laboratory confirmed):	CQ / AQ+SP
– <i>P. vivax</i>	CQ+PQ(14d)* or CQ+SP+PQ
• Treatment failure:	ASU(7d)+SP
• Severe malaria:	ATM(7d)+SP
• Pregnancy:	
– prevention	CQ
– treatment	CQ or Q

PAPUA NEW GUINEA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
104 900	86 500	86 500	66 797	65 000	99 000	71 013	38 105	20 900	18 564
2000	2001	2002	2003	Date of last report: 18 October 2004					
81 192	89 819	79 822	70 226						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	70 226
Reported malaria deaths	537

**Probable or clinically diagnosed**

Malaria cases	1 729 697
Severe (inpatient or hospitalized) cases	17 590
Malaria deaths	537

Slides taken  
Rapid diagnostic tests (RDTs) taken

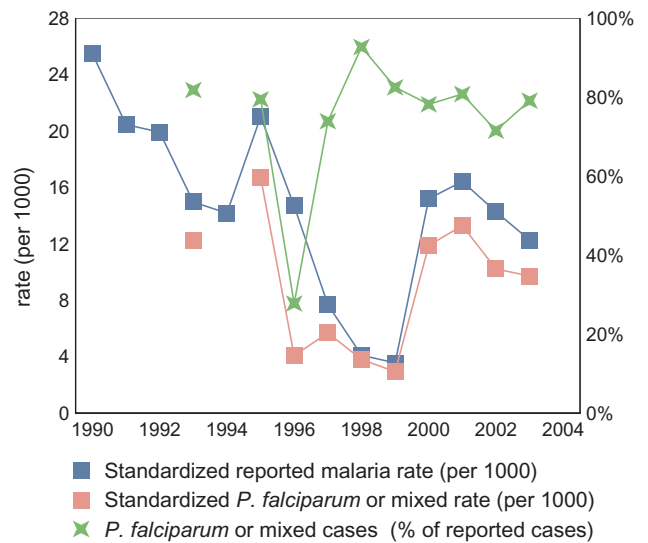
**Laboratory confirmed**

Malaria cases	70 226
<i>P. falciparum</i> or mixed	55 638
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	81 192	89 819	79 822	70 226	100

**Reported malaria cases by selected subnational area**

15 of 20 areas	2000	2001	2002	2003	%
Morobe	11 431	11 804	10 719	13 898	20
New Ireland	10 788	10 511	10 129	8 150	12
East New Britain	7 207	6 163	8 587	7 738	11
National Capital District	3 511	11 826	11 943	6 853	10
Western Highlands	638	942	4 175	4 986	7
Sanduan (West Sepik)	3 272	2 520	7 186	4 542	6
Madang	5 376	5 383	4 641	4 097	6
Milne Bay	3 732	3 751	2 609	4 057	6
West New Britain	3 470	4 492	4 248	3 222	5
Oro (Northern)	1 853	2 121	1 891	2 160	3
North Solomon	2 700	2 432	2 510	1 699	2
Chimbu	6 471	6 652	2 157	1 610	2
Eastern Highlands	1 264	1 371	1 617	1 569	2
Central	663	479	924	1 356	2
Western	2 606	4 714	2 281	1 224	2

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

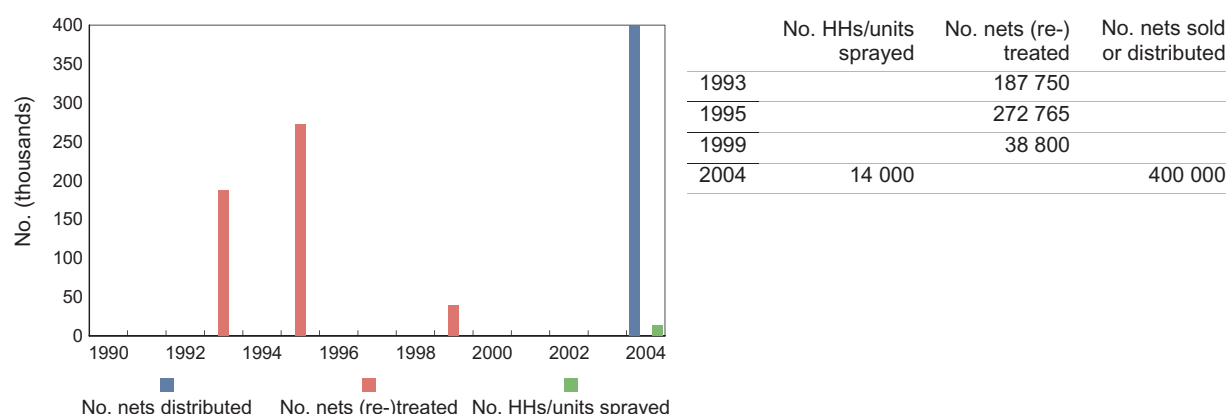
ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

*No survey-based estimates of mosquito net or ITN coverage are currently available.*

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

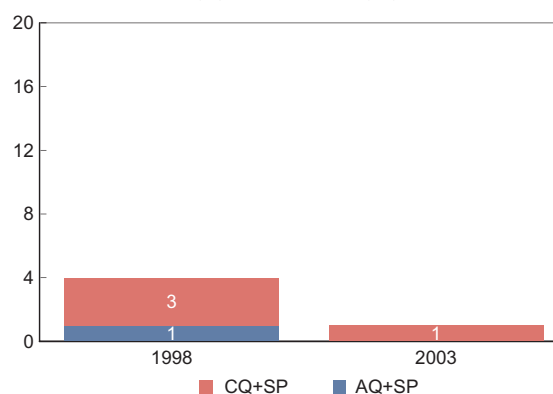


## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ+SP</b>						
1998-2003	4	0.0	0.0	27.0	0.0	13.5
<b>AQ+SP</b>						
1998	1	0.0				

Number of drug efficacy studies available by year and drug type

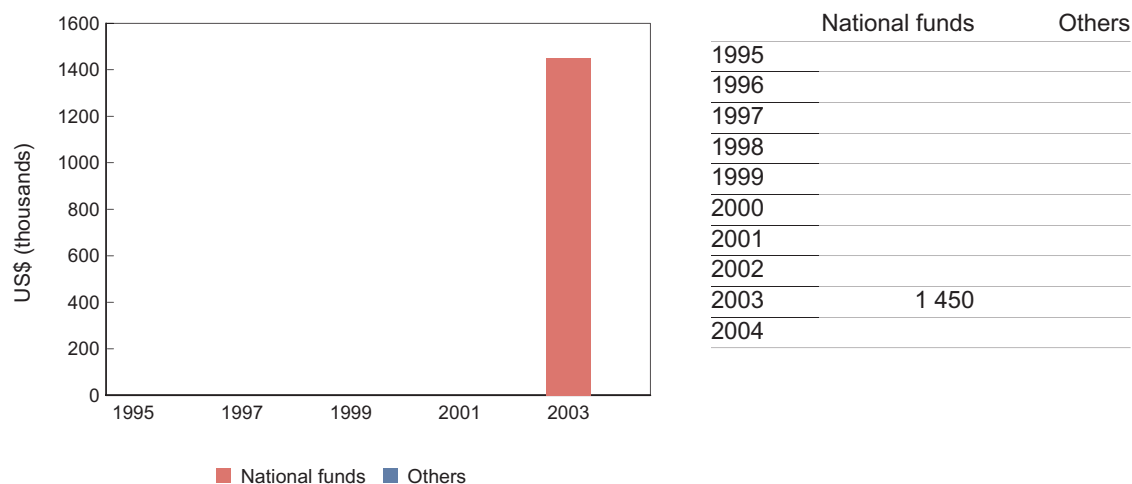


## PAPUA NEW GUINEA

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

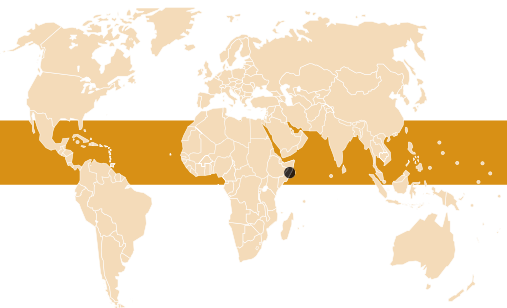
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	3	6 106 557	MoH	Yes	07-Jul-04	6 106 557	1	2 185 723	35.8%

## General notes and remarks

See explanatory notes at the beginning of the report.

The information on ITNs reflects nets that have been distributed since 1997, including 320 000 distributed by Rotary Against Malaria, and the rest among other agencies including AusAID, Mines, Unicef, WHO and various NGOs.

\* for areas of stable transmission



## Malaria situation

Malaria transmission ranges from unstable and epidemic in Puntland and Somaliland to moderate in central Somalia to high in the south. The groups most severely affected are young children, pregnant women and nomadic populations. Accounting for 95% of reported cases, *P. falciparum* is overwhelmingly the predominant parasite species. The major malaria vectors are *A. arabiensis* and *A. funestus*; while both vectors are found in the south, only *A. arabiensis* is found in the north.

## National policy and planning

The conflict in Somalia has destroyed the entire public health infrastructure, except in Somaliland in the north-west zone of the country and in Puntland in the north-east zone. Priorities for malaria control vary across the country, according to variations in endemicity. In the north, the priorities are to reduce transmission through vector control and to ensure epidemic preparedness; in the more endemic south and central areas, the priorities are to reduce malaria morbidity and to prevent mortality in high-risk groups through early diagnosis and prompt treatment and personal protection through ITNs.

## Progress in malaria control activities

Control activities have continued to develop since the inception of the RBM Partnership, with strong partnerships with WHO, UNICEF and international NGOs. An international staff and national officers were recruited by WHO to implement RBM activities, and an RBM strategic framework was developed. Functional sites for monitoring antimalarial drug efficacy have been established, and studies were conducted in Jamane, Janale and Jowhar for AQ and ASU+SP. The antimalarial drug policy is being updated

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 4
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	No
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria – <i>P. falciparum</i> (unconfirmed): – <i>P. falciparum</i> (laboratory confirmed): – <i>P. vivax</i>	CQ CQ
• Treatment failure:	SP
• Severe malaria:	Q
• Pregnancy: – prevention – treatment	SP (IPT)*

to include ACTs. Malaria outbreaks in 2003 were promptly responded to as a result of pre-positioning of antimalarial drugs in epidemic zones. Several capacity-building and training courses were conducted. Other achievements include the recruitment of an RBM control programme coordinator and operational research on the use of larvivorous fish in selected areas in the north-west zone.

## Financial support

Funding of malaria control activities is supported by international and donor agencies such as WHO and UNICEF. The GFATM funds totalling US\$ 8.9 million have been committed, of which over half were disbursed in 2004.



SOMALIA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
			3 049						9 055
2000	2001	2002	2003	Date of last report: 25 May 2004					
10 364	10 364	96 922	23 349						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	23 349
Reported malaria deaths	10

**Probable or clinically diagnosed**

Malaria cases	15 778
Severe (inpatient or hospitalized) cases	
Malaria deaths	44
Slides taken	12 578
Rapid diagnostic tests (RDTs) taken	

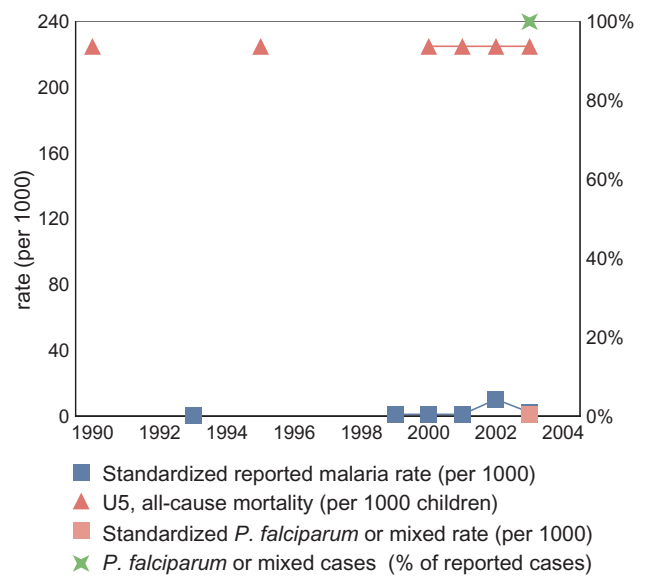
**Laboratory confirmed**

Malaria cases	7 571
<i>P. falciparum</i> or mixed	7 571
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	10

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	10 364	10 364	96 922	23 349	100

**Reported malaria cases by selected subnational area**

15 of 15 areas	2000	2001	2002	2003	%
Mogadishu				7 280	31
Las-anod				2 404	10
Berbera				990	4
Hargeisa				766	3
Gabilay				627	3
Burao				492	2
Bossaso				405	2
Borama				358	2
Allay baday				285	1
Baki				213	1
Qardho				203	1
Garowe				157	1
Galkayo				129	1
Ergavo				116	<1
Zeila				50	<1

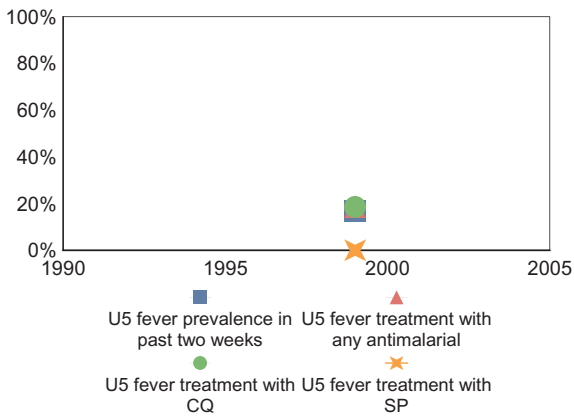
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

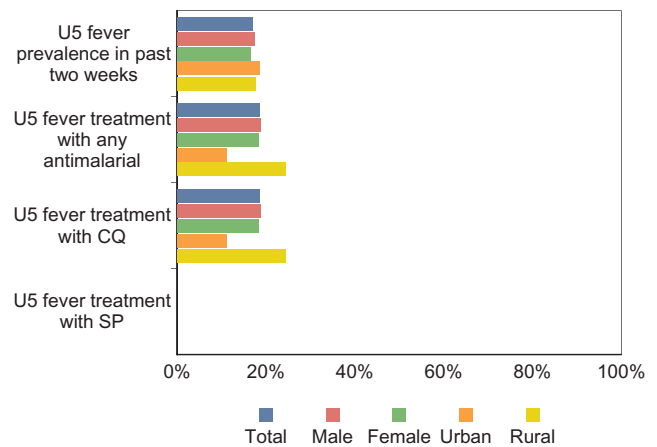
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



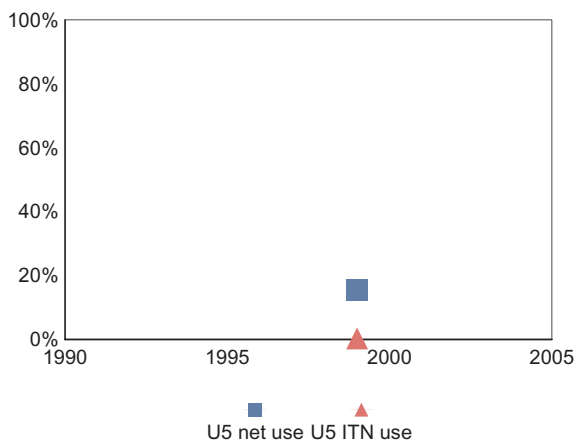
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



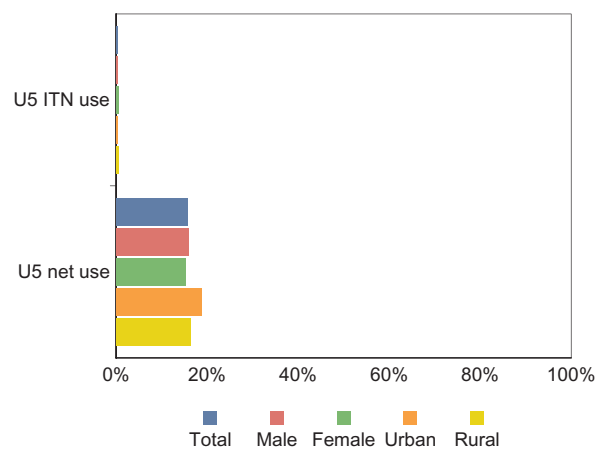
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



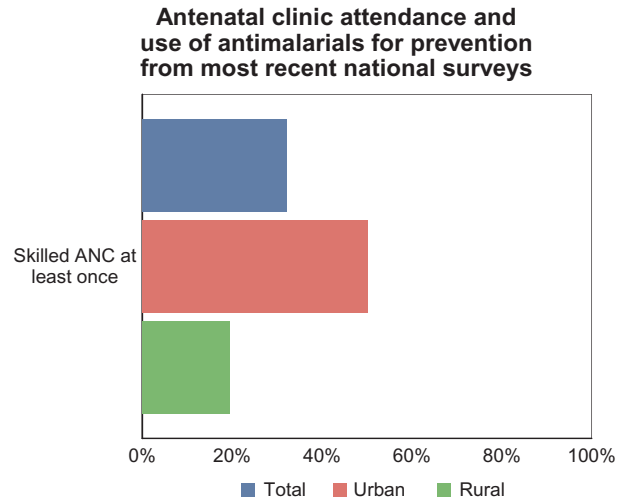
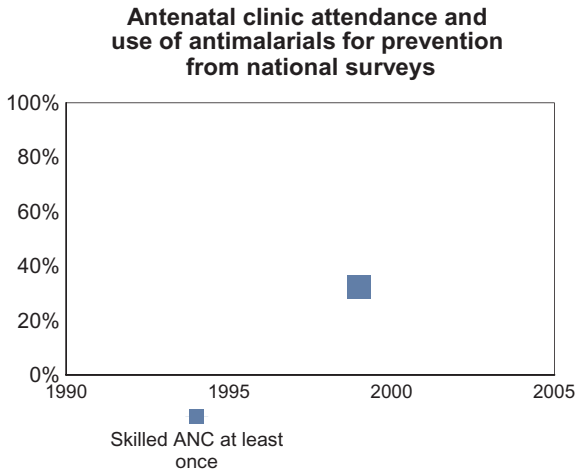
**Estimates of ITN coverage from most recent national survey**



SOMALIA

**Intermittent preventive treatment during pregnancy**

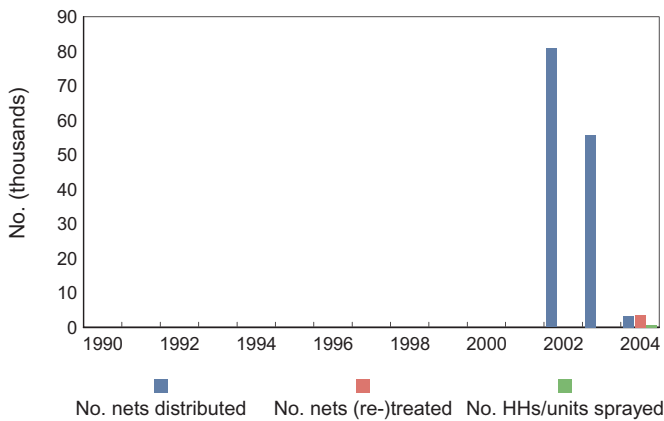
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



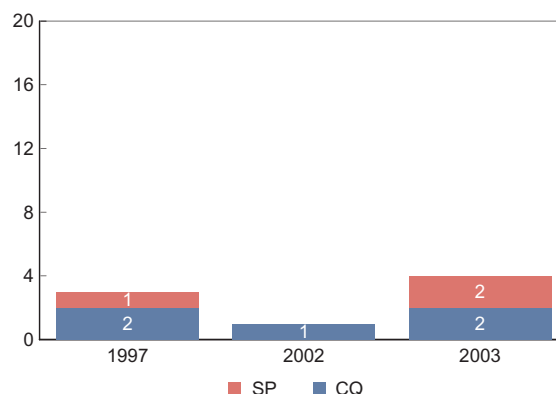
	No. HHs/units sprayed	No. nets (re-) treated	No. nets sold or distributed
2002			80 839
2003			55 839
2004	567	3 500	3 338

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1997-2003	5	51.0	27.5	78.0	30.4	74.0
<b>SP</b>						
1997-2003	3	4.0	2.0	5.9	2.0	5.9

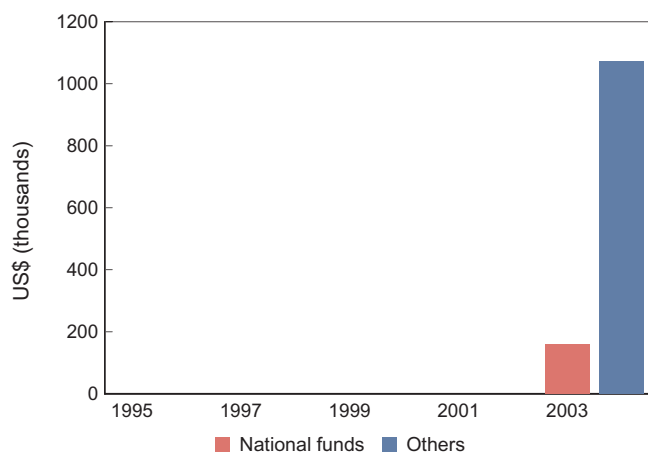
Number of drug efficacy studies available by year and drug type



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003	160	
2004		1 072

### Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

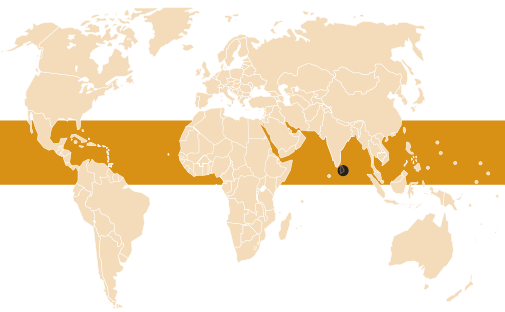
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	8 890 497	UNICEF	Yes	23-Jun-04	8 890 497	1	4 682 032	52.7%

### General notes and remarks

See explanatory notes at the beginning of the report.

\* IPT is for hyperendemic areas only





## Malaria situation

Since 1999, reported rates of confirmed malaria cases and deaths have fallen more than 10-fold; the rate of reported *P. falciparum* cases decreased in parallel. Approximately 70% of reported cases in 2003 were from the North-East Province, mainly from the districts of Ampara, Batticaloa, Kilinochchi, Mullativu and Trincomalee. There were two reported deaths caused by *P. falciparum* malaria in 2003 in Batticaloa and Kalmunai. *P. falciparum* resistance to CQ is increasing. The NMCP reports only microscopically confirmed malaria cases. Because many fever patients in Sri Lanka seek treatment through private sector health facilities and a number of patients in public sector facilities are treated for malaria without laboratory diagnosis, the actual number of malaria cases is likely to be much higher than reported. The tsunami of 26 December 2004 raised concern about an increased risk of epidemics in some coastal areas of Sri Lanka. Initial actions of larviciding appear to have prevented immediate outbreaks. Active surveillance is ongoing in order to assess the full impact on malaria transmission and disease burden.

## National policy and planning

Malaria control efforts in Sri Lanka are decentralized and, with the overall reductions in disease burden in recent years, control efforts made by regional managers are not intensively monitored. Early detection and prompt treatment is the mainstay of disease control. IRS is the major vector control measure, but ITN promotion has recently also become a national strategy. Larviciding is practised in selected areas.

## Progress in malaria control activities

In 2003, malaria was effectively controlled in the North-East Province and neighbouring districts, with close monitoring of the interventions. Monitoring and evaluation have been greatly hampered in recent years in Sri Lanka because of the civil war. With the ongoing peace initiatives and the reintroduction of malaria monitoring and surveillance activities, the NMCP is able to monitor the trend in malaria burden

in areas where communication was previously hampered. A constraint for the NMCP is that the existing epidemiological and entomological surveillance systems are not adequate for early warning of malaria outbreaks and do not cover patients diagnosed and treated outside the public sector. Training of staff, quality control of diagnosis and treatment practices, and better access for the population to laboratory facilities are needed for case management and malaria diagnosis. Malaria control activities should become more evidence-based and planning should be better linked with agendas for research. Improved management skills are also needed.

## Financial support

National funds for malaria control in 2003 were a reported US\$ 2.5 million, a reduction from the previous year. The GFATM has disbursed over US\$ 3.6 million for two proposals from early applications. An additional GFATM grant has been approved that will contribute US\$ 2.2 million over 2 years.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	Yes 2004
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria – <i>P. falciparum</i> (unconfirmed): – <i>P. falciparum</i> (laboratory confirmed): – <i>P. vivax</i>	CQ+PQ CQ+PQ CQ+PQ
• Treatment failure:	SP+PQ
• Severe malaria:	Q(7d)
• Pregnancy: – prevention – treatment	  CQ or Q

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
287 384	400 263	399 349	327 020	273 434	142 294	184 319	218 550	211 691	264 549
2000	2001	2002	2003	Date of last report: 1 October 2004					
210 039	66 522	41 411	10 510						

**Reported malaria by type and quality**

For most recent year 2003

Reported malaria cases	10 510
Reported malaria deaths	2

**Probable or clinically diagnosed**

- Malaria cases
- Severe (inpatient or hospitalized) cases
- Malaria deaths

Slides taken 1 192 259

Rapid diagnostic tests (RDTs) taken

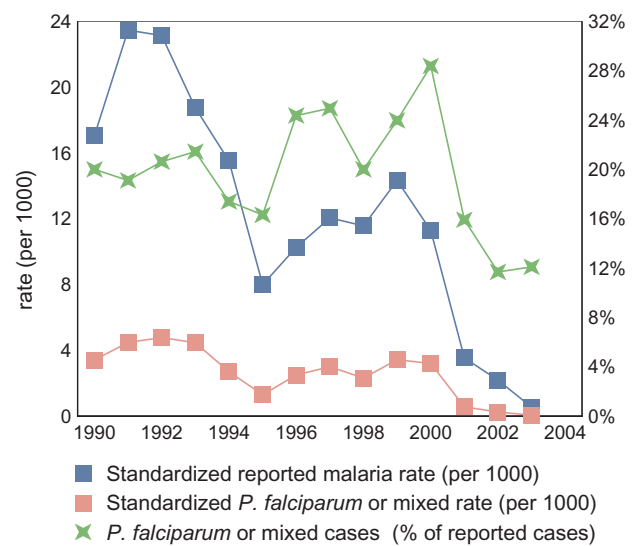
**Laboratory confirmed**

- Malaria cases 10 510
  - P. falciparum* or mixed 1 273
  - P. vivax* 9 237
- Severe (inpatient or hospitalized) cases
- Malaria deaths 2

**Investigations**

- Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
Gender	Total	210 039	66 522	41 411	10 510	100
	Male	112 783	35 864	22 400	6 143	58
	Female	97 256	30 688	19 011	4 367	42
Age	<1 year	5 107	2 371	1 589		4
	1-4 years	29 646	10 973	6 944		17
	<5 years				1 750	17
	5-9 years	29 012	7 999	5 630	1 344	13
	10-14 years	27 273	7 297	4 870	1 311	12
	15+ years	119 001	37 882	22 738	6 105	58

**Reported malaria cases by selected subnational area**

15 of 26 areas	2000	2001	2002	2003	%
Batticaloa	6 639	4 057	6 486	1 467	14
Killinochchi	47 326	21 989	11 447	1 404	13
Anuradhapura	13 218	3 210	2 866	1 213	12
Trincomalee	6 608	1 390	522	1 028	10
Polonnaruwa	4 052	1 657	1 040	935	9
Kalmune				650	6
Mullaitivu	25 099	11 768	6 285	633	6
Kurunegala	11 863	5 648	2 943	632	6
Ampara	3 843	979	1 673	441	4
Jaffna	7 253	1 365	1 891	413	4
Moneragala	40 885	3 705	805	392	4
Vavuniya	8 844	2 345	798	294	3
Ratnapura	6 982	2 821	1 836	248	2
Hambantota	5 319	665	1 084	193	2
Badulla	5 757	1 005	296	132	1

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

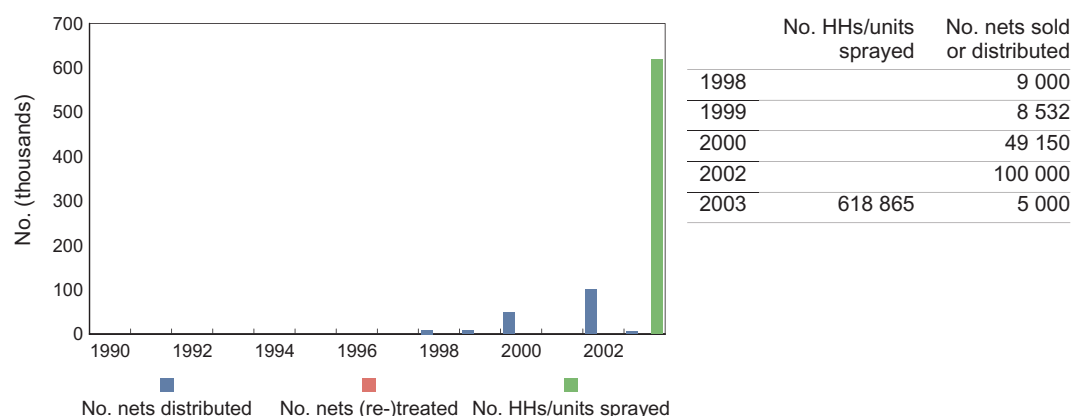
ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

No survey-based estimates of mosquito net or ITN coverage are currently available.

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

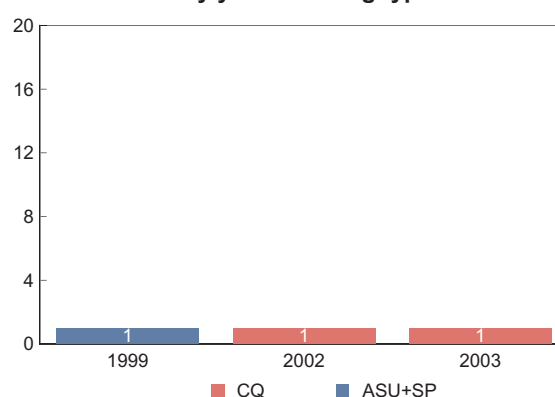


## MONITORING ANTIMALARIAL DRUG EFFICACY

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Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
2002-2003	2	31.8	10.0	53.5	10.0	53.5
<b>ASU+SP</b>						
1999	1	0.0				

Number of drug efficacy studies available by year and drug type

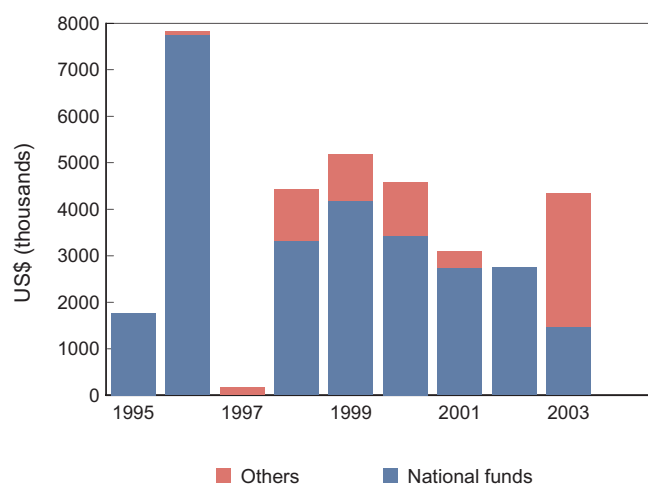




## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995	1 775	
1996	7 742	82
1997		164
1998	3 328	1 104
1999	4 187	1 007
2000	3 430	1 155
2001	2 750	358
2002	2 750	
2003	1 481	2 874
2004		

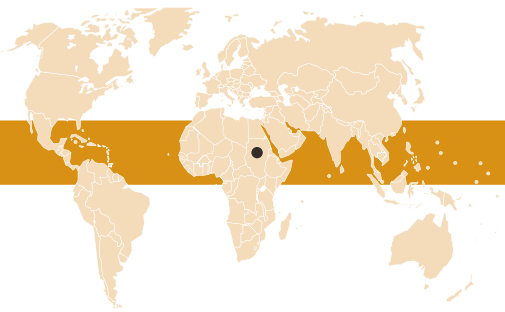
## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	1	5 197 620	LJSS	Yes	19-Dec-02	4 467 480	4	3 680 162	82.4%
			MoH	Yes	19-Dec-02	730 140	2	425 559	58.3%
CCM	4	2 203 520		No					

## General notes and remarks

See explanatory notes at the beginning of the report.



## Malaria situation

Malaria is the leading cause of morbidity and mortality in Sudan. Symptomatic malaria accounts for 20–40% of outpatient clinic visits and approximately 30% of hospital admissions. The entire population of Sudan is at risk of malaria, although to different degrees. In the northern, eastern and western states malaria is mainly low to moderate with predominantly seasonal transmission and epidemic outbreaks. In southern Sudan, malaria is moderate to high or highly intense, generally with perennial transmission. *P. falciparum* is by far the predominant parasite species.

Between the 1970s and the mid-1990s, malaria control efforts suffered major disruptions. Khartoum State, formerly a nearly malaria-free area, increasingly suffered from malaria epidemics, with more than 700 000 cases annually between 1998 and 2001.

## National policy and planning

In 1998, with the support of WHO, the government initiated a plan to revitalize malaria control. In 2001, a national 10-year strategic plan was developed; in 2002, the Malaria Free Initiative was launched; in 2003, a plan was developed for scaling up the use of ITNs including using communication for behavioural impact; and in 2004 a national policy for control of malaria in pregnancy was initiated. Also in 2004, the national drug policy was updated to use the ACT ASU+SP for first-line treatment.

## Progress in malaria control activities

The infrastructure of the programme continues to be strengthened. The federal malaria control office and malaria control units in the priority states of Gezira, Khartoum and White Nile were established with full operations by the end of 2001. Training was extended to a large part of the curative health care and environmental health structures, which are an integral part of the malaria control efforts in these states. A network of sentinel sites for epidemic early warning and monitoring of drug and insecticide resistance were also established. In Gezira, ITN coverage has reached 30% of the target popu-

lation, and large-scale distribution of subsidized ITNs to pregnant women and children continues. Community mobilization and participation have resulted in a high degree of public awareness of malaria and its control in the priority states. In nine more states, malaria control units were strengthened in 2000–2001. This development was accompanied by a major effort in staff training. Partnerships with numerous NGOs have been instrumental and are expected to be central to scaling up interventions.

## Financial support

Limited financial resources and delay in the release of a GFATM grant have hindered the implementation of the new drug policy and the plan for scaling up the use of ITNs. Malaria diagnosis and treatment in public sector health facilities are payable by the patient, which follows the principle of cost sharing; there is some evidence that this limits the use of public sector facilities and promotes haphazard self-treatment.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>		<i>Strategy</i>
• Treatment and diagnosis guidelines		Yes
– published/updated in:		2004
• Monitoring antimalarial drug resistance:		Yes
– number of sites currently active:		10
• Home-based management of malaria:		Yes
• Vector control using insecticides:		Yes
• Monitoring insecticide resistance		Yes
– number of sites currently active:		12
• Insecticide-treated mosquito nets:		Yes
• Intermittent preventive treatment:		Yes
• Epidemic preparedness:		Yes
<i>Antimalarial drug policy, end 2004</i>		<i>Current policy</i>
• Uncomplicated malaria		
– <i>P. falciparum</i> (unconfirmed):		ASU+SP (North) ASU+AQ (South)
– <i>P. falciparum</i> (laboratory confirmed):		ASU+SP (North) ASU+AQ (South)
– <i>P. vivax</i>		CQ+PQ(14d) (South)
• Treatment failure:		ATM-LUM (North) Q(7d) (South)
• Severe malaria:	Q(7d) or ATM(6d) or ATM(3d) +ASU+SP (North)	
• Pregnancy:		
– prevention		SP (IPT)
– treatment	Q(7d) or ASU+SP(from 13 weeks)	

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
7 508 704	6 947 787	9 326 944	9 867 778	8 562 205	6 347 143	4 595 092	4 065 460	5 062 000	4 215 308
2000	2001	2002	2003	Date of last report: 25 November 2004					
4 332 827	3 985 702	3 056 400	3 084 320						

**Reported malaria by type and quality**

For most recent year 2003

Reported malaria cases	3 084 320
Reported malaria deaths	2 479

**Probable or clinically diagnosed**

Malaria cases	1 998 367
Severe (inpatient or hospitalized) cases	105 813
Malaria deaths	2 479

Slides taken  
Rapid diagnostic tests (RDTs) taken

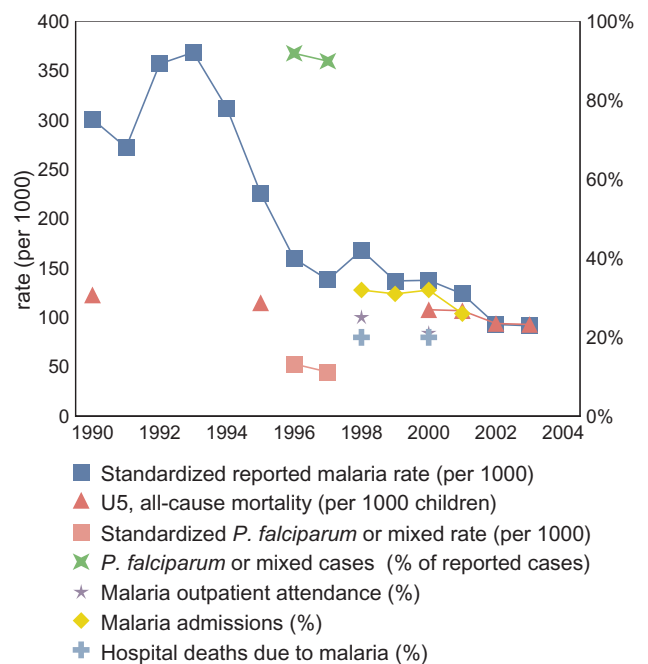
**Laboratory confirmed**

Malaria cases	1 085 853
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	4 332 827	3 985 702	3 056 400	3 084 320	100
Gender	Male		1 994 132	1 507 629	1 739 351	56
	Female		1 991 570	1 548 771	1 344 969	44
Age	<5 years		868 893	760 572	676 525	22
	5> years		3 116 809	2 295 828	2 407 795	78

**Reported malaria cases by selected subnational area**

7 areas	2000	2001	2002	2003	%
Khartoum				397 658	13
Central				272 759	9
Eastern				197 014	6
Kordofan				149 751	5
Southern				106 299	3
Northern				43 775	1
Darfur				29 701	1

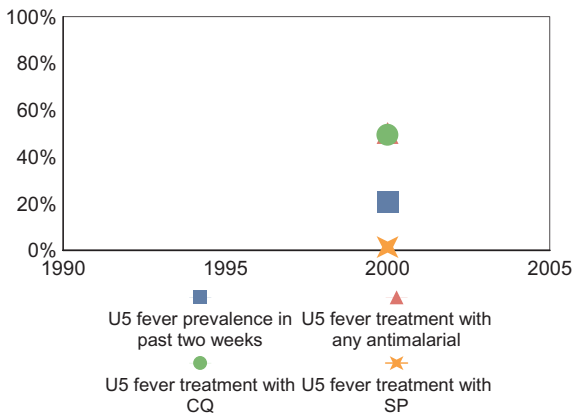
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

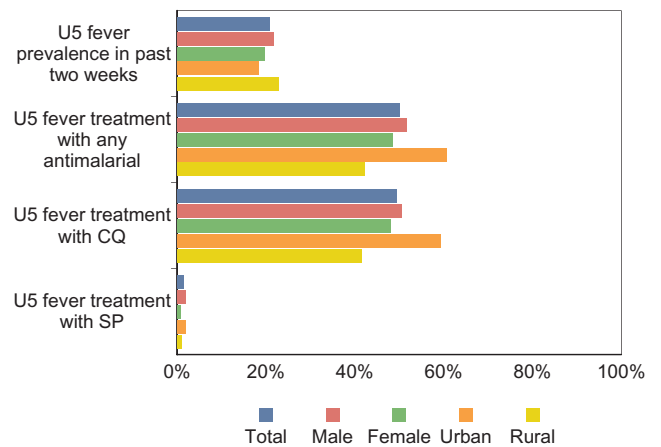
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



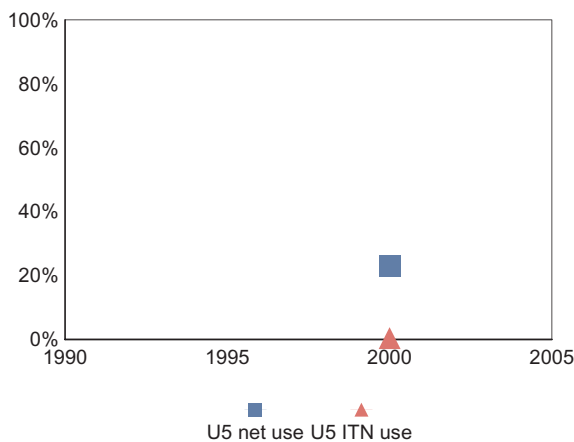
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



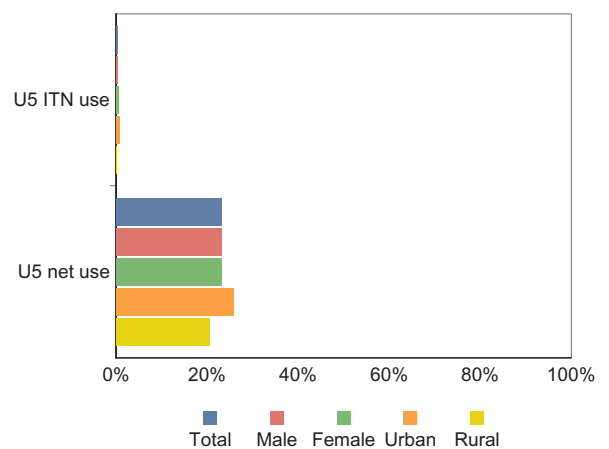
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



