

# Summary

The *2009 World Malaria Report* summarizes information received from 108 malaria endemic countries and other sources and updates the analysis presented in the *2008 Report*. It highlights progress made in meeting the World Health Assembly (WHA) targets for malaria to be achieved by 2010 and 2015, and new goals on malaria elimination contained in the Global Malaria Action Plan (2008):

- International funding commitments for malaria control have increased from around US\$ 0.3 billion in 2003 to US\$ 1.7 billion in 2009 due largely to the emergence of the Global Fund and greater commitments by the US President's Malaria Initiative, the World Bank and other agencies. This increase in funding is resulting in dramatic scale-up of malaria control interventions in many settings and measurable reductions in malaria burden.
- An increased percentage of African households (31%) are estimated to own at least one insecticide-treated net (ITN) in 2008 compared to 2006 (17%), and more children under 5 years of age used an ITN in 2008 (24%) compared to previous years, but the percentage of children using a net is still below the WHA target of 80%. These weighted averages are affected by low ITN ownership in several large African countries for which resources for scale-up are only now being made available. Household ITN ownership reached more than 50% in 13 high burden African countries.
- Use of artemisinin-based combination therapies (ACTs) has increased compared to 2006 but remains very low in most African countries; in 11 of 13 countries surveyed during 2007–2008, fewer than 15% of children under 5 years of age with fever had received an ACT, well below the WHA target of 80%.
- More than one-third of the 108 malarious countries (9 African countries and 29 outside of Africa) documented reductions in malaria cases of > 50% in 2008 compared to 2000. The number of cases fell least in countries with the highest incidence rates.
- Ten countries are implementing nationwide elimination programmes of which six entered the elimination phase in 2009. Eight countries are in the pre-elimination stage and a further nine countries have interrupted transmission and are in the phase of preventing reintroduction of malaria.

In countries that have achieved high coverage of their populations with bed nets and treatment programmes, recorded cases and deaths due to malaria have fallen by 50% suggesting that Millennium Development

Goals (MDG) targets can be achieved if there is adequate coverage of key interventions. While these results were observed in some island settings (Sao Tome and Principe and Zanzibar, United Republic of Tanzania), they were also seen in countries on the African mainland, including Eritrea, Rwanda, and Zambia.

There is evidence from Sao Tome and Principe, Zanzibar and Zambia that large decreases in malaria cases and deaths have been mirrored by steep declines in all-cause deaths among children less than 5 years of age, suggesting that intensive efforts at malaria control could help many African countries to reach, by 2015, a two-thirds reduction in child mortality as set forth in the MDGs.

Parasite resistance to antimalarial medicines and mosquito resistance to insecticides are major threats to achieving global malaria control. Well conducted surveillance of drug efficacy in endemic countries with support from WHO has shown early evidence of resistance to artemisinins, and WHO is leading a major resistance containment effort. Continued use of artemisinin monotherapy is a major factor in parasite resistance; yet, despite WHO's call for a halt to their use, marketing of artemisinin monotherapies continues in many countries.

International disbursements to malaria-endemic countries (US\$ 0.65 billion in 2007, the latest year for which data are available), still fall short of the US\$ 5 billion required annually to ensure high coverage and maximal impact world wide. Approximately 80% of external funds were targeted to the WHO African Region. The South-East Asia Region received the least money per person at risk for malaria and saw the lowest increase in external financing between 2000 and 2007. High levels of external assistance are associated with increased procurement of commodities and decreases in malaria incidence.

However, external funds for malaria control are disproportionately concentrated on smaller countries with lower disease burdens. More attention needs to be given to ensuring success in large countries that account for most malaria cases and deaths, and protecting the gains that have been made. This will require not only adequate financial resources but also the strengthening of health systems capable of delivering vector control interventions, providing diagnostics for the parasitologic confirmation of malaria alongside treatment with ACTs, and the development of routine surveillance systems for malaria as well as for parasite resistance to antimalarial medicines and mosquito resistance to insecticides.

# Key points

## ● Background and context

*With the target year 2010 in sight, malaria-endemic countries and the global community are attempting to achieve high coverage with effective interventions to attain both coverage and impact targets.*

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

## ● Policies and strategies for malaria control

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

### Treatment

4. Prompt parasitological confirmation by microscopy or with a rapid diagnostic test (RDT) is recommended for all patients with suspected malaria, before treatment is started. Confirmed cases of uncomplicated *Plasmodium falciparum* malaria should be treated with an artemisinin-based combination therapy (ACT) and *P. vivax* malaria with chloroquine where it is effective, or an appropriate ACT in areas where *P. vivax* is resistant to chloroquine. Treatment of *P. vivax* should be combined with 14 days of primaquine to prevent relapse.
5. Treatment solely on the basis of clinical suspicion should be considered only when a parasitological diagnosis is not accessible. In 2008, 20 of 45 malaria-endemic countries in the WHO African Region and 51 of 64 countries outside the African Region reported having a policy of parasitological testing of suspected malaria cases in persons of all ages, and 78 countries reported a policy of treatment with ACT for *P. falciparum* malaria.
6. WHO recommends that oral artemisinin-based monotherapies be withdrawn from the market and replaced with ACTs. Thirty-seven countries still allow use of oral artemisinin-based