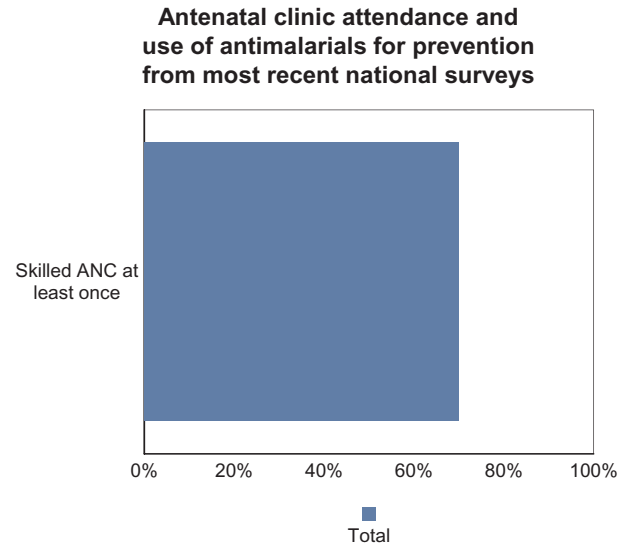
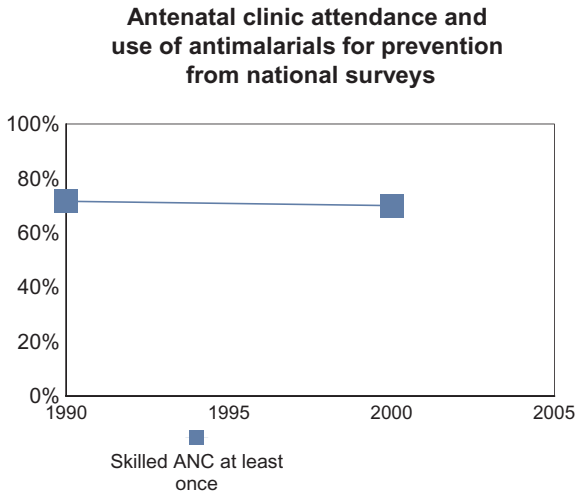
**Estimates of ITN coverage from most recent national survey**



SUDAN

**Intermittent preventive treatment during pregnancy**

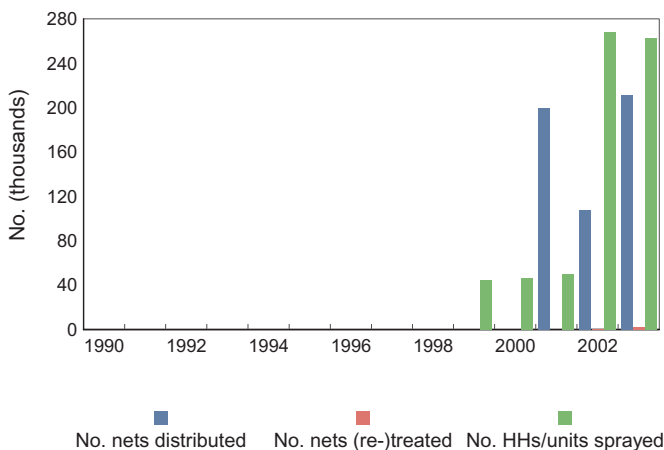
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



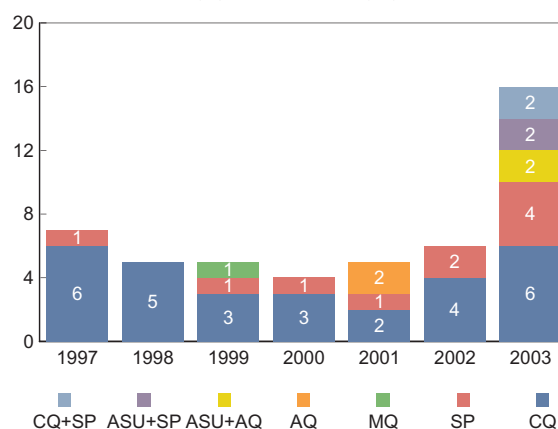
	No. HHs/units sprayed	No. nets (re-) treated	No. nets sold or distributed
1999	45 000		
2000	46 000		
2001	50 000		200 000
2002	268 000	800	108 090
2003	263 000	2 000	211 520

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>High transmission area</b>						
<b>CQ</b>						
2001-2003	5	53.1	16.6	60.7	32.4	59.4
<b>SP</b>						
2001-2002	3	6.0	0.0	12.0	0.0	12.0
<b>AQ</b>						
2001	2	6.5	6.0	7.0	6.0	7.0
<b>ASU+AQ</b>						
2003	2	0.4	0.0	0.8	0.0	0.8
<b>ASU+SP</b>						
2003	2	1.7	0.8	2.5	0.8	2.5
<b>Moderate/low transmission area</b>						
<b>CQ</b>						
1996-2003	24	47.6	0.0	76.9	33.8	57.4
<b>SP</b>						
1996-2003	7	4.2	0.0	11.7	2.0	8.1
<b>MQ</b>						
1999	1	2.5				
<b>CQ+SP</b>						
2003	2	10.2	5.9	14.4	5.9	14.4

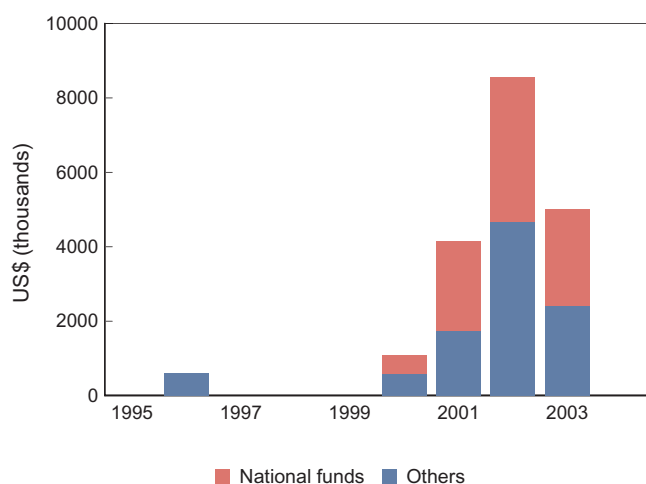
Number of drug efficacy studies available by year and drug type



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		600
1997		
1998		
1999		
2000	500	574
2001	2 400	1 744
2002	3 887	4 670
2003	2 600	2 406
2004		

## SUDAN

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

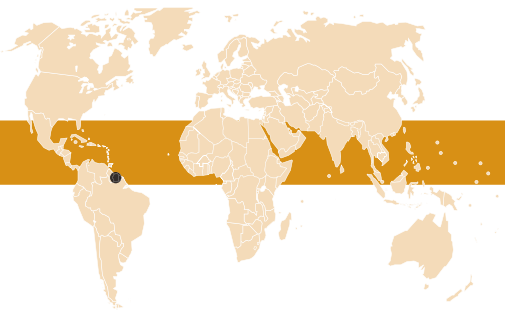
Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	14 237 853		No			-		
			<b>UNDP</b>	Yes	24-Aug-04	12 855 490	1	4 903 414	38.1%

**General notes and remarks**

See explanatory notes at the beginning of the report.

For antimalarial drug efficacy results, data for high transmission areas reflect clinical failure and data for moderate/low transmission areas reflect total failure.

For more information, please refer to the Federal Ministry of Health web site at: [www.fmoh.gov.sd](http://www.fmoh.gov.sd) and the RBM Progress in Sudan 2003.



## Malaria situation

In Suriname, malaria risk is greatest along the Marowijne River, which borders French Guiana, as well as in areas close to Brokopondo Lake in the northern-central region where *A. darlingi* is present. Malaria caused by *P. falciparum* is the most prominent infectious disease in remote areas. The total of 14 657 malaria cases reported in 2003 was similar to that reported in previous years. The outbreaks in 2003 occurred in the south of the country near the Brazilian border as well as in the eastern Marowijne region, which were associated with increased movement of people into gold-mining areas.

## National policy and planning

Malaria control is carried out mostly by the Medical Mission, an NGO primarily financed by the government. The country collaborates with Brazil, French Guiana and Guyana because of overlapping areas of transmission and cross-border migration of the labour force for the mining industry in remote areas. ITNs are being used and local ITN production is promoted.

## Progress in malaria control activities

In the first months of 2003, the National Malaria Board changed the first-line treatment policy from Q to the combination treatment ASU+MQ, resulting in increased patient adherence to treatment. Based on drug efficacy trials undertaken for the Amazon Network for Monitoring Antimalarial Drug Resistance, in 2004 the National Malaria Board adopted the use of ATM+LUM (Coartem®) as a first-line treatment. Human and material resources within the

entomology unit of the MoH were strengthened. Operational research was undertaken for determining the most efficient vector control strategies.

## Financial support

The majority of funding for malaria control comes from nongovernmental sources. Following a successful proposal by the Medical Mission, the GFATM granted over US\$ 3 million over 2 years to start in 2005.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2004
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	3
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	
– <i>P. falciparum</i> (laboratory confirmed):	ATM-LUM
– <i>P. vivax</i>	CQ+PQ
• Treatment failure:	Q(7d)
• Severe malaria:	
• Pregnancy:	
– prevention	
– treatment	



SURINAME

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
1 608	1 490	1 404		4 704	6 606	16 649	11 323	12 412	13 939
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 13 October 2004					
13 132	17 074	13 091	14 657						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	14 657
Reported malaria deaths	

**Probable or clinically diagnosed**

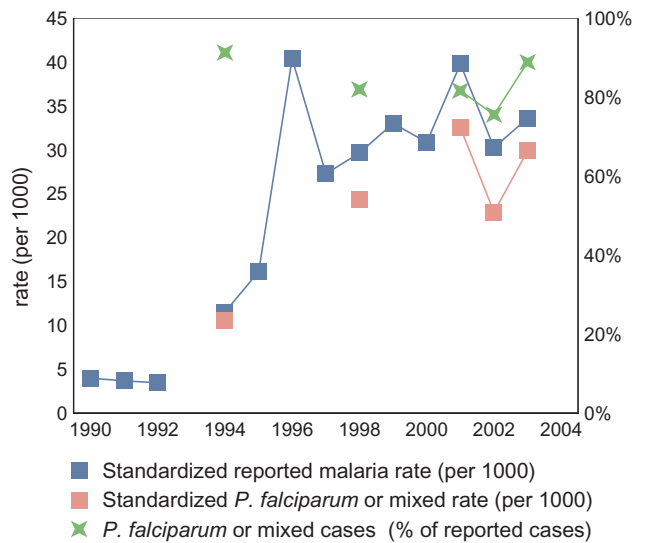
Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	70 670
Rapid diagnostic tests (RDTs) taken	

**Laboratory confirmed**

Malaria cases	14 657
<i>P. falciparum</i> or mixed	13 043
<i>P. vivax</i>	1 614
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases	
Estimated reporting completeness (%)	



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	13 132	17 074	13 091	14 657	100

**Reported malaria cases by selected subnational area**

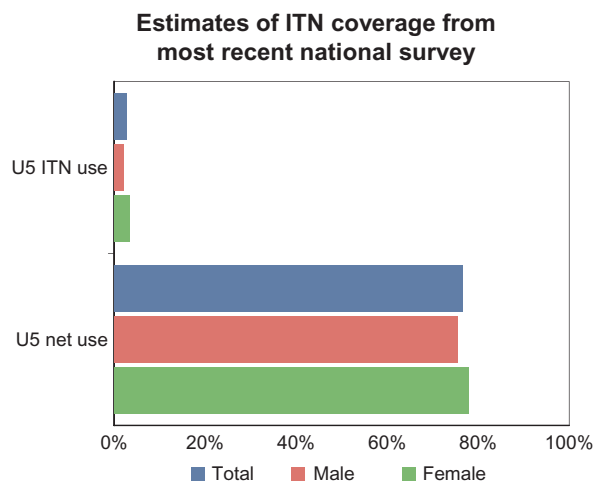
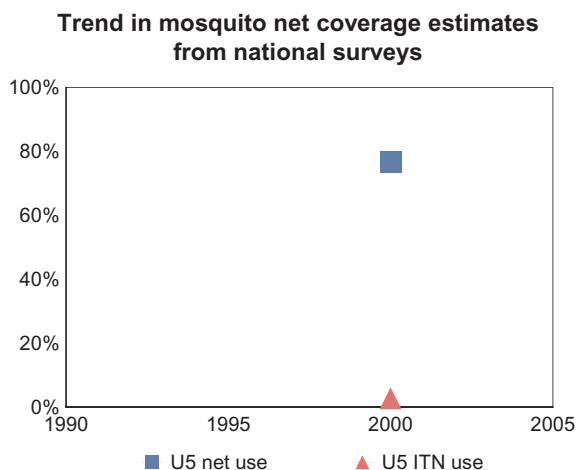
2000	2001	2002	2003	%
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## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.



## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

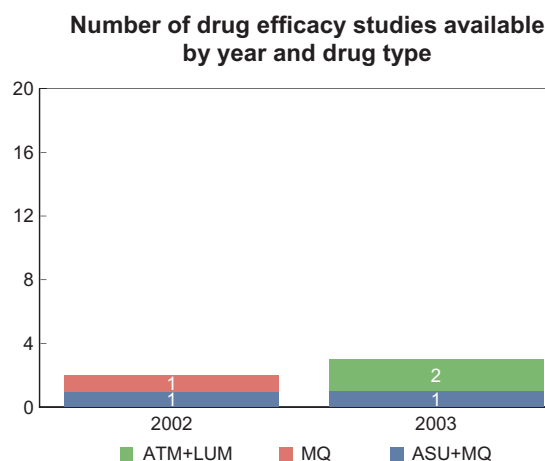
Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.

*No data are currently available.*

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>MQ</b>						
2002	1	7.3				
<b>ATM+LUM</b>						
2003	2	2.0	1.9	2.0	1.9	2.0
<b>ASU+MQ</b>						
2002-2003	2	4.1	2.4	5.8	2.4	5.8

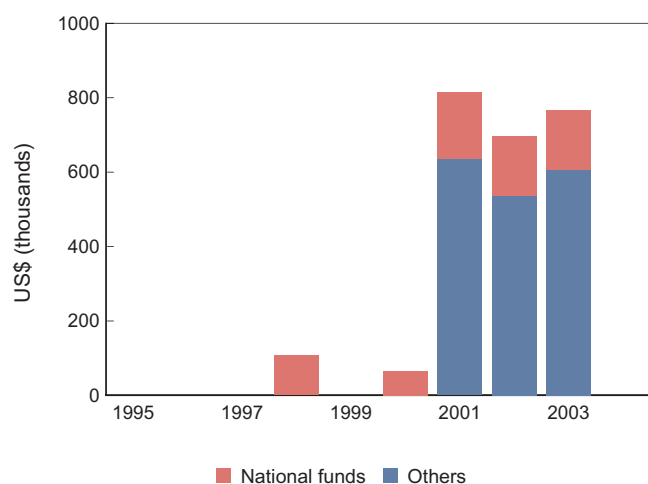


## SURINAME

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998	106	
1999		
2000	66	
2001	178	636
2002	161	536
2003	161	606
2004		

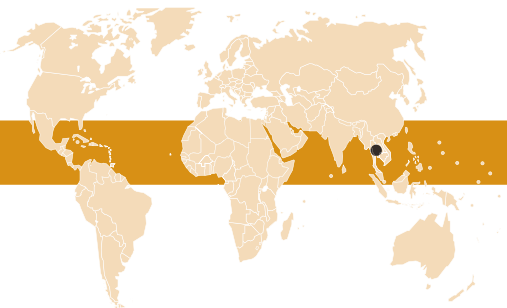
## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	4	3 043 500	<b>Medische Zending</b>	Yes	14-Dec-04	2 963 950	1	1 084 850	36.6%

## General notes and remarks

See explanatory notes at the beginning of the report.



## Malaria situation

Malaria in Thailand is forest-related and most prevalent along the international borders, especially on the Thai–Myanmar border. In the central plain areas, transmission has been eliminated for more than 2 decades. Malaria transmission in forested areas is intense because of highly efficient vectors, enhanced vector longevity and extensive population movement into and out of these same areas. At national level, malaria cases and deaths have fallen gradually since 1999, but the disease remains an important public health problem along the international borders. Young adult males who work in or near forests are a special group at risk in these areas.

## National policy and planning

The NMCP was a specialized, vertical programme from its inception in 1949 until 1996, when it was partially merged with the control programme for other vector-borne diseases—dengue and filariasis—and is now known as the Bureau of Vector-Borne Diseases of the Department of Communicable Disease Control within the Ministry of Public Health. At regional level, the control programme structure comprises 12 disease prevention and control offices, each directed by a medical officer. Throughout Thailand, there are 39 vector-borne disease control centres at provincial level and 302 vector-borne disease control units at district level that are responsible for the control of malaria as well as other vector-borne diseases. During the past decade, downsizing, decentralization and integration of the control programme have resulted in a 30–40% reduction in the number of malaria staff throughout the country.

## Progress in malaria control activities

The major problems and constraints faced by the malaria control programme are: (i) trans-

mission at the international borders among foreign workers; (ii) drug resistance along the Thai–Cambodian and Thai–Myanmar borders; (iii) acceptance of and willingness to use IRS; (iv) challenges in educating at-risk populations about unsafe behaviours; (v) emergence of epidemics as a result of migration of non-immune labour force following development projects into high-risk areas, and (vi) high case-fatality rates among non-immune groups such as tourists and migrants.

## Financial support

National funds available for malaria control activities totalled over US\$ 18 million in 2003. Funding from the GFATM will provide an additional US\$ 2.3 million over 2 years.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2004
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	9
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	Yes
– number of sites currently active:	2
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	NA
– <i>P. falciparum</i> (laboratory confirmed):	MQ (alone) or MQ + ASU(2d)
– <i>P. vivax</i>	CQ+PQ
• Treatment failure:	Q(7d)+T(7d)
• Severe malaria:	ASU or Q
• Pregnancy:	
– prevention	NA
– treatment	Q(7d)

THAILAND

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
273 880	198 383	168 370	115 220	102 119	82 743	87 622	97 540	131 055	125 379
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 1 October 2004					
81 692	63 528	45 240	37 355						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	37 355
Reported malaria deaths	325

**Probable or clinically diagnosed**

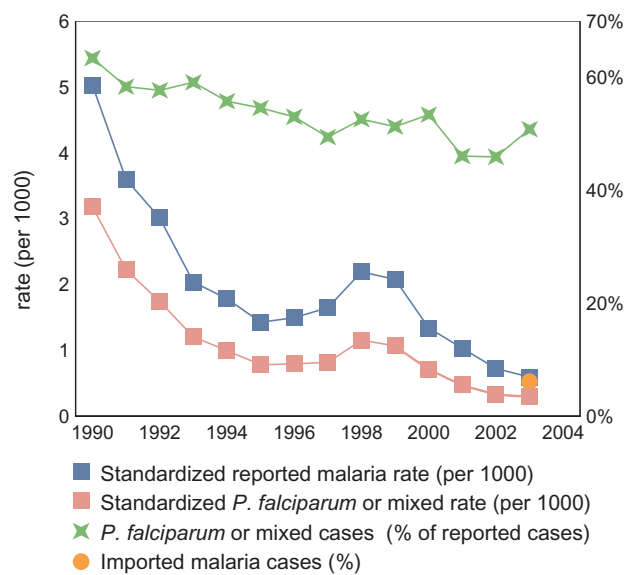
Malaria cases	
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	3 256 939
Rapid diagnostic tests (RDTs) taken	2 668

**Laboratory confirmed**

Malaria cases	37 355
<i>P. falciparum</i> or mixed	19 024
<i>P. vivax</i>	18 295
Severe (inpatient or hospitalized) cases	
Malaria deaths	325

**Investigations**

Imported cases	2 279
Estimated reporting completeness (%)	80



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	81 692	63 528	45 240	37 355	100
Gender	Male				24 879	67
	Female				12 476	33
Age	1-4 years	4 898	3 812			6
	<5 years				2 129	6
	5-9 years				3 100	8
	10-14 years				4 145	11
	15+ years				27 981	75
	15-19 years	15 524	15 882			25
>19 years	61 269	43 834			69	

**Reported malaria cases by selected subnational area**

10 areas	2000	2001	2002	2003	%
Tak				10 278	28
Yala				3 051	8
Kanchanaburi				2 659	7
Chanthaburi				2 628	7
Mae Hong Son				1 929	5
Chiangmai				1 732	5
Prachuap Kiri Khan				1 437	4
Ubon Ratchathani				1 186	3
Nakhon Sri Thammarat				1 166	3
Chumporn				1 080	3

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

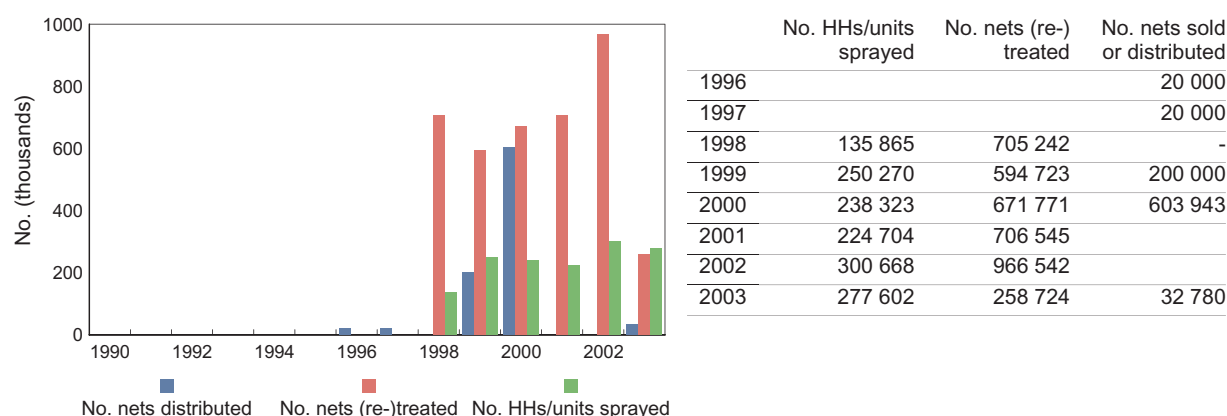
ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

No survey-based estimates of mosquito net or ITN coverage are currently available.

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



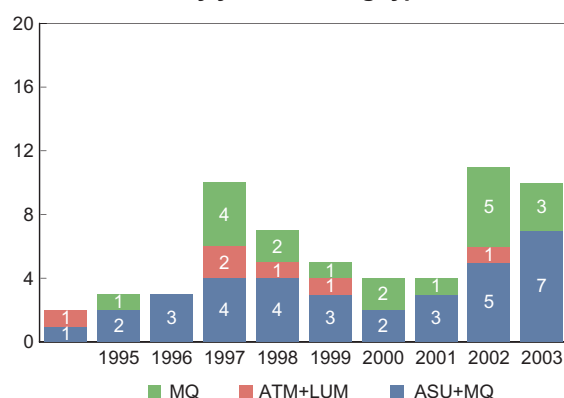
Among the over 250,000 nets retreated in Thailand in 2003, over 111,000 (or 45%) were retreated in the provinces of Tak, Yala, Kanchanaburi, Chanthaburi, Maehong Son, Chiangmai.

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>MQ</b>						
1995-2003	19	13.8	2.0	68.4	7.5	28.0
<b>ATM+LUM</b>						
1996-2002	6	2.6	0.0	3.9	0.5	3.5
<b>ASU+MQ</b>						
1995-2003	34	3.6	0.0	21.4	1.2	8.1

Number of drug efficacy studies available by year and drug type

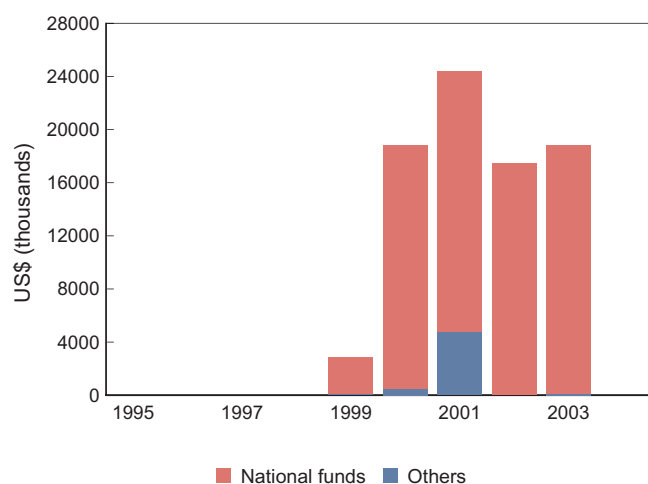


## THAILAND

## FINANCING FOR MALARIA

## Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999	2 717	155
2000	18 354	458
2001	19 578	4 797
2002	17 396	71
2003	18 700	117
2004		

## Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria

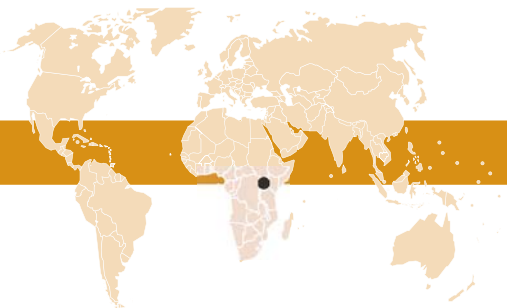
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	2 280 000	MoH	Yes	15-Oct-03	2 280 000	1	660 000	28.9%

## General notes and remarks

See explanatory notes at the beginning of the report.

Reported malaria cases for 2003 are for Thai nationals only. An additional 408 699 blood sites were examined in 2003 with 32 395 positive slides, of which 18 120 were *P. falciparum* for foreign nationals residing in Thailand. The vast majority of these foreign nationals are reported as being from Myanmar.



## Malaria situation

Malaria is the leading cause of morbidity and mortality in Uganda and is responsible for up to 40% of outpatient visits, 25% of hospital admissions and 14% of hospital deaths. The burden of malaria is greatest among children under 5 years of age and pregnant women.

## National policy and planning

A national RBM strategic plan (2001/2002–2004/2005) guides malaria control activities in Uganda. The main strategies are: (i) prompt and effective treatment, including home management; (ii) vector control, including ITNs and IRS; (iii) IPT during pregnancy; and (iv) epidemic preparedness.

## Progress in malaria control activities

In the past 5 years, positive developments have included: (i) increasing the capacity of the NMCP; (ii) developing an ITN policy and strategy; (iii) enhancing monitoring of antimalarial drug efficacy; (iv) updating the antimalarial drug policy in 2002 and 2004; and (v) in April 2002, developing and implementing a strategy of home management of fever using pre-packaged CQ and SP. Remaining challenges for increasing ITN coverage include how to distribute appropriately to vulnerable groups and how to raise awareness of the importance of ITNs for these target populations. Challenges to implementing the new IPT policy include: (i) increasing the use of antenatal clinics by vulnerable women; (ii) reducing drug stock-outs; and (iii) countering erroneous beliefs about the harmful effects of SP through increased education among populations of pregnant women at risk of malaria.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2004
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	9
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	Yes
– number of sites currently active:	7
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	Yes
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	ATM-LUM*
– <i>P. falciparum</i> (laboratory confirmed):	ATM-LUM*
– <i>P. vivax</i>	
• Treatment failure:	Q(7d)
• Severe malaria:	Q(7d)
• Pregnancy:	
– prevention	SP (IPT)
– treatment	Q(7d)

## Financial support

Malaria funding from the NMCP is merged with funding for other health services at district and subdistrict levels, which share human resources, infrastructure and supplies. At national level, the NMCP has a very small budget for operating expenses compared with what is allocated for malaria control at district level. National NGOs cover their own operating costs and support districts in cash or in kind directly or through the NMCP. In 2000, funds for malaria control included US\$ 385 000 from the government and US\$ 376 000 from other sources. Uganda also received over US\$ 9 million of committed funds of US\$ 89 million from the GFATM.



UGANDA

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
		2 446 659	1 470 662	2 191 277	1 431 068		2 317 840	2 845 811	3 070 800
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 30 November 2004					
3 552 859	5 622 934	7 216 411	12 343 411						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	12 343 411
Reported malaria deaths	8 450

**Probable or clinically diagnosed**

Malaria cases	12 343 411
Severe (inpatient or hospitalized) cases	
Malaria deaths	8 450
Slides taken	
Rapid diagnostic tests (RDTs) taken	

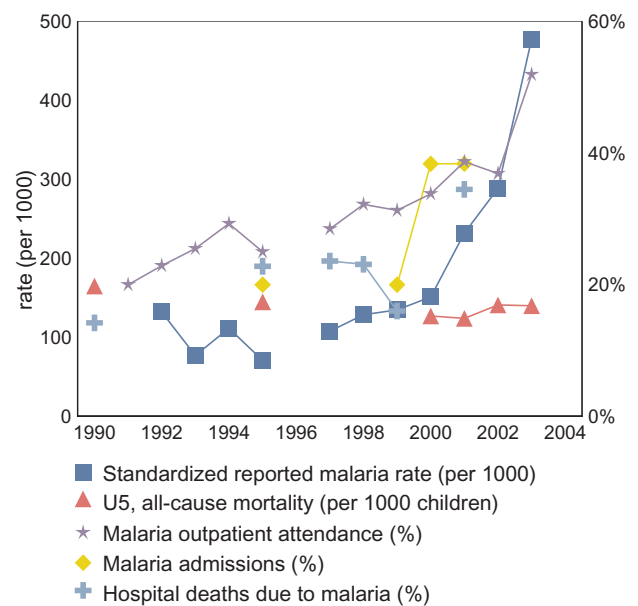
**Laboratory confirmed**

Malaria cases	
<i>P. falciparum</i> or mixed	
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	

**Investigations**

Imported cases

Estimated reporting completeness (%) 97



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
Age	Total	3 552 859	5 622 934	7 216 411	12 343 411	100
	<5 years	1 628 314	2 234 275	2 791 753	3 748 520	30
	5> years	1 924 545	3 388 659	4 424 658	8 594 891	70

**Reported malaria cases by selected subnational area**

15 of 15 areas	2000	2001	2002	2003	%
Mbarara	173 793	323 909	197 985	487 926	4
Bushenyi	122 055	220 432	359 201	378 173	3
Tororo		149 155	149 155	324 548	3
Wakiso		151 895	151 895	323 958	3
Arua	150 834	146 617	274 784	322 632	3
Masaka	116 548	222 381	273 305	320 897	3
Mbale	160 596	166 413	320 678	304 132	2
Kasese				287 132	2
Rakai	62 435	263 162	263 162	280 733	2
Kabale	99 346	251 635	251 635	256 256	2
Jinja	102 327	118 971	226 028	249 254	2
Pallisa	116 193	168 417	210 914	238 547	2
Ntungamo	75 549	192 010	221 981	234 692	2
Kumi	117 669	141 562	141 562	195 299	2
Kampala	39 927	32 360	32 360	159 089	1

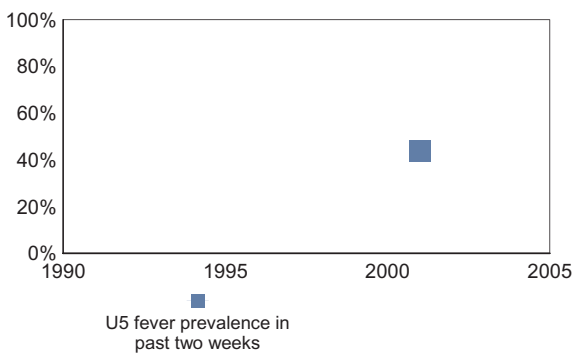
**COVERAGE OF ROLL BACK MALARIA INTERVENTIONS**

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

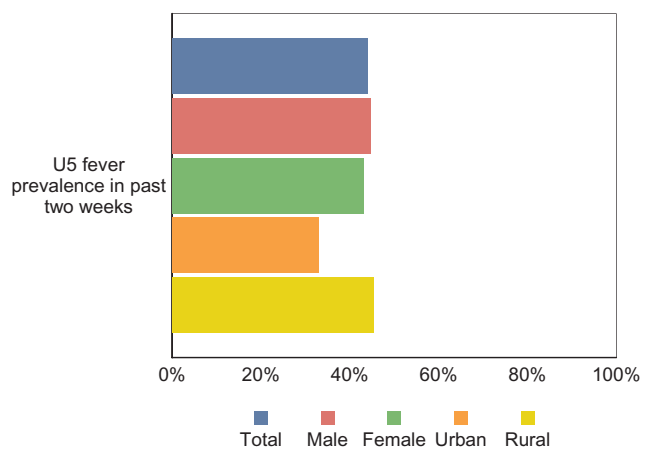
**Fever prevalence and treatment with antimalarials**

Prompt access to effective treatment is one of the key interventions promoted by RBM. Information presented below is from household surveys on fever prevalence and reported treatment of fever with antimalarials among children under 5 years of age (U5) within the previous 2 weeks.

**Trend in fever prevalence and antimalarial coverage estimates from national surveys**



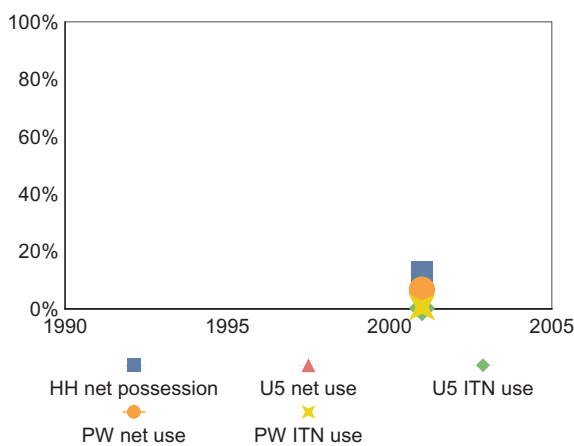
**Estimate of fever prevalence and treatment with antimalarials from most recent national survey**



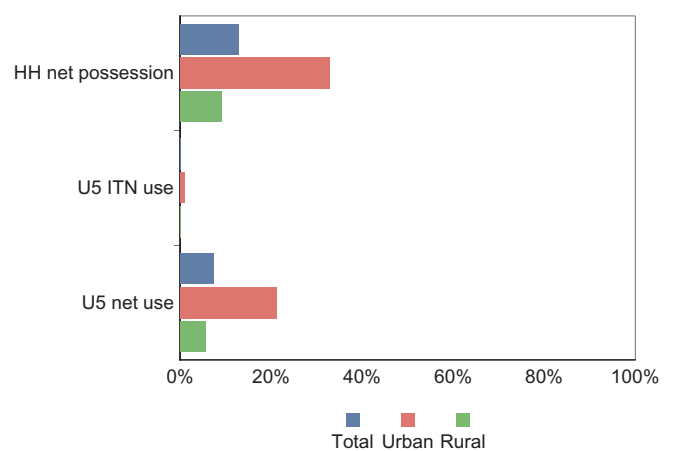
**Insecticide-treated nets**

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

**Trend in mosquito net coverage estimates from national surveys**



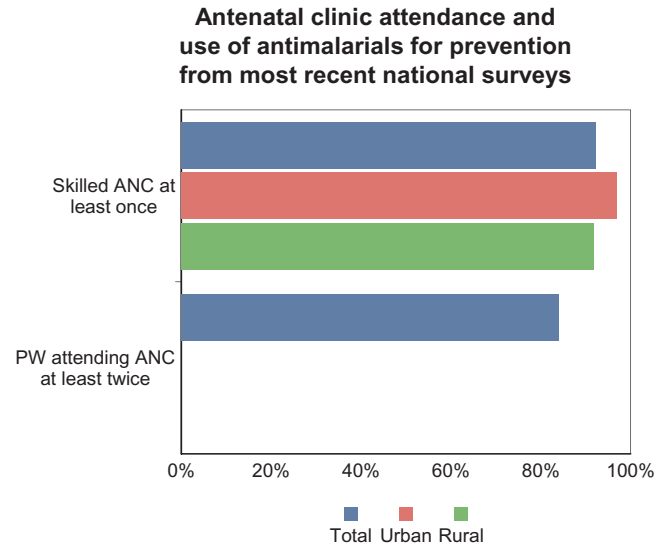
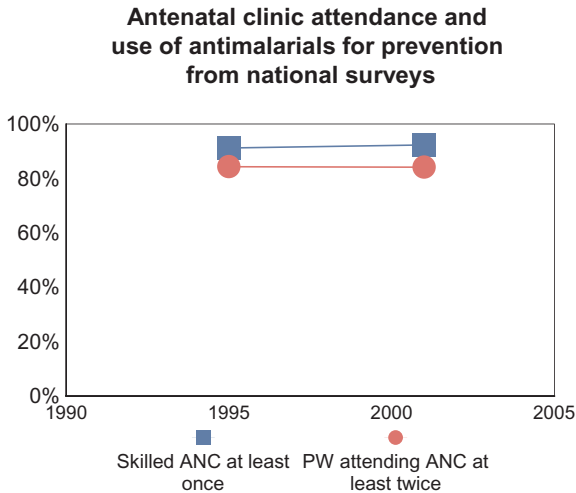
**Estimates of ITN coverage from most recent national survey**



UGANDA

**Intermittent preventive treatment during pregnancy**

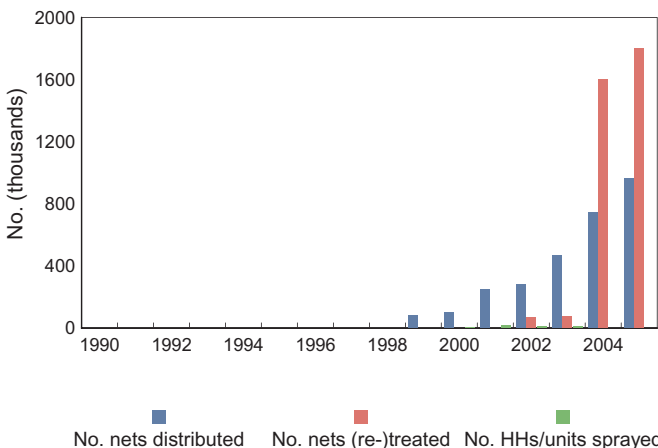
RBM promotes IPT with SP in countries with areas of stable malaria transmission as one of its key prevention strategies for pregnant women (PW). However, few surveys have assessed the coverage of IPT among pregnant women. Data below represent available household survey results in which indicators related to monitoring IPT have been assessed. The level of skilled antenatal attendance and the percentage of women attending antenatal clinics (ANC) at least twice are presented as a background for which improvements in IPT can be achieved.



**SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES**

**General malaria-related services delivered**

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



Year	No. HHs/units sprayed	No. nets (re-) treated	No. nets sold or distributed	No. retreatment kits distributed
1999			80 000	35 00
2000	6 105		100 000	58 00
2001	17 642		250 000	130 00
2002	12 533	65 315	280 295	130 41
2003	9 619	74 079	467 081	158 99
2004		1 600 000	745 000	
2005		1 800 000	960 000	

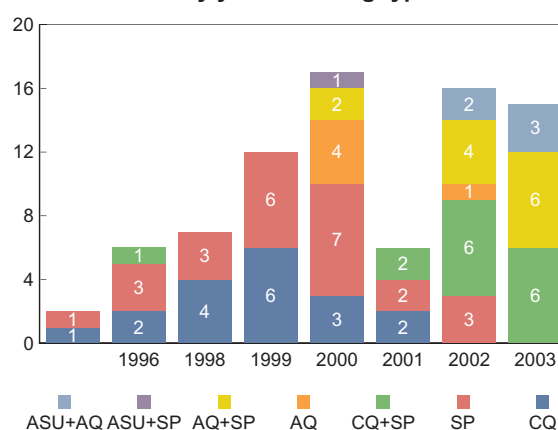
Figures for 2004 and 2005 are projected estimates.

## MONITORING ANTIMALARIAL DRUG EFFICACY

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1996-2001	18	29.3	7.5	81.2	16.4	58.7
<b>SP</b>						
1996-2002	25	11.4	0.0	25.0	5.0	16.8
<b>AQ</b>						
1999-2002	5	8.8	0.0	14.5	1.6	12.3
<b>CQ+SP</b>						
1996-2003	15	12.0	0.0	37.0	7.0	19.0
<b>AQ+SP</b>						
1999-2003	12	1.6	0.0	13.0	0.5	3.5
<b>ASU+AQ</b>						
2002-2003	5	1.0	0.0	4.0	0.5	3.7
<b>ASU+SP</b>						
2000	1	0.5				

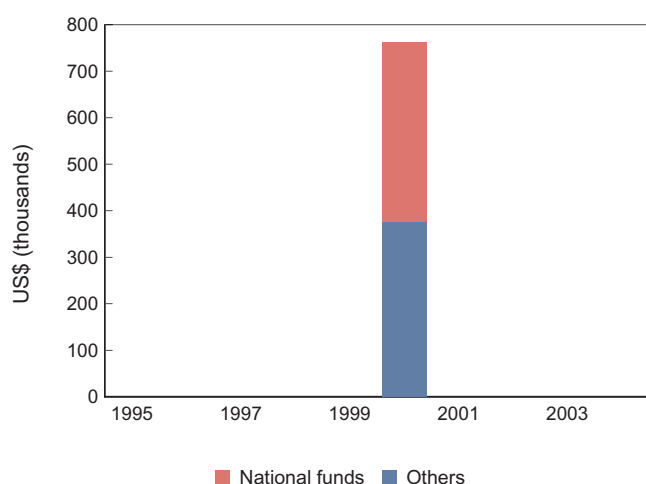
Number of drug efficacy studies available by year and drug type



## FINANCING FOR MALARIA

### Annual funding for malaria control

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999		
2000	385	376
2001		
2002		
2003		
2004		

Malaria funding from the national malaria control programme is included in funding for other health services at the district level. Human resources, infrastructure and supplies are funded together with other health services at district and subdistrict level. The funds for the districts are sent directly from the Ministry of Finance. At national level the malaria control programme receives funding for running expenses, but this is very small compared to what is spent on malaria control at district level. National nongovernmental organizations have their own running costs and they support districts in cash or in kind directly or through the Malaria Control Programme.

## UGANDA

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	23 211 300	<b>MoF</b>	Yes	27-Feb-04	23 211 300	3	9 749 358	42.0%
CCM	4	36 432 148		No					

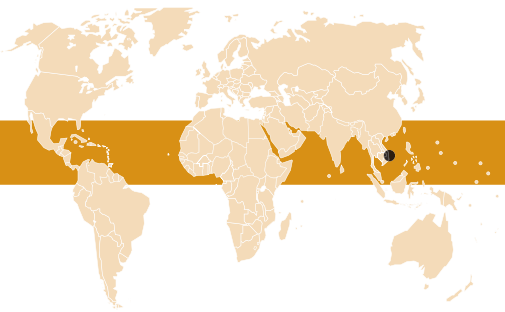
**General notes and remarks**

See explanatory notes at the beginning of the report.

Information on reported malaria cases comes from the Uganda Health Management Information System (HMIS). Uganda is also implementing the WHO-promoted integrated Disease Surveillance and Response System (IDSR), but the national programme felt the information received from IDSR was less complete than HMIS. For example, in 2003 IDSR reported 7 147 152 malaria cases while HMIS reported 12 343 411 malaria cases.

Information on hospitalized or inpatient malaria cases and malaria deaths from HMIS is not reliable. The information included in the profile for inpatient malaria cases and deaths is from IDSR, despite known problems with completeness of reporting and compatibility with HMIS records.

\* policy adopted, not presently being deployed, implementation process ongoing



## MALARIA SITUATION

Since 1975, the worst year for malaria was 1991 when close to 2 million cases and 4646 deaths were reported; in 2003 these numbers had decreased to 37 416 and 50, respectively. Several explanations were given for this severe situation, including insufficient funding for malaria control resulting in low coverage of ITNs and insecticides, scarcity of antimalarial drugs, large population movements, lack of international support and poor access to health facilities, particularly in the remote mountain areas.

## National policy and planning

Since 1991, the Vietnamese Government has recognized the socioeconomic impact of malaria and given top priority to activities for the control of malaria. Today, political commitment for malaria control is provided at all levels. The NMCP has focused on: (i) strengthening the malaria control network from central to village level; (ii) increasing the number of village health workers; (iii) producing new, effective antimalarial drugs; (iv) ensuring free treatment; (v) regular spraying of houses; (vi) distributing ITNs with the participation of the community; (vii) regular training for personnel at all levels; and (viii) providing health education for malaria prevention, in particular to vulnerable groups such as migrants and ethnic minorities.

## Progress in malaria control activities

The MoH focuses on sustaining the success of the 1990s and improving control activities in areas and population groups where mortality and morbidity are still high, particularly in remote areas where village health workers are scarce and among migrants, who have an increased exposure to vectors and reduced access

to health services. Cooperation and partnerships between the MoH and the Medical Department of the Ministry of Defence in remote and border areas, Women's Union, Youth Union, Ministry of Transportation, Ministry of Construction and Ministry of Education have contributed to strengthening malaria control activities.

## Financial support

The country reported just over US\$ 4 million for malaria control in 2003 from national sources. Financial support from WHO, the European Commission and the governments of Australia, Belgium, Germany and others contributed to successful control in the 1990s.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines	Yes
– published/updated in:	2003
• Monitoring antimalarial drug resistance:	Yes
– number of sites currently active:	5
• Home-based management of malaria:	NA
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance	Yes
– number of sites currently active:	
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria	
– <i>P. falciparum</i> (unconfirmed):	ASU(5d) or CQ
– <i>P. falciparum</i> (laboratory confirmed):	DHA/PPQ/TMP+PQ or ASU(5d)+PQ
– <i>P. vivax</i>	CQ+PQ(5d)
• Treatment failure:	DHA/PPQ/TMP+PQ ASU(3d)+MQ25
• Severe malaria:	ASU/ATM or Q
• Pregnancy:	
– prevention	CQ (weekly)
– treatment	Q(7d) or CQ or ASU

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
123 796	187 994	225 928	156 069	140 120	100 116	76 356	65 859	72 091	64 679
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 16 December 2004					
62 442	53 601	46 902	37 416						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	37 416
Reported malaria deaths	50

**Probable or clinically diagnosed**

Malaria cases	12 694
Severe (inpatient or hospitalized) cases	423
Malaria deaths	4
Slides taken	2 738 600
Rapid diagnostic tests (RDTs) taken	

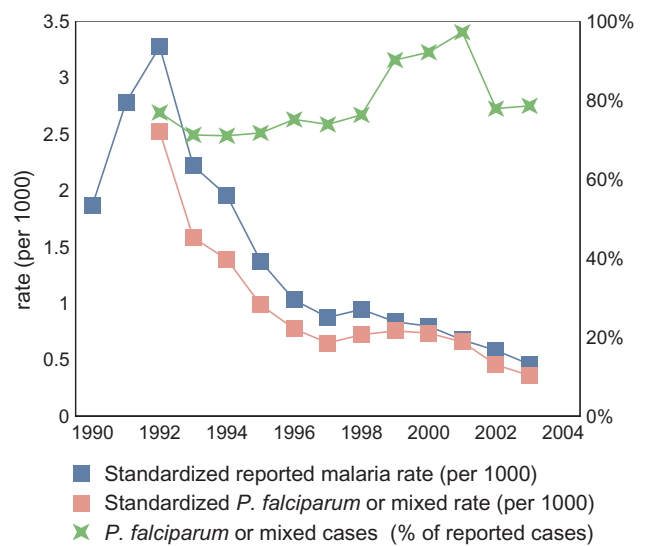
**Laboratory confirmed**

Malaria cases	37 416
<i>P. falciparum</i> or mixed	29 435
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	46

**Investigations**

Imported cases

Estimated reporting completeness (%)



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	62 442	53 601	46 902	37 416	100

**Reported malaria cases by selected subnational area**

15 of 63 areas	2000	2001	2002	2003	%
Dak Lak	8 977	9 450	8 008	6 715	18
Gia Lai	7 605	5 424	5 526	4 771	13
Binh Phuoc	8 285	5 667	5 278	3 953	11
Binh Thuan	8 739	8 773	4 183	3 197	9
Quang Nam	931	3 739	2 898	3 035	8
Khanh Hoa	3 936	4 596	2 952	2 179	6
Quang Tri	2 281	3 279	1 793	1 951	5
Lam Dong	3 441	3 532	2 661	1 673	4
Ninh Thuan	2 844	3 304	2 319	1 585	4
Kon Tum	2 070	1 904	1 752	1 172	3
Quang Binh	2 358	1 473	1 148	1 108	3
Phu Yen	3 627	2 962	1 677	979	3
Binh Dinh	3 974	2 581	1 295	817	2
Dong Nai	3 321	1 862	897	720	2
Lai Chau	887	1 366	714	549	1

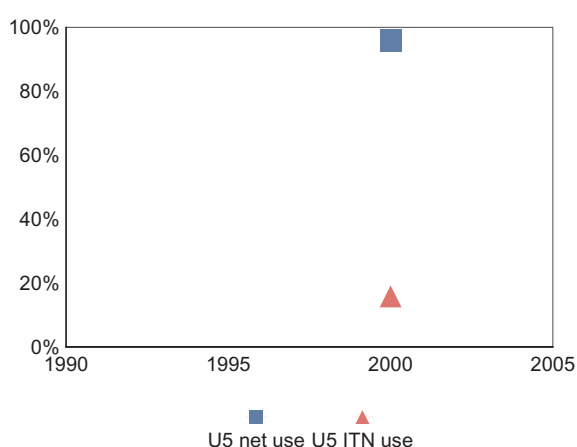
## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

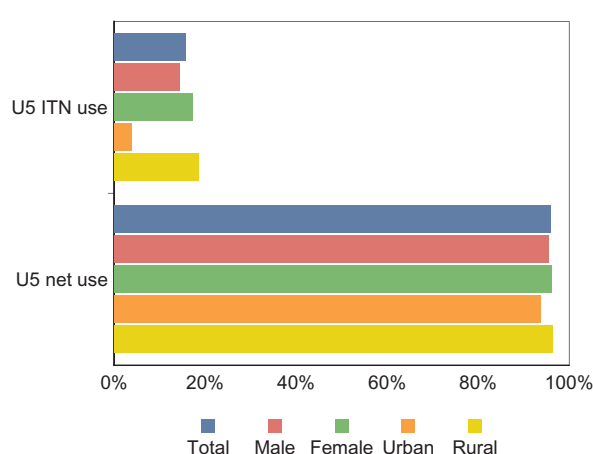
### Insecticide-treated nets

ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

Trend in mosquito net coverage estimates from national surveys



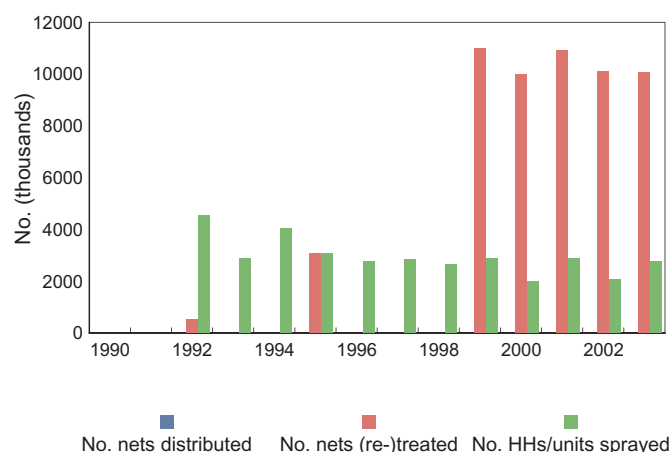
Estimates of ITN coverage from most recent national survey



## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



Year	No. HHs/units sprayed	No. nets (re-) treated
1992	4 552 188	506 025
1993	2 893 886	
1994	4 043 216	
1995	3 081 218	3 068 709
1996	2 747 631	
1997	2 830 974	
1998	2 637 915	
1999	2 873 831	11 007 770
2000	1 984 018	10 007 707
2001	2 883 297	10 920 217
2002	2 080 180	10 101 814
2003	2 746 657	10 047 593

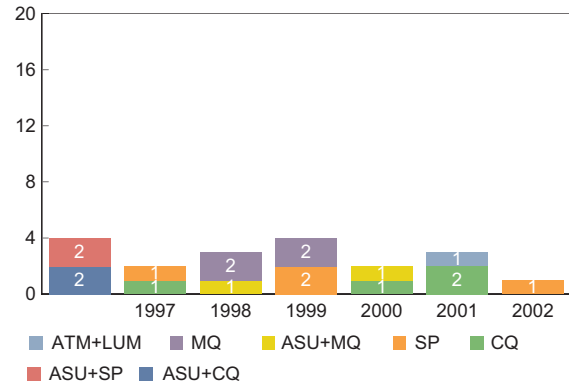


**MONITORING ANTIMALARIAL DRUG EFFICACY**

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1997-2001	4	52.3	6.2	71.9	27.0	64.3
<b>SP</b>						
1997-2002	4	16.6	12.2	70.6	13.0	41.9
<b>MQ</b>						
1998-1999	4	11.7	0.0	42.3	0.0	32.8
<b>ATM+LUM</b>						
2001	1	2.2				
<b>ASU+CQ</b>						
	2	37.4	28.0	46.8	28.0	46.8
<b>ASU+SP</b>						
	2	33.2	8.3	58.1	8.3	58.1
<b>ASU+MQ</b>						
1998-2000	2	5.6	0.0	11.1	0.0	11.1

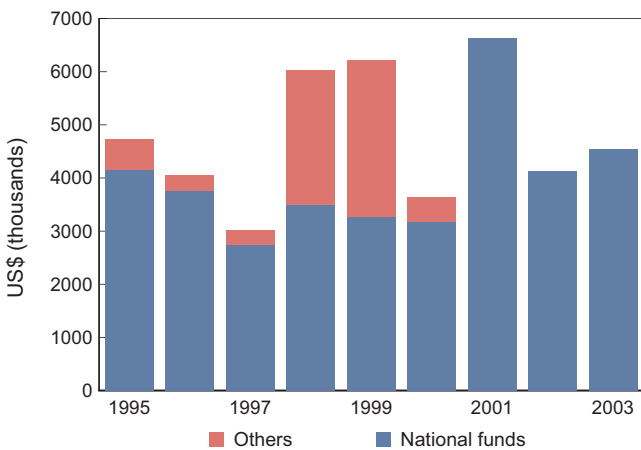
Number of drug efficacy studies available by year and drug type



**FINANCING FOR MALARIA**

**Annual funding for malaria control**

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995	4 145	577
1996	3 756	284
1997	2 749	273
1998	3 494	2 528
1999	3 271	2 944
2000	3 178	462
2001	6 632	
2002	4 129	
2003	4 537	

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

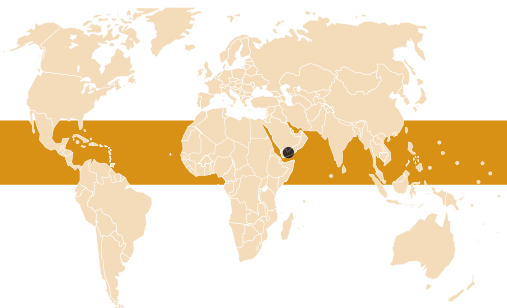
Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	3	13 388 402	MoH	Yes	24-Aug-04	13 388 402	1	3 218 217	24.0%

**General notes and remarks**

See explanatory notes at the beginning of the report.

A total of 2 738 600 slides taken in 2003 include information from patients tested with rapid diagnostic tests. Reported malaria cases by age and gender are not available.



## Malaria situation

Malaria is one of the most serious health problems in Yemen. Approximately 60% of the population live in areas with malaria transmission. *P. falciparum* accounts for more than 90% of malaria cases. Social unrest during the 1990s brought about almost a complete halt to malaria control activities in the country, resulting in a serious deterioration of the malaria situation. The instability, in addition to climatic changes and heavy rainfalls, contributed to malaria epidemics in 1996 and 1998.

## National policy and planning

In 2001, the WHO Regional Office for the Eastern Mediterranean assisted the Government of Yemen to establish the NMCP with a 5-year plan of action for malaria control with the broader RBM Partnership. The plan of action consists of: (i) strategic directions aimed at human resource development; (ii) early diagnosis and prompt treatment of cases; (iii) selective vector control by larviciding and IRS; (iv) prevention of malaria in pregnancy; (v) epidemic preparedness and response; (vi) strengthening malaria surveillance; and (vii) community involvement in operational research. The RBM Partnership in Yemen includes many stakeholders. WHO is a major partner of the government and provides a long-term medical officer and a short-term entomologist. There is also a strong partnership with Saudi Arabia, with periodic border coordination meetings and joint vector control campaigns conducted at the Yemeni–Saudi border. Other partners include the GFATM, the governments of Italy, Japan and Oman, various NGOs, the private sector, local health offices and the Supreme National Malaria Control Committee. Intersectoral collaboration involves various ministries and departments, including the Ministry of Finance and the Ministry of Agriculture and Irrigation.

## Progress in malaria control activities

The RBM control programme initially focused on high-risk areas including the Tihama coastal belt, selected districts in foothill and mountainous areas and Socotra Island. Key strategies are training in case management, improving

laboratory diagnostic capacity and ensuring the availability of antimalarial drugs in all health institutions, particularly at the peripheral centres. Monitoring of insecticide and drug resistance has begun in selected areas, and malaria surveillance benefits from a newly introduced reporting system. As a result of these activities, the number of reported malaria cases has fallen considerably in areas under RBM support, notably in Socotra Island where elimination might now be possible. However, challenges remain: (i) the capacity of the NMCP is still limited; (ii) the diagnosis of malaria is still based primarily on clinical signs; and (iii) surveillance needs to be strengthened. National treatment guidelines are available, but need updating in view of resistance to CQ, and should be actively promoted to improve compliance by physicians.

## Financial support

The Government of Yemen has provided around US\$ 2 million for the past few years for malaria control efforts. Funding from the GFATM will provide over US\$ 4 million over 2 years.

## National malaria policy & strategy environment

<i>Malaria strategy overview for 2003</i>	<i>Strategy</i>
• Treatment and diagnosis guidelines – published/updated in:	Yes
• Monitoring antimalarial drug resistance: – number of sites currently active:	Yes 4
• Home-based management of malaria:	Yes
• Vector control using insecticides:	Yes
• Monitoring insecticide resistance – number of sites currently active:	Yes 2
• Insecticide-treated mosquito nets:	Yes
• Intermittent preventive treatment:	NA
• Epidemic preparedness:	Yes
<i>Antimalarial drug policy, end 2004</i>	<i>Current policy</i>
• Uncomplicated malaria – <i>P. falciparum</i> (unconfirmed): – <i>P. falciparum</i> (laboratory confirmed): – <i>P. vivax</i>	CQ CQ CQ+PQ(14d)
• Treatment failure:	SP+PQ(1d)
• Severe malaria:	Q+PQ(1d)
• Pregnancy: – prevention – treatment	  CQ

**EPIDEMIOLOGICAL DATA**

Following WHO recommendations, malaria case reporting is carried out in most countries. The data presented below reflect aggregated malaria cases at the national level and are presented by gender, age and subnational level as submitted to WHO. Malaria reporting from national surveillance systems varies in quality and reporting completeness and may have limited value in understanding the actual malaria burden, but may be useful for understanding trends in the relative burden of malaria in the public health sector.

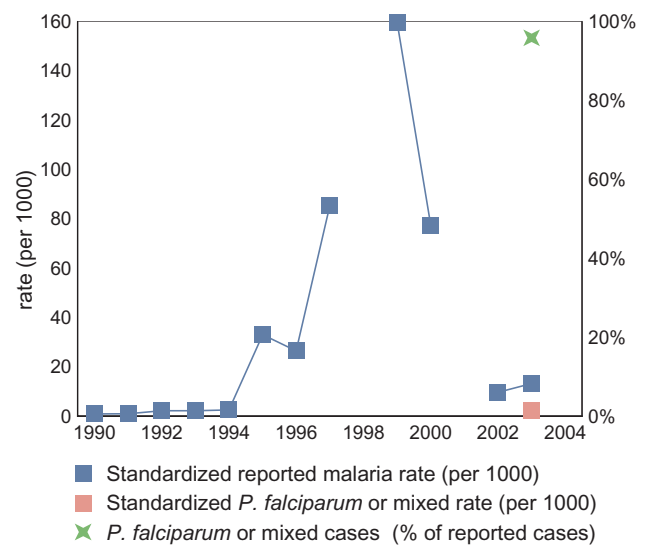
**Reported malaria cases (annual)**

<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>
11 384	12 717	29 320	31 262	37 201	500 000	416 246	1 394 495		2 781 640
<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	Date of last report: 15 December 2004					
1 394 495		187 159	265 023						

**Reported malaria by type and quality**

For most recent year

Reported malaria cases	265 023
Reported malaria deaths	29
<b>Probable or clinically diagnosed</b>	
Malaria cases	214 212
Severe (inpatient or hospitalized) cases	
Malaria deaths	
Slides taken	414 919
Rapid diagnostic tests (RDTs) taken	0
<b>Laboratory confirmed</b>	
Malaria cases	50 811
<i>P. falciparum</i> or mixed	48 741
<i>P. vivax</i>	
Severe (inpatient or hospitalized) cases	
Malaria deaths	29
<b>Investigations</b>	
Imported cases	
<b>Estimated reporting completeness (%)</b>	



**Reported malaria cases by age and gender**

Group	Subgroup	2000	2001	2002	2003	%
	Total	1 394 495	187 159	265 023		100

**Reported malaria cases by selected subnational area**

15 of 22 areas	2000	2001	2002	2003	%
Taiz			35 439		19
Sanaa			31 985		17
Dhamar			19 861		11
Hejja			16 875		9
Omran			14 406		8
Ebb			12 658		7
Al Hodieda			8 282		4
M'arib			7 231		4
El mehwit			6 730		4
Shebwa			4 636		2
Aden			3 178		2
Al Amana			2 531		1
Al dalea			2 512		1
El makla			2 314		1
Lahj			2 018		1

## COVERAGE OF ROLL BACK MALARIA INTERVENTIONS

Information related to the coverage of RBM key interventions is presented here. This includes coverage of antimalarial treatment, possession and use of insecticide-treated nets (ITNs), and use of intermittent preventive treatment (IPT) among pregnant women (PW) where national policy indicates.

### Insecticide-treated nets

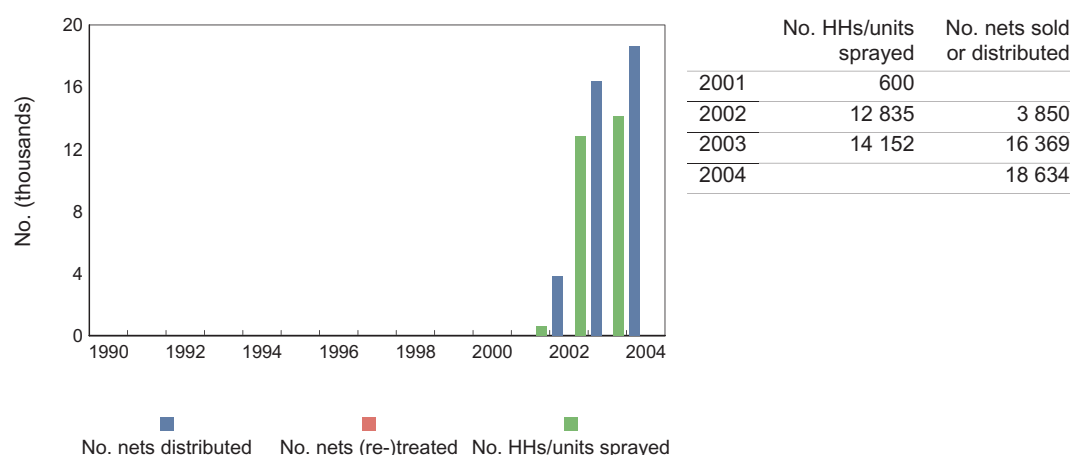
ITNs are one of the key interventions promoted by RBM. Coverage of ITNs is best assessed through household (HH) surveys which ask questions on possession and use of nets, as well as insecticide treatment status, among the target populations of children under 5 years of age (U5) and pregnant women. Data below represent available household survey results in which household possession and use of nets and ITNs have been assessed.

*No survey-based estimates of mosquito net or ITN coverage are currently available.*

## SERVICE DELIVERY AND MALARIA-RELATED COMMODITIES

### General malaria-related services delivered

Services delivered for malaria control include numbers of nets and insecticides delivered or sold, numbers of nets (re-)treated with insecticide and numbers of households (HHs)/units sprayed during IRS campaigns. These services and service-related commodities mostly reflect core malaria control activities of national malaria control programmes. The information reflects annual, country-reported data.



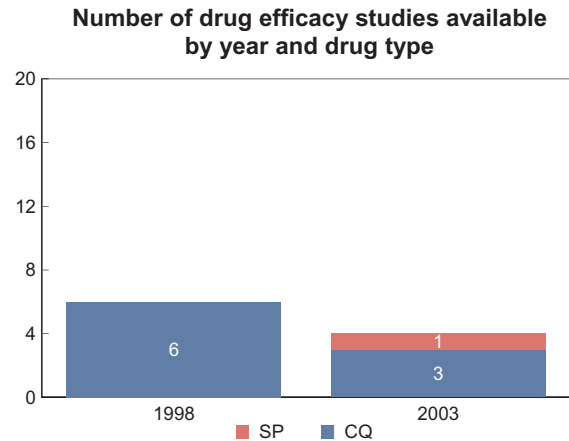
The programme also noted that the planned number of households to be sprayed in 2003 was 36 766, but this was not achieved due to a delay in the local purchase of insecticides.

The number of staff for spraying in the programme went from 397 in 2002 to 426 in 2004 in addition to 91 field supervisors. Larviciding operations in wells, tanks and stagnant water collections was estimated to cover about 2 130 kilometers weekly.

**MONITORING ANTIMALARIAL DRUG EFFICACY**

Monitoring antimalarial drug efficacy is important for understanding the impact of antimalarial treatment being delivered and the need for drug policy change, essential for ensuring prompt access to effective treatment. Median, range and quartiles are based on percentage clinical failure for uncomplicated *P. falciparum* malaria for countries in Africa south of the Sahara, and percentage total failure for all other areas. Included are studies that used WHO protocol among selected drugs.

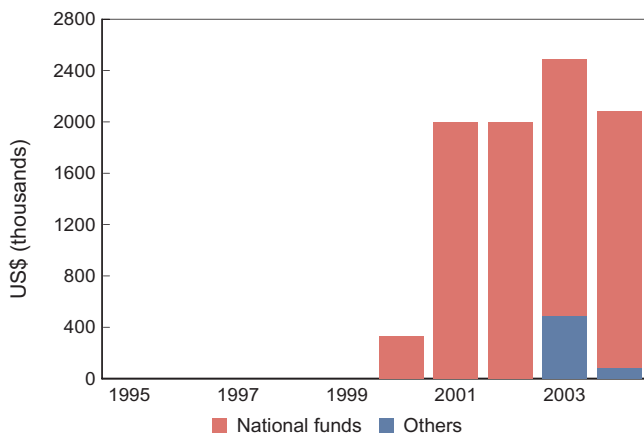
Study years	Number of studies	Median	Range		Percentile	
			Low	High	25th	75th
<b>CQ</b>						
1998-2003	9	42.4	9.0	57.0	23.3	44.9
<b>SP</b>						
2003	1	0.0				



**FINANCING FOR MALARIA**

**Annual funding for malaria control**

This information represents country-reported national and other resources budgeted or spent for national malaria control programme efforts. If information was reported in a different currency than US\$, the annual average of the official exchange rate from the World Development Index was used for conversion. Currency is presented in US\$ (thousands).



	National funds	Others
1995		
1996		
1997		
1998		
1999		
2000	333	
2001	2 000	
2002	2 000	
2003	2 000	490
2004	2 000	80

**Malaria funds from the Global Fund to Fight HIV, Tuberculosis, and Malaria**

Information on additional resources provided to countries through GFATM from 2-year committed funds for malaria from successful proposals through the first four rounds is presented. The details on approved proposals, grant agreements and disbursements to date are provided. Figures are presented in US\$. These data are maintained and updated by GFATM.

Approved proposals			Grant agreements and disbursements (as of 13 January 2005)						
Source	Round	Total year 1-2 budgets	Principal recipient	Signed	Signature date	Grant amount	No. of disbursements	Total disbursed	% disbursed
CCM	2	4 159 632	MoH	Yes	30-Sep-03	4 159 632	2	1 661 532	39.9%

**General notes and remarks**

See explanatory notes at the beginning of the report.

Home management of malaria cases is conducted in Socotra Island. A change in antimalarial drug policy based on the results of 9 efficacy studies is planned for the second quarter of 2005. SP during pregnancy is used for special populations with limited access to health care. Reported malaria cases at the national level do not include age or gender.

## ANNEX 2. COUNTRY DATA, BY REGION

### Regional and subregional classification of countries and territories

The information from countries and territories considered to be malaria-endemic is presented from three broad global regions: Africa, Asia and the Americas, which are further divided into subregions. Groupings are based on geographical proximity and, secondarily, on existing WHO regional groupings.

#### AFRICA

**Central Africa:** Cameroon, Central African Republic, Chad, Congo, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Sao Tome and Principe

**East Africa:** Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Mayotte, Rwanda, Somalia, Sudan, Uganda, United Republic of Tanzania

**North Africa:** Algeria, Egypt, Morocco

**Southern Africa:** Angola, Botswana, Madagascar, Malawi, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe

**West Africa:** Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo

#### ASIA

**Central Asia and Transcaucasia:** Armenia, Azerbaijan, Georgia, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

**Eastern Mediterranean:** Afghanistan, Iran (Islamic Republic of), Iraq, Oman, Pakistan, Saudi Arabia, Syrian Arab Republic, Turkey, Yemen

**South-East Asia:** Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Myanmar, Nepal, Sri Lanka, Thailand, Timor-Leste

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

#### THE AMERICAS

**Central America and the Caribbean:** Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Haiti, Honduras, Mexico, Nicaragua, Panama

**South America:** Argentina, Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Paraguay, Peru, Suriname, Venezuela

## Explanatory notes for regional tabulations

Data from country profiles for indicators based on the basic monitoring and evaluation framework (Table 1)(5) were re-tabulated by region and subregion for malaria-endemic countries using the country classification presented in Annex 2.

Table A.21 shows the reported cases and deaths per country for the most recent year for which WHO/RBM received data. For cases, besides the categories “probable/clinically diagnosed”, “laboratory-confirmed” and “imported” that are reported by countries, the table includes “standardized cases” (column 4 of table). Standardized cases were derived from the total reported number of cases and an appreciation of the proportion of these cases that were laboratory-confirmed (column 6). For countries where none of the reported cases were confirmed (“NR” in column 6), which includes most countries in Africa south of the Sahara, standardized cases are defined as probable/clinically diagnosed cases. For countries where all cases are laboratory-confirmed (“All” in column 6), standardized cases are laboratory-confirmed cases minus imported cases. For the few countries where some cases were laboratory-confirmed (“Some” in column 6, for Afghanistan, Somalia, Sudan and Yemen), standardized cases are the sum of the categories probable/clinically diagnosed and laboratory-confirmed, which were mutually exclusive for these countries.

The standardized case reporting rate (per 1000 per year, column 5) was calculated by dividing the standardized cases by the national population size estimated by the United Nations Population Division (2002 revision (52), column 3) for the middle of the year under consideration (column 2).

Standardized reported deaths (column 7) denotes, for countries where all cases are laboratory-confirmed, the malaria-attributed deaths based on confirmed cases (column 12). For countries reporting only probable/clinically diagnosed cases, standardized deaths denotes the malaria-attributed deaths based on probable/clinically diagnosed cases (column 10).

Percentage imported cases (column 19) denotes imported malaria cases (column 18) as a percentage of total confirmed cases (column 12).

Table A.22 shows standardized case reporting rates, by year between 1990 and 2003, calculated as described above.



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**Table A.1 Summary of key strategies and policies of national malaria control programmes**

### Africa

<b>Central</b>	Manual <sup>a</sup>	Drug efficacy monitoring <sup>b</sup>	Home management of malaria	Vector control insecticide	Insecticide resistance monitoring <sup>b</sup>	ITNs	IPT	Epidemic preparedness
Cameroon		-						
CAR	2004	5						
Chad		4						
Congo		-						
DR Congo		8						
Equatorial Guinea		-						
Gabon		-						
Sao Tome & Principe	2004	-						
<b>East</b>								
Burundi		-						
Comoros		6						
Djibouti								
Eritrea		-			-			
Ethiopia	1995	-						
Kenya		6						
Rwanda		10						
Somalia		4						
Sudan	2004	10			12			
Uganda	2004	9			7			
UR Tanzania	2001	8			-			
<b>North</b>								
Algeria		-						
Egypt					-			
Morocco					9			
<b>Southern</b>								
Angola		8						
Botswana	1999	3						
Madagascar		2						
Malawi	1997	6			6			
Mauritius		-						
Mozambique		5						
Namibia	1995	3			4			
South Africa		5						
Swaziland		2			1			
Zambia		11			-			
Zimbabwe		12						

ANNEX 2. COUNTRY DATA, BY REGION

<b>West</b>	Manual <sup>a</sup>	Drug efficacy monitoring <sup>b</sup>	Home management of malaria	Vector control insecticide	Insecticide resistance monitoring <sup>b</sup>	ITNs	IPT	Epidemic preparedness
Benin		-						
Burkina Faso	2001	8			2			
Cape Verde		-						
Côte d'Ivoire		-						
Gambia		-						
Ghana	2004	6						
Guinea		-						
Guinea-Bissau		-						
Liberia		-						
Mali		4						
Mauritania		-						
Niger		3						
Nigeria	2001	6			1			
Senegal		-						
Sierra Leone		11						
Togo		6						

## Asia

### Central Asia and Transcaucasia

Armenia								
Azerbaijan								
Georgia								
Kyrgyzstan								
Tajikistan								
Turkmenistan								
Uzbekistan								

### Eastern Mediterranean

Afghanistan	2003	4						
Iran (Islamic Republic of)	2004	5			4			
Iraq								
Oman					-			
Pakistan		4			-			
Saudi Arabia		-			4			
Syrian Arab Republic								
Turkey								
Yemen		4			2			

### South-East Asia

Bangladesh	2002	4			5			
Bhutan	2000	2						
DPR Korea		2						
India	2001	13			72			
Indonesia		-						
Myanmar	2002	6			1			
Nepal	2001	3						
Sri Lanka	2004	-						
Thailand	2004	9			2			
Timor-Leste		-						

**Table A.1 Summary of key strategies and policies of national malaria control programmes**

<b>Western Pacific</b>	Manual <sup>a</sup>	Drug efficacy monitoring <sup>b</sup>	Home management of malaria	Vector control insecticide	Insecticide resistance monitoring <sup>b</sup>	ITNs	IPT	Epidemic preparedness
Cambodia		8			-			
China		4						
Lao PDR	2000	6			10			
Malaysia	1993	18			14			
Papua New Guinea		4						
Philippines		3			4			
Republic of Korea	2003							
Solomon Islands		8						
Vanuatu		2						
Viet Nam	2003	5			-			

## The Americas

### Central America & Caribbean

Belize		-						
Costa Rica		-						
Dominican Republic		-						
El Salvador		-						
Guatemala		-						
Haiti		-						
Honduras		-						
Mexico		-						
Nicaragua		-						
Panama		-						

### South America

Argentina		-						
Bolivia		-						
Brazil	2001	7						
Colombia	2004	-						
Ecuador		-						
French Guiana		-						
Guyana		-						
Paraguay		-						
Peru		-						
Suriname	2004	3						
Venezuela		-						

#### Notes:

Please refer to explanatory notes for regional tabulations.

IPT = intermittent preventive treatment for pregnant women; ITNs = insecticide-treated nets

Yes =  No =  Not applicable =  Blank cell = not determined -- = no information available

<sup>a</sup> Year indicates the date of publication of the most recent manual for national malaria control or treatment guidelines.

<sup>b</sup> Number of active monitoring sites.

## Table A.2 Antimalarial drug policy, end 2004

	<i>P. falciparum</i>						<i>P. vivax</i>
	Uncomplicated		Treatment failure	Severe malaria	Pregnancy		
	Unconfirmed	Confirmed			Treatment	Prevention	
<b>Africa</b>							
<b>Central</b>							
Cameroon	ASU+AQ*	ASU+AQ*	Q(7d)	Q(7d)		SP (IPT)	
CAR	CQ	CQ	SP	Q(7d)	Q(7d)	CQ weekly	
Chad	CQ	CQ	SP	Q(7d)	Q(7d)	CQ weekly	
Congo	CQ	CQ	SP	Q(7d)	Q(7d)	CQ weekly	
DR Congo	SP	SP	Q(7d)	Q(7d)	Q(7d)	SP (IPT)	
Equatorial Guinea	CQ	CQ	Q(7d)	Q(7d)	Q(7d)		
Gabon	ASU+AQ*	ASU+AQ*	ATB+LUM*	Q(7d)	Q(7d)	SP (IPT)	
Sao Tome & Principe	ASU+AQ	ASU+AQ	Q(7d)	Q(7d)	Q or ASU+AQ	SP (IPT)	
<b>East</b>							
Burundi	ASU+AQ	ASU+AQ	Q(7d)	Q(7d)	Q(7d)		
Comoros	ATB+LUM	ATB+LUM	Q(7d)	Q(7d)	Q(7d)		
Djibouti	CQ	CQ	SP	Q(7d)	Q(7d)	CQ	
Eritrea	CQ+SP	CQ+SP	Q(7d)	Q(7d)	Q(7d)		CQ
Ethiopia	ATB+LUM	ATB+LUM	Q(7d)	Q(7d)	Q(7d)		CQ
Kenya	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)	Q(7d)	SP (IPT)	
Rwanda	AQ+SP	AQ+SP	Q(7d)	Q(7d)	Q(7d)	SP (IPT)	
Somalia	CQ	CQ	SP	Q	Q	SP (IPT)*	
Sudan	ASU+SP (North) ASU+AQ (South)	ASU+SP (North) ASU+AQ (South)	ATB+LUM (North) Q(7d) (South)	Q(7d) or ATM(6d) or ATM(3d)+ASU+SP (North)	Q(7d) or ASU+SP (from 13 weeks)	SP (IPT)	CQ+PQ(14d) (South)
Uganda	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)	Q(7d)	SP (IPT)	
UR Tanzania	ATB+LUM* ASU+AQ (Zanzibar)	ATB+LUM* ASU+AQ (Zanzibar)	Q(7d) ATB+LUM (Zanzibar)	Q(7d)	SP	SP (IPT)	NA
<b>North</b>							
Algeria							CQ
Egypt	all confirmed	CQ+PQ	SP	Q(7d)	Q(7d)		CQ+PQ(14d)
Morocco	all confirmed	ATB+LUM	Q(7d)	Q	Q		CQ+PQ(14d)

Table A.2 Antimalarial drug policy, end 2004

Southern	<i>P. falciparum</i>						<i>P. vivax</i>
	Uncomplicated		Treatment failure	Severe malaria	Pregnancy		
	Unconfirmed	Confirmed			Treatment	Prevention	
Angola	CQ	CQ	SP	Q(7d)		CQ weekly	
Botswana	SP	SP	Q(7d)	Q(7d)			
Madagascar	ASU+AQ*	ASU+AQ*	Q(7d)	Q(7d)		SP (IPT)	
Malawi	SP	SP	Q(7d)	Q(7d)	SP or Q	SP (IPT)	
Mauritius							CQ
Mozambique	AQ+SP	AQ+SP	ATB+LUM	Q(7d)		SP (IPT)	
Namibia	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)	Q	SP (IPT)	CQ
South Africa	ASU+SP (Mpumalaga)	ATM+LUM (KwaZulu Natal) ASU+SP (Mpumalaga)	Q(7d)	Q(7d)		CQ + PG (KwaZulu Natal)	
Swaziland	CQ	CQ	SP	Q(7d)			
Zambia	ATB+LUM	ATB+LUM	Q(7d)	Q(7d)		SP (IPT)	
Zimbabwe	CQ+SP	CQ+SP	Q(7d)	Q(7d)		SP (IPT)	
<b>West</b>							
Benin	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)		SP (IPT)	
Burkina Faso	CQ	CQ	SP	Q(7d)	CQ	SP (IPT)	
Cape Verde	CQ	CQ	SP	Q(7d)		CQ weekly	
Côte d'Ivoire	AQ or SP	AQ or SP	ATB+LUM or AS+MQ	Q(7d)		SP (IPT)	
Gambia	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)		CQ weekly	
Ghana	ASU+AQ*	ASU+AQ*	Q(7d)	Q(7d)	Q or ASU+AQ (2nd & 3rd trim.)	SP (IPT)	
Guinea	CQ	CQ	SP	Q(7d)		SP (IPT)	
Guinea-Bissau	CQ	CQ	SP	Q(7d)		SP (IPT)	
Liberia	ASU+AQ	ASU+AQ	Q(7d)	Q(7d)			
Mali	ATB+LUM*	ATB+LUM*	ASU+SP	Q(7d)	Q(7d)	SP (IPT)	
Mauritania	CQ	CQ	SP	Q(7d)		CQ weekly	
Niger	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)		CQ weekly	
Nigeria	ATB+LUM*	ATB+LUM*	Q(7d)	Q(7d)	ACT (2nd & 3rd trim.)	SP (IPT)	NA
Senegal	AQ+SP	AQ+SP	Q(7d)	Q(7d)		SP (IPT)	
Sierra Leone	ASU+AQ	ASU+AQ	Q(7d)	Q(7d)		CQ weekly	
Togo	CQ	CQ	SP	Q(7d)		SP (IPT)	

Asia Central Asia and Transcaucasia	<i>P. falciparum</i>						<i>P. vivax</i>
	Uncomplicated		Treatment failure	Severe malaria	Pregnancy		
	Unconfirmed	Confirmed			Treatment	Prevention	
Nepal	CQ+PQ	SP+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ
Sri Lanka	CQ+PQ	CQ+PQ	SP+PQ	Q(7d)	CQ or Q		CQ+PQ
Armenia	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
Azerbaijan	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
Georgia	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
Kyrgyzstan	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
Tajikistan	ASU(3d)+SP	ASU(3d)+SP	Q(7d)	Q(7d)	Q		CQ+PQ(14d)
Turkmenistan	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
Uzbekistan	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
<b>Eastern Mediterranean</b>							
Afghanistan	CQ+SP	ASU+SP*	Q(7d)	Q/ATM(7d)/(3d)+SP	Q or ASU+SP (Pf) CQ (Fv)		CQ
Iran (Islamic Republic of)	all confirmed	ASU+SP*	ATB+LUM	Q(7d) or ATM			CQ+PQ(14d)
Iraq	all confirmed						CQ+PQ(14d)
Oman	all confirmed	Q(3d)+SP+PQ(1d)	Q(7d)	Q	Q(7d)		CQ+PQ(14d)
Pakistan	CQ	CQ+PQ(3d)	SP	Q	CQ		CQ+PQ(5d)
Saudi Arabia	all confirmed	CQ	SP	Q			CQ+PQ(14d)
Syrian Arab Republic	all confirmed	SP	Q+D	Q(7d)			CQ+PQ(14d)
Turkey	CQ	CQ+PQ	Q(7d)	Q(7d)	CQ		CQ+PQ(14d)
United Arab Emirates	all confirmed	SP+PQ(3d)	MQ25	Q(7d)			CQ+PQ(14d)
Yemen	CQ	CQ	SP+PQ(1d)	Q+PQ(1d)	CQ		CQ+PQ(14d)
<b>South-East Asia</b>							
Bangladesh	CQ+PQ	ATB+LUM	Q(7d)	Q(7d)	CQ or Q	NA	CQ+PQ(14d)
Bhutan		ATB+LUM*	Q(7d)	ATM inj. (3d) or Q(7d)	Q(1st trim.) ASU(2nd & 3rd trim.)	CQ	CQ
DPR Korea							CQ+PQ
India	CQ ASU(3d)+SP (5 provinces)	CQ+PQ ASU(3d)+SP (5 provinces)	SP	Q(7d)	CQ	CQ	CQ+PQ
Indonesia	CQ+PQ	ASU(3d)+AQ	SP	Q(7d)	CQ	CQ	CQ+PQ(5d)
Maldives		CQ+PQ	MQ+SP	Q(5d)			CQ+PQ
Myanmar	CQ+SP or ASU(3d)+MQ	ATB+LUM or ASU+MQ	Q(7d)+D(7) or ASU(7d)+D(7)	Q(7d)+D(7) or ASU(7d)+D(7)	Q(1st trim.)+CD; ASU+C/D(2nd & 3rd trim.)+C/D	not recommended	CQ+PQ

**Table A.2 Antimalarial drug policy, end 2004**

	<i>P. falciparum</i>						<i>P. vivax</i>
	Uncomplicated		Treatment failure	Severe malaria	Pregnancy		
	Unconfirmed	Confirmed			Treatment	Prevention	
Thailand	NA	MQ (alone) or MQ+ASU(2d)	Q(7d)+T(7d)	ASU or Q	Q(7d)	NA	CQ+PQ
Timor-Leste	CQ+SP	SP	Q(7d)	Q(7d)			CQ+PQ
<b>Western Pacific</b>							
Cambodia	ASU(3d)+MQ	ASU(3d)+MQ	Q(7d)+T(7d)	ATM(IM)+MQ	Q(7d)or ASU+MQ		CQ
China	CQ/ATM(5d)/DHA (Yunnan, Hainan)	ATM/ASU(5d)/DHA (Yunnan, Hainan)	ATM/ASU(7d),Q/PYR (Yunnan, Hainan)	ATM (Yunnan, Hainan) or QC	Q(7d)/CQ (Yunnan, Hainan)		CQ+PQ(8d)
Lao PDR	CQ+SP	CQ+SP or ATB+LUM	Q(7d)+D/T(7d)	Q(7d)+D/T(7d)	Q (P <sup>f</sup> ) and CQ (Pv)	NA	CQ
Malaysia	all confirmed	CQ/SP/CQ+SP(day3) +/- PQ(3d)	Q(7)+T(7) or MQ	Q(7d)	Q(7d)	CQ weekly	CQ+PQ(14d)
Papua New Guinea	CQ / AQ+SP	CQ / AQ+SP	ASU(7d)+SP	ATM(7d)+SP	CQ or Q	CQ	CQ+PQ(14d)* or CQ+SP+PQ
Philippines	CQ+SP+PQ	CQ+SP+PQ	ATB+LUM	Q(7d)+T	CQ+SP	CQ	CQ+PQ(14d)
Republic of Korea							CQ+PQ(14d)
Solomon Islands	CQ or CQ+SP	CQ+SP	Q(3d) + SP	Q(7d)	CQ+SP	CQ	CQ+PQ(14d) or CQ+SP+PQ
Vanuatu	CQ	CQ +SP	Q(7d)	Q(7d)	CQ+SP	CQ	CQ+PQ
Viet Nam	ASU(5d) or CQ	DHA/PPQ/TMP+PQ or ASU(5d)+PQ	DHA/PPQ/TMP+PQ ASU(3d)+MQ25	ASU/ATM or Q	Q(7d) or CQ or ASU	CQ (weekly)	CQ+PQ(5d)
<b>The Americas</b>							
<b>Central America &amp; Caribbean</b>							
Belize							CQ+PQ
Costa Rica							CQ+PQ
Dominican Republic		CQ+ PQ(3d)					
El Salvador							CQ+PQ
Guatemala							CQ+PQ
Haiti		CQ+PQ					
Honduras							CQ+PQ
Mexico							CQ+PQ
Nicaragua							CQ+PQ
Panama							CQ+PQ

South America	<i>P. falciparum</i>				<i>P. vivax</i>	
	Uncomplicated		Treatment failure	Severe malaria		Pregnancy
	Unconfirmed	Confirmed		Treatment		Prevention
Argentina					CQ+PQ	
Bolivia		MQ15+ASU(3d) CQ + PQ	Q(7d) + C(7d) MQ15/25+ASU		CQ+PQ	
Brazil		Q(3d)+D(5d) +PQ(day6) Q(3d)+D(5d)+PQ (Amazon)	MQ15/20+PQ(day2) MQ15/20+PQ (Amazon)	ASU vs ATM or Q	Q (Pf) or CQ (Pv) CQ+PQ(7d)	
Colombia		AQ(3d)+SP+PQ	Q(3d)+C20(5d) MQ(3rd line)		CQ+PQ	
Ecuador		ASU+SP	Q Q(7d)+T/C/D(7d) (3rd line)		CQ+PQ	
French Guiana		Q(7d)+T(7d)			CQ+PQ	
Guyana		ATB+LUM	Q(7d)+T(7d)		CQ+PQ	
Paraguay		CQ+ PQ			CQ+PQ	
Peru		ASU(3d)+MQ (in 1 province) ASU(3d)+SP			CQ+PQ	
Suriname		ATB+LUM	Q(7d)		CQ+PQ	
Venezuela		ASU+MQ	Q(7d)+T/C/D(7d)		CQ	

\* = policy adopted, not presently being deployed, implementation process ongoing



Table A.3 Summary of finances available for malaria control (in US\$ thousands)

## Africa

Source	1996	1997	1998	1999	2000	2001	2002	2003
<b>Central</b>								
Cameroon	-	-	-	-	-	-	-	9 678
Others	-	-	-	-	-	-	-	246
Central African Republic	-	-	-	48	48	46	134	179
Others	-	-	-	38	38	46	261	274
Chad	-	-	-	13	25	-	27	28
Others	-	-	-	-	46	-	-	-
Congo	-	-	-	-	-	369	-	-
Others	-	-	-	-	-	369	-	349
DR Congo	-	-	-	-	-	1 431	-	-
Others	-	-	-	552	315	1 431	2 035	6 269
Equatorial Guinea	-	-	-	-	-	30	-	-
Others	-	-	-	25	25	30	30	40
Gabon	-	-	-	-	-	-	-	-
Sao Tome & Principe	-	-	-	8	19	51	24	39
Others	-	-	-	-	51	51	58	149
<b>East</b>								
Burundi	-	-	-	29	21	1 271	29	30
Others	-	-	-	-	400	1 271	1 043	3 497
Comoros	-	-	-	-	19	43	73	104
Others	-	-	-	41	23	43	17	52
Djibouti	-	56	-	-	-	-	-	-
Others	30	100	-	-	-	-	-	-
Eritrea	-	-	-	50	60	1 652	85	98
Others	-	-	-	1 200	2 048	1 652	1 800	1 316
Ethiopia	-	-	-	-	-	-	3 597	4 971
Others	-	-	-	-	-	-	-	-
Kenya	-	-	-	39	83	-	128	82
Others	-	-	-	-	-	418	917	3 130
Rwanda	-	-	-	256	186	86	275	120
Others	-	-	-	342	205	86	368	926

Source	1996	1997	1998	1999	2000	2001	2002	2003
Somalia								
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	160
Sudan								
National funds	-	-	-	-	500	2 400	3 887	2 600
Others	600	-	-	-	574	1 744	4 670	2 406
Uganda								
National funds	-	-	-	-	385	-	-	-
Others	-	-	-	-	376	-	-	-
UR Tanzania								
National funds	-	-	-	-	200	200	500	500
Others	-	-	590	590	573	1 641	1 566	4 006
<b>North</b>								
Algeria								
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-
Egypt								
National funds	2	2	-	-	-	-	-	-
Others	2	2	-	-	-	6	2	-
Morocco								
National funds	219	157	156	122	94	88	-	350
Others	-	-	-	6	38	4	-	50
<b>Southern</b>								
Angola								
National funds	-	-	-	-	-	1 080	-	-
Others	-	-	-	-	-	1 080	2 130	-
Botswana								
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	432
Madagascar								
National funds	-	-	-	542	2 039	2 401	2 916	5 358
Others	-	-	-	105	387	269	33	1 010
Malawi								
National funds	-	-	-	1 880	3 000	500	6 720	22 238
Others	-	-	-	300	500	500	1 200	1 700
Mauritius								
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	80	80
Mozambique								
National funds	-	-	-	-	-	-	-	256
Others	-	-	-	-	-	-	-	903
Namibia								
National funds	-	-	-	-	-	407	1 570	573
Others	-	-	-	-	-	260	382	366
South Africa								
National funds	-	-	-	7 900	8 000	-	8 200	8 300
Others	-	-	-	-	-	-	60	-
Swaziland								
National funds	-	-	-	-	400	-	420	450
Others	-	-	-	-	-	-	-	-
Zambia								
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-
Zimbabwe								
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-

Table A.3 Summary of finances available for malaria control (in US\$ thousands)

West Africa	Source	1996	1997	1998	1999	2000	2001	2002	2003
Benin	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Burkina Faso	National funds	-	-	-	19	9	56	96	96
	Others	-	-	-	5	450	450	1 055	619
Cape Verde	National funds	-	-	-	-	-	40	-	-
	Others	-	-	-	20	-	40	40	24
Côte d'Ivoire	National funds	-	-	-	417	385	200	252	167
	Others	-	-	-	200	200	200	165	165
Gambia	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Ghana	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Guinea	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Guinea-Bissau	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Liberia	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Mali	National funds	-	-	-	-	-	202	1 007	-
	Others	-	-	-	-	-	-	1 744	-
Mauritania	National funds	-	-	-	25	26	364	124	132
	Others	-	-	-	444	1 140	364	291	1 209
Niger	National funds	-	-	-	-	-	52	-	-
	Others	-	-	-	-	92	52	157	3 832
Nigeria	National funds	-	-	-	3 000	5 000	2 020	4 000	3 530
	Others	-	-	-	320	2 000	2 020	1 850	2 330
Senegal	National funds	-	-	-	138	-	205	45	2 100
	Others	-	-	-	67	249	205	704	1 764
Sierra Leone	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Togo	National funds	-	-	-	30	10	155	13	100
	Others	-	-	-	70	155	155	422	1 210

		1996	1997	1998	1999	2000	2001	2002	2003	
<b>Asia</b> <b>Central Asia</b> <b>and Transcaucasia</b>	Armenia	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	Azerbaijan	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	Georgia	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	Kyrgyzstan	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	Tajikistan	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	Turkmenistan	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	Uzbekistan	-	-	-	-	-	-	-	-	
		Others	-	-	-	-	-	-	-	
	<b>Eastern Mediterranean</b>									
	Afghanistan	National funds	-	-	-	-	-	-	-	-
		Others	-	-	350	-	-	-	-	-
	Iran (Islamic Republic of)	National funds	-	-	-	-	6 500	6 500	6 633	6 206
		Others	-	-	-	-	-	-	45	35
Iraq	National funds	64	72	-	-	60	-	35	-	
	Others	145	72	-	-	30	-	113	175	
Oman	National funds	-	16 905	-	-	6 207	-	-	-	
	Others	-	-	-	-	-	-	-	-	
Pakistan	National funds	5	3	-	-	-	-	-	492	
	Others	75	75	-	38	-	-	-	84	
Saudi Arabia	National funds	-	14 152	14 152	-	14 152	14 152	-	14 133	
	Others	-	45	45	-	-	-	-	-	
Syrian Arab Republic	National funds	5 964	5 899	-	-	-	-	758	-	
	Others	-	-	-	-	-	-	32	-	
Turkey	National funds	-	-	-	-	-	-	-	-	
	Others	-	-	-	-	-	-	-	-	
Yemen	National funds	-	-	-	-	333	2 000	2 000	2 000	
	Others	-	-	-	-	-	-	-	490	

Table A.3 Summary of finances available for malaria control (in US\$ thousands)

South-East Asia	Source	1996	1997	1998	1999	2000	2001	2002	2003
Bangladesh	National funds	120	-	103	97	100	425	287	232
	Others	467	-	308	19	80	229	221	590
Bhutan	National funds	-	-	-	-	-	-	-	-
	Others	67	37	116	155	138	100	21	128
DPR Korea	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	780
India	National funds	40 922	38 107	39 749	58 065	42 690	-	44 160	49 100
	Others	-	1 140	8 483	-	-	-	19 820	23 910
Indonesia	National funds	-	-	-	-	-	-	-	45
	Others	-	-	840	870	1 148	2 784	1 860	153
Myanmar	National funds	3 551	3 561	11 986	4 837	11 703	20 698	20 945	23 041
	Others	1 159	-	371	163	753	585	800	622
Nepal	National funds	-	1 200	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Sri Lanka	National funds	7 742	-	3 328	4 187	3 430	2 750	2 750	1 481
	Others	82	164	1 104	1 007	1 155	358	-	2 874
Thailand	National funds	-	-	-	2 717	18 354	19 578	17 396	18 700
	Others	-	-	-	155	458	4 797	71	117
Timor-Leste	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
<b>Western Pacific</b>									
Cambodia	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
China	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Lao PDR	National funds	-	-	-	101	78	72	334	369
	Others	-	-	-	6 523	3 768	4 309	769	2 387
Malaysia	National funds	-	-	-	-	-	-	-	927
	Others	-	-	-	-	-	-	-	-
Papua New Guinea	National funds	-	-	-	-	-	-	-	1 450
	Others	-	-	-	-	-	-	-	-
Philippines	National funds	-	-	102	360	62	62	62	62
	Others	-	-	-	-	-	-	-	-
Republic of Korea	National funds	-	-	-	-	-	-	-	397
	Others	-	-	-	-	-	-	-	-
Solomon Islands	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	494
Vanuatu	National funds	-	-	-	-	-	-	-	-
	Others	-	-	-	-	-	-	-	-
Viet Nam	National funds	3 756	2 749	3 494	3 271	3 178	6 632	4 129	4 537
	Others	284	273	2 528	2 944	462	-	-	-

## The Americas Central America & Caribbean

Source	1996	1997	1998	1999	2000	2001	2002	2003
Belize	-	-	440	-	-	-	-	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	440	-	-	-	-	-
Costa Rica	-	-	3 597	4 750	3 380	2 500	2 880	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	3 597	4 750	3 380	2 500	2 880	-
Dominican Republic	-	-	1 431	1 496	1 410	1 443	1 221	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	1 431	1 496	1 410	1 443	1 221	-
El Salvador	-	-	4 358	3 000	157	30	5	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	4 358	3 000	157	30	5	-
Guatemala	-	-	1 360	730	703	-	-	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	1 360	730	703	-	-	-
Haiti	-	-	-	-	-	-	-	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	41	-	-	-	-	-
Honduras	-	-	1 859	150	2 598	2 353	81	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	1 859	150	2 598	2 353	81	-
Mexico	-	-	14 118	15 350	17 652	17 157	19 576	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	14 118	15 350	17 652	17 157	19 576	-
Nicaragua	-	-	-	4 102	333	333	333	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	4 102	333	333	333	-
Panama	-	-	5 172	5 162	5 066	4 680	3 987	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	5 172	5 162	5 066	4 680	3 987	-
<b>South America</b>								
Argentina	-	-	-	-	-	-	-	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-
Bolivia	-	-	660	133	846	935	918	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	660	133	846	935	918	-
Brazil	-	-	30 189	30 308	44 767	21 517	21 412	40 696
National funds	-	-	-	-	-	-	-	-
Others	-	-	30 189	30 308	44 767	21 517	21 412	40 696
Colombia	-	-	11 661	9 930	9 950	11 364	11 364	13 050
National funds	-	-	-	-	-	-	-	-
Others	-	-	11 661	9 930	9 950	11 364	11 364	13 050
Ecuador	-	-	573	1 454	-	3 156	3 816	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	573	1 454	-	3 156	3 816	-
French Guiana	-	-	-	-	-	-	-	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	-	-	-	-	-	-
Guyana	-	-	640	772	1 000	800	800	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	640	772	1 000	800	800	-
Paraguay	-	-	7 501	4 338	1 932	1 061	5 412	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	7 501	4 338	1 932	1 061	5 412	-
Peru	-	-	2 927	4 996	1 901	4 110	-	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	2 927	4 996	1 901	4 110	-	-
Suriname	-	-	106	-	66	178	161	161
National funds	-	-	-	-	-	-	-	-
Others	-	-	106	-	66	178	161	161
Venezuela	-	-	1 632	762	5 412	-	2 066	-
National funds	-	-	-	-	-	-	-	-
Others	-	-	1 632	762	5 412	-	2 066	-

**Table A.4 Summary of committed and disbursed malaria funds available from the GFATM  
(in US\$)**

	Approved proposals			Grant agreements and disbursements					
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Angola	3	25 259 000	38 383 000			-			-
Benin	1	2 389 185	2 973 150	✓	20-Mar-03	2 389 185	1	14-Apr-03	341 021
							2	5-Nov-03	897 475
							3	13-Sep-04	350 199
							4	20-Sep-04	728 444
							<b>Total disbursed by proposal:</b>		<b>2 317 139</b>
							as percentage of grant amount:		97.0%
	3	1 383 931	2 145 813	✓	29-Sep-04	1 383 931	1	21-Oct-04	646 754
							<b>Total disbursed by proposal:</b>		<b>646 754</b>
							as percentage of grant amount:		46.7%
Burkina Faso	2	7 499 988	7 499 988	✓	04-Nov-03	7 499 988	1	2-Dec-03	627 513
							2	11-Jun-04	2 298 000
							<b>Total disbursed by proposal:</b>		<b>2 925 513</b>
							as percentage of grant amount:		39.0%
Burundi	2	13 792 126	17 766 125	✓	16-Sep-03	13 792 126	1	30-Oct-03	2 038 647
							2	30-Jul-03	4 631 017
							<b>Total disbursed by proposal:</b>		<b>6 669 664</b>
							as percentage of grant amount:		48.4%
Cameroon	3	16 938 794	32 770 143	✓	10-Sep-04	16 938 794	1	30-Sep-04	1 886 215
							<b>Total disbursed by proposal:</b>		<b>1 886 215</b>
							as percentage of grant amount:		11.1%
Central African Republic	4	10 592 816	17 857 057			-			-
Comores	2	1 534 631	2 485 878	✓	23-Mar-04	1 534 631	1	21-May-04	599 483
							<b>Total disbursed by proposal:</b>		<b>599 483</b>
							as percentage of grant amount:		39.1%
Democratic Republic of the Congo	3	24 966 676	53 936 609	✓	7-Sep-04	24 966 676	1	1-Oct-04	1 441 186
							<b>Total disbursed by proposal:</b>		<b>1 441 186</b>
							as percentage of grant amount:		5.8%

	Approved proposals			Grant agreements and disbursements					
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Eritrea	2	2 617 633	7 911 425	✓	28-Jul-03	2 617 633	1	20-Nov-03	324 063
							<b>Total disbursed by proposal:</b>		<b>324 063</b>
							as percentage of grant amount:		12.4%
Ethiopia	2	37 915 011	76 875 212	✓	01-Aug-03	37 915 011	1	19-Aug-03	17 891 589
							<b>Total disbursed by proposal:</b>		<b>17 891 589</b>
							as percentage of grant amount:		47.2%
Gabon	4	7 419 625	9 892 185	✓	16-Dec-04	7 419 624	1	21-Dec-04	1 224 253
							<b>Total disbursed by proposal:</b>		<b>1 224 253</b>
							as percentage of grant amount:		16.5%
Gambia	3	5 665 500	13 861 866	✓	31-Aug-04	5 665 500	1	4-Oct-04	1 456 473
							<b>Total disbursed by proposal:</b>		<b>1 456 473</b>
							as percentage of grant amount:		25.7%
Ghana	2	4 596 111	9 356 933	✓	03-Jul-03	4 596 111	1	12-Aug-03	886 150
							2	18-Jun-04	1 755 720
							3	5-Nov-04	279 240
							<b>Total disbursed by proposal:</b>		<b>2 921 110</b>
							as percentage of grant amount:		63.6%
	4	18 561 367	38 887 781			-			-
Guinea	2	6 893 509	8 798 945	✓	04-Aug-03	6 893 509	1	12-Dec-03	177 112
							1.1	27-Apr-04	424 233
							1.2	22-Sep-04	796 750
							<b>Total disbursed by proposal:</b>		<b>1 398 095</b>
							as percentage of grant amount:		20.3%
Guinea-Bissau	4	1 885 791	4 177 512	✓	24-Nov-04	1 885 791	1	12-Dec-04	192 906
							<b>Total disbursed by proposal:</b>		<b>192 906</b>
							as percentage of grant amount:		10.2%
Kenya	2	10 526 880	33 586 810	✓	23-Jun-03	10 526 880	1	27-Aug-03	940 541
							2	17-Dec-04	3 699 906
							<b>Total disbursed by proposal:</b>		<b>4 640 447</b>
							as percentage of grant amount:		44.1%
	4	81 972 711	186 319 508			-			-
Liberia	3	12 140 921	12 140 921	✓	23-Jun-04	12 140 921	1	19-Nov-04	2 205 185
							1.1	21-Dec-04	592 389
							<b>Total disbursed by proposal:</b>		<b>2 797 574</b>
							as percentage of grant amount:		23.0%



Table A.4 Summary of committed and disbursed malaria funds available from the GFATM (in US\$)

	Approved proposals				Grant agreements and disbursements				
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Madagascar	1	1 482 576	2 000 064	✓	05-Feb-03	1 482 576	1	12-Mar-03	591 931
							2	4-Dec-03	141 691
							3	21-May-04	208 663
							4	21-Jun-04	540 291
							5	26-Oct-04	267 723
						<b>Total disbursed by proposal:</b>		<b>1 750 299</b>	<b>118.1%</b>
						as percentage of grant amount:		as percentage of grant amount:	
3		5 232 448	10 400 722	✓	27-Sep-04	5 232 488	1	10-Nov-04	2 708 913
							1.1	21-Dec-04	55 865
						<b>Total disbursed by proposal:</b>		<b>2 764 778</b>	<b>52.8%</b>
						as percentage of grant amount:		as percentage of grant amount:	
4		19 304 060	41 527 527			-			-
Malawi		20 872 000	39 688 000			-			-
Mali	1	2 023 424	2 592 991	✓	25-Aug-03	2 023 424	1	11-Nov-03	678 620
							2	8-Nov-04	266 500
						<b>Total disbursed by proposal:</b>		<b>945 120</b>	<b>46.7%</b>
						as percentage of grant amount:		as percentage of grant amount:	
Mauritania	2	824 044	2 899 074	✓	22-Mar-04	824 044	1	31-Mar-04	50 578
							1.1	2-Jun-04	290 000
							2	2-Nov-04	92 167
						<b>Total disbursed by proposal:</b>		<b>432 745</b>	<b>52.5%</b>
						as percentage of grant amount:		as percentage of grant amount:	
Mozambique	2	12 217 393	28 205 783	✓	02-Apr-04	12 217 393	1	21-Dec-04	6 653 718
							<b>Total disbursed by proposal:</b>		<b>6 653 718</b>
						as percentage of grant amount:		as percentage of grant amount:	
Multicountry Africa (RMCC: includes Mozambique, South Africa and Swaziland)	2	7 090 318	22 387 532	✓	18-Jun-03	7 090 318	1	15-Jul-03	2 160 782
							2	7-Apr-04	391 891
							3	21-Jul-04	507 528
							4	4-Oct-04	1 240 118
							5	17-Dec-04	697 182
						<b>Total disbursed by proposal:</b>		<b>4 997 501</b>	<b>70.5%</b>
						as percentage of grant amount:		as percentage of grant amount:	
Namibia	2	3 719 354	6 304 577	✓	23-Nov-04	3 719 354	1	17-Dec-04	349 654
							<b>Total disbursed by proposal:</b>		<b>349 654</b>
						as percentage of grant amount:		as percentage of grant amount:	
									<b>9.4%</b>

	Approved proposals				Grant agreements and disbursements				
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Niger	3	4 815 109	5 886 835	✓	25-Aug-04	4 815 109	1	15-Sep-04	475 896
							2	23-Dec-04	2 407 044
							<b>Total disbursed by proposal:</b>		<b>2 882 940</b>
							as percentage of grant amount:		59.9%
Nigeria	2	20 994 149	44 314 691	✓	22-Oct-04	20 994 149	1	12-Nov-04	4 582 319
							<b>Total disbursed by proposal:</b>		<b>4 582 319</b>
							as percentage of grant amount:		21.8%
	4	20 467 000	86 122 000	✓	03-Dec-04	20 467 000	1	21-Dec-04	4 268 800
							<b>Total disbursed by proposal:</b>		<b>4 268 800</b>
							as percentage of grant amount:		20.9%
Rwanda	3	13 045 293	17 676 240	✓	30-Jun-04	13 045 293	1	23-Sep-04	7 428 843
							<b>Total disbursed by proposal:</b>		<b>7 428 843</b>
							as percentage of grant amount:		56.9%
Sao Tome and Principe	4	1 941 359	3 484 859			-			-
Senegal	1	4 285 714	7 142 857	✓	10-Feb-03	4 285 714	1	28-Feb-03	350 000
							1.1	11-Nov-03	150 000
							2	18-Aug-04	1 026 770
							<b>Total disbursed by proposal:</b>		<b>1 526 770</b>
							as percentage of grant amount:		35.6%
Sierra Leone	4	23 745 283	33 871 668			-			-
	4	12 096 834	18 805 137			-			-
Somalia	2	8 890 497	12 886 413	✓	23-Jun-04	8 890 497	1	24-Jun-04	4 682 032
							<b>Total disbursed by proposal:</b>		<b>4 682 032</b>
							as percentage of grant amount:		52.7%
Sudan	2	14 237 853	33 240 453			-			-
		12 855 490	27 827 045	✓	24-Aug-04	12 855 490	1	22-Sep-04	4 903 414
							<b>Total disbursed by proposal:</b>		<b>4 903 414</b>
							as percentage of grant amount:		38.1%
Swaziland	2	978 000	1 864 500	✓	18-Jun-03	978 000	1	30-Jul-03	208 000
							1.1	20-Aug-03	175 000
							2	6-Jan-05	231 500
							<b>Total disbursed by proposal:</b>		<b>614 500</b>
							as percentage of grant amount:		62.8%

Table A.4 Summary of committed and disbursed malaria funds available from the GFATM (in US\$)

	Approved proposals			Grant agreements and disbursements					
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Togo	3	3 479 336	5 885 906	3	09-Mar-04	3 479 336	1 1.1	13-May-04 21-Dec-04	886 489 1 259 782
							<b>Total disbursed by proposal:</b>		<b>2 146 271</b>
							as percentage of grant amount:		61.7%
Uganda	4	6 374 288	11 003 235	-		-			-
	2	23 211 300	35 783 000	3	27-Feb-04	23 211 300	1 2 3	18-Mar-04 1-Oct-04 21-Dec-04	3 858 041 3 242 129 2 649 188
							<b>Total disbursed by proposal:</b>		<b>9 749 358</b>
							as percentage of grant amount:		42.0%
United Republic of Tanzania	4	66 432 148	158 047 079	-		-			-
	1	11 959 076	19 827 716	3	11-Dec-02	11 959 076	1 2 3	4-Feb-03 23-Jul-04 2-Nov-04	489 478 2 406 507 2 667 866
							<b>Total disbursed by proposal:</b>		<b>5 563 851</b>
							as percentage of grant amount:		46.5%
	4	54 201 787	90 468 963	-		-			-
		5 089 361	9 586 972	3	23-Nov-04	5 089 361	1	21-Dec-04	2 792 077
							<b>Total disbursed by proposal:</b>		<b>2 792 077</b>
							as percentage of grant amount:		54.9%
United Republic of Tanzania, Zanzibar	1	781 220	1 153 080	3	06-Mar-03	781 220	1 1	24-Apr-03 26-May-04	162 700 618 520
							<b>Total disbursed by proposal:</b>		<b>781 220</b>
							as percentage of grant amount:		100.0%
Zambia	-	-	-	3	02-Sep-03	852 600	1 2	10-Oct-03 21-May-04	254 430 237 294
	-	-	-	3	02-Sep-03	852 600	3 4	1-Nov-04 17-Dec-04	131 664 90 423
							<b>Total disbursed by proposal:</b>		<b>713 811</b>
							as percentage of grant amount:		83.7%
	1	17 891 800	39 274 000	3	15-Aug-03	17 039 200	1 2 3	21-Jul-03 7-Jun-04 21-Dec-04	1 692 382 9 169 983 2 270 152
							<b>Total disbursed by proposal:</b>		<b>13 132 517</b>
							as percentage of grant amount:		77.1%
	4	20 279 950	43 495 950	-		-			-

	Approved proposals			Grant agreements and disbursements					
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Zimbabwe	1	6 716 250	8 877 500	3	05-Feb-03	6 716 250	1	1-May-03	1 415 000
							<b>Total disbursed by proposal:</b>		<b>1 415 000</b>
							as percentage of grant amount:		21.1%
							<b>Total disbursed for Africa</b>		<b>134 410 002</b>
							as percentage of total grant amount:		
<b>Asia</b>									
Afghanistan	2	3 125 605	3 125 605	3	25-Oct-04	3 125 605	1	19-Nov-04	1 687 514
							<b>Total disbursed by proposal:</b>		<b>1 687 514</b>
							as percentage of grant amount:		54.0%
Bhutan	4	1 000 957	1 737 190	3	07-Jan-05	1 000 957			-
							<b>Total disbursed by proposal:</b>		<b>0</b>
							as percentage of grant amount:		0.0%
Cambodia	2	5 013 262	9 998 371	3	14-Oct-03	5 013 262	1	12-Dec-03	1 952 490
							2	11-Jun-04	355 567
							3	21-Oct-04	150 633
							4	12-Jan-05	321 299
							<b>Total disbursed by proposal:</b>		<b>2 779 989</b>
							as percentage of grant amount:		55.5%
China	4	5 221 242	9 870 565			-			-
	1	3 523 662	6 406 659	3	30-Jan-03	3 523 662	1	10-Apr-03	542 800
							1.1	27-Jun-03	135 700
							2	24-Nov-03	908 345
							3	23-Dec-03	321 350
							4	10-May-04	729 114
							5	21-Jun-04	525 903
							6	17-Dec-04	360 450
							<b>Total disbursed by proposal:</b>		<b>3 523 662</b>
							as percentage of grant amount:		100.0%
DPR Korea	3	3 227 300	8 548 200			-			-
Georgia	3	645 700	806 300	3	29-Apr-04	645 700	1	11-Jun-04	360 950
							<b>Total disbursed by proposal:</b>		<b>360 950</b>
							as percentage of grant amount:		55.9%
India	4	30 167 781	69 053 902			-			-

Table A.4 Summary of committed and disbursed malaria funds available from the GFATM (in US\$)

	Approved proposals			Grant agreements and disbursements					
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
Indonesia	1	8 254 947	23 704 947	✓	11-Jun-03	8 254 947	1	8-Jul-03	1 435 987
							2	12-Mar-04	4 556 562
							<b>Total disbursed by proposal:</b>		<b>5 992 549</b>
							as percentage of grant amount:		72.6%
Lao People's Democratic Republic	1	3 155 152	12 709 087	✓	05-Feb-03	3 155 152	1	2-May-03	259 691
							2	18-Nov-03	938 535
							3	13-May-04	1 069 544
							4	15-Dec-04	200 000
							<b>Total disbursed by proposal:</b>		<b>2 467 770</b>
							as percentage of grant amount:		78.2%
	4	3 292 689	14 515 720			-			-
Multicountry Western Pacific (includes Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Niue, Palau, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu)	2	2 416 850	4 897 650	✓	27-Jun-03	2 416 850	1	30-Jul-03	295 500
							1.1	18-Nov-03	646 000
							2	4-Jun-04	798 320
							3	22-Dec-04	477 668
							<b>Total disbursed by proposal:</b>		<b>2 217 488</b>
							as percentage of grant amount:		91.8%
Myanmar	3	9 462 062	27 050 046			-			-
Nepal	2	2 622 929	7 624 668	✓	13-Aug-03	2 622 929	1	23-Dec-03	116 583
							2	21-Dec-04	528 075
							<b>Total disbursed by proposal:</b>		<b>644 658</b>
							as percentage of grant amount:		24.6%
Pakistan	2	4 407 000	7 719 800	✓	06-Aug-03	4 407 000	1	19-Dec-03	650 462
							2	12-Nov-04	813 700
							<b>Total disbursed by proposal:</b>		<b>1 464 162</b>
							as percentage of grant amount:		33.2%
	3	1 548 636	1 548 636	✓	12-Oct-04	1 548 636	1	24-Nov-04	454 800
							<b>Total disbursed by proposal:</b>		<b>454 800</b>
							as percentage of grant amount:		29.4%
Papua New Guinea	3	6 106 557	20 105 689	✓	07-Jul-04	6 106 557	1	9-Aug-04	2 185 723
							<b>Total disbursed by proposal:</b>		<b>2 185 723</b>
							as percentage of grant amount:		35.8%

Round	Approved proposals			Grant agreements and disbursements					
	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount	
Philippines	2	7 244 762	11 829 545	3	11-Jun-03	7 244 762	1	30-Jun-03	1 115 843
							1.1	10-Sep-03	1 115 843
	2	7 244 762	11 829 545	3	11-Jun-03	7 244 762	2	26-Mar-04	1 402 744
							3	15-Jul-04	1 089 582
							4	12-Nov-04	1 177 337
							<b>Total disbursed by proposal:</b>		<b>5 901 349</b>
							as percentage of grant amount:		81.5%
Sri Lanka	-	-	-	3	19-Dec-02	4 467 480	1	11-Feb-03	752 893
							2	23-Jul-03	265 398
							3	18-Dec-03	1 204 359
							4	30-Jul-04	1 457 512
							<b>Total disbursed by proposal:</b>		<b>3 680 162</b>
							as percentage of grant amount:		82.4%
1	5 197 620	8 345 200	3	19-Dec-02	730 140	1	11-Feb-03	176 573	
							2	17-Sep-04	248 986
							<b>Total disbursed by proposal:</b>		<b>425 559</b>
							as percentage of grant amount:		58.3%
4	2 203 520	3 781 268	-	-	-	-	-	-	
2	2 280 000	5 282 000	3	15-Oct-03	2 280 000	1	20-Feb-04	660 000	
							<b>Total disbursed by proposal:</b>		<b>660 000</b>
							as percentage of grant amount:		28.9%
2	2 300 744	2 963 723	3	25-Jun-03	2 300 744	1	17-Jul-03	230 964	
							2	23-Dec-03	150 000
							2.1	16-Feb-04	309 419
							3	13-Jul-04	100 000
							4	12-Nov-04	50 000
							5	15-Dec-04	524 067
							<b>Total disbursed by proposal:</b>		<b>1 364 450</b>
							as percentage of grant amount:		59.3%
4	1 343 466	2 482 572	-	-	-	-	-	-	
3	13 388 402	22 787 909	3	24-Aug-04	13 388 402	1	21-Dec-04	3 218 217	
							<b>Total disbursed by proposal:</b>		<b>3 218 217</b>
							as percentage of grant amount:		24.0%
2	4 159 632	11 878 206	3	30-Sep-03	4 159 632	1	4-Dec-03	200 000	
							2	21-Dec-04	1 461 532
							<b>Total disbursed by proposal:</b>		<b>1 661 532</b>
							as percentage of grant amount:		39.9%
<b>Total disbursed for Asia</b>									<b>40 690 534</b>
as percentage of total grant amount:									

Table A.4 Summary of committed and disbursed malaria funds available from the GFATM (in US\$)

	Approved proposals			Grant agreements and disbursements					
	Round	Total 2-year budgets	Total lifetime budgets	Signed	Grant signature date	Grant amount	Disbursement number	Disbursement date	Disbursement amount
<b>The Americas</b>									
Bolivia	3	6 099 563	10 176 979	3	05-Jul-04	6 099 563	1	15-Jul-04	780 367
							<b>Total disbursed by proposal:</b>	<b>15-Jul-04</b>	<b>780 367</b>
							as percentage of grant amount:		12.8%
Guatemala	4	9 713 853	14 216 920	-	-	-			-
Guyana	3	2 055 675	2 924 675	3	1-Oct-2004	2 055 675	1	6-Jan-05	812 371
							<b>Total disbursed by proposal:</b>		<b>812 371</b>
							as percentage of grant amount:		39.5%
Haiti	3	7 390 556	14 856 557	3	25-Jun-04	7 390 556	1	21-Jul-04	26 437 720
							<b>Total disbursed by proposal:</b>		<b>26 437 720</b>
							as percentage of grant amount:		357.7%
Honduras	-	-	-	3	17-Feb-03	4 096 050	1	2-Apr-03	379 889
							1.1	28-May-03	6 000
							2	27-Nov-03	53 507
							3	13-May-04	1 271 983
							4	23-Dec-04	1 331 730
							<b>Total disbursed by proposal:</b>		<b>3 043 109</b>
							as percentage of grant amount:		74.3%
	1	20 470 016	41 119 903	3	17-Feb-03	12 583 466			-
							<b>Total disbursed by proposal:</b>		<b>0</b>
							as percentage of grant amount:		0.0%
Multicountry Americas (Andean: includes Colombia, Ecuador, Peru and Venezuela)	3	15 909 000	26 483 000	-	-	-			-
Nicaragua	2	3 404 671	5 613 132	3	07-Oct-03	3 404 671	1	10-Oct-03	89 601
							1.1	18-Jun-04	531 531
							2	10-Mar-04	350 325
							3	3-Aug-04	1 017 897
							<b>Total disbursed by proposal:</b>		<b>1 989 354</b>
							as percentage of grant amount:		58.4%
Suriname	4	3 043 500	4 997 500	3	14-Dec-04	2 963 950	1	6-Jan-05	1 084 850
							<b>Total disbursed by proposal:</b>		<b>1 084 850</b>
							as percentage of grant amount:		36.6%
							<b>Total disbursed for The Americas</b>		<b>34 147 771</b>
							as percentage of total grant amount:		

Figures are updated as of 13 January 2005.

Table A.5 Summary of malaria-related service delivery

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Africa</b>												
<b>Central</b>												
Cameroon	No. nets sold or distributed	-	-	-	-	-	-	-	-	-	12 930	105 233
	No. nets (re-)treated	-	-	-	-	-	-	-	-	-	-	1 142
CAR	No. nets sold or distributed	-	-	-	-	-	-	-	-	5 050	5 250	7 500
	No. nets (re-)treated	-	-	-	-	-	-	-	-	5 050	5 250	7 500
Chad	No. nets sold or distributed	-	-	-	2 000	-	-	-	2 000	1 000	5 100	49 000
	No. nets (re-)treated	215	-	-	2 083	-	-	215	2 083	1 381	50 943	94 118
Congo	No. nets sold or distributed	-	-	-	-	-	-	-	-	1 000	2 000	4 250
	No. nets (re-)treated	-	-	-	-	-	-	-	-	500	800	1 000
DR Congo	No. nets sold or distributed	50 600	-	-	6 000	-	-	50 600	6 000	119 186	53 000	365 100
	No. nets (re-)treated	-	-	-	-	-	-	-	-	-	4 092	12 223
Equatorial Guinea	No. nets sold or distributed	-	-	-	-	-	-	-	-	16 000	14 000	16 000
Sao Tome & Principe	No. nets sold or distributed	-	-	-	-	-	-	-	-	4 840	6 393	7 864
	No. nets (re-)treated	-	-	-	-	-	-	-	-	284	913	1 110
<b>East</b>												
Burundi	No. nets sold or distributed	-	-	-	-	-	-	-	-	-	-	210 000
	No. nets (re-)treated	-	-	-	-	-	-	-	-	-	-	17 000
Comoros	No. nets sold or distributed	828	-	-	5 100	-	-	828	5 100	2 500	25 000	6 800
Djibouti	No. nets sold or distributed	-	-	-	1 500	-	-	-	1 500	-	-	-
Eritrea	No. nets sold or distributed	51 517	-	-	97 324	-	-	51 517	97 324	67 708	276 038	187 709
	No. nets (re-)treated	12 711	-	-	20 437	-	-	12 711	20 437	110 371	227 750	497 117
	No. HHs/units sprayed	125 498	-	-	39 838	-	-	125 498	39 838	76 754	56 336	86 574
Ethiopia	No. nets sold or distributed	-	-	-	-	-	-	-	-	237 000	378 900	331 900
	No. nets (re-)treated	-	-	-	-	-	-	-	-	52 800	2 300	93 200
	No. HHs/units sprayed	-	-	-	-	-	-	-	-	877 761	1 105 833	1 131 950
Kenya	No. nets sold or distributed	-	-	-	32 300	-	-	-	32 300	267 200	200 000	684 850
	No. nets (re-)treated	-	-	-	32 300	-	-	-	32 300	267 200	200 000	418 500
Rwanda	No. nets sold or distributed	70 430	-	-	70 870	-	-	70 430	70 870	115 309	88 010	269 210
	No. nets (re-)treated	75 015	-	-	78 650	-	-	75 015	78 650	86 093	106 197	391 161
	No. HHs/units sprayed	-	-	-	19 000	-	-	-	19 000	14 000	14 000	14 000
Somalia	No. nets sold or distributed	-	-	-	-	-	-	-	-	-	80 839	55 839



Table A.5 Summary of malaria-related service delivery

Indicator	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Sudan											
No. nets sold or distributed	-	-	-	-	-	-	-	-	200 000	108 090	211 520
No. nets (re-)treated	-	-	-	-	-	-	-	-	-	800	2 000
No. HHS/units sprayed							45 000	46 000	50 000	268 000	263 000
Uganda											
No. nets sold or distributed				100 000			80 000	100 000	250 000	280 295	467 081
No. retreatment kits distributed				58 000			35 000	58 000	130 000	130 412	158 997
No. nets (re-)treated				-			-	-	-	65 315	74 079
No. HHS/units sprayed				6 105			-	6 105	17 642	12 533	9 619
UR Tanzania											
No. nets sold or distributed				63 556			138 498	63 556	103 522	640 039	1 466 181
No. nets (re-)treated				242 242			206 706	242 242	431 414	978 194	1 580 748
<b>Southern</b>											
Angola											
No. nets (re-)treated	-	-	-	120 086			-	120 086	157 752	431 280	364 940
No. HHS/units sprayed	-	-	-	-			-	-	-	4 000	-
Botswana											
No. nets sold or distributed	-	-	-	-			-	-	-	6 500	60 200
No. nets (re-)treated	-	-	-	-			-	-	-	-	35
Madagascar											
No. nets sold or distributed	11 100	11 100	11 100	11 100	11 100	11 100	11 100	11 100	134 971	123 871	148 871
No. HHS/units sprayed	-	-	-	213 847			-	213 847	60 232	-	111 096
Malawi											
No. nets sold or distributed	-	-	-	41 835			3 530	41 835	46 062	149 065	1 052 418
No. nets (re-)treated	-	-	-	-			-	-	-	24 000	726 000
Mauritius											
No. nets sold or distributed	-	-	-	-			-	-	-	-	-
No. nets (re-)treated	-	-	-	-			-	-	-	-	-
No. HHS/units sprayed	-	-	-	-			-	-	306	643	-
Mozambique											
No. nets sold or distributed	-	-	-	219 344			-	219 344	104 277	130 326	205 993
No. nets (re-)treated	-	-	-	548			-	548	211 652	253 323	73 000
No. HHS/units sprayed	-	-	-	584 830			498 530	584 830	466 520	499 126	732 889
Namibia											
No. nets sold or distributed	-	-	-	-			-	-	1 000	18 000	-
No. nets (re-)treated	-	-	-	-			-	-	-	3 600	22 000
No. HHS/units sprayed	-	-	-	95 775			-	95 775	422 498	490 491	498 132
South Africa											
No. nets sold or distributed	3 200			-			-	-	10 000	20 000	60 000
No. HHS/units sprayed	-	-	-	1 000 000			1 000 000	1 000 000	1 000 000	1 000 000	1 000 000
Swaziland											
No. nets sold or distributed	-	-	-	-			-	-	-	-	1 200
No. HHS/units sprayed	-	-	-	74 279			-	74 279	75 111	78 080	89 322
Zambia											
No. nets sold or distributed	-	-	-	115 891			36 000	115 891	260 881	378 090	272 462
No. nets (re-)treated	-	-	-	38 064			36 000	38 064	100 188	145 509	290 000
No. HHS/units sprayed	-	-	-	31 463			-	31 463	32 000	32 100	61 300
Zimbabwe											
No. nets sold or distributed	-	-	-	-			-	-	72 000	-	90 000
No. nets (re-)treated	-	-	-	-			-	-	-	-	72 000
No. HHS/units sprayed	-	-	-	916 000			916 000	845 256	-	978 125	545 500

West	Indicator	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Burkina Faso	No. nets sold or distributed							21 374	14 988	5 396	28 252	41 515
	No. nets (re-)treated							1 199	2 036	2 667	7 271	3 919
Côte d'Ivoire	No. nets sold or distributed							-	-	9 266	11 204	-
	No. nets (re-)treated							-	-	3 508	6 401	-
Ghana	No. nets sold or distributed							15 000	-	-	60 000	85 030
	No. nets (re-)treated							-	-	-	-	-
Guinea-Bissau	No. nets sold or distributed							-	40 000	-	4 000	189 000
	No. nets (re-)treated							-	-	-	-	-
Mali	No. nets sold or distributed							-	-	64 000	189 000	439 897
	No. nets sold or distributed							5 830	13 432	9 001	989	30 893
Mauritania	No. nets (re-)treated							-	-	-	-	-
	No. nets sold or distributed							-	-	-	-	-
Niger	No. nets sold or distributed							-	2 600	34 353	36 127	121 000
	No. nets (re-)treated							-	10 000	29 200	25 000	36 000
Nigeria	No. nets sold or distributed							30 000	70 000	145 000	1 161 925	1 535 718
	No. nets (re-)treated							384 286	-	-	900 000	1 400 000
Senegal	No. nets sold or distributed							-	-	-	-	881 000
	No. nets (re-)treated							-	-	-	-	72 700
Togo	No. HHs/units sprayed							68 736	41 620	-	92 898	-
	No. nets sold or distributed							6 272	10 789	13 500	30 613	85 000
	No. nets (re-)treated							421	1 172	1 312	567	879
<b>Asia</b>												
<b>Eastern Mediterranean</b>												
Afghanistan	No. nets sold or distributed							59 324	74 218	49 735	-	145 375
	No. nets (re-)treated							-	58 374	61 190	-	42 154
Iran (Islamic Republic of)	No. nets sold or distributed							-	-	-	-	15 000
	No. HHs/units sprayed							-	-	140 561	111 456	144 000
Iraq	No. HHs/units sprayed							64 698	46 621	38 566	18 894	21 730
	No. nets sold or distributed							-	-	-	-	350 000
Saudi Arabia	No. HHs/units sprayed							-	-	-	-	44 619
	No. nets sold or distributed							-	-	-	3 850	16 369
Yemen	No. nets sold or distributed							-	-	600	12 835	14 152
	No. HHs/units sprayed							-	-	-	-	-
<b>South-East Asia</b>												
Bangladesh	No. nets sold or distributed							15 272	11 207	9 274	10 534	130 512
	No. HHs/units sprayed							-	-	-	-	4 000
Bhutan	No. nets sold or distributed							-	-	1 466	2 546	7 213
	No. nets (re-)treated							25 832	32 632	31 568	35 374	38 906

Table A.5 Summary of malaria-related service delivery

Indicator	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
DPR Korea			-	-	-	-	-	-	-	-	90 360
No. nets (re-)treated			-	-	-	-	-	-	-	-	394 000
India			-	150 000	-	-	-	-	-	600 000	1 500 000
No. nets sold or distributed			61 966	96 775	-	114 800	-	-	-	15 000	-
Indonesia			2 442	1 558	500	-	-	38 535	34 964	62 500	49 000
No. nets sold or distributed			-	4 300	4 750	4 800	4 800	53 335	98 299	160 799	213 683
Myanmar			17 617	52 255	22 008	20 443	29 256	27 803	20 417	12 439	6 454
No. HHS/units sprayed			-	-	-	-	-	-	-	-	-
Nepal			-	-	-	-	-	-	-	62 742	-
No. nets sold or distributed			-	-	-	-	-	-	-	-	-
No. HHS/units sprayed			-	-	-	-	-	-	-	100 000	5 000
Sri Lanka			-	-	-	9 000	8 532	49 150	-	-	618 865
No. nets sold or distributed			-	-	-	-	-	-	-	-	-
No. HHS/units sprayed			-	20 000	20 000	-	200 000	603 943	-	-	32 780
Thailand			-	-	-	705 242	594 723	671 771	706 545	966 542	258 724
No. nets sold or distributed			-	-	-	135 865	250 270	238 323	224 704	300 668	277 602
No. nets (re-)treated			-	-	-	-	-	-	-	-	-
No. HHS/units sprayed			-	-	-	-	-	-	-	-	4 000
Timor-Leste			-	-	-	-	-	-	-	-	-
No. nets sold or distributed			-	-	-	-	-	-	-	-	-
No. HHS/units sprayed			-	-	-	-	-	-	-	-	-
<b>Western Pacific</b>											
Cambodia			-	-	-	-	-	296 337	130 726	131 673	127 035
No. nets sold or distributed			-	-	-	-	-	48 013	68 230	115 163	83 688
No. nets (re-)treated			20 000	-	-	-	185 556	-	-	-	-
China			-	-	-	-	40 231	5 267 614	558 945	-	-
No. nets (re-)treated			5 703	-	-	-	-	354 097	836 303	400 981	889 480
Lao PDR			-	-	-	-	-	-	-	-	-
No. nets (re-)treated			-	-	-	-	-	-	-	-	-
Malaysia			25 469	-	-	-	431 648	-	-	232 005	255 911
No. nets sold or distributed			-	-	-	-	-	-	-	-	-
No. nets (re-)treated			-	-	-	-	-	-	-	-	-
No. HHS/units sprayed			187 750	-	272 765	-	38 800	-	-	-	-
Papua New Guinea			-	-	-	-	-	-	-	-	-
No. nets (re-)treated			-	-	-	-	-	-	-	-	-
Philippines			150 034	-	259 935	-	402 067	368 077	276 149	240 901	225 000
No. nets sold or distributed			-	-	-	-	-	-	-	-	-
No. nets (re-)treated			-	-	-	-	-	-	-	-	-
Republic of Korea			-	-	209 558	-	-	-	39 094	-	18 693
No. nets (re-)treated			-	-	-	-	121 101	82 697	60 266	79 848	57 981
Solomon Islands			-	16 239	2 926	3 649	3 755	16 199	690	1 640	3 621
No. nets sold or distributed			-	18 990	7 338	19 774	12 933	10 322	3 590	-	11 922
No. nets (re-)treated			-	-	-	-	-	-	-	-	-
No. HHS/units sprayed			2 893 886	4 043 216	2 830 974	2 637 915	2 873 831	1 984 018	2 883 297	2 080 180	2 746 657
Viet Nam			-	3 068 709	-	-	11 007 770	10 007 707	10 920 217	10 101 814	10 047 593
No. nets (re-)treated			2 747 631	3 081 218	2 747 631	2 637 915	2 873 831	1 984 018	2 883 297	2 080 180	2 746 657
No. HHS/units sprayed			1 161	804	651	560	262	270	200	155	110
<b>The Americas</b>											
<b>Central America &amp; Caribbean</b>											
Mexico			1 473	1 332	1 161	804	262	270	200	155	110
No. HHS/units sprayed											

## The Americas

## Central America &amp; Caribbean

Mexico No. HHS/units sprayed 1 473 1 332 1 161 804 651 560 262 270 200 155 110

**Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure**

Africa	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Angola</b>							
Chloroquine	2002	6	41.8	8.2	54.1	14.8	52.1
Sulfadoxine–pyrimethamine	2002–2003	8	5.7	0.0	28.2	2.7	8.8
Amodiaquine	2002–2003	2	8.7	3.9	13.4	3.9	13.4
Artesunate+amodiaquine	2003	1	0.0				
Artesunate+sulfadoxine–pyrimethamine	2003	1	1.2				
<b>Benin</b>							
Chloroquine	1998–2002	14	19.4	3.4	47.6	14.1	23.2
Sulfadoxine–pyrimethamine	2002	5	9.5	1.6	17.2	4.8	16.8
<b>Botswana</b>							
Chloroquine	1997–2000	6	24.4	20.7	44.0	20.7	44.0
<b>Burkina Faso</b>							
Chloroquine	1996–2003	24	12.0	5.3	35.5	10.0	21.7
Sulfadoxine–pyrimethamine	1998–2003	9	0.8	0.0	6.3	0.0	4.3
Amodiaquine	1996	1	4.4				
<b>Burundi</b>							
Chloroquine	2001	4	69.2	52.4	73.7	58.9	73.4
Sulfadoxine–pyrimethamine	2001	4	30.8	10.9	52.8	20.2	42.4
Artemether–lumefantrine	2001	2	0.0	0.0	0.0	0.0	0.0
Artesunate+amodiaquine	2001	2	1.3	0.0	2.6	0.0	2.6
<b>Cameroon</b>							
Chloroquine	1994–2001	12	33.0	2.0	66.6	15.9	58.2
Sulfadoxine–pyrimethamine	1997–2003	8	9.0	0.0	14.1	6.7	11.0
Amodiaquine	1997–2003	9	1.6	0.0	5.3	0.0	3.2
Amodiaquine+sulfadoxine–pyrimethamine	2001–2003	4	0.0	0.0	0.0	0.0	0.0
<b>Central African Republic</b>							
Chloroquine	1997–1998	5	20.8	19.0	57.1	19.3	39.6
<b>Chad</b>							
Chloroquine	1999–2003	3	21.5	14.2	67.4	14.2	67.4
Sulfadoxine–pyrimethamine	2002–2003	2	11.7	4.0	19.4	4.0	19.4
Amodiaquine	2002–2003	2	3.4	1.9	4.9	1.9	4.9
<b>Comoros</b>							
Chloroquine	1997–2001	9	57.1	31.2	75.0	42.4	67.3
Sulfadoxine–pyrimethamine	2004	2	1.5	0.0	3.0	0.0	3.0
Chloroquine+sulfadoxine–pyrimethamine	2003	3	0.0	0.0	2.6	0.0	2.6
Artemether–lumefantrine	2004	3	0.0	0.0	1.8	0.0	1.8
Artesunate+amodiaquine	2003	3	0.0	0.0	0.0	0.0	0.0
Artesunate+sulfadoxine–pyrimethamine	2003	3	0.0	0.0	3.6	0.0	3.6
<b>Congo</b>							
Chloroquine	1999–2001	2	44.0	38.0	50.0	38.0	50.0
Sulfadoxine–pyrimethamine	1999–2002	3	0.0	0.0	9.5	0.0	9.5
<b>Côte d'Ivoire</b>							
Chloroquine	1997–2002	26	16.4	1.8	43.1	11.4	19.3
Sulfadoxine–pyrimethamine	1999	2	14.8	5.9	23.6	5.9	23.6

**Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure**

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Democratic Republic of the Congo</b>							
Chloroquine	2000–2001	7	48.0	29.4	80.0	34.0	50.0
Sulfadoxine–pyrimethamine	2000–2004	12	9.3	0.0	30.2	4.4	18.3
Amodiaquine+sulfadoxine–pyrimethamine	2002–2004	5	1.7	0.0	6.0	0.7	4.4
Artesunate+amodiaquine	2003–2004	3	0.0	0.0	1.4	0.0	1.4
Artesunate+sulfadoxine–pyrimethamine	2002–2004	6	0.0	0.0	5.6	0.0	3.4
<b>Equatorial Guinea</b>							
Chloroquine	1996–1999	2	48.9	42.1	55.6	42.1	55.6
Sulfadoxine–pyrimethamine	1996–1999	2	5.0	0.0	10.0	0.0	10.0
<b>Eritrea</b>							
Chloroquine	1997–2001	29	42.8	12.6	66.6	28.6	47.3
Sulfadoxine–pyrimethamine	2001–2002	6	3.1	0.0	15.4	0.0	10.3
Chloroquine+sulfadoxine–pyrimethamine	2002–2003	4	6.5	0.0	10.2	1.9	9.7
Artesunate+amodiaquine	2002–2003	3	0.0	0.0	1.4	0.0	1.4
<b>Ethiopia</b>							
Chloroquine	1996–1998	18	70.0	5.0	97.8	55.8	85.2
Sulfadoxine–pyrimethamine	1997–2003	17	10.3	0.0	44.9	2.0	26.1
Amodiaquine	1998	7	18.9	6.2	66.7	6.5	45.8
Artemether–lumefantrine	2003	4	0.0	0.0	0.0	0.0	0.0
<b>Gabon</b>							
Chloroquine	2001	2	57.1	52.2	62.0	52.2	62.0
Sulfadoxine–pyrimethamine	2000	1	4.4				
Amodiaquine	1997–2002	5	12.5	3.2	14.0	7.9	14.0
Artemether–lumefantrine	2001–2002	2	0.8	0.0	1.6	0.0	1.6
Artesunate+amodiaquine	2001–2002	2	0.9	0.0	1.7	0.0	1.7
<b>Gambia</b>							
Chloroquine	1998–2003	4	12.2	2.9	28.2	6.1	21.6
Artesunate+chloroquine	2000	1	3.2				
<b>Ghana</b>							
Chloroquine	1998–2003	9	23.2	9.0	31.3	15.8	29.7
Sulfadoxine–pyrimethamine	1998–2003	3	3.0	0.0	5.2	0.0	5.2
Amodiaquine+sulfadoxine–pyrimethamine	2002	1	1.4				
Artemether–lumefantrine	2003	1	0.0				
Artesunate+amodiaquine	2003	1	0.0				
Artesunate+sulfadoxine–pyrimethamine	2002	1	0.8				
<b>Guinea</b>							
Chloroquine	1996–2001	8	15.6	7.7	28.3	9.9	22.6
<b>Guinea-Bissau</b>							
Chloroquine	2001	3	6.8	5.4	10.9	5.4	10.9
<b>Kenya</b>							
Chloroquine	1996–1999	7	65.8	15.2	84.8	31.7	80.4
Sulfadoxine–pyrimethamine	1996–2003	27	8.4	0.0	51.6	3.4	17.9
Amodiaquine	1996–2003	24	2.4	0.0	23.1	0.0	8.3
Amodiaquine+sulfadoxine–pyrimethamine	2003	2	2.0	1.6	2.4	1.6	2.4
<b>Liberia</b>							
Chloroquine	1999	2	25.9	22.5	29.2	22.5	29.2
Amodiaquine	2001	1	7.4				
<b>Madagascar</b>							
Chloroquine	1996–2004	13	9.5	0.0	25.6	6.9	17.1
Sulfadoxine–pyrimethamine	2003	1	0.0				
Amodiaquine	2004	1	0.0				

## ANNEX 2. COUNTRY DATA, BY REGION

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Malawi</b>							
Sulfadoxine-pyrimethamine	1998–2002	15	18.6	2.8	40.0	16.6	33.3
Mefloquine	1998	1	10.2				
<b>Mali</b>							
Chloroquine	1996–2003	19	11.0	2.0	24.3	4.2	13.0
Sulfadoxine-pyrimethamine	2001–2003	3	0.6	0.0	2.0	0.0	2.0
<b>Mauritania</b>							
Chloroquine	1998	2	24.0	11.6	36.4	11.6	36.4
<b>Mozambique</b>							
Chloroquine	1998–2001	20	35.9	13.0	53.0	22.1	42.9
Sulfadoxine-pyrimethamine	1998–2002	10	5.4	0.2	17.3	2.7	13.7
Amodiaquine	2001	1	8.4				
Amodiaquine+sulfadoxine-pyrimethamine	2001	1	0.0				
Artesunate+amodiaquine	2001	1	0.0				
Artesunate+sulfadoxine-pyrimethamine	2001	1	0.0				
<b>Namibia</b>							
Chloroquine	1997–2003	9	19.0	4.0	66.7	6.5	35.1
Sulfadoxine-pyrimethamine	1997–2003	5	8.8	0.0	22.8	0.0	18.6
<b>Niger</b>							
Chloroquine	1998–2001	2	19.2	17.4	20.9	17.4	20.9
<b>Nigeria</b>							
Chloroquine	1998–2003	11	25.8	2.0	53.7	13.6	38.7
Sulfadoxine-pyrimethamine	2001–2003	7	9.3	5.7	43.5	7.7	40.5
Amodiaquine	2001–2002	2	1.5	0.0	2.9	0.0	2.9
<b>Rwanda</b>							
Chloroquine	1997–2000	6	52.4	18.5	60.6	33.2	59.2
Sulfadoxine-pyrimethamine	2000	3	35.1	11.6	35.7	11.6	35.7
Amodiaquine	2001–2002	6	0.0	0.0	2.3	0.0	2.0
Chloroquine+sulfadoxine-pyrimethamine	2000	6	13.2	6.1	39.7	8.1	37.7
Amodiaquine+sulfadoxine-pyrimethamine	2001	3	0.0	0.0	0.0	0.0	0.0
Artesunate+amodiaquine	2002	3	0.0	0.0	1.6	0.0	1.6
Artesunate+sulfadoxine-pyrimethamine	2001	3	0.0	0.0	0.0	0.0	0.0
<b>Senegal</b>							
Chloroquine	1996–2002	19	12.9	2.7	30.7	10.1	16.6
Sulfadoxine-pyrimethamine	2001–2002	7	3.3	1.7	10.2	2.0	5.8
Amodiaquine	2001–2002	3	2.8	2.0	5.1	2.0	5.1
Amodiaquine+sulfadoxine-pyrimethamine	2001–2003	4	0.0				
Artemether–lumefantrine	2003	1	0.0				
Artesunate+amodiaquine	2002	2	0.0	0.0	0.0	0.0	0.0
Artesunate+mefloquine	2002	2	0.0	0.0	0.0	0.0	0.0
<b>Sierra Leone</b>							
Chloroquine	1998–2003	7	34.5	26.3	58.5	32.0	51.5
Sulfadoxine-pyrimethamine	2001–2003	5	11.2	7.8	23.4	9.1	17.7
Amodiaquine	2002–2003	5	1.8	0.0	7.6	0.0	5.8
<b>Somalia</b>							
Chloroquine	1997–2003	5	51.0	27.5	78.0	30.4	74.0
Sulfadoxine-pyrimethamine	1997–2003	3	4.0	2.0	5.9	2.0	5.9
<b>South Africa</b>							
Chloroquine	1997	4	53.8	40.0	62.5	44.2	60.8
Sulfadoxine-pyrimethamine	1997–2002	6	7.3	3.6	87.8	3.7	55.7
Artemether–lumefantrine	2002	1	0.0				
Artesunate+sulfadoxine-pyrimethamine	2004	1	5.0				

**Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure**

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Sudan</b>							
<i>High transmission area</i>							
Chloroquine	2001–2003	5	53.1	16.6	60.7	32.4	59.4
Sulfadoxine–pyrimethamine	2001–2002	3	6.0	0.0	12.0	0.0	12.0
Amodiaquine	2001	2	6.5	6.0	7.0	6.0	7.0
Artesunate+amodiaquine	2003	2	0.4	0.0	0.8	0.0	0.8
Artesunate+sulfadoxine–pyrimethamine	2003	2	1.7	0.8	2.5	0.8	2.5
<i>Moderate/low transmission area</i>							
Chloroquine	1996–2003	24	47.6	0.0	76.9	33.8	57.4
Sulfadoxine–pyrimethamine	1996–2003	7	4.2	0.0	11.7	2.0	8.1
Mefloquine	1999	1	2.5				
Chloroquine+sulfadoxine–pyrimethamine	2003	2	10.2	5.9	14.4	5.9	14.4
<b>Swaziland</b>							
Chloroquine	2000	1	12.5				
<b>Togo</b>							
Chloroquine	1998–2001	6	6.1	0.0	28.8	1.6	23.7
<b>Uganda</b>							
Chloroquine	1996–2001	18	29.3	7.5	81.2	16.4	58.7
Sulfadoxine–pyrimethamine	1996–2002	25	11.4	0.0	25.0	5.0	16.8
Amodiaquine	1999–2002	5	8.8	0.0	14.5	1.6	12.3
Chloroquine+sulfadoxine–pyrimethamine	1996–2003	15	12.0	0.0	37.0	7.0	19.0
Amodiaquine+sulfadoxine–pyrimethamine	1999–2003	12	1.6	0.0	13.0	0.5	3.5
Artesunate+amodiaquine	2002–2003	5	1.0	0.0	4.0	0.5	3.7
Artesunate+sulfadoxine–pyrimethamine	2000	1	0.5				
<b>United Republic of Tanzania</b>							
<i>Mainland</i>							
Chloroquine	1997–1999	8	43.0	27.6	71.0	36.6	53.5
Sulfadoxine–pyrimethamine	1997–2002	15	10.5	1.4	33.8	5.6	16.9
Amodiaquine	1999–2002	12	3.7	0.0	10.8	1.6	6.9
Amodiaquine+sulfadoxine–pyrimethamine	1999	1	3.4				
<i>Zanzibar</i>							
Chloroquine	2001	2	60.5	60.2	60.8	60.2	60.8
Sulfadoxine–pyrimethamine	2001	2	8.9	4.7	13.1	4.7	13.1
Amodiaquine	2001	2	5.6	4.7	6.5	4.7	6.5
Artemether–lumefantrine	2002	2	1.0	0.0	2.0	0.0	2.0
Artesunate+amodiaquine	2002	2	1.9	1.8	1.9	1.8	1.9
<b>Zambia</b>							
Chloroquine	1996–2002	22	31.9	6.6	54.0	24.6	46.3
Sulfadoxine–pyrimethamine	1996–2003	17	7.9	0.0	17.9	3.3	14.2
Artemether–lumefantrine	2003	3	0.0	0.0	0.0	0.0	0.0
Artesunate+sulfadoxine–pyrimethamine	2002–2003	5	0.0	0.0	1.7	0.0	0.9
<b>Zimbabwe</b>							
Chloroquine	1999–2003	28	10.8	0.0	42.3	5.0	19.9
Sulfadoxine–pyrimethamine	1999	2	10.0	0.0	20.0	0.0	20.0
Chloroquine+sulfadoxine–pyrimethamine	2001–2004	25	1.1	0.0	8.6	0.0	3.9
<b>Asia</b>							
<b>Afghanistan</b>							
Chloroquine	1999–2002	4	67.7	60.0	89.5	61.7	80.8
Sulfadoxine–pyrimethamine	2002–2003	3	8.7	4.0	22.7	4.0	22.7
Amodiaquine	2004	1	37.7				
Amodiaquine+sulfadoxine–pyrimethamine	2003–2004	2	2.0	1.0	3.0	1.0	3.0

## ANNEX 2. COUNTRY DATA, BY REGION

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Bangladesh</b>							
Chloroquine	1996–1999	3	63.6	50.0	77.2	50.0	77.2
Mefloquine	1996	1	27.2				
Chloroquine+sulfadoxine–pyrimethamine	1996–2003	7	30.7	12.9	37.2	24.0	33.0
Artemether–lumefantrine	2002	1	0.8				
Artesunate+mefloquine	2002	1	0.9				
<b>Bhutan</b>							
Chloroquine	1997	4	78.1	64.7	80.7	70.8	80.0
Sulfadoxine–pyrimethamine	1998	1	34.8				
Mefloquine	1999	1	9.7				
Artesunate combinations	2000–2003	8	4.9	1.1	12.0	2.2	8.7
<b>Cambodia</b>							
Artemether–lumefantrine	2001–2004	3	26.9	13.5	30.0	13.5	30.0
Artesunate+mefloquine	2001–2004	12	3.7	0.0	14.3	1.1	8.1
<b>China</b>							
Chloroquine	1997–1999	2	29.6	18.4	40.7	18.4	40.7
<b>India</b>							
Chloroquine	1996–2004	25	34.0	0.0	95.9	23.6	65.4
Sulfadoxine–pyrimethamine	1999–2003	12	17.9	0.0	68.2	3.0	45.4
Mefloquine	1996–2001	3	4.5	0.0	7.8	0.0	7.8
Chloroquine+sulfadoxine–pyrimethamine		1	6.5				
Artesunate+mefloquine	2001	2	6.4	1.9	10.9	1.9	10.9
<b>Indonesia</b>							
Chloroquine	1995–2003	18	69.5	11.1	100.0	49.5	78.3
Sulfadoxine–pyrimethamine	1996–2003	12	17.8	0.0	82.9	12.0	43.0
Chloroquine+sulfadoxine–pyrimethamine	1999–2003	2	22.2	6.2	38.2	6.2	38.2
Artesunate+sulfadoxine–pyrimethamine	1999	1	4.3				
<b>Iran (Islamic Republic of)</b>							
Chloroquine	2000–2002	4	72.5	61.0	75.0	66.4	74.2
Sulfadoxine–pyrimethamine	1999–2001	3	0.0	0.0	5.7	0.0	5.7
<b>Lao People's Democratic Republic</b>							
Chloroquine	1998–2002	5	44.8	31.3	52.8	36.7	49.5
Sulfadoxine–pyrimethamine	2001–2002	3	18.0	17.9	18.7	17.9	18.7
Mefloquine	2001	1	0.0				
Chloroquine+sulfadoxine–pyrimethamine	2001	2	12.3	7.8	16.7	7.8	16.7
Artemether–lumefantrine	2001–2003	2	4.7	3.1	6.3	3.1	6.3
Artesunate+mefloquine	2001–2003	2	0.0	0.0	0.0	0.0	0.0
<b>Malaysia</b>							
Chloroquine	2003	1	45.2				
Sulfadoxine–pyrimethamine	1996	1	29.4				
Mefloquine	1996	1	0.0				
Chloroquine+sulfadoxine–pyrimethamine	1999–2003	4	47.6	31.3	62.5	37.5	57.0
<b>Myanmar</b>							
Chloroquine	1997–2002	18	24.7	6.0	76.0	12.5	34.7
Sulfadoxine–pyrimethamine	1997–2002	18	27.8	0.0	100.0	7.9	37.7
Mefloquine	1997–2002	18	6.0	0.0	44.4	0.0	16.4
Artemether–lumefantrine	2003	3	2.0	0.0	2.0	0.0	2.0
Artesunate+amodiaquine	2003	4	4.0	3.0	7.0	3.5	5.5
Artesunate+sulfadoxine–pyrimethamine	2003	2	0.0	0.0	0.0	0.0	0.0
Artesunate+mefloquine	1996–2003	10	1.5	0.0	8.0	0.0	5.1
<b>Nepal</b>							
Sulfadoxine–pyrimethamine	1997–2003	7	22.0	0.0	88.2	0.0	72.7



**Table A.6 Summary of antimalarial drug efficacy results expressed as treatment failure**

	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Pakistan</b>							
Chloroquine	2001–2002	13	28.9	18.2	79.0	25.9	66.6
Sulfadoxine–pyrimethamine	2001–2002	4	13.0	8.7	18.7	9.8	16.9
Amodiaquine	2002	1	83.3				
Artesunate+amodiaquine	2002	1	18.0				
Artesunate+chloroquine	2002	1	28.8				
Artesunate+sulfadoxine–pyrimethamine	2002	1	0.0				
<b>Papua New Guinea</b>							
Chloroquine+sulfadoxine–pyrimethamine	1998–2003	4	0.0	0.0	27.0	0.0	13.5
Amodiaquine+sulfadoxine–pyrimethamine	1998	1	0.0				
<b>Philippines</b>							
Chloroquine	1996–2000	9	42.1	16.4	76.2	32.1	52.0
Sulfadoxine–pyrimethamine	1999–2001	7	42.6	8.5	66.7	12.5	60.6
Chloroquine+sulfadoxine–pyrimethamine	2001–2002	3	18.4	11.1	29.6	11.1	29.6
<b>Saudi Arabia</b>							
Chloroquine	1997–1998	2	15.4	12.4	18.4	12.4	18.4
<b>Solomon Islands</b>							
Chloroquine	1997–2001	5	27.8	10.7	66.7	12.2	49.8
<b>Sri Lanka</b>							
Chloroquine	2002–2003	2	31.8	10.0	53.5	10.0	53.5
Artesunate+sulfadoxine–pyrimethamine	1999	1	0.0				
<b>Tajikistan</b>							
Chloroquine	2002	1	56.0				
Sulfadoxine–pyrimethamine	2002	1	16.0				
Chloroquine+sulfadoxine–pyrimethamine	2003	1	2.1				
<b>Thailand</b>							
Mefloquine	1995–2003	19	13.8	2.0	68.4	7.5	28.0
Artemether–lumefantrine	1996–2002	6	2.6	0.0	3.9	0.5	3.5
Artesunate+mefloquine	1995–2003	34	3.6	0.0	21.4	1.2	8.1
<b>Timor-Leste</b>							
Chloroquine	2000	1	66.7				
Sulfadoxine–pyrimethamine	2001	1	10.0				
<b>Vanuatu</b>							
Chloroquine+sulfadoxine–pyrimethamine	2001	1	16.0				
<b>Viet Nam</b>							
Chloroquine	1997–2001	4	52.3	6.2	71.9	27.0	64.3
Sulfadoxine–pyrimethamine	1997–2002	4	16.6	12.2	70.6	13.0	41.9
Mefloquine	1998–1999	4	11.7	0.0	42.3	0.0	32.8
Artemether–lumefantrine	2001	1	2.2				
Artesunate+chloroquine		2	37.4	28.0	46.8	28.0	46.8
Artesunate+sulfadoxine–pyrimethamine		2	33.2	8.3	58.1	8.3	58.1
Artesunate+mefloquine	1998–2000	2	5.6	0.0	11.1	0.0	11.1
<b>Yemen</b>							
Chloroquine	1998–2003	9	42.4	9.0	57.0	23.3	44.9
Sulfadoxine–pyrimethamine	2003	1	0.0				

The Americas	Study years	Number of studies	Median	Range		Percentile	
				Low	High	25th	75th
<b>Bolivia</b>							
Sulfadoxine–pyrimethamine	2002	1	18.7				
Mefloquine	2001	2	0.0	0.0	0.0	0.0	0.0
Artesunate+mefloquine	2001	3	0.0	0.0	0.0	0.0	0.0
<b>Brazil</b>							
Mefloquine	1996–2002	6	5.2	0.0	9.7	0.5	7.9
<b>Colombia</b>							
Chloroquine	1997–1998	5	66.6	44.5	96.6	47.3	83.7
Sulfadoxine–pyrimethamine	1997–2002	12	10.8	0.0	26.5	1.9	15.8
Amodiaquine	1997–2002	7	11.5	0.0	50.0	3.2	27.3
Mefloquine	2002–2003	3	2.2	0.0	6.4	0.0	6.4
Chloroquine+sulfadoxine–pyrimethamine	2002	2	17.4	12.1	22.6	12.1	22.6
Amodiaquine+sulfadoxine–pyrimethamine	2001–2003	4	2.3	0.0	10.8	1.1	6.6
<b>Ecuador</b>							
Chloroquine	1998–2003	4	85.4	83.3	94.4	84.2	90.1
Sulfadoxine–pyrimethamine	2001–2003	3	4.0	0.0	17.1	0.0	17.1
Chloroquine+sulfadoxine–pyrimethamine	2003	1	0.0				
Artesunate+sulfadoxine–pyrimethamine	2003	2	0.0	0.0	0.0	0.0	0.0
<b>French Guiana</b>							
Mefloquine	1996	1	3.4				
<b>Guyana</b>							
Chloroquine	1998	1	55.6				
Mefloquine	2003	1	28.1				
Artesunate+mefloquine	2003	1	7.5				
<b>Peru</b>							
Chloroquine	1998–2002	6	86.4	75.6	90.0	78.3	89.8
Sulfadoxine–pyrimethamine	1998–2002	9	11.8	0.0	80.0	1.7	65.2
Mefloquine	1999–2000	4	0.0	0.0	0.0	0.0	0.0
Artesunate+sulfadoxine–pyrimethamine	2000	1	1.1				
Artesunate+mefloquine	2000	1	0.0				
<b>Suriname</b>							
Mefloquine	2002	1	7.3				
Artemether–lumefantrine	2003	2	2.0	1.9	2.0	1.9	2.0
Artesunate+mefloquine	2002–2003	2	4.1	2.4	5.8	2.4	5.8
<b>Venezuela</b>							
Chloroquine	1997–2002	5	48.6	0.0	100.0	13.1	88.6
Sulfadoxine–pyrimethamine	1997–1999	3	20.0	0.0	23.0	0.0	23.0

**Notes:**

Median, range and quartiles are based on percentage clinical failure with at least 14-day follow up for countries in Africa south of the Sahara. For all other areas, including South Africa and moderate/low transmission areas of Sudan, percentage total failure is used.

**Table A.7 Percentage of households that have at least one mosquito net, by background characteristics**

	Year	Source	Scale	Total	Residence		Wealth quintile				
					Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Benin	2004	MoH/RBM 2004	6 health zones	61.1	-	-	-	-	-	-	-
	2002	PSI 2002	1 district	12.0	-	-	-	-	-	-	-
	2001	DHS 2001	<b>national</b>	<b>40.2</b>	<b>48.9</b>	<b>35.0</b>	-	-	-	-	-
Burkina Faso		PSI 2001	sub-national	58.0	-	-	-	-	-	-	-
		RBM 2000	3 health zones	47.4	-	-	-	-	-	-	-
	2003	DHS 2003	<b>national</b>	<b>40.4</b>	<b>46.4</b>	<b>38.8</b>	<b>34.1</b>	<b>39.7</b>	<b>37.3</b>	<b>38.6</b>	<b>51.5</b>
Cameroon	2001	PSI 2001	3 provinces	15.0	-	-	-	-	-	-	
Chad	2000	RBM 2001	5 districts	68.2	-	-	-	-	-	-	
Congo	2003	PSI 2003	1 district	27.9	-	-	-	-	-	-	
Eritrea	2003	MoH 2003	3 zobas	91.2	-	-	-	-	-	-	
Ethiopia	2002	DHS 2002	<b>national</b>	<b>33.8</b>	<b>28.3</b>	<b>37.3</b>	-	-	-	-	-
	2001	RBM 2001	14 districts	16.2	-	-	-	-	-	-	
	2000	DHS 2000	<b>national</b>	<b>1.1</b>	<b>3.1</b>	<b>0.6</b>	-	-	-	-	
Ghana	2003	DHS 2003	<b>national</b>	<b>17.6</b>	<b>9.9</b>	<b>24.2</b>	<b>27.9</b>	<b>23.6</b>	<b>17.1</b>	<b>12.1</b>	<b>11.4</b>
		Grabowsky et al., 2003	1 district	94.4	-	-	92.2	96.0	98.0	94.0	91.7
	2003	DHS 2003	<b>national</b>	<b>21.8</b>	<b>37.6</b>	<b>16.6</b>	<b>11.2</b>	<b>11.4</b>	<b>14.0</b>	<b>24.4</b>	<b>39.3</b>
Kenya	2001	PSI 2000	6 regions	37.0	-	-	-	-	-	-	-
		RBM 2001	4 districts	29.7	-	-	-	-	-	-	-
	2001	PSI 2001	1 district	60.8	-	-	-	-	-	-	-
Madagascar	2004	MoH 2004	<b>national</b>	<b>42.9</b>	<b>63.3</b>	<b>39.3</b>	-	-	-	-	-
	2000	DHS 2000	<b>national</b>	<b>13.1</b>	<b>32.1</b>	<b>10.1</b>	-	-	-	-	-
		IMCI 2000	5 districts	18.2	-	-	-	-	-	-	-
Mali	1998	PSI 1998	1 district	22.2	28.0	14.0	-	-	-	-	-
	2003	NetMark 2003	5 areas	72.8	81.0	67.3	-	-	-	-	-
	2001	DHS 2001	<b>national</b>	<b>54.4</b>	<b>57.7</b>	<b>53.4</b>	-	-	-	-	-
Mauritania	2004	DHS 2003-2004	<b>national</b>	<b>56.0</b>	<b>42.5</b>	<b>66.2</b>	-	-	-	-	-
	2001	DHS 2000-2001	<b>national</b>	<b>55.6</b>	<b>39.9</b>	<b>66.8</b>	-	-	-	-	-
	2000	NetMark 2000	5 areas	26.5	34.0	21.5	-	-	-	-	-
Namibia	2000	DHS 2000	<b>national</b>	<b>13.1</b>	<b>10.9</b>	<b>14.5</b>	-	-	-	-	-

Year	Source	Scale	Total	Residence		Wealth quintile				
				Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Nigeria	2003 DHS 2003	national	11.8	5.4	15.5	23.0	15.5	10.8	8.0	3.3
	2000 NetMark 2000	5 areas	12.0	13.3	11.2	-	-	-	-	-
Rwanda	2001 PSI/2001		11.1	56.0	4.3	-	-	-	-	-
	2000 DHS 2000	national	6.6	29.7	2.9	-	-	-	-	-
	1997 PSI 1997	3 areas	3.2	-	-	-	-	-	-	-
Senegal	2000 NetMark 2000	5 areas	33.6	28.8	36.8	-	-	-	-	-
Togo	2000 RBM 2000	3 districts	30.5	-	-	-	-	-	-	-
Uganda	2003 Fapohunda BM., 2003	6 districts	30.0	-	-	-	-	-	-	-
	Gertrude N., 2004	1 district	43.7	-	-	-	-	-	-	-
	2002 Spencer et al., 2004	1 district	78.2	-	-	-	-	-	-	-
	2001 DHS 2000-2001	national	12.8	32.9	9.2	-	-	-	-	-
	MoH 2001 (RBM baseline survey)	4 districts	17.6	-	-	-	-	-	-	-
	2000 CMS 2000	district	22.4	45.5	16.5	-	-	-	-	-
	NetMark 2000	5 areas	34.0	47.4	24.9	-	-	-	-	-
	PSI/2000	4 provinces	22.4	-	-	-	-	-	-	-
	1999 Nuwaha F., 1999	1 district	55.0	-	-	-	-	-	-	-
UR Tanzania	2001 NSO 2001	national	37.1	67.4	27.9	-	-	-	-	-
	2000 Nathan R. et al., 2004	2 districts	73.0	-	-	54.0	64.0	74.0	83.0	92.0
	PSI/2000	4 areas	51.1	-	-	-	-	-	-	-
	1999 DHS 1999	national	30.3	57.1	20.8	-	-	-	-	-
	1998 PSI 1998	4 areas	32.0	-	-	-	-	-	-	-
	1997 Nathan R. et al., 2004	2 districts	37.0	-	-	20.0	29.0	32.0	45.0	63.0
Zambia	2002 DHS 2002-2003	national	27.2	34.9	23.3	-	-	-	-	-
	2000 NetMark 2000	5 areas	26.5	34.9	20.8	-	-	-	-	-
Zimbabwe	1999 DHS 1999	national	10.2	16.5	6.3	-	-	-	-	-

Year	Source	Scale	Total	Residence	
				Urban	Rural
Afghanistan	2002 MoH 2002	50 districts	10.8	-	-
Cambodia	2000 DHS 2000	national	82.0	91.5	80.3
Lao PDR	2001 PSI/2001	2 provinces	96.9	-	-
Myanmar	2001 PSI/2001	1 state	50.0	-	-
Nepal	2003 MoH 2003	8 districts	73.0	-	-
Timor-Leste	2004 MoH 2005	national	36.0	-	-

Table A.7 Percentage of households that have at least one mosquito net, by background characteristics

	The Americas	Year	Source	Scale	Total	Residence	
						Urban	Rural
Bolivia		2002	PSI/2002	1 province	92.4	-	-
		2001	PSI/2001a	1 province	94.4	-	-
			PSI/2001b	1 province	95.6	-	-
Colombia		2000	DHS 2000	national	31.0	30.6	32.1
Nicaragua		2001	DHS 2001	national	42.1	45.6	37.0

Table A.8 Percentage of households that have at least one insecticide-treated net, by background characteristics

	Africa	Year	Source	Scale	Total	Residence		Wealth quintile				
						Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Benin		2004	MoH/RBM 2004	6 health zones	41.9	-	-	-	-	-	-	-
		2002	PSI/2002	1 district	2.1	-	-	-	-	-	-	-
		2001	PSI/2001	sub-national	26.7	-	-	-	-	-	-	-
Burkina Faso			RBM 2000	3 health zones	5.4	-	-	-	-	-	-	-
		2003	DHS 2003	national	4.6	12.0	2.7	1.5	1.7	2.2	3.6	13.1
		2001	RBM 2000	district	17.4	-	-	-	-	-	-	-
Chad		2000	RBM 2001	5 districts	5.4	-	-	-	-	-	-	
Congo		2003	PSI/2003	1 district	2.4	-	-	-	-	-	-	
Eritrea		2003	MoH 2003	3 zobas	71.0	-	-	-	-	-	-	
Ethiopia		2000	DHS 2000	national	0.2	0.4	0.1	-	-	-	-	-
		2003	DHS 2003	national	3.2	2.3	4.0	7.1	2.1	2.0	2.2	3.7
Guinea		2001	RBM 2001	5 districts	12.2	-	-	-	-	-	-	
Kenya		2001	RBM 2001	4 districts	7.0	-	-	-	-	-	-	
Malawi		2003	DHS 2003	national	5.9	10.6	4.4	2.5	2.6	4.2	5.6	11.7
		2004	MoH 2004	national	33.8	52.3	30.4	-	-	-	-	-
Mali		2000	DHS 2000	national	4.9	-	-	-	-	-	-	-
			IMCI 2000	5 districts	7.0	-	-	-	-	-	-	-
Mali		1998	PSI 1998	1 district	0.4	0.6	0.0	-	-	-	-	-
		2003	RBM 2003	district	25.1	-	-	-	-	-	-	-

	Year	Source	Scale	Total	Residence		Wealth quintile				
					Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Mauritania	2004	DHS 2003–2004	national	0.6	0.5	0.6	-	-	-	-	-
Mozambique	2000	NetMark 2000	5 areas	7.2	9.3	5.8	-	-	-	-	-
Nigeria	2003	DHS 2003	national	2.2	1.0	2.9	4.5	1.3	2.4	2.1	1.0
	2000	NetMark 2000	5 areas	0.1	0.3	0.0	-	-	-	-	-
Senegal	2000	NetMark 2000	5 areas	11.0	10.0	11.7	-	-	-	-	-
Togo	2005	MoH, 2005	12 districts	62.0	-	-	61.5	64.2	59.5	66.4	60.3
Uganda	2003	Gertude N., 2004	1 district	11.5	-	-	-	-	-	-	-
	2002	Spencer et al., 2004	1 district	75.6	-	-	-	-	-	-	-
	2001	MoH 2001 (RBM baseline survey)	4 districts	1.7	-	-	-	-	-	-	-
	2000	NetMark 2000	5 areas	3.8	6.7	1.8	-	-	-	-	-
	1999	Nuwaha F., 1999	1 district	6.8	-	-	-	-	-	-	-
UR Tanzania	1999	DHS 1999	national	1.3	-	-	-	-	-	-	-
	1998	PSI 1998	4 areas	6.0	-	-	-	-	-	-	-
Zambia	2002	DHS 2002–2003	national	13.6	16.1	12.4	-	-	-	-	-
	2001	RBM 2001	10 districts	1.6	-	-	-	-	-	-	-
	2000	NetMark 2000	5 areas	9.3	9.4	9.2	-	-	-	-	-

### Asia

	Year	Source	Scale	Total
Afghanistan	2002	MoH 2002	50 districts	4.8
Lao PDR	2001	PSI 2001	2 provinces	63.8

### The Americas

	Year	Source	Scale	Total	Residence	
					Urban	Rural
Bolivia	2001	PSI 2001b	1 province	13.4	-	-
Colombia	2000	DHS 2000	national	2.8	2.5	3.7

**Table A.9 Percentage of children under 5 years of age that slept under a mosquito net during the night preceding the survey, by background characteristics**

	Year	Source	Scale	Total	Gender		Residence			Wealth quintile			
					Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Angola	2001	MICS 2001	national	10.2	9.5	10.9	10.9	8.6	7.1	5.7	5.4	11.1	20.2
Benin	2004	MoH/RBM 2004	6 health zones	31.3	-	-	-	-	-	-	-	-	-
	2002	PSI 2002	sub-national	46.2	-	-	-	-	-	-	-	-	-
	2001	DHS 2001	national	32.0	31.7	32.3	42.9	26.8	-	-	-	-	-
	1999	MICS 1999	national	38.7	-	-	48.0	32.2	-	-	-	-	-
Burkina Faso	2003	DHS 2003	national	19.8	19.6	20.0	22.8	19.3	22.3	19.4	17.1	16.0	26.4
Burundi	2000	MICS 2000	national	2.6	2.7	2.6	27.6	0.7	0.2	0.7	0.8	1.9	8.8
Cameroon	2001	PSI 2001	3 provinces	6.2	-	-	-	-	-	-	-	-	-
	2000	MICS 2000	national	11.3	11.4	11.3	17.6	8.7	7.3	9.8	8.9	14.5	18.6
CAR	2000	MICS 2000	national	30.9	31.0	30.8	48.2	19.8	18.6	16.7	23.1	41.4	58.8
Chad	2000	MICS 2000	national	26.9	26.6	27.2	57.5	18.6	22.5	13.6	19.5	32.1	50.3
		RBM 2001	5 districts	43.3	-	-	-	-	-	-	-	-	-
Comoros	2000	MICS 2000	national	36.4	37.3	35.5	56.8	31.1	23.4	25.6	32.8	40.9	60.6
Côte d'Ivoire	2000	MICS 2000	national	9.6	9.7	9.4	11.9	7.9	7.0	8.0	12.9	11.0	9.8
DR Congo	2001	MICS 2001	national	11.8	11.9	11.7	15.0	10.3	7.1	14.0	9.7	9.6	18.6
Equatorial Guinea	2000	MICS 2000	national	15.4	16.7	14.0	29.8	9.9	7.3	8.6	22.8	16.3	26.8
Eritrea	2003	MoH 2003	3 zobas	81.0	-	-	-	-	-	-	-	-	-
	2002	DHS 2002	national	12.1	11.8	12.4	14.3	11.0	-	-	-	-	-
Ethiopia	2001	RBM 2001	14 districts	17.1	-	-	-	-	-	-	-	-	-
Gabon	2000	DHS 2000	national	8.7	-	-	7.5	14.4	-	-	-	-	-
Gambia	2000	MICS 2000	national	42.1	43.1	41.0	35.7	45.9	44.5	46.1	44.5	37.8	32.9
Ghana	2003	DHS 2003	national	14.7	-	-	9.0	17.5	16.8	17.1	16.0	11.2	9.6
		Grabowsky et al., 2003	1 district	60.2	-	-	-	-	62.3	70.8	61.5	58.5	74.5
	2001	RBM 2001	5 districts	27.0	-	-	-	-	-	-	-	-	-
Guinea	2001	RBM 2001	4 districts	27.2	-	-	-	-	-	-	-	-	-
Guinea-Bissau	2000	MICS 2000	national	67.0	67.2	66.7	74.9	63.5	60.5	63.4	66.8	71.4	74.7
Kenya	2003	DHS 2003	national	14.5	14.9	14.2	32.6	10.7	6.4	7.0	11.4	18.3	35.3
	2001	PSI 2000	6 regions	31.2	-	-	-	-	-	-	-	-	-
		RBM 2001	4 districts	15.1	-	-	-	-	-	-	-	-	-
	2000	MICS 2000	national	16.4	15.7	17.1	34.9	10.2	6.8	8.6	9.2	19.2	42.5

	Year	Source	Scale	Total	Gender		Residence		Wealth quintile					
					Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
Madagascar	2001	PSI 2001	1 district	54.7	-	-	-	-	-	-	-	-	-	-
	2000	MICS 2000	national	30.3	30.1	30.5	31.7	29.9	27.9	38.0	30.3	23.0	31.6	
	2004	MoH 2004	national	38.0	-	-	57.5	34.1	-	-	-	-	-	-
Malawi	2000	DHS 2000	national	7.6	-	-	20.8	5.7	-	-	-	-	-	-
		IMCI 2000	5 districts	8.6	-	-	-	-	-	-	-	-	-	-
	1998	PSI 1998	1 district	58.0	-	-	60.0	53.0	-	-	-	-	-	-
Mali	2003	NetMark 2003	5 areas	52.7	-	-	-	-	-	-	-	-	-	-
Mauritania	2004	DHS 2003-2004	national	30.8	30.6	31.0	25.7	34.5	-	-	-	-	-	-
Mozambique	2000	NetMark 2000	5 areas	12.5	-	-	17.1	9.8	-	-	-	-	-	-
Namibia	2000	DHS 2000	national	6.7	-	-	5.0	7.5	-	-	-	-	-	-
Niger	2000	MICS 2000	national	16.6	17.2	16.0	35.8	13.7	12.9	7.8	15.5	14.0	32.5	
Nigeria	2003	DHS 2003	national	5.9	6.3	5.6	3.6	7.0	-	-	-	-	-	-
	2000	NetMark 2000	5 areas	8.8	-	-	9.9	8.2	-	-	-	-	-	-
Rwanda	2001	PSI 2001		47.3	-	-	50.0	45.7	-	-	-	-	-	-
	2000	DHS 2000	national	5.6	-	-	26.9	1.7	-	-	-	-	-	-
		MICS 2000	national	6.0	5.6	6.4	27.8	2.2	0.5	0.9	0.8	9.7	37.7	
Sao Tome & Principe	2000	MICS 2000	national	42.5	41.8	42.4	60.4	27.1	31.4	14.8	25.9	25.5	47.6	
Senegal	2000	MICS 2000	national	15.2	14.6	15.9	13.3	16.3	15.5	20.4	15.7	11.4	11.7	
		NetMark 2000	5 areas	17.7	-	-	13.7	19.9	-	-	-	-	-	-
Sierra Leone	2000	MICS 2000	national	15.2	16.1	14.3	12.6	16.1	15.6	15.7	14.9	15.4	14.4	
Somalia	1999	MICS 1999	national	15.6	15.9	15.3	18.7	16.3	-	-	-	-	-	-
	2000	MICS 2000	national	23.1	23.1	23.1	25.8	20.6	18.1	23.0	27.4	23.6	23.1	
Swaziland	2000	MICS 2000	national	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.5	
Togo	2000	MICS 2000	national	14.8	15.4	14.1	18.5	13.3	11.3	11.8	13.1	16.1	26.2	
		RBM 2000	3 districts	22.7	-	-	-	-	-	-	-	-	-	-
	2003	CMS 2003a	2 districts	1.0	-	-	-	-	-	-	-	-	-	-
		CMS 2003b	4 districts	1.0	-	-	-	-	-	-	-	-	-	-
		Fapohunda BM, 2003	6 districts	22.0	-	-	-	-	-	-	-	-	-	-
		GTZ 2001	3 districts	1.0	-	-	-	-	-	-	-	-	-	-
2001	DHS 2000-2001	national	7.3	-	-	21.1	5.7	-	-	-	-	-	-	-
	MoH 2001 (RBM baseline survey)	4 districts	11.8	-	-	-	-	-	-	-	-	-	-	-
2000	NetMark 2000	5 areas	24.7	-	-	34.3	18.3	-	-	-	-	-	-	-
UR Tanzania	1999	DHS 1999	national	20.7	-	-	47.9	13.0	-	-	-	-	-	-



Table A.9 Percentage of children under 5 years of age that slept under a mosquito net during the night preceding the survey, by background characteristics

Year	Source	Scale	Total	Gender		Residence		Wealth quintile					
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
Zambia	2002 DHS 2002-2003	national	16.3	16.5	16.1	21.9	13.7	-	-	-	-	-	-
	2001 RBM 2001	10 districts	13.2	-	-	-	-	-	-	-	-	-	-
	2000 NetMark 2000	5 areas	11.9	-	-	19.3	7.2	-	-	-	-	-	-
	1999 MICS 1999	national	6.0	6.1	5.9	8.5	4.7	3.9	3.0	4.8	7.2	11.5	-
Zimbabwe	1999 DHS 1999	national	3.0	-	-	-	-	-	-	-	-	-	-
<b>Asia</b>													
Azerbaijan	2000 MICS 2000	national	12.4	12.8	12.0	6.5	18.1	17.1	19.7	8.9	5.4	4.7	-
Indonesia	2000 MICS 2000	national	32.0	32.0	32.2	23.3	37.5	-	-	-	-	-	-
Iraq	2000 MICS 2000	national	7.4	7.3	7.5	6.9	8.3	-	-	-	-	-	-
Lao PDR	2001 PSI 2001	2 provinces	98.3	-	-	-	-	-	-	-	-	-	-
	2000 National Health Survey 2002	national	82.3	82.8	81.9	96.9	77.9	72.9	82.2	83.2	86.4	91.1	-
Tajikistan	2000 MICS 2000	national	5.9	5.6	6.1	6.1	5.8	2.9	6.8	7.3	6.5	6.0	-
Timor-Leste	2002 MICS 2002	national	47.5	48.1	46.8	74.6	39.3	26.1	33.2	46.3	58.6	77.1	-
Viet Nam	2000 MICS 2000	national	95.9	95.5	96.2	93.7	96.4	92.4	98.6	98.7	99.0	92.7	-
<b>The Americas</b>													
Bolivia	2001 PSI 2001a	1 province	97.1	-	-	-	-	-	-	-	-	-	-
Colombia	2000 DHS 2000	national	23.9	-	-	23.2	25.6	-	-	-	-	-	-
Guatemala	1999 MICS	national	6.4	-	-	5.6	19.1	-	-	-	-	-	-
Guyana	2000 MICS 2000	national	-	68.7	65.8	-	-	-	-	-	-	-	-
Suriname	2000 MICS 2000	national	76.6	75.4	77.9	-	-	0.0	50.0	58.1	74.9	-	-

**Table A.10 Percentage of children under 5 years of age that slept under an insecticide-treated net during the night preceding the survey, by background characteristics**

	Year	Source	Scale	Total	Gender		Residence			Wealth quintile				
					Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
<b>Africa</b>														
Angola	2001	MICS 2001	national	2.3	2.3	2.3	2.9	0.9	-	0.8	0.8	0.8	3.8	4.7
Benin	2003	AIMI/Benin 2003	3 districts	47.0	-	-	-	-	-	-	-	-	-	-
	2001	DHS 2001	national	7.4	7.0	7.8	13.5	4.4	-	-	-	-	-	-
		RBM 2000	3 health zones	4.4	-	-	-	-	-	-	-	-	-	-
	1999	MICS 1999	national	5.0	-	-	4.3	0.7	-	-	-	-	-	-
Burkina Faso	2003	DHS 2003	national	1.6	1.4	1.9	5.2	1.1	1.1	0.4	0.6	1.5	6.0	-
	2001	RBM 2000	district	12.4	-	-	-	-	-	-	-	-	-	-
Burundi	2000	MICS 2000	national	1.3	1.4	1.2	14.8	0.2	0.0	0.7	0.2	0.5	4.7	-
Cameroon	2000	MICS 2000	national	1.3	1.3	1.4	2.7	0.8	0.5	0.1	1.1	2.5	3.1	-
CAR	2000	MICS 2000	national	1.5	1.3	1.8	2.1	1.2	0.6	1.3	1.1	2.0	2.7	-
Chad	2000	MICS 2000	national	0.6	0.6	0.6	1.3	0.4	0.4	0.4	0.0	0.2	2.1	-
		RBM 2001	5 districts	2.9	-	-	-	-	-	-	-	-	-	-
Comoros	2000	MICS 2000	national	9.3	9.3	9.3	16.8	7.4	5.0	6.0	7.1	9.2	19.9	-
Côte d'Ivoire	2000	MICS 2000	national	1.1	1.2	1.1	1.9	0.6	0.3	1.0	1.6	1.2	2.1	-
DR Congo	2001	MICS 2001	national	0.7	0.7	0.8	2.1	0.1	0.0	0.1	0.2	0.4	3.1	-
Equatorial Guinea	2000	MICS 2000	national	0.7	0.9	0.6	3.2	0.2	0.0	0.2	1.9	0.6	3.1	-
Eritrea	2003	MoH 2003	3 zobas	63.0	-	-	-	-	-	-	-	-	-	-
	2002	DHS 2002	national	4.2	4.3	4.1	4.8	4.0	-	-	-	-	-	-
Gambia	2000	MICS 2000	national	14.7	14.4	15.2	7.2	19.4	17.6	20.7	13.9	10.8	7.4	-
Ghana	2003	DHS 2003	national	3.5	-	-	3.5	3.5	6.2	1.6	1.9	2.6	5.0	-
		Grabowsky et al., 2003	1 district	60.2	-	-	-	-	57.7	66.7	56.9	57.7	62.7	-
	2001	RBM 2001	5 districts	9.1	-	-	-	-	-	-	-	-	-	-
Guinea	2001	RBM 2001	4 districts	0.5	-	-	-	-	-	-	-	-	-	-
Guinea-Bissau	2000	MICS 2000	national	7.4	7.9	7.1	19.0	2.5	2.2	2.7	4.1	9.3	23.0	-
Kenya	2003	DHS 2003	national	4.6	5.1	4.1	9.8	3.5	1.2	2.2	4.9	4.8	12.0	-
	2001	RBM 2001	4 districts	4.5	-	-	-	-	-	-	-	-	-	-
	2000	MICS 2000	national	2.9	3.0	2.8	3.9	2.6	2.0	2.7	2.5	3.2	4.2	-
Madagascar	2000	MICS 2000	national	0.2	0.2	0.2	0.8	0.2	0.2	0.2	0.3	0.2	0.3	-
Malawi	2004	MoH 2004	national	35.5	-	-	50.1	32.2	-	-	-	-	-	-
	2000	DHS 2000	national	2.5	-	-	10.6	1.3	-	-	-	-	-	-

**Table A.10 Percentage of children under 5 years of age that slept under an insecticide-treated net during the night preceding the survey, by background characteristics**

Year	Source	Scale	Total	Gender		Residence		Wealth quintile						
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor		
2003	NetMark 2003	5 areas	17.7	-	-	-	-	-	-	-	-	-	-	-
	RBM 2003	district	8.4	-	-	-	-	-	-	-	-	-	-	-
2004	DHS 2003-2004	national	2.1	2.5	1.7	2.4	1.9	-	-	-	-	-	-	-
2000	NetMark 2000	5 areas	3.5	-	-	4.6	2.9	-	-	-	-	-	-	-
2000	MICS 2000	national	1.0	0.9	1.1	4.0	0.5	0.3	0.3	0.3	0.5	0.1	0.1	3.7
2003	DHS 2003	national	1.2	1.1	1.2	0.6	1.4	-	-	-	-	-	-	-
2000	NetMark 2000	5 areas	0.1	-	-	0.2	0.0	-	-	-	-	-	-	-
2000	DHS 2000	national	4.3	-	-	20.8	1.3	-	-	-	-	-	-	-
	MICS 2000	national	5.0	4.8	5.3	23.9	1.7	0.3	0.6	0.6	0.5	8.4	31.9	-
2000	MICS 2000	national	22.8	20.8	23.4	32.4	14.4	9.3	7.9	9.3	12.8	12.2	26.1	-
2000	MICS 2000	national	1.7	1.7	1.6	1.5	1.7	0.7	2.4	0.7	2.0	1.5	1.3	-
	NetMark 2000	5 areas	5.7	-	-	4.9	6.2	-	-	-	-	-	-	-
2000	MICS 2000	national	1.5	1.7	1.3	3.9	0.7	0.2	0.3	0.2	0.6	2.0	5.3	-
1999	MICS 1999	national	0.3	0.3	0.5	0.4	0.6	-	-	-	-	-	-	-
2000	MICS 2000	national	0.4	0.4	0.5	0.7	0.2	0.1	0.3	0.1	0.3	0.5	0.9	-
2000	MICS 2000	national	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.0	0.0	0.3	-
2000	MICS 2000	national	2.0	2.3	1.6	3.7	1.4	0.9	0.3	0.9	1.3	2.4	7.1	-
2003	Fapohunda BM, 2003	6 districts	4.0	-	-	-	-	-	-	-	-	-	-	-
2001	DHS 2000-01	national	0.2	-	-	0.9	0.2	-	-	-	-	-	-	-
	MoH 2001 (RBM baseline survey)	4 districts	2.0	-	-	-	-	-	-	-	-	-	-	-
2000	NetMark 2000	5 areas	3.1	-	-	5.5	1.5	-	-	-	-	-	-	-
1999	DHS 1999	national	2.1	-	-	4.8	1.3	-	-	-	-	-	-	-
2002	DHS 2002-2003	national	6.5	6.4	6.6	8.1	5.8	-	-	-	-	-	-	-
2001	RBM 2001	10 districts	10.2	-	-	-	-	-	-	-	-	-	-	-
2000	NetMark 2000	5 areas	4.1	-	-	6.1	2.8	-	-	-	-	-	-	-
1999	MICS 1999	national	1.1	1.3	0.8	1.6	0.8	0.2	0.4	0.2	1.0	1.1	2.9	-

	Year	Source	Scale	Total	Gender		Residence			Wealth quintile				
					Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
<b>Asia</b>														
Azerbaijan	2000	MICS 2000	national	1.4	1.5	1.3	0.9	1.9	2.0	1.8	1.6	0.3	0.8	
Indonesia	2000	MICS 2000	national	0.1	0.1	0.1	0.0	0.1	-	-	-	-	-	
Iraq	2000	MICS 2000	national	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	
Lao PDR	2000	National Health Survey 2002	national	14.6	14.5	14.6	10.9	15.3	10.8	17.7	14.2	15.8	15.2	
Tajikistan	2000	MICS 2000	national	1.9	1.6	2.3	1.1	2.1	0.9	3.1	2.5	1.8	0.8	
Timor-Leste	2002	MICS 2002	national	3.9	4.0	3.9	8.8	2.5	0.9	1.7	4.1	8.0	5.7	
Viet Nam	2000	MICS 2000	national	15.8	14.4	17.3	3.8	18.6	27.3	15.1	11.0	11.6	4.1	

### The Americas

Bolivia	2001	PSI 2001a	1 province	15.3	-	-	-	-	-	-	-	-	-	
Colombia	2000	DHS 2000	national	2.8	-	-	2.5	3.7	-	-	-	-	-	
Guatemala	1999	MICS	national	1.2	-	-	1.2	1.5	-	-	-	-	-	
Guyana	2000	MICS 2000	national	-	8.1	5.6	-	-	-	-	-	-	-	
Suriname	2000	MICS 2000	national	2.7	2.1	3.3	-	-	0.0	0.0	6.5	3.1	-	

**Table A.11 Percentage of pregnant women that slept under a mosquito net during the night preceding the survey, by background characteristics**

	Year	Source	Scale	Total	Residence			Wealth quintile			
					Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
<b>Africa</b>	2004	MoH/RBM 2004	6 health zones	51.5	-	-	-	-	-	-	-
	2001	DHS 2001	national	33.2	39.0	30.5	-	-	-	-	-
		RBM 2000	3 health zones	36.9	-	-	-	-	-	-	-
	2003	DHS 2003	national	24.0	24.6	23.9	29.2	25.7	29.7	21.0	26.7
	2001	PSI 2001	3 provinces	5.0	-	-	-	-	-	-	-
	2000	RBM 2001	5 districts	45.5	-	-	-	-	-	-	-
	2002	DHS 2002	national	6.6	-	-	7.4	5.5	5.2	8.7	7.0
	2001	RBM 2001	14 districts	4.7	-	-	-	-	-	-	-
	2003	DHS 2003	national	9.5	5.6	11.5	11.9	8.4	11.7	8.3	4.9
	2001	RBM 2001	5 districts	21.6	-	-	-	-	-	-	-
2001	RBM 2001	4 districts	25.5	-	-	-	-	-	-	-	
2003	DHS 2003	national	13.1	25.7	9.9	5.7	6.4	8.6	17.4	27.5	
2001	PSI 2000	6 regions	23.1	-	-	-	-	-	-	-	
2001	PSI 2001	1 district	53.3	-	-	-	-	-	-	-	
2004	MoH 2004	national	34.1	54.4	31.8	-	-	-	-	-	
2003	NetMark 2003	5 areas	49.1	-	-	-	-	-	-	-	
2004	DHS 2003-2004	national	31.2	27.2	34.6	-	-	-	-	-	
2000	NetMark 2000	5 areas	18.8	-	-	-	-	-	-	-	
2003	DHS 2003	national	5.4	3.2	6.2	-	-	-	-	-	
2000	NetMark 2000	5 areas	7.4	-	-	-	-	-	-	-	
2000	NetMark 2000	5 areas	21.4	-	-	-	-	-	-	-	
2001	DHS 2000-2001	national	6.6	-	-	-	-	-	-	-	
2000	NetMark 2000	5 areas	20.8	-	-	-	-	-	-	-	
2002	DHS 2002-2003	national	17.4	-	-	-	-	-	-	-	
2000	NetMark 2000	5 areas	4.1	-	-	-	-	-	-	-	
<b>Asia</b>				<b>Total</b>							
	2001	PSI 2001	2 provinces	96.0							

**Table A.12 Percentage of pregnant women that slept under an insecticide-treated net during the night preceding the survey, by background characteristics**

	Year	Source	Scale	Total	Residence			Wealth quintile					
					Urban	Rural	Poorest	Second	Middle	Fourth	Least poor		
<b>Africa</b>	2004	MoH/RBM 2004	6 health zones	28.7	-	-	-	-	-	-	-	-	-
	2001	RBM 2000	3 health zones	3.8	-	-	-	-	-	-	-	-	-
	2003	DHS 2003	<b>national</b>	<b>2.6</b>	<b>6.1</b>	<b>2.1</b>	<b>0.6</b>	<b>0.7</b>	<b>2.7</b>	<b>1.5</b>	<b>8.3</b>		
Burkina Faso	2001	RBM 2000	district	10.0	-	-	-	-	-	-	-	-	-
Chad	2000	RBM 2001	5 districts	7.2	-	-	-	-	-	-	-	-	-
Eritrea	2002	DHS 2002	<b>national</b>	<b>2.9</b>	-	-	<b>3.4</b>	<b>2.3</b>	<b>0.8</b>	<b>3.8</b>	<b>5.5</b>		
Ghana	2003	DHS 2003	<b>national</b>	<b>2.7</b>	<b>1.6</b>	<b>3.2</b>	<b>4.7</b>	<b>2.8</b>	<b>1.0</b>	<b>1.9</b>	<b>3.0</b>		
Guinea	2001	RBM 2001	5 districts	7.8	-	-	-	-	-	-	-	-	-
Kenya	2001	RBM 2001	4 districts	2.7	-	-	-	-	-	-	-	-	-
Kenya	2003	DHS 2003	<b>national</b>	<b>4.4</b>	<b>4.8</b>	<b>4.3</b>	<b>1.7</b>	<b>2.2</b>	<b>6.5</b>	<b>6.3</b>	<b>5.9</b>		
Malawi	2004	MoH 2004	<b>national</b>	<b>31.4</b>	<b>49.1</b>	<b>29.0</b>	-	-	-	-	-	-	-
Mali	2003	NetMark 2003	5 areas	19.6	-	-	-	-	-	-	-	-	-
		RBM 2003	district	19.0	-	-	-	-	-	-	-	-	-
Mozambique	2000	NetMark 2000	5 areas	5.6	-	-	-	-	-	-	-	-	-
Nigeria	2003	DHS 2003	<b>national</b>	<b>1.3</b>	<b>0.4</b>	<b>1.6</b>	-	-	-	-	-	-	-
	2000	NetMark 2000	5 areas	0.0	-	-	-	-	-	-	-	-	-
Senegal	2000	NetMark 2000	5 areas	6.0	-	-	-	-	-	-	-	-	-
Uganda	2001	DHS 2000–2001	<b>national</b>	<b>0.5</b>	-	-	-	-	-	-	-	-	-
		MoH 2001 (RBM baseline survey)	4 districts	2.3	-	-	-	-	-	-	-	-	-
Zambia	2000	NetMark 2000	5 areas	1.5	-	-	-	-	-	-	-	-	-
	2002	DHS 2002–2003	<b>national</b>	<b>7.9</b>	-	-	-	-	-	-	-	-	-
	2000	NetMark 2000	5 areas	1.4	-	-	-	-	-	-	-	-	-
<b>The Americas</b>	<b>Year</b>	<b>Source</b>	<b>Scale</b>	<b>Total</b>									
Bolivia	2001	PSI/2001a	1 province	17.8									

**Table A.13 Percentage of children under 5 years of age with reported fever in the 2 weeks prior to the survey, by background characteristics**

Country	Year	Source	Scale	Total	Gender		Residence			Wealth quintile			
					Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Angola	2001	MICS 2001	national	25.0	25.3	24.7	24.7	25.7	25.6	24.0	26.0	26.4	23.0
Benin	2001	DHS 2001	national	41.0	42.0	40.4	35.9	43.7	-	-	-	-	-
	1999	MICS 1999	national	15.0	-	-	15.0	16.0	-	-	-	-	-
Botswana	1988	DHS 1988	national	3.9	3.6	4.2	3.8	4.0	-	-	-	-	-
Burkina Faso	2003	DHS 2003	national	36.7	-	-	28.5	38.0	37.3	36.5	39.6	37.7	30.1
	1999	DHS 1998-1999	national	36.0	37.1	34.5	30.1	36.5	-	-	-	-	-
	1993	DHS 1992-1993	national	35.0	36.3	33.7	27.8	36.3	-	-	-	-	-
Burundi	2000	MICS 2000	national	16.5	17.6	15.5	14.8	16.6	14.5	19.6	17.7	14.1	17.0
Cameroon	2000	MICS 2000	national	24.8	24.8	24.8	22.9	25.6	26.9	23.6	26.3	23.0	23.4
	1991	DHS 1991	national	23.0	-	-	-	-	-	-	-	-	-
CAR	2000	MICS 2000	national	31.8	32.9	30.8	27.7	34.4	35.8	33.9	32.4	29.3	27.0
Chad	2000	MICS 2000	national	29.2	29.1	29.3	28.4	29.4	23.8	30.5	30.0	32.5	30.1
	1997	DHS 1996-1997	national	32.0	-	-	-	-	-	-	-	-	-
Comoros	2000	MICS 2000	national	31.0	30.5	31.5	25.0	32.6	29.8	33.9	33.0	29.9	28.5
Côte d'Ivoire	2000	MICS 2000	national	30.7	30.8	30.6	29.0	31.9	32.2	33.0	29.5	28.5	28.6
	1999	DHS 1998-1999	national	36.0	-	-	-	-	-	-	-	-	-
DR Congo	2001	MICS 2001	national	41.1	41.0	41.3	37.7	42.8	38.4	46.0	43.3	41.2	36.2
Equatorial Guinea	2000	MICS 2000	national	25.1	27.0	23.1	33.2	27.5	-	-	-	-	-
Eritrea	2002	DHS 2002	national	29.8	30.5	29.1	24.2	32.7	35.9	32.8	30.7	28.3	19.7
Ethiopia	2001	RBM 2001	14 districts	88.6	-	-	-	-	-	-	-	-	-
	2000	DHS 2000	national	28.4	29.0	27.8	25.0	28.8	-	-	-	-	-
Gabon	2000	DHS 2000	national	29.1	-	-	30.1	26.1	-	-	-	-	-
Gambia	2000	MICS 2000	national	14.8	14.4	15.3	14.4	15.1	14.8	15.6	12.3	19.1	12.4
Ghana	2003	DHS 2003	national	21.3	21.7	20.8	22.4	20.7	21.5	19.0	22.0	23.3	20.9
	1998	DHS 1998-1999	national	26.8	26.8	26.9	26.0	27.1	-	-	-	-	-
	1988	DHS 1988	national	35.0	-	-	-	-	-	-	-	-	-
Guinea	1999	DHS 1999	national	41.9	42.2	41.7	39.2	42.9	-	-	-	-	-
Guinea-Bissau	2000	MICS 2000	national	42.2	42.3	42.0	46.5	40.3	42.3	40.0	39.5	45.1	44.7

Year	Source	Scale	Total	Gender		Residence		Wealth quintile				
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
2003	DHS 2003	national	41.6	42.2	41.0	40.4	41.9	38.4	44.7	43.3	42.0	40.1
2000	MICS 2000	national	15.3	15.7	15.1	10.8	17.0	21.6	16.4	14.2	14.5	8.6
1998	DHS 1998	national	42.3	42.4	42.2	41.7	42.4	-	-	-	-	-
1993	DHS 1993	national	41.0	-	-	-	-	-	-	-	-	-
1989	DHS 1988-1989	national	42.0	-	-	-	-	-	-	-	-	-
1986	DHS 1986	national	50.0	-	-	-	-	-	-	-	-	-
2000	MICS 2000	national	15.9	15.9	15.9	11.5	16.9	15.3	23.6	13.5	13.4	6.9
1992	DHS 1992	national	27.0	-	-	-	-	-	-	-	-	-
2004	MoH 2004	national	39.0	-	-	28.6	40.1	-	-	-	-	-
2000	DHS 2000	national	41.6	-	-	31.9	43.0	-	-	-	-	-
1992	DHS 1992	national	40.0	-	-	-	-	-	-	-	-	-
2001	DHS 2001	national	26.8	27.0	26.6	24.0	27.7	-	-	-	-	-
1987	DHS 1987	national	33.0	-	-	-	-	-	-	-	-	-
2004	DHS 2003-2004	national	37.5	39.9	34.4	34.1	40.2	-	-	-	-	-
2001	DHS 2000-2001	national	31.1	30.6	31.6	31.9	30.4	-	-	-	-	-
2000	DHS 2000	national	19.4	19.0	19.9	20.9	18.7	-	-	-	-	-
1992	DHS 1992	national	34.0	-	-	-	-	-	-	-	-	-
2000	MICS 2000	national	41.6	42.5	40.5	25.8	43.9	45.5	45.0	40.4	47.9	28.8
1992	DHS 1992	national	45.0	-	-	-	-	-	-	-	-	-
2003	DHS 2003	national	31.6	31.6	31.6	27.8	33.3	-	-	-	-	-
1999	DHS 1999	national	30.2	31.8	28.6	26.5	31.6	-	-	-	-	-
1990	DHS 1990	national	32.0	-	-	-	-	-	-	-	-	-
2000	DHS 2000	national	32.7	-	-	-	-	-	-	-	-	-
	MICS 2000	national	33.4	31.5	35.1	22.7	35.3	38.1	38.5	31.4	32.1	18.1
1992	DHS 1992	national	41.0	-	-	-	-	-	-	-	-	-
2000	MICS 2000	national	29.0	29.4	28.9	28.6	29.1	28.1	30.5	36.8	27.8	28.4
2000	MICS 2000	national	20.5	21.9	19.2	15.1	26.9	26.6	23.8	19.0	15.3	16.7
1993	DHS 1992-1993	national	38.0	-	-	-	-	-	-	-	-	-
2000	MICS 2000	national	45.9	46.3	45.6	43.9	46.6	46.3	50.1	45.2	48.5	37.8
1999	MICS 1999	national	17.0	17.5	16.5	18.5	17.6	-	-	-	-	-
2000	MICS 2000	national	20.7	21.8	19.6	18.4	22.8	21.0	20.5	21.2	20.5	20.6
2000	MICS 2000	national	4.0	3.8	4.1	9.1	3.0	2.5	2.8	3.2	6.1	8.6
2000	MICS 2000	national	36.2	35.9	36.4	28.8	38.9	41.2	37.9	39.1	35.6	20.9



Table A.13 Percentage of children under 5 years of age with reported fever in the 2 weeks prior to the survey, by background characteristics

Year	Source	Scale	Total	Gender		Residence			Wealth quintile				
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
2003	Fapohunda BM, 2003	6 districts	46.3	-	-	-	-	-	-	-	-	-	-
2001	DHS 2000-01	national	43.9	44.7	43.1	32.9	45.3	-	-	-	-	-	-
	MoH 2001 (RBM baseline survey)	4 districts	1.0	-	-	-	-	-	-	-	-	-	-
1989	DHS 1988-1989	national	41.0	-	-	-	-	-	-	-	-	-	-
1999	DHS 1999	national	35.1	36.5	33.7	33.4	35.5	-	-	-	-	-	-
1996	DHS 1996	national	30.0	-	-	-	-	-	-	-	-	-	-
1992	DHS 1991-1992	national	31.0	-	-	-	-	-	-	-	-	-	-
2002	DHS 2002-2003	national	43.3	42.2	44.4	33.2	47.8	-	-	-	-	-	-
1999	MICS 1999	national	14.4	14.4	14.4	10.7	16.3	15.6	15.9	19.0	12.5	8.5	-
1997	DHS 1996-1997	national	40.0	-	-	-	-	-	-	-	-	-	-
1992	DHS 1992	national	43.0	-	-	-	-	-	-	-	-	-	-
1999	DHS 1999	national	25.8	26.4	25.1	22.6	27.3	-	-	-	-	-	-

Table A.14 Percentage of febrile children under 5 years of age who received treatment with CQ, by background characteristics

Year	Source	Scale	Total	Gender		Residence			Wealth quintile			
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
2001	MICS 2001	national	56.9	57.1	56.8	57.6	55.6	52.4	58.7	60.0	55.5	57.7
2001	DHS 2001	national	59.0	57.5	60.5	60.3	58.5	-	-	-	-	-
2003	DHS 2003	national	47.7	-	-	52.3	47.1	35.9	43.9	49.0	56.9	55.1
2000	MICS 2000	national	23.3	22.8	23.9	25.0	23.2	14.8	27.5	24.6	21.2	26.0
2000	MICS 2000	national	48.3	47.4	49.3	48.3	48.3	41.7	46.8	47.8	59.8	47.8
2000	MICS 2000	national	65.7	65.3	66.1	71.4	62.7	57.7	62.3	68.8	70.6	73.1
2000	MICS 2000	national	31.1	30.1	32.0	39.9	28.8	20.0	33.8	28.9	32.7	39.5
2000	MICS 2000	national	61.5	60.7	62.2	63.0	61.1	48.4	66.6	60.3	67.4	64.6
2000	MICS 2000	national	56.3	55.8	56.9	67.4	48.9	40.9	53.7	59.6	72.0	67.1
2001	MICS 2001	national	45.0	44.4	45.5	49.2	43.2	40.7	43.8	47.8	45.9	45.9
2000	MICS 2000	national	41.2	40.0	42.7	43.6	39.5	40.2	41.4	43.2	39.9	42.7
2002	DHS 2002	national	2.4	3.4	1.3	2.8	2.3	1.5	1.8	2.5	4.9	0.9

Year	Source	Scale	Total	Gender		Residence			Wealth quintile					
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor		
Ethiopia	2000	DHS 2000	1.6	-	-	-	-	-	-	-	-	-	-	-
Gabon	2000	DHS 2000	38.8	-	-	35.6	49.1	-	-	-	-	-	-	-
Gambia	2000	MICS 2000	54.5	58.9	50.4	57.0	53.1	54.9	54.4	54.7	58.1	47.4	47.4	47.4
Ghana	2003	DHS 2003	59.2	58.0	60.5	61.7	57.9	55.2	52.1	64.0	69.6	56.3	56.3	56.3
Guinea-Bissau	2000	MICS 2000	58.3	57.4	59.1	71.5	51.7	43.7	56.0	57.1	61.7	76.2	76.2	76.2
Kenya	2003	DHS 2003	3.4	3.7	3.0	2.6	3.5	6.5	4.7	1.7	0.9	2.1	2.1	2.1
	2000	MICS 2000	43.5	44.9	40.7	35.7	44.5	43.4	39.8	46.8	44.0	41.7	41.7	41.7
Madagascar	2000	MICS 2000	29.7	29.5	29.9	23.3	30.8	28.1	31.2	30.4	30.5	21.2	21.2	21.2
Malawi	2000	DHS 2000	1.3	-	-	0.5	1.4	-	-	-	-	-	-	-
Mali	2001	DHS 2001	38.2	-	-	52.1	34.4	-	-	-	-	-	-	-
Mauritania	2004	DHS 2003-2004	28.3	28.6	27.9	22.0	32.4	-	-	-	-	-	-	-
	2001	DHS 2000-2001	21.3	20.0	22.7	25.9	17.8	-	-	-	-	-	-	-
Mozambique	2003	HDS 2003	14.9	-	-	12.7	15.7	-	-	-	-	-	-	-
Namibia	2000	DHS 2000	14.4	14.7	14.0	6.3	19.2	-	-	-	-	-	-	-
Niger	2000	MICS 2000	48.1	48.7	47.4	59.0	47.1	41.6	43.3	49.2	47.7	64.9	64.9	64.9
Nigeria	2003	DHS 2003	32.9	31.6	34.1	37.6	31.1	-	-	-	-	-	-	-
Rwanda	2000	DHS 2000	4.6	-	-	-	-	-	-	-	-	-	-	-
		MICS 2000	7.1	8.2	6.1	11.9	6.5	5.0	5.9	7.3	6.7	26.9	26.9	26.9
Sao Tome & Principe	2000	MICS 2000	60.7	61.9	60.2	61.2	61.1	60.6	51.7	59.4	62.9	61.8	61.8	61.8
Senegal	2000	MICS 2000	35.9	34.4	37.5	49.0	23.3	25.4	30.0	32.6	54.8	54.2	54.2	54.2
Sierra Leone	2000	MICS 2000	59.6	60.6	58.6	58.3	60.0	52.5	58.5	62.7	63.6	62.1	62.1	62.1
Somalia	1999	MICS 1999	18.5	18.7	18.4	11.1	24.4	-	-	-	-	-	-	-
Sudan	2000	MICS 2000	49.4	50.6	48.1	59.4	41.6	45.0	47.5	48.4	45.9	54.9	54.9	54.9
Swaziland	2000	MICS 2000	22.6	25.4	18.9	28.0	21.8	30.1	12.0	25.8	28.1	18.8	18.8	18.8
Togo	2000	MICS 2000	59.2	59.9	58.5	61.4	58.6	56.6	57.5	60.3	59.9	68.5	68.5	68.5
UR Tanzania	1999	DHS 1999	52.9	-	-	-	-	-	-	-	-	-	-	-
Zambia	2002	DHS 2002-2003	49.7	-	-	46.0	50.9	-	-	-	-	-	-	-
	1999	MICS 1999	56.4	56.6	56.2	56.2	56.5	50.2	50.4	65.5	54.7	62.4	62.4	62.4

**Table A.15 Percentage of febrile children under 5 years or age who received treatment with SP, by background characteristics**

Africa	Year	Source	Scale	Total	Gender		Residence			Wealth quintile				
					Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
					1.6	1.2	1.0	2.4	1.0	0.7	1.6	2.5	0.8	
Angola	2001	MICS 2001	national	1.4	1.6	1.2	1.0	2.4	1.0	-	-	-	-	-
Benin	2001	DHS 2001	national	0.9	0.7	1.0	0.4	1.0	-	-	-	-	-	-
Burkina Faso	2003	DHS 2003	national	0.2	-	-	0.9	0.2	-	-	-	-	0.6	1.0
Burundi	2000	MICS 2000	national	1.6	1.8	1.5	0.0	1.8	1.1	2.5	1.8	1.8	1.0	1.6
Cameroon	2000	MICS 2000	national	1.4	1.6	1.1	1.8	1.2	0.0	2.1	1.8	2.3	0.8	0.8
CAR	2000	MICS 2000	national	0.3	0.3	0.3	0.5	0.2	0.2	0.2	0.0	0.5	0.5	0.5
Chad	2000	MICS 2000	national	1.2	1.0	1.5	1.9	1.1	1.7	0.5	1.8	0.9	1.7	1.7
Comoros	2000	MICS 2000	national	4.0	4.1	3.8	3.8	4.0	4.3	3.7	3.9	3.7	4.3	4.3
Côte d'Ivoire	2000	MICS 2000	national	2.5	3.0	1.9	2.5	2.4	1.6	2.1	4.1	2.3	2.4	2.4
DR Congo	2001	MICS 2001	national	0.8	0.9	0.7	1.0	0.7	0.2	0.6	0.4	2.2	0.8	0.8
Eritrea	2002	DHS 2002	national	0.5	0.5	0.4	0.3	0.6	0.3	0.6	0.7	0.7	0.7	0.0
Ethiopia	2000	DHS 2000	national	0.7	-	-	-	-	-	-	-	-	-	-
Gambia	2000	MICS 2000	national	3.1	4.0	2.4	3.9	2.7	4.0	3.0	3.2	2.5	2.7	2.7
Ghana	2003	DHS 2003	national	0.3	0.5	0.0	0.8	0.0	0.0	0.0	0.0	0.6	1.0	1.0
Guinea-Bissau	2000	MICS 2000	national	2.5	2.7	2.2	3.4	2.0	0.7	0.9	3.8	3.4	3.7	3.7
Kenya	2003	DHS 2003	national	11.1	11.9	10.2	7.6	11.9	11.1	12.5	15.1	8.3	7.6	7.6
Kenya	2000	MICS 2000	national	26.3	25.7	28.9	33.9	25.8	23.5	29.6	21.7	24.8	39.9	39.9
Madagascar	2000	MICS 2000	national	0.7	1.2	0.2	0.0	0.8	0.0	0.5	1.3	1.8	1.8	1.8
Malawi	2000	DHS 2000	national	23.2	-	-	27.6	22.8	-	-	-	-	-	-
Mauritania	2004	DHS 2003-2004	national	0.7	1.2	-	0.6	0.8	-	-	-	-	-	-
Mozambique	2003	HDS 2003	sub-national	10.7	-	-	9.2	11.3	-	-	-	-	-	-
Niger	2000	MICS 2000	national	0.1	0.2	0.0	0.2	0.1	0.0	0.0	0.0	0.3	0.1	0.1
Nigeria	2003	DHS 2003	national	0.4	0.5	0.6	0.4	0.4	-	-	-	-	-	-
Rwanda	2000	DHS 2000	national	1.2	-	-	-	-	-	-	-	-	-	-
Rwanda	2000	MICS 2000	national	2.3	2.7	1.9	0.2	2.5	1.7	1.8	2.0	3.6	0.6	0.6
Sao Tome & Principe	2000	MICS 2000	national	0.8	0.3	1.3	1.0	0.6	0.0	0.0	0.0	0.0	1.0	1.0
Senegal	2000	MICS 2000	national	0.5	0.6	0.3	0.0	0.3	0.0	0.2	0.5	0.5	2.1	2.1
Sierra Leone	2000	MICS 2000	national	4.3	4.3	4.3	6.7	3.6	2.7	1.6	4.9	7.7	5.6	5.6
Somalia	1999	MICS 1999	national	0.0	0.0	0.0	0.0	0.0	-	-	-	-	-	-
Sudan	2000	MICS 2000	national	1.4	1.9	0.8	2.0	0.9	0.8	0.6	1.6	1.0	2.0	2.0

Year	Source	Scale	Gender		Residence			Wealth quintile				
			Total	Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
2000	MICS 2000	national	5.7	7.7	4.5	0.0	9.9	25.2	4.3	4.3	0.0	0.0
2000	MICS 2000	national	3.4	2.8	4.0	4.5	3.1	2.6	2.0	3.1	3.5	10.9
1999	DHS 1999	national	0.0	-	-	-	-	-	-	-	-	-
2002	DHS 2002-2003	national	2.4	-	-	4.7	1.7	-	-	-	-	-
1999	MICS 1999	national	2.4	2.6	2.2	3.2	2.2	2.4	0.1	1.9	3.5	6.6

**Table A.16 Percentage of febrile children under 5 years of age who received treatment with any antimalarial, by background characteristics**

Year	Source	Scale	Gender		Residence			Wealth quintile				
			Total	Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
2001	MICS 2001	national	63.0	63.1	62.8	63.1	62.7	57.8	64.2	64.2	65.0	62.7
2001	DHS 2001	national	60.4	59.0	62.0	62.3	59.7	-	-	-	-	-
2003	DHS 2003	national	49.6	-	-	60.1	48.4	36.5	44.7	49.7	59.3	62.7
1993	DHS 1992-1993	national	31.5	33.3	29.6	39.1	30.5	-	-	-	-	-
2000	MICS 2000	national	31.3	30.2	32.6	41.7	30.6	23.9	34.2	29.8	28.8	37.4
2000	MICS 2000	national	66.1	67.0	65.1	70.8	64.4	59.1	66.7	61.0	76.7	70.8
2000	MICS 2000	national	68.8	69.0	68.6	75.8	65.2	59.3	64.6	71.6	74.7	79.0
2000	MICS 2000	national	31.9	30.9	32.8	41.2	29.5	21.1	34.3	29.5	33.5	40.5
2000	MICS 2000	national	62.7	62.2	63.1	65.2	62.1	51.2	67.5	60.7	67.9	66.3
2000	MICS 2000	national	57.5	57.0	58.0	68.6	49.8	41.9	54.3	60.8	73.2	69.5
2001	MICS 2001	national	45.4	44.9	45.9	49.6	43.7	40.9	44.3	47.8	46.9	46.7
2000	MICS 2000	national	48.6	47.2	50.2	55.2	42.9	44.2	45.2	53.8	49.1	53.2
2002	DHS 2002	national	3.6	4.2	2.9	4.0	3.5	2.4	3.3	4.2	5.8	1.5
2001	RBM 2001	14 districts	73.7	-	-	-	-	-	-	-	-	-
2000	DHS 2000	national	3.0	-	-	-	-	-	-	-	-	-
2000	MICS 2000	national	55.2	59.6	51.0	58.0	53.5	54.9	56.0	56.5	58.1	47.4
2003	DHS 2003	national	62.8	62.1	63.5	65.2	61.4	59.0	55.4	65.0	76.9	58.3
1998	DHS 1998-1999	national	60.7	60.7	60.7	60.1	60.9	-	-	-	-	-
2000	MICS 2000	national	58.4	57.5	59.4	71.9	51.7	43.7	56.0	57.3	61.8	76.8

Table A.16 Percentage of febrile children under 5 years of age who received treatment with any antimalarial, by background characteristics

Year	Source	Scale	Total	Gender		Residence			Wealth quintile			
				Male	Female	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Kenya	2003	DHS 2003	26.5	27.5	25.5	21.5	27.7	27.5	31.6	28.7	24.9	18.2
	2000	MICS 2000	64.5	65.6	63.4	63.6	64.7	64.0	62.7	63.7	62.4	75.8
	1998	DHS 1998	40.4	39.9	40.8	35.2	41.5	-	-	-	-	-
Madagascar	2000	MICS 2000	60.7	59.3	62.3	61.9	60.5	66.0	55.9	64.2	58.2	52.7
Malawi	2004	MoH 2004	31.6	-	-	39.3	31.0	-	-	-	-	-
	2000	DHS 2000	27.0	-	-	33.7	26.3	-	-	-	-	-
Mauritania	2004	DHS 2003-2004	33.4	34.0	32.6	26.7	37.7	-	-	-	-	-
Mozambique	2003	HDS 2003	14.8	-	-	12.7	12.7	-	-	-	-	-
Namibia	2000	DHS 2000	14.4	14.7	14.0	6.3	19.2	-	-	-	-	-
Niger	2000	MICS 2000	48.1	48.7	47.4	59.0	47.1	41.6	43.3	49.2	47.7	64.9
Nigeria	2003	DHS 2003	33.8	32.5	35.2	38.5	32.2	-	-	-	-	-
Rwanda	2000	DHS 2000	9.2	-	-	11.5	9.0	-	-	-	-	-
		MICS 2000	12.6	14.5	11.1	20.7	11.7	8.8	10.0	12.0	16.0	30.4
Sao Tome & Principe	2000	MICS 2000	61.2	62.2	60.8	61.9	61.4	60.6	51.7	59.4	62.9	62.4
Senegal	2000	MICS 2000	36.2	34.9	37.6	52.7	30.1	25.4	30.0	33.1	54.8	56.1
Sierra Leone	2000	MICS 2000	60.7	61.4	59.9	60.8	60.7	53.3	58.5	63.9	65.2	64.4
Somalia	1999	MICS 1999	18.5	18.7	18.4	11.1	24.4	-	-	-	-	-
Sudan	2000	MICS 2000	50.2	51.7	48.5	60.6	42.1	32.1	41.3	54.6	61.3	75.3
Swaziland	2000	MICS 2000	25.5	27.1	23.9	28.4	26.9	35.1	16.2	28.3	27.7	18.7
Togo	2000	MICS 2000	60.0	60.2	59.8	62.2	59.4	56.8	58.1	61.3	61.2	70.0
UR Tanzania	1999	DHS 1999	53.4	54.3	52.4	61.7	51.6	-	-	-	-	-
Zambia	2002	DHS 2002-2003	51.9	52.8	51.0	49.3	52.7	-	-	-	-	-
	1999	MICS 1999	58.0	58.2	57.8	57.9	58.0	52.6	50.4	66.7	56.9	65.5

**Table A.17 Pregnant women receiving SP at least once during pregnancy (community level, prevention or treatment), by background characteristics**

Africa	Year	Source	Scale	Residence			Wealth quintile					
				Total	Urban	Rural	Poorest	Second	Middle	Fourth	Least poor	
Benin	2001	DHS 2001	national	6.2	4.2	7.2	-	-	-	-	-	-
Ghana	2003	DHS 2003	national	1.0	0.9	1.1	1.3	0.7	1.0	0.9	1.4	-
Kenya	2003	DHS 2003	national	12.5	13.1	12.4	12.6	11.8	13.8	11.9	12.5	-
Malawi	2004	MoH 2004	national	77.7	88.9	75.4	-	-	-	-	-	-
	2000	DHS 2000	national	67.5	-	-	-	-	-	-	-	-
Mauritania	2004	DHS 2003-2004	national	0.5	0.9	0.2	-	-	-	-	-	-
Nigeria	2003	DHS 2003	national	2.4	-	-	-	-	-	-	-	-
Rwanda	2000	DHS 2000	national	0.1	-	-	-	-	-	-	-	-
Zambia	2002	DHS 2002-2003	national	0.5	0.8	0.4	-	-	-	-	-	-

**Table A.18 Pregnant women receiving SP at least twice during pregnancy (community level, prevention or treatment), by background characteristics**

Africa	Year	Source	Scale	Residence		
				Total	Urban	Rural
Malawi	2004	MoH 2004	national	46.8	57.2	44.7
	2000	DHS 2000	national	29.3	-	-

**Table A.19 Pregnant women receiving SP at least once during an antenatal visit, by background characteristics**

	Year	Source	Scale	Total	Residence	
					Urban	Rural
Mauritania	2004	DHS 2003–2004	national	0.3	0.7	-
Nigeria	2003	DHS 2003	national	1.0	2.0	0.6

**Table A.20 Pregnant women receiving SP at least twice during an antenatal visit, by background characteristics**

	Year	Source	Scale	Total	Residence		Wealth quintile				
					Urban	Rural	Poorest	Second	Middle	Fourth	Least poor
Ghana	2003	DHS 2003	national	0.8	0.6	0.9	0.7	0.7	1.0	0.6	1.1
Kenya	2003	DHS 2003	national	3.9	4.2	3.9	3.0	4.7	4.7	3.4	3.9
Uganda	2001	MoH 2002	17 districts	33.0	-	-	-	-	-	-	-

Table A.21 Reported malaria for the most recent year information received

1	2	3	Standardized reported malaria				Reported malaria cases and deaths description												
			Year	Pop (000s)	Cases	Rate (per 1000)	Confirmed status	Deaths	Probable/clinically diagnosed					Slides/RDTs	Laboratory confirmed				
									Cases	Severe	Deaths	Cases	Severe		Deaths	Cases	Pf/mixed (%)	Pv	Severe
Year	Pop (000s)	Cases	Rate (per 1000)	Confirmed status	Deaths	8	9	10	11	12	13	14	15	16	17	18	19		
<b>Africa</b>																			
<b>Central</b>																			
Cameroon	1998	14 458	664 413	45.96	NR		664 413												
CAR	2003	3 865	95 644	24.75	NR		95 644												
Chad	2001	8 103	386 197	47.66	NR	1 001	386 197	19 463											
Congo	1998	3 244	17 122	5.28	NR		17 122												
DR Congo	2003	52 771	4 386 638	83.13	NR	16 498	4 386 638	16 498											
Equatorial Guinea	1995	401	12 530	31.25	NR		12 530												
Gabon	1998	1 202	80 247	66.78	NR		80 247												
Sao Tome & Principe	2003	161	63 199	393.53	NR		63 199												
<b>East</b>																			
Burundi	2002	6 602	1 808 588	273.96	NR	330	1 808 588	330											
Comoros	2001	726	3 718	5.12	NR	16	3 718	820	16										
Djibouti	2003	703	5 036	7.17	All					5 036									
Eritrea	2003	4 141	72 023	17.39	NR	78	72 023		78										
Ethiopia	2003	70 678	565 273	8.00	All						1 210 868	395 964	70	158 115					
Kenya	2002	31 540	124 197	3.94	NR	135	124 197	9 584	135										
Rwanda	2003	8 387	856 233	102.09	Some		856 233	94 990	1 045										
Somalia	2003	9 890	23 349	2.36	Some	10	15 778		44							10			
Sudan	2003	33 610	3 084 320	91.77	Some	2 479	1 998 367	105 813	2 479										
Uganda	2003	25 827	12 343 411	477.93	NR	8 450	12 343 411		8 450										
UR Tanzania	2003	36 977	10 712 526	289.71	Some	14 156	10 712 526	521 019	14 156										
<b>North</b>																			
Algeria	2002	31 266	52	<0.01	All	0													
Egypt	2003	71 931	0	<0.01	All	0													
Morocco	2003	30 566	4	<0.01	All														
<b>Southern</b>																			
Angola	2002	13 184	1 409 328	106.90	NR	11 344	1 409 328		11 344										
Botswana	2003	1 785	22 418	12.56	Some	10	22 418												
Madagascar	2003	17 404	2 114 400	121.49	NR	759	2 114 400	10 359	759										
Malawi	2002	11 871	2 853 317	240.36	NR	6 993	4 216 059	157 862	9 579										
Mauritius	2002	1 210	22	0.02	NR		22												
Mozambique	2003	18 863	5 087 865	269.72	NR	3 569	5 087 865		3 569										
Namibia	2003	1 987	444 081	223.44	NR	1 095	444 081	20 968	1 095										
South Africa	2003	45 026	13 446	0.30	NR	141	13 446		141										



Table A.21 Reported malaria for the most recent year information received

Year	Standardized reported malaria							Reported malaria cases and deaths description										
	Pop (000s)			Cases		Rate (per 1000)	Confirmed status	Probable / clinically diagnosed			Laboratory confirmed			Investigations				
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Swaziland	2003	1 077	36 664	34.03	NR	977	36 664											
Zambia	2001	10 570	2 010 185	190.18	NR	5 763	2 010 185	162 709	5 763									
Zimbabwe	2002	12 835	1 252 668	97.60	NR	626	599 416	626										
<b>West</b>																		
Benin	2001	6 387	779 041	121.98	NR	670	779 041	32 008	670									
Burkina Faso	2002	12 624	1 451 125	114.95	NR	4 417	1 451 125	73 017	4 417									
Cape Verde	2000	436	143	0.33	NR		143											
Côte d'Ivoire	2001	16 098	400 402	24.87	NR	422	400 402	40 375	422									
Gambia	1999	1 273	127 899	100.47	NR		127 899											
Ghana	2003	20 922	3 552 869	169.81	Some	3 245	3 552 869	478 960	3 245	478 960								
Guinea	2000	8 117	889 089	109.53	NR	441	889 089	14 933	441									
Guinea-Bissau	2002	1 449	194 976	134.57	NR	780	194 976	66 703	780									
Liberia	1998	2 580	777 754	301.51	NR		777 754											
Mali	2003	13 007	809 428	62.23	NR	1 309	809 428	1 309										
Mauritania	2002	2 807	167 423	59.64	NR	100	167 423	7 312	100									
Niger	2002	11 544	681 707	59.05	NR	1 096	681 707	4 777	1 096									
Nigeria	2003	124 009	2 608 479	21.03	NR	5 343	2 608 479	5 343										
Senegal	2000	9 393	1 120 094	119.25	NR	1 337	1 120 094	36 860	1 337									
Sierra Leone	1999	4 294	409 670	95.41	NR		409 670											
Togo	2001	4 686	431 826	92.15	NR	791	431 826	12 904	791									
<b>Asia</b>																		
<b>Central Asia and Transcaucasia</b>																		
Armenia	2003	3 061	8	<0.01	All	0					29	4	14		0	21	72	
Azerbaijan	2003	8 370	480	0.06	All	0					482	0	0	0	0	2	0	
Georgia	2003	5 126	308	0.06	All	0					316	2	1	0	8	3		
Kyrgyzstan	2003	5 138	465	0.09	All	0					468	1	0	0	3	1		
Tajikistan	2003	6 245	5 428	0.87	All	0					5 428	250	5	0	0	0		
Turkmenistan	2003	4 867	1	<0.01	All	0					7	0	0	0	0	6	86	
Uzbekistan	2003	26 093	33	<0.01	All	0					74	0	0	0	0	41	55	
<b>Eastern Mediterranean</b>																		
Afghanistan	2003	23 897	591 441	24.75	Some		224 662				366 779	44 243	12	322 536				
Iran (Islamic Republic of)	2003	68 920	17 060	0.25	All		0				1 358 262	4 475	19	18 818	131		6 502	28
Iraq	2003	25 175	303	0.01	All	0	0	0	0		307	0	0	307	0	0	4	1
Oman	2003	2 851	6	<0.01	All						740	299	40			734	99	
Pakistan	2003	153 578	122 560	0.80	All	29	3 985 915	29			125 152	39 944	32	85 240	14	2 592	2	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Saudi Arabia	2003	24 217	596	0.02	All	0				819 869	1 724	1 234	72	462	0	1 128	65	
Syrian Arab Republic	2003	17 800	2	<0.01	All						24	13	54	10		22	92	
Turkey	2003	71 325	9 182	0.13	All	0					9 222	12	0		0	40	0	
Yemen	2003	20 010	265 023	13.24	Some	29	214 212			414 919	50 811	48 741	96		29			
<b>South-East Asia</b>																		
Bangladesh	2003	146 736	56 879	0.39	All	574	434 723		1 250	434 723	56 879	42 012	74	14 867	10 332	574		
Bhutan	2003	2 257	3 806	1.69	All	15	237			61 246	3 806	1 681	44	2 126	1 621	15		
DPR Korea	2003	22 664	16 538	0.73	All	0	46 251	0	0	32 083	16 538	0	0	16 538	0	0		
India	2003	1 065 462	1 781 336	1.67	All	990				98 154 977	1 781 336	845 173	47	936 163		990		
Indonesia	2002	217 131	220 073	1.01	All	197	1 355 714			1 298 194	220 073	71 202	32	148 871		197		
Myanmar	2003	49 485	716 100	14.47	Some	2 476	539 929			661 392	176 171	139 315	79	35 995	12 962	2 476		
Nepal	2003	25 164	9 394	0.37	All	3	56 640			195 376	9 394	1 218	13	8 177		3		
Sri Lanka	2003	19 065	10 510	0.55	All	2				1 192 259	10 510	1 273	12	9 237		2		
Thailand	2003	62 833	35 076	0.56	All	325				3 259 607	37 355	19 024	51	18 295		325	2 279	6
Timor-Leste	2003	778	31 819	40.89	All	8	100 000		100	50 815	31 819	17 370	55	14 449	409	8		
<b>Western Pacific</b>																		
Cambodia	2003	14 144	71 258	5.04	All	492		4 936		160 326	71 258	63 739	89			492		
China	2002	1 294 867	25 520	0.02	All	42					25 520	5 937	23			42		
Lao PDR	2003	5 657	18 894	3.34	All	187				256 534	18 894	17 878	95	1 016		187		
Malaysia	2003	24 425	5 477	0.22	All	21					6 338	2 884	46	3 127	421	21	861	14
Papua New Guinea	2003	5 711	70 226	12.30	All	537	1 729 697	17 590	537		70 226	55 638	79					
Philippines	2003	79 999	43 644	0.55	All						43 644							
Republic of Korea	2003	47 700	1 107	0.02	All	0					1 171	25	2	1 146		0	64	5
Solomon Islands	2003	477	90 606	189.94	All	71			71	297 897	90 606	64 302	71	26 304				
Vanuatu	2003	212	15 240	71.90	All	0					15 240	8 406	55			0		
Viet Nam	2003	81 377	37 416	0.46	All	50	12 694	423	4	2 738 600	37 416	29 435	79		46			

## The Americas

### Central America & Caribbean

Belize	2002	251	928	3.70	All	0				15 480	928	0	0	928	0	0		
Costa Rica	2003	4 173	718	0.17	All	0				9 622	718	14	2	704		0		
Dominican Republic	2003	8 745	1 296	0.15	All	16				391 216	1 296	1 034	80	4		16		
El Salvador	2003	6 515	85	0.01	All					102 053	85	2	2	83				
Guatemala	2003	12 347	31 127	2.52	All	0				156 227	31 127	1 310	4	29 817	5	0		
Haiti	2003	8 326	9 837	1.18	All	16				51 067	9 837	9 837	100	0		16		
Honduras	2003	6 941	10 122	1.46	All	0				90 575	10 122	323	3	9 799		0		
Mexico	2003	103 457	3 819	0.04	All	0				1 577 647	3 819	17	0	4 272		0		
Nicaragua	2003	5 466	6 812	1.25	All	0				449 839	6 812	1 245	18	5 567		0		
Panama	2003	3 120	9 000	2.88	All	3				333 622	9 000	627	5	3 873		3		

Table A.21 Reported malaria for the most recent year information received

1	Standardized reported malaria				Reported malaria cases and deaths description												
	Year (000s)		Pop (000s)	Rate (per 1000)	Probable / clinically diagnosed			Laboratory confirmed			Investigations						
	2	3			Cases	Confirmed status	Deaths	Cases	Severe	Deaths	Slides/ RDTs	Cases	Pf/mixed (%)	Pv	Severe Deaths	Imported (%)	18
	4	5	6	7	8	9	10	11	12	13	14	15	16	17			
<b>South America</b>																	
Argentina	2003	38 428	122	0.00	All	0		3 977	122	0	0	122	0	0			
Bolivia	2003	8 808	20 343	2.31	All	2		158 299	20 343	793	4	17 319		2			
Brazil	2003	178 470	379 551	2.13	All	30		1 474 656	379 551	81 343	21	297 962	10 719	30			
Colombia	2003	44 222	164 722	3.72	All	24		520 980	164 722	69 238	42	95 484		24			
Ecuador	2003	13 003	52 065	4.00	All	0		433 244	52 065	10 724	21	41 341		0			
French Guiana	2003	178	3 823	21.49	All	0		46 548	3 823	3 166	83	657		0			
Guyana	2003	765	27 627	36.09	All			185 877	27 627	12 970	47	14 654					
Paraguay	2003	5 878	1 392	0.24	All	0		126 582	1 392	3	0	1 389		0			
Peru	2003	27 167	79 473	2.93	All	25		1 426 410	79 473	17 687	22	61 680		25			
Suriname	2003	436	14 657	33.65	All			70 670	14 657	13 043	89	1 614					
Venezuela	2003	25 699	31 719	1.23	All			346 586	31 719	5 562	18	26 111					

**Notes:**

Please refer to explanatory notes for regional tabulations.

NR = none reported

RDTs = rapid diagnostic tests

Pf/mixed = number of reported *P. falciparum* or mixed casesPv = number of reported *P. vivax* cases

Table A.22 Standardized reported malaria cases and rates per 1000 since 1990

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Africa</b>														
<b>Central</b>														
Cameroon	869 048 74.5	787 796 65.6	664 413 53.8	478 693 37.7	189 066 14.5	784 321 58.5	931 311 67.7	787 796 55.8	664 413 46.0					
CAR	174 436 59.3	125 038 41.4	89 930 29.0	82 072 25.8	82 057 25.1	100 962 30.1	95 259 27.7	99 718 28.4	105 664 29.5	127 964 35.0	89 614 24.1	140 742 37.3		95 644 24.7
Chad	212 554 36.5	246 410 41.1	229 444 37.2	234 869 37.0	278 225 42.6	293 564 43.6	278 048 40.1	343 186 47.9	395 205 53.5	392 815 51.5	369 263 47.0	386 197 47.7		
Congo	32 428 13.0	32 391 12.6	21 121 7.9	15 504 5.6	35 957 12.7	28 008 9.5	14 000 4.6	9 491 3.0	17 122 5.3					
DR Congo							198 064 4.4		141 353 3.0	1 508 042 31.7	964 623 19.9	2 199 247 44.2	2 640 168 51.6	4 386 638 83.1
Equatorial Guinea	25 552 72.3	22 598 62.5	25 100 67.7	17 867 46.9	14 827 37.9	12 530 31.3								
Gabon	57 450 60.3	80 247 81.6	100 629 99.2	70 928 67.8	82 245 76.3	54 849 49.4	74 310 65.2	57 450 49.0	80 247 66.8					
Sao Tome & Principe						51 938 396.3	47 074 350.1	47 757 346.2	46 026 325.1	37 026 254.9	43 488 291.9	55 630 364.1	66 619 425.2	63 199 393.5
<b>East</b>														
Burundi	92 870 16.6	588 938 99.4	773 539 132.9	828 429 140.4	831 481 139.3	932 794 154.9	974 226 160.8	670 857 110.3	687 301 112.4	1 936 584 313.9	3 057 239 487.9	2 855 868 445.4	1 808 588 274.0	
Comoros														
Djibouti	3 237 6.1	7 338 13.5	7 468 13.6	4 166 7.5	6 140 11.0	5 982 10.5	6 105 10.5	4 314 7.1	5 920 9.5	6 140 9.5	4 667 7.0	4 312 6.3	5 021 7.2	5 036 7.2
Eritrea						81 183 25.3	129 908 39.7		255 150 73.6	147 062 41.0	119 155 32.1	125 746 32.7	75 386 18.9	72 023 17.4
Ethiopia														
Kenya														
Rwanda	1 282 012 189.2	1 331 494 204.7	1 373 247 226.7	733 203 131.7	371 550 71.2	1 391 931 271.0	1 145 759 213.0	1 331 494 226.0	1 279 581 195.1	906 552 125.7	915 916 118.6			856 233 102.1
Somalia				3 049 0.4						9 055 1.1	10 364 1.2	10 364 1.1	96 922 10.2	23 349 2.4
Sudan	7 508 704 301.2	6 947 787 272.5	9 326 944 357.3	9 867 778 368.9	8 562 205 312.3	6 347 143 226.1	4 595 092 159.9	4 065 460 138.3	5 062 000 168.4	4 215 308 137.1	4 332 827 137.8	3 985 702 124.0	3 056 400 93.0	3 084 320 91.8
Uganda														
UR Tanzania	10 715 736 411.1	8 715 736 322.9	7 681 524 274.7	8 777 340 303.2	7 976 590 266.6	2 438 040 79.0	4 969 273 156.6	1 131 655 34.8	30 504 654 915.1	423 967 12.4		7 489 890 206.5	10 712 526 289.7	
<b>North</b>														
Algeria	152 <0.1	229 <0.1	106 <0.1	84 <0.1	206 <0.1	107 <0.1	221 <0.1	197 <0.1	256 <0.1	701 <0.1	63 <0.1	53 <0.1	52 <0.1	
Egypt	75 <0.1	24 <0.1	16 <0.1	17 <0.1	495 <0.1	313 <0.1	23 <0.1	4 <0.1	0 <0.1	0 <0.1	0 <0.1	0 <0.1	0 <0.1	0 <0.1
Morocco	837 <0.1	494 <0.1	405 <0.1	198 <0.1	158 <0.1	166 <0.1	53 <0.1	76 <0.1	68 <0.1	17 <0.1	3 <0.1	0 <0.1	20 <0.1	4 <0.1



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Sierra Leone				9 636	16 851	5 865	7 192	209 312	249 744	409 670				
				2.4	4.1	1.4	1.8	50.5	59.4	95.4				
Togo	810 509	780 825	634 166	561 328	328 488	297 326	352 334	366 672	368 472	412 619	398 103	431 826		
	234.6	220.9	175.7	152.4	87.2	76.9	88.3	88.8	86.1	93.3	87.3	92.1		

## Asia

### Central Asia and Transcaucasia

Armenia	0	0	0	0	1	0	149	567	542	329	56	31	16	8
	0	0	0	0	<0.1	0	<0.1	0.2	0.2	0.1	<0.1	<0.1	<0.1	<0.1
Azerbaijan	24	113	27	23	667	2 840	13 135	9 911	5 175	2 311	1 526	1 054	505	480
	<0.1	<0.1	<0.1	<0.1	0.1	0.4	1.7	1.2	0.6	0.3	0.2	0.1	0.1	0.1
Georgia	0	0	0	0	0	0	3	0	14	35	244	437	473	308
	0	0	0	0	0	0	<0.1	0	<0.1	<0.1	<0.1	<0.1	0.1	0.1
Kyrgyzstan	0	0	0	0	0	0	1	0	5	0	7	15	2 712	465
	0	0	0	0	0	0	<0.1	0	<0.1	0	<0.1	<0.1	0.5	0.1
Tajikistan	175	294	404	619	2 411	6 103	16 561	29 794	19 351	13 493	19 064	11 387	6 160	5 428
	<0.1	0.1	0.1	0.1	0.4	1.1	2.8	5.1	3.2	2.2	3.1	1.9	1.0	0.9
Turkmenistan	0	13	5	1	1	0	3	4	115	10	18	5	15	1
	0	<0.1	<0.1	<0.1	<0.1	0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Uzbekistan	3	1	0	0	0	0	0	0	0	7	46	9	11	33
	<0.1	<0.1	0	0	0	0	0	0	0	<0.1	<0.1	<0.1	<0.1	<0.1

### Eastern Mediterranean

Afghanistan	317 479	297 605			88 302	303 955	202 767	288 070	395 581	203 911	364 243	590 176	591 441	
	23.0	20.3			4.8	15.3	10.0	14.0	18.9	9.5	16.5	25.7	24.7	
Iran (Islamic Republic of)	77 470	96 340	76 971	64 581	51 089	67 532	56 362	38 684	32 951	23 110	19 716	8 895	9 122	17 060
	1.4	1.7	1.3	1.1	0.8	1.1	0.9	0.6	0.5	0.4	0.3	0.1	0.1	0.2
Iraq	3 924	1 764	5 752	49 863	98 243	98 705	49 840	13 959	9 684	4 143	1 860	1 265	952	303
	0.2	0.1	0.3	2.6	5.0	4.9	2.4	0.7	0.4	0.2	0.1	0.1	<0.1	<0.1
Oman	32 720	19 274	14 827	16 873	7 083	1 164	603	129	116	30	6	2	6	6
	17.7	10.0	7.4	8.1	3.3	0.5	0.3	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Pakistan	79 689	66 586	99 015	92 634	108 566	109 792	98 035	77 480	73 516	91 774	82 526	104 003	101 761	122 560
	0.7	0.6	0.8	0.8	0.9	0.9	0.8	0.6	0.5	0.7	0.6	0.7	0.7	0.8
Saudi Arabia	15 666	9 962	19 623	18 380	10 032	15 662	15 221	17 692	36 139	10 099	4 736	1 614	1 226	596
	0.9	0.6	1.1	1.0	0.5	0.8	0.8	0.9	1.7	0.5	0.2	0.1	0.1	<0.1
Syrian Arab Republic	107	54	456	966	583	582	280	83	14	5	6	63	15	2
	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Turkey	8 675	12 213	18 665	47 206	84 321	81 754	60 634	35 376	36 780	20 908	11 381	10 758	10 184	9 182
	0.2	0.2	0.3	0.8	1.4	1.3	0.9	0.5	0.6	0.3	0.2	0.2	0.1	0.1
Yemen	11 384	12 717	29 320	31 262	37 201	500 000	416 246	1 394 495	2 781 640	1 394 495	187 159	265 023		
	1.0	1.0	2.2	2.3	2.6	33.1	26.5	85.6	159.7	77.4	9.7	13.2		

### South-East Asia

Bangladesh	53 875	63 578	115 660	125 402	166 564	152 729	100 864	68 594	60 023	63 738	55 599	55 646	55 646	66 879
	0.5	0.6	1.0	1.1	1.4	1.2	0.8	0.5	0.5	0.5	0.4	0.4	0.4	0.4
Bhutan	9 497	22 126	28 900	28 116	39 852	23 188	15 696	9 029	7 693	12 237	5 935	5 982	6 511	3 806
	5.6	12.8	16.6	15.9	22.3	12.8	8.5	4.8	1 085	7 980	73 742	115 615	98 852	16 538
DPR Korea									<0.1	0.4	3.3	5.2	4.4	0.7
India	2 018 783	2 117 460	2 125 826	2 207 431	2 511 453	2 988 231	3 035 588	2 660 057	2 222 748	2 284 713	2 031 790	2 085 484	1 842 019	1 781 336
	2.4	2.5	2.4	2.5	2.7	3.2	3.2	2.8	2.3	2.3	2.0	2.0	1.8	1.7

Table A.22 Standardized reported malaria cases and rates per 1000 since 1990

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Indonesia	171 908 0.9	132 412 0.7	103 277 0.5	136 367 0.7	145 920 0.8	123 226 0.6	179 878 0.9	161 285 0.8	160 282 0.8	245 612 1.2	267 592 1.2	220 073 1.0		
Myanmar	989 042 24.4	939 042 22.8	789 672 18.8	702 239 16.5	701 043 16.2	656 547 14.9	664 507 14.8	568 262 12.5	548 066 11.9	591 826 12.6	592 354 12.5	661 463 13.7	721 739 14.8	716 100 14.5
Nepal	22 856 1.2	29 135 1.5	23 234 1.2	16 380 0.8	9 442 0.5	9 718 0.5	6 628 0.3	8 957 0.4	8 498 0.4	8 959 0.4	7 616 0.3	6 408 0.3	12 786 0.5	9 394 0.4
Sri Lanka	287 384 17.1	400 263 23.5	399 349 23.2	327 020 18.8	273 434 15.5	142 294 8.0	184 319 10.3	218 550 12.1	211 691 11.6	264 549 14.3	210 039 11.3	66 522 3.5	41 411 2.2	10 510 0.6
Thailand	273 880 5.0	198 383 3.6	168 370 3.0	115 220 2.0	102 119 1.8	82 743 1.4	87 622 1.5	97 540 1.7	131 055 2.2	125 379 2.1	81 692 1.3	63 528 1.0	45 240 0.7	35 076 0.6
Timor-Leste									10 332 13.8		49 836 71.0	63 440 89.2	26 651 36.1	31 819 40.9
<b>Western Pacific</b>														
Cambodia	123 796 12.7	102 930 10.2	93 595 9.0	98 956 9.2	74 190 6.7	76 923 6.7	74 883 6.3	85 661 7.0	58 874 4.7	64 679 5.0	62 439 4.7	53 601 4.0	46 902 3.4	71 258 5.0
China	89 000 0.1	83 000 0.1	74 000 0.1	59 000 <0.1	62 000 0.1	47 118 <0.1	33 382 <0.1	26 800 <0.1	27 090 <0.1	26 797 <0.1	18 620 <0.1	26 945 <0.1	25 520 <0.1	
Lao PDR	22 044 5.3	41 048 9.7	39 904 9.2	41 556 9.3	53 707 11.7	52 021 11.1	51 544 10.7	54 133 11.0	41 039 8.1	28 096 5.4	40 023 7.6	26 932 5.0	21 384 3.9	18 894 3.3
Malaysia	50 500 2.8	39 189 2.1	36 853 2.0	39 890 2.1	58 958 3.0	59 208 2.9	52 060 2.5	26 651 1.2	13 491 0.6	11 106 0.5	12 705 0.6	12 780 0.5	11 019 0.5	5 477 0.2
Papua New Guinea	104 900 25.5	86 500 20.5	86 500 19.9	66 797 15.0	65 000 14.2	99 000 21.1	71 013 14.7	38 105 7.7	20 900 4.1	18 564 3.6	81 192 15.2	89 819 16.4	79 822 14.3	70 226 12.3
Philippines	86 200 1.4	86 400 1.4	95 778 1.5	64 944 1.4	61 959 0.9	56 852 0.8	40 545 0.6	42 005 0.6	50 709 0.7	37 061 0.5	36 596 0.5	34 787 0.5	37 005 0.5	43 644 0.5
Republic of Korea	0 0	0 0	0 0	1 <0.1	21 <0.1	107 <0.1	396 <0.1	1 724 <0.1	3 992 0.1	3 621 0.1	4 142 0.1	2 556 0.1	1 799 <0.1	1 107 <0.1
Solomon Islands	116 500 365.7	141 400 429.9	153 359 451.5	126 123 359.6	131 687 363.6	118 521 316.9	84 795 219.7	68 125 171.0	72 808 177.2	63 169 149.1	67 884 155.4	76 417 169.8	74 865 161.5	90 606 189.9
Vanuatu	28 805 192.7	19 466 126.7	12 842 81.3	11 483 70.6	5 765 34.4	11 954 69.4	5 740 32.4	6 103 33.5	6 181 33.1	5 180 27.0	6 422 32.6	7 647 37.9	14 339 69.3	15 240 71.9
Viet Nam	123 796 1.9	187 994 2.8	225 928 3.3	156 069 2.2	140 120 2.0	100 116 1.4	76 356 1.0	65 859 0.9	72 091 0.9	64 679 0.8	62 442 0.8	53 601 0.7	46 902 0.6	37 416 0.5
<b>The Americas and Caribbean</b>														
Belize	3 033 16.3	3 317 17.4	5 341 27.2	8 586 42.5	9 957 47.9	9 413 44.1	6 605 30.2	4 014 17.9	2 614 11.4	1 850 7.9	1 486 6.2	1 097 4.5	928 3.7	
Costa Rica	1 151 0.4	3 273 1.0	6 951 2.2	5 033 1.5	4 445 1.3	4 515 1.3	5 480 1.5	4 712 1.3	5 148 1.4	3 998 1.0	1 879 0.5	1 363 0.3	1 021 0.2	718 0.2
Dominican Republic	356 0.1	377 0.1	698 0.1	987 0.1	1 670 0.2	1 808 0.2	1 414 0.2	816 0.1	2 006 0.2	3 589 0.4	1 215 0.1	1 038 0.1	1 296 0.2	1 296 0.1
El Salvador	9 269 1.8	5 933 1.1	4 539 0.9	3 887 0.7	2 803 0.5	3 362 0.6	5 888 1.0	2 719 0.5	1 182 0.2	1 230 0.2	745 0.1	362 0.1	1 117 <0.1	85 <0.1
Guatemala	41 711 4.8	57 829 6.4	57 560 6.2	41 868 4.4	22 057 2.3	24 178 2.4	20 268 2.0	32 099 3.0	47 689 4.4	45 098 4.1	53 311 4.7	35 824 3.1	35 540 3.0	31 127 2.5
Haiti	4 806 0.7	25 511 3.6	13 457 1.9	853 0.1	23 140 3.1		18 877 2.5	34 449 4.4	34 449 4.4	1 196 0.2	16 897 2.1	9 837 1.2	9 837 1.2	

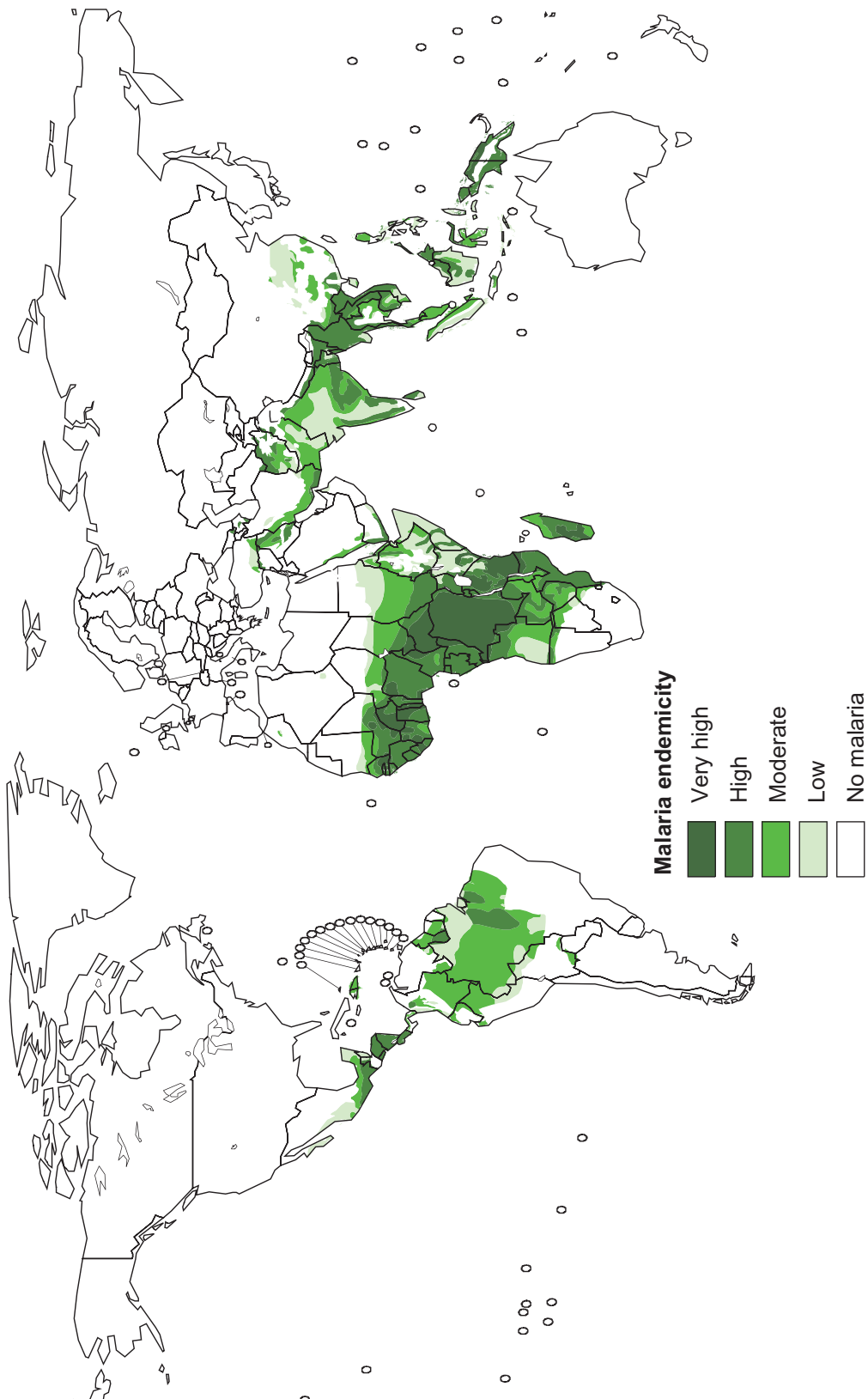
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Honduras	53 095 10.9	73 352 14.6	70 838 13.7	44 513 8.4	52 110 9.5	59 446 10.5	74 487 12.8	65 863 11.0	42 979 7.0	46 740 7.4	35 122 5.4	24 023 3.6	17 223 2.5	10 122 1.5
Mexico	44 513 0.5	26 565 0.3	16 170 0.2	15 793 0.2	12 864 0.1	7 329 0.1	6 293 0.1	4 805 0.1	25 023 0.3	13 450 0.1	7 362 0.1	4 895 <0.1	4 624 <0.1	3 819 <0.1
Nicaragua	35 785 9.4	27 653 7.0	26 866 6.6	44 037 10.6	41 490 9.7	69 444 15.7	75 606 16.6	42 819 9.1	33 903 7.0	38 676 7.8	24 014 4.7	10 482 2.0	7 466 1.4	6 812 1.2
Panama	381 0.2	1 115 0.5	727 0.3	481 0.2	684 0.3	730 0.3	476 0.2	505 0.2	1 039 0.4	936 0.3	1 036 0.4	928 0.3	2 244 0.7	9 000 2.9
<b>South America</b>														
Argentina	1 660 0.1	803 <0.1	643 <0.1	758 <0.1	948 <0.1	1 065 <0.1	2 048 0.1	592 <0.1	339 <0.1	222 <0.1	440 <0.1	215 <0.1	215 <0.1	122 <0.1
Bolivia	19 680 3.0	19 031 2.8	24 486 3.5	27 475 3.8	34 749 4.8	46 911 6.3	64 012 8.4	51 478 6.6	73 913 9.3	50 037 6.1	31 468 3.8	15 765 1.9	14 276 1.7	20 343 2.3
Brazil	560 396 3.8	614 431 4.1	609 860 4.0	466 190 3.0	564 406 3.6	565 727 3.5	455 194 2.8	392 976 2.4	471 892 2.8	609 594 3.6	610 878 3.6	388 658 2.2	349 873 2.0	379 551 2.1
Colombia	99 489 2.8	184 156 5.2	184 023 5.1	129 377 3.5	127 218 3.4	187 082 4.9	135 923 3.5	180 898 4.5	185 455 4.6	66 845 1.6	107 616 2.6	206 195 4.8	195 719 4.5	164 722 3.7
Ecuador	71 670 7.0	59 400 5.7	41 089 3.8	46 859 4.3	30 006 2.7	18 128 1.6	11 882 1.0	16 365 1.4	43 696 3.6	87 620 7.2	98 598 7.9	108 903 8.6	86 757 6.8	52 065 4.0
French Guiana	5 909 50.8	3 573 29.5	4 072 32.4	3 974 30.6	4 241 31.6	4 711 34.0	4 724 32.9	3 195 21.5	3 462 22.5	5 307 33.3	3 708 22.6	3 823 22.6	3 661 21.1	3 823 21.5
Guyana	22 681 31.0	42 204 57.8	39 702 54.3	33 172 45.2	39 566 53.6	59 311 80.0		32 103 42.9	41 200 54.8	27 283 36.1	24 018 31.7	27 122 35.6	21 895 28.7	27 627 36.1
Paraguay	2 912 0.7	2 983 0.7	1 289 0.3	436 0.1	583 0.1	898 0.2	637 0.1	567 0.1	2 091 0.4	9 947 1.9	6 853 1.3	2 710 0.5	2 778 0.5	1 392 0.2
Peru	28 882 1.3	33 705 1.5	54 922 2.4	95 222 4.1	122 039 5.2	192 629 8.1	208 132 8.6	183 740 7.4	247 004 9.8	166 579 6.5	69 726 2.7	79 473 3.0	85 742 3.2	79 473 2.9
Suriname	1 608 4.0	1 490 3.7	1 404 3.5	1 604 11.5	4 704 11.5	6 606 16.1	16 649 40.4	11 323 27.3	12 412 29.7	13 939 33.1	13 132 30.9	17 074 39.8	13 091 30.3	14 657 33.7
Venezuela	46 910 2.4	43 454 2.2	21 416 1.0	12 539 0.6	13 727 0.6	16 371 0.7	18 858 0.8	22 400 1.0	21 862 0.9	19 086 0.8	29 736 1.2	29 491 1.2	29 491 1.2	31 719 1.2



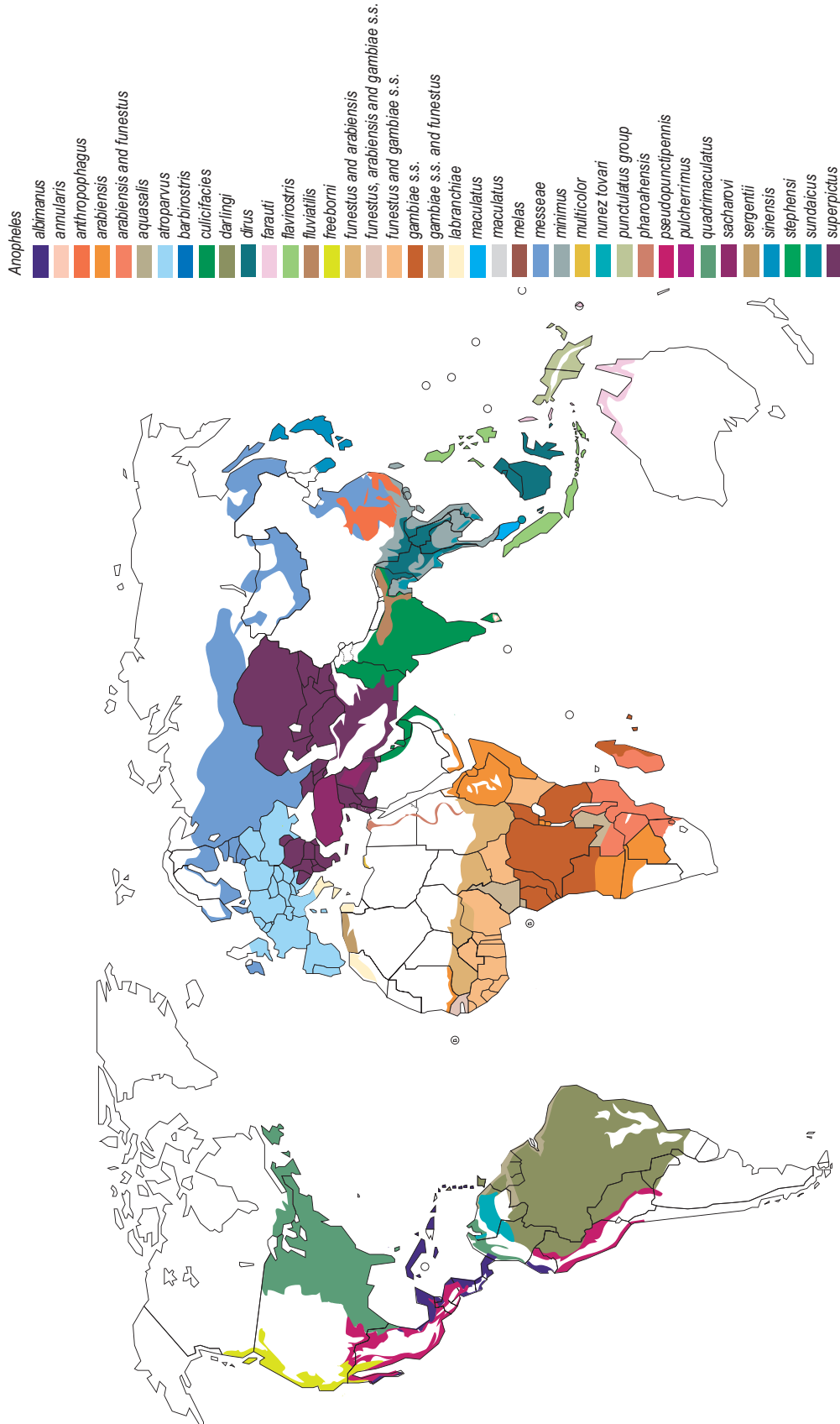


## ANNEX 3. MAPS

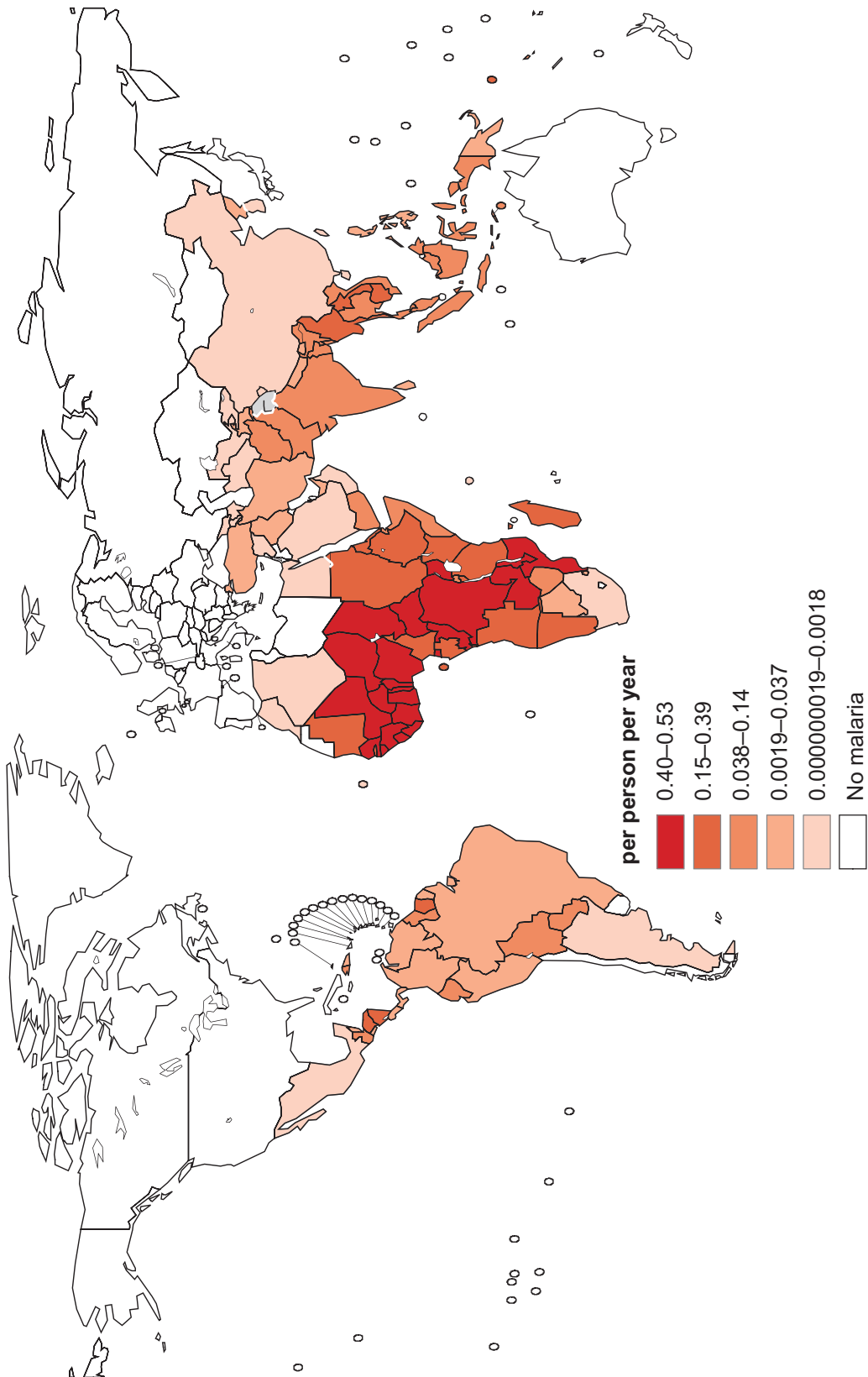
**Map 1.** Global distribution of malaria transmission risk, 2003 (21)  
(Annex 5 shows endemicity classifications)



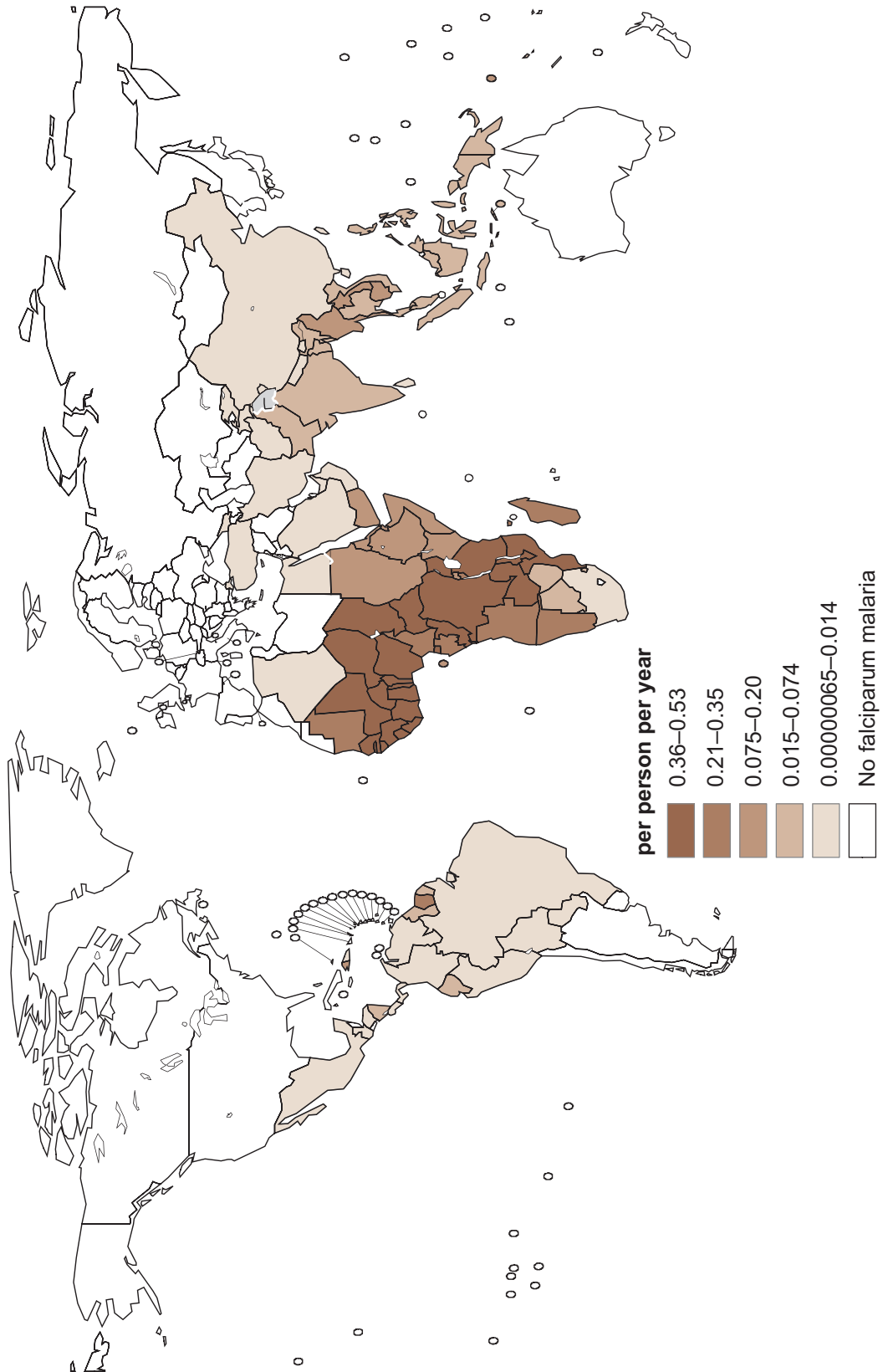
**Map 2.** Global distribution of dominant malaria vectors, 2003 (75)



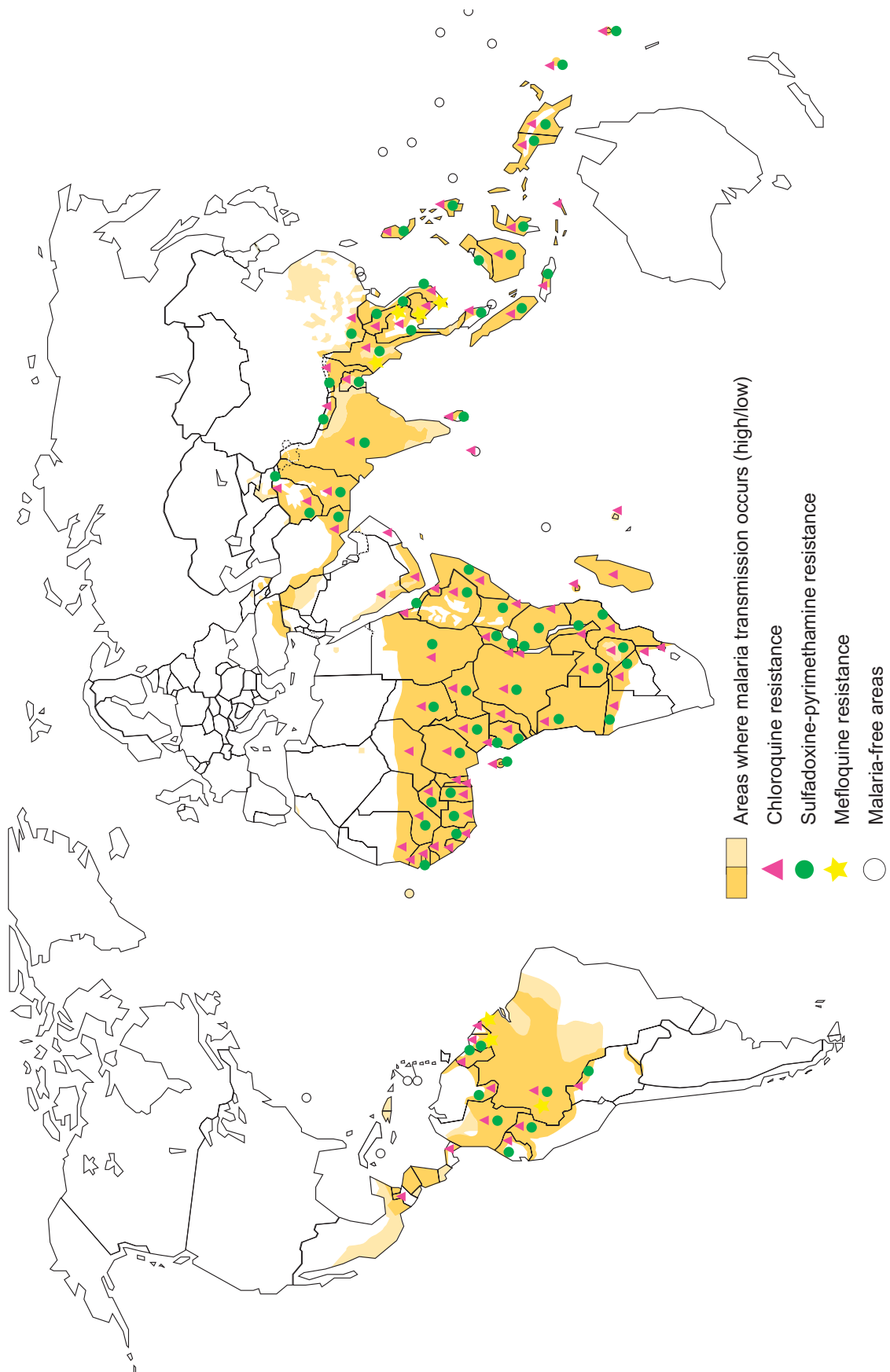
**Map 3.** Estimated incidence of clinical malaria episodes—caused by any species—resulting from local transmission, country level averages, 2004 (2)



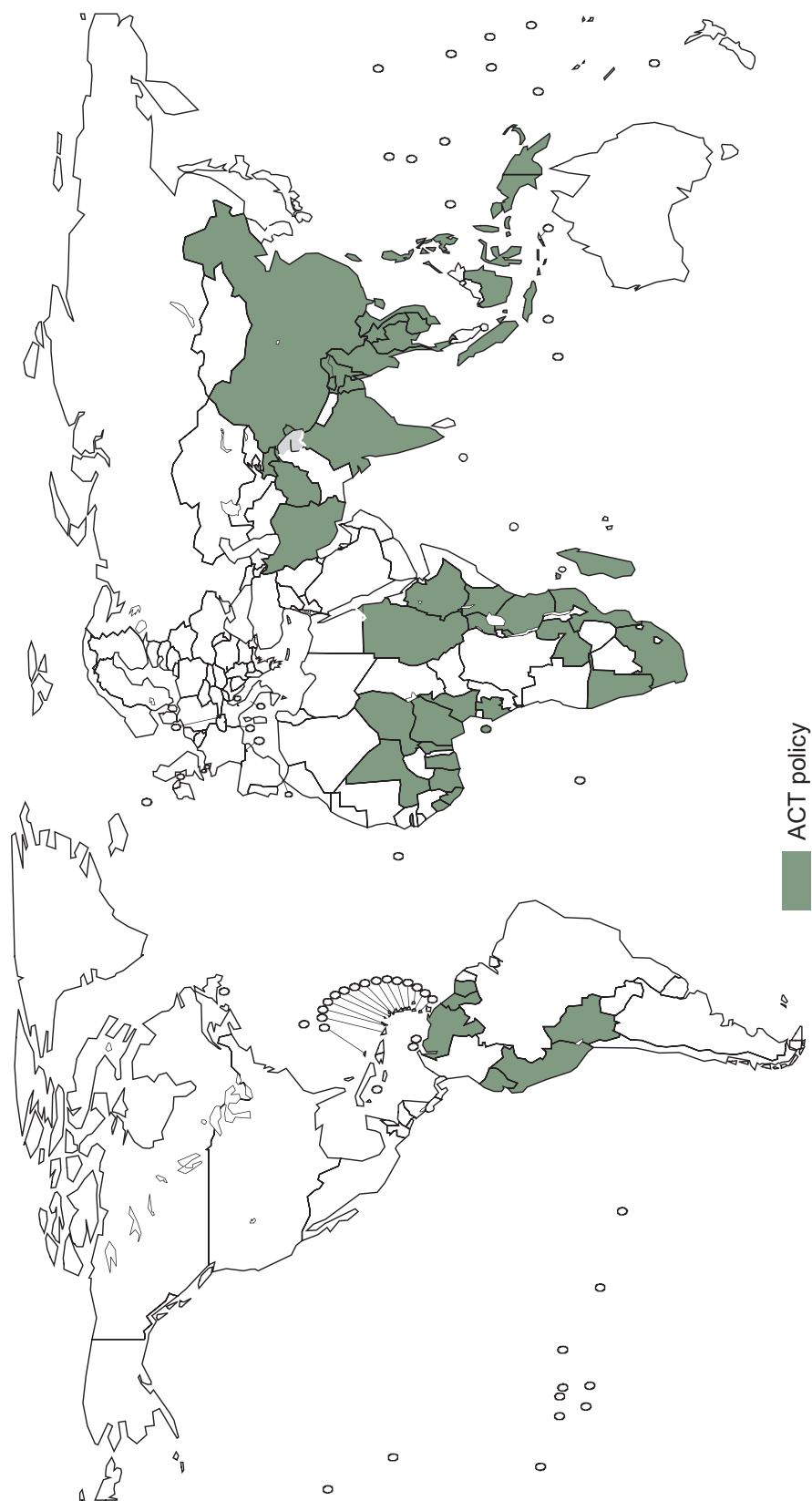
**Map 4.** Estimated incidence of clinical *P. falciparum* episodes resulting from local transmission, country level averages, 2004 (2)



**Map 5.** Drug resistance to *P. falciparum* from studies in sentinel sites, up to 2004



**Map 6.** Countries that include artemisinin-based combination therapy in antimalarial treatment policy, as of 2004



## ANNEX 4.

# THE ROLL BACK MALARIA MONITORING AND EVALUATION REFERENCE GROUP

The RBM MERG was established in May 2003 to act as an advisory body for the RBM Partnership on monitoring and evaluation. MERG develops and maintains consensus on priority strategies for monitoring and evaluating activities to be supported by all RBM partners. This includes provision of technical advice on state-of-the-art approaches to monitoring and evaluation of malaria programmes and development of products that are useful for implementing monitoring and evaluation activities and reporting at regional, national and international levels. The technical focus of MERG has initially been on the global indicators (5) to ensure consistency and accuracy in national and regional reporting. The geographical focus of the advisory body has been on Africa; however, attention to issues related to other regions has been increasing since the inception of MERG. MERG itself is not involved in implementation; rather, the work of MERG is implemented by NMCPs with support from the RBM intercountry teams and RBM partners.

MERG works in collaboration with RBM partner agencies with an interest in monitoring and evaluation. Under the guidance of MERG, for example, WHO, UNICEF and the World Bank collaborated with the GFATM to produce the Monitoring and Evaluation Toolkit, a framework and composite guideline for planning monitoring and evaluation activities related to HIV/AIDS, tuberculosis and malaria (7).

MERG has developed five task forces: four for prioritizing and better defining several RBM coverage and impact indicators (5), and one for overall improvement of monitoring and evaluation capacity.

- Malaria Mortality Task Force, chaired by UNICEF, 1st meeting in July 2003;<sup>9</sup>
- Malaria Morbidity and Incidence Task Force, chaired by WHO/RBM, 1st meeting in October 2004;<sup>10</sup>
- Malaria-related Anaemia Task Force, chaired by WHO/RBM, 1st meeting in October 2003;<sup>11</sup>
- Survey and Indicator Guidance Task Force, chaired by ORC Macro, 1st meeting in February 2004;<sup>12</sup>
- Strengthening Country Capacity for Monitoring and Evaluation Task Force, chaired by Malaria Consortium.

The task forces advise on operational definitions, possible measurement methods and data sources for the indicators, and how to improve monitoring and evaluation capacity at country level.

### Mortality Task Force

The MERG Malaria Mortality Task Force recommends that for highly-endemic areas of Africa south of the Sahara, the primary burden and impact indicator to be monitored by countries is the all-cause under-5 mortality rate. This is best measured by nationally representative household surveys, such as DHS and MICS (10), in addition to national census data. Mortality should be reported together with the coverage of malaria interventions, in particular the use of ITNs, the coverage of

<sup>9</sup> RBM MERG Task Force on Mortality Trends, meeting minutes 16 July 2003 (<http://rbm.who.int/merg>).

<sup>10</sup> RBM MERG Task Force on Morbidity and Incidence, meeting minutes 19–21 October 2004 (<http://rbm.who.int/merg>).

<sup>11</sup> RBM MERG Task Force on Malaria-related Anaemia, meeting minutes 27–28 October 2003 (<http://rbm.who.int/merg>).

<sup>12</sup> RBM MERG Task Force on Survey and Indicator Guidance, meeting minutes 10–11 February 2004 (<http://rbm.who.int/merg>).



prompt and effective antimalarial treatment of children under 5 years of age, and the use of IPT by pregnant women. These coverage indicators are measured by the same surveys. The time trends in all-cause mortality and intervention coverage together could be used to model the trend in malaria-specific mortality (and morbidity) in children under 5 years of age. It is important to note that mortality levels measured retrospectively through birth histories have an inherent time lag. Therefore, the mortality impact of malaria control could be evaluated at the earliest at around five years after the onset of intensified control measures (20).

For African countries that are approaching the Abuja targets of 60% coverage with ITNs and prompt and effective treatment, it becomes relevant to evaluate the trend in malaria-attributable mortality, for triangulation with all-cause under-5 mortality. This might include data from small-scale sentinel demographic surveillance sites based on verbal autopsies, although it is recognized that verbal autopsies have limited sensitivity and specificity for malaria and could thus underestimate the actual impact of effective malaria control efforts on malaria-specific mortality (18).

Outside Africa south of the Sahara, vital registration and health facility records could provide a reliable indication of malarial deaths; if such records are not complete, they are at least likely to be valid as a trend indicator. In 2005, the task force plans to explore additional ways of estimating malaria-attributable mortality in non-African countries.

### Morbidity Task Force

The MERG Malaria Morbidity and Incidence Task Force has worked to develop consensus on a method for estimating the incidence of clinical malaria episodes for all countries. The estimates will allow regular updating to track trends and progress towards RBM and Millennium Development Goals, and will serve as input to WHO's next statistical report on the Global Burden of Disease. During the first task force meeting in October 2004, a draft estimation method that synthesizes maps of malaria endemicity, data from surveys on intervention coverage, research data on malaria incidence rates and HIS data on proportions of falciparum malaria cases was proposed and discussed, and possible improvements agreed (2) (Box 2). Draft country-level estimates of total clinical incidence and falciparum malaria incidence as of January 2005 are shown in Maps 3 and 4, respectively.

#### *Refining the WHO map of populations at risk of malaria transmission*

As the basis for the incidence estimation, the WHO map (Map 1) of the distribution of populations living at risk of malaria transmission (57) is being updated and refined from national to subnational level. The updated map distinguishes between low, moderate and high intensity malaria transmission. An update of Map 1 is being produced with input from a range of technical experts and with focused Geographic Information Systems work conducted in collaboration with Oxford University, England (21).

#### *Parasite infection prevalence as an additional impact indicator?*

RBM has not recommended monitoring of changes in malaria parasite prevalence as an indicator for monitoring the impact of control efforts (5) since in areas of stable transmission malaria infection alone does not necessarily reflect actual disease. Conversely, interventions might successfully reduce malaria morbidity and mortality without immediately producing detectable reductions in parasite prevalence. Nevertheless, since parasite prevalence in children can be precisely measured in representative household-based surveys, the outcome is worth further exploration as an additional burden and impact indicator. For a meaningful interpretation, parasite prevalence surveys should be conducted during or shortly after the malaria transmission season, in areas considered at risk of malaria transmission. Outside Africa, given lower endemicity and less acquired clinical immunity

in the population, parasite infection might more closely correlate with morbidity than it would in Africa south of the Sahara. There, older age groups would also be relevant to sample.

### **Malaria-related Anaemia Task Force**

In view of the documented reductions in childhood anaemia in response to malaria prevention or treatment in endemic areas in Africa south of the Sahara (73), the MERG Malaria-related Anaemia Task Force has proposed that childhood anaemia may be useful as an additional impact indicator in these areas. Although anaemia is not a specific indicator of malaria, in very young children—less than 60 months, or less than 24 or 36 months in the most endemic settings—malaria may account for a large proportion of moderate and severe anaemia. The prevalence of childhood anaemia can be precisely measured through household surveys such as the national DHS, and it should be considered for inclusion in the laboratory component of national and subnational MIS. The task force has noted that care should be taken not to infer time trends between subsequent surveys if they are conducted during different seasons, especially in areas of seasonal malaria transmission.

Task force members at the London School of Hygiene and Tropical Medicine, England, are conducting an estimation of the burden of malaria-attributable anaemia in African children under 5 years of age, which will become available in mid-2005.

### **Survey and Indicator Guidance Task Force**

The MERG Survey and Indicator Guidance Task Force has worked to coordinate survey activities among organizations and involved partners. With Macro International, the task force coordinated the development of another survey tool, the MIS, to be used at a national or subnational level. The potential advantages of MIS include the following:

- The proposed sample size for this survey method is smaller than for DHS and MICS, since the primary use is to monitor intervention coverage and not child mortality. With smaller sample sizes, the MIS will be less expensive than DHS or MICS.
- MIS can be conducted at subnational level and targeted to areas with actual malaria transmission, as needed.
- While DHS and MICS are done only every 5 years, MIS could be conducted at 2–3 year or even shorter intervals, to more rapidly track progress in increasing intervention coverage as well as impact on parasite prevalence and anaemia in young children.
- For operational reasons, both DHS and MICS are conducted during the dry season and, therefore, outside the peak malaria transmission season; MIS could be targeted to peak malaria transmission season.
- The ability to target MIS to at-risk populations during peak transmission will make the resultant data more relevant for some malaria indicators, such as ITN usage the night preceding the survey and anaemia and parasite prevalence.

The entire MIS package—questionnaire, training manual, guidance on sampling and sampling sizes with costing—will be available for use by countries in 2005 in hard copy, on CD-ROM and through the Internet.

## Strengthening Country Capacity for Monitoring and Evaluation Task Force

MERG recognizes the need for strengthening country capacity in monitoring and evaluation of RBM activities. In order to identify specific country-level monitoring and evaluation capacity development needs and ways to meet these needs, the Strengthening Country Capacity for Monitoring and Evaluation Task Force was established to develop a conceptual framework for strengthening monitoring and evaluation capacity at country and subregional levels. Through an extensive review of monitoring and evaluation capacity and practices in Africa, the task force reported that monitoring and evaluation within NMCPs has remained weak, despite significant investment from RBM (76). These weaknesses are primarily caused by limited human resources, lack of equipment, lack of an enabling environment and weak linkages with other programmes and partners.

The task force recommends strengthening capacity by establishing and institutionalizing monitoring and evaluation systems within NMCPs. These systems should, as a minimum, include a monitoring and evaluation component within the NMCP, linked to a monitoring and evaluation subcommittee that is part of the country coordinating mechanism for malaria control. The monitoring and evaluation effort should be adequately staffed and equipped. Staff should have the necessary skills, clear job descriptions and adequate office and storage space to deliver the products of the monitoring and evaluation system. The monitoring and evaluation component should establish links with other institutions within and outside the MoH in the form of a subcommittee charged with promoting best practices in monitoring and evaluation and coordinating RBM monitoring and evaluation within the country. This will maximize available resources, technical capacity and data collection efforts.

## ANNEX 5. DEFINITIONS

### WHO standard malaria case definitions

**Probable malaria:** a person with signs and/or symptoms of malaria and who receives antimalarial treatment.

**Probable severe malaria:** a person who requires hospitalization for signs and/or symptoms of severe malaria and receives antimalarial treatment.

**Probable malaria death:** death of a person who was diagnosed with probable severe malaria.

**Confirmed malaria:** a person with signs and/or symptoms of malaria, who receives antimalarial treatment, with laboratory confirmation of diagnosis.

**Confirmed severe malaria:** a person requiring hospitalization for signs and/or symptoms of severe malaria, who receives antimalarial treatment, with laboratory confirmation of diagnosis.

**Confirmed malaria death:** death of a person who was diagnosed with severe malaria, with laboratory confirmation of diagnosis.

**Indigenous or autochthonous malaria case:** a malaria case that is natural to an area or country, i.e. not imported. The term is applied to cases whose origin from local transmission cannot be disproved.

**Imported malaria case:** a malaria case in which the infection was acquired outside the area in which it is found, implying that its origin could be traced to a known malarious area.

**Induced malaria case:** a malaria case attributed to the effect of a blood transfusion or other form of parenteral inoculation, but not to normal transmission by the mosquito. The course of the infection might be different from that observed in the normal case.

**Introduced malaria case:** a malaria case in which it can be proved that the infection is the first step (direct secondary) of local transmission subsequent to a proved imported case.

Source: (15).

## Other definitions

**Epidemic:** term applied to malaria when the incidence of cases—other than seasonal rises—in an area rises rapidly and markedly above its usual level or when the infection occurs in an area where it was not previously present. Malaria epidemics occur principally in areas of low transmission, where no single age group in the population is immune. The introduction of malaria, particularly if exacerbated by changes in rainfall and temperature, can trigger explosive epidemics that affect both adults and children. Epidemics can also occur in areas of higher transmission as the result of the abandonment of control programmes, immigration of non-immune people and reduced access to treatment.

**Endemic:** term applied to malaria when there is a constant measurable incidence both of cases and of natural transmission in an area over a succession of years.

**Hypoendemic:** term applied to malaria when transmission is of low intensity and usually not throughout the year and where the disease burden is generally low. In the classification of Metselaar & Van Thiel, hypoendemicity corresponds to a parasite infection prevalence below 10% in children 2–9 years of age (77).

**Hyperendemic:** term applied to malaria when transmission occurs usually throughout the year at high intensity and the disease burden is high in young children. In the classification of Metselaar & Van Thiel, hyperendemicity corresponds to a parasite infection prevalence above 75% in children 1 year of age (77).

## ANNEX 6.

# ROLL BACK MALARIA AND WORLD HEALTH ORGANIZATION GUIDELINES ON MALARIA CONTROL

### Prompt and effective antimalarial treatment and drug resistance

- *Antimalarial drug combination therapy: report of a WHO technical consultation, 4–5 April 2001.* Geneva, World Health Organization, 2001 (WHO/CDS/RBM/2001.35; [http://mosquito.who.int/cmc\\_upload/0/000/015/082/use\\_of\\_antimalarials2.pdf](http://mosquito.who.int/cmc_upload/0/000/015/082/use_of_antimalarials2.pdf); version française: [http://mosquito.who.int/cmc\\_upload/0/000/015/082/use\\_of\\_antimalarials2\\_fr.pdf](http://mosquito.who.int/cmc_upload/0/000/015/082/use_of_antimalarials2_fr.pdf)).
- *Management of severe malaria: a practical handbook*, 2nd ed. Geneva, World Health Organization, 2000 (<http://mosquito.who.int/docs/hbsm.pdf>).
- *The use of antimalarial drugs: report of an informal consultation, 13–17 November 2000.* Geneva, World Health Organization, 2001 (WHO/CDS/RBM/2001.33; [http://mosquito.who.int/cmc\\_upload/0/000/014/923/use\\_of\\_antimalarials.pdf](http://mosquito.who.int/cmc_upload/0/000/014/923/use_of_antimalarials.pdf); version française: [http://mosquito.who.int/cmc\\_upload/0/000/014/923/uamd\\_fr.pdf](http://mosquito.who.int/cmc_upload/0/000/014/923/uamd_fr.pdf)).
- *Monitoring antimalarial drug resistance: report of a WHO consultation, Geneva, Switzerland, 3–5 December 2001.* Geneva, World Health Organization, 2002 (WHO/CDS/CSR/EPH/2002.17 WHO/CDS/RBM/2002.39; [http://mosquito.who.int/cmc\\_upload/0/000/015/800/200239.pdf](http://mosquito.who.int/cmc_upload/0/000/015/800/200239.pdf)).
- *Assessment and monitoring of antimalarial drug efficacy for the treatment of uncomplicated falciparum malaria.* Geneva, World Health Organization, 2003 (WHO/HTM/RBM/2003.50; [http://mosquito.who.int/cmc\\_upload/0/000/017/017/ProtocolWHO.pdf](http://mosquito.who.int/cmc_upload/0/000/017/017/ProtocolWHO.pdf)).

### Vector control including insecticide-treated nets

- Roll Back Malaria. *Scaling-up insecticide-treated netting programmes in Africa: a strategic framework for coordinated national action.* Geneva, World Health Organization, 2002 (WHO/CDS/RBM/2002.43; [http://mosquito.who.int/cmc\\_upload/0/000/015/845/itn\\_programmes.pdf](http://mosquito.who.int/cmc_upload/0/000/015/845/itn_programmes.pdf); version française: [http://mosquito.who.int/cmc\\_upload/0/000/015/845/itn\\_programmes\\_fr.pdf](http://mosquito.who.int/cmc_upload/0/000/015/845/itn_programmes_fr.pdf)).
- Roll Back Malaria. *Insecticide-treated mosquito net interventions: a manual for national control programme managers.* Geneva, World Health Organization, 2003 (WHO/CDS/RBM/2002.45; [http://mosquito.who.int/cmc\\_upload/0/000/016/211/ITNinterventions\\_en.pdf](http://mosquito.who.int/cmc_upload/0/000/016/211/ITNinterventions_en.pdf); version française: [http://mosquito.who.int/cmc\\_upload/0/000/016/211/ITNinterventions\\_fr.pdf](http://mosquito.who.int/cmc_upload/0/000/016/211/ITNinterventions_fr.pdf)).
- *WHO recommended insecticides for treatment of mosquito nets for malaria vector control.* Geneva, World Health Organization ([http://mosquito.who.int/cmc\\_upload/0/000/012/605/ITNTable.htm](http://mosquito.who.int/cmc_upload/0/000/012/605/ITNTable.htm)).
- Nájera JA, Zaim M. *Malaria vector control: insecticides for indoor residual spraying.* Geneva, World Health Organization, 2001 (WHO/CDS/WHOPES/2001.3).
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- *Specifications for netting materials: report of an informal consultation*. Geneva, World Health Organization, 2001 (WHO/CDS/RBM/2001.28; [http://mosquito.who.int/cmc\\_upload/0/000/012/756/netspex.pdf](http://mosquito.who.int/cmc_upload/0/000/012/756/netspex.pdf); version française: [http://mosquito.who.int/cmc\\_upload/0/000/012/756/Netspex\(fr\).pdf](http://mosquito.who.int/cmc_upload/0/000/012/756/Netspex(fr).pdf)).
- *Guidelines on the management of public health pesticides: report of the WHO interregional consultation, Chiang Mai, Thailand, 25–28 February 2003*. Geneva, World Health Organization, 2003 (WHO/CDS/WHOPES/2003.7).  
Guidelines for the purchase of public health pesticides. Geneva, World Health Organization, 2000 (WHO/CDS/WHOPES/2000.1; <http://www.who.int/ctd/whopes/docs/PurchaseGuidelinesRev.pdf>).

### Malaria in pregnancy

- *A strategic framework for malaria prevention and control during pregnancy in the African Region*. Brazzaville, World Health Organization Regional Office for Africa, 2004 (AFR/MAL/04/01; [http://mosquito.who.int/rbm/Attachment/20041004/malaria\\_pregnancy\\_str\\_framework.pdf](http://mosquito.who.int/rbm/Attachment/20041004/malaria_pregnancy_str_framework.pdf)).

### Malaria epidemics

- *Malaria epidemics: forecasting, prevention, early detection and control: from policy to practice*. Geneva, World Health Organization, 2003 (<http://mosquito.who.int/docs/Leysinreport.pdf>).
- *Field guide for malaria epidemic assessment and reporting. Draft for field testing*. Geneva, World Health Organization, 2004 (WHO/HTM/MAL/2004.1097; [http://mosquito.who.int/cmc\\_upload/0/000/016/569/FTest.pdf](http://mosquito.who.int/cmc_upload/0/000/016/569/FTest.pdf)).
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- *WHO Expert Committee on Malaria. Twentieth report*. Geneva, World Health Organization, 2000 (WHO Technical Report Series, No. 892; <http://www.rbm.who.int/docs/ecr20.pdf>; version française: [http://mosquito.who.int/docs/ecr20fr\\_toc.htm](http://mosquito.who.int/docs/ecr20fr_toc.htm)).

### Monitoring and evaluation

- *Roll Back Malaria/MEASURE Evaluation/World Health Organization/UNICEF. Guidelines for core population coverage indicators for Roll Back Malaria: to be obtained from household surveys*. Calverton, MEASURE Evaluation, 2004 ([http://rbm.who.int/partnership/wg/wg\\_monitoring/docs/GuidelinesForCorePopulationFINA L9-20\\_Malaria.pdf](http://rbm.who.int/partnership/wg/wg_monitoring/docs/GuidelinesForCorePopulationFINA L9-20_Malaria.pdf)).
- *Monitoring and evaluation toolkit: HIV/AIDS, tuberculosis, and malaria*. Geneva, Global Fund to Fight AIDS, Tuberculosis and Malaria, 2004 ([http://www.theglobalfund.org/pdf/guidelines/pp\\_me\\_toolkit\\_en.pdf](http://www.theglobalfund.org/pdf/guidelines/pp_me_toolkit_en.pdf); version française: [http://www.theglobalfund.org/pdf/guidelines/pp\\_me\\_toolkit\\_fr\\_lowres.pdf](http://www.theglobalfund.org/pdf/guidelines/pp_me_toolkit_fr_lowres.pdf)).
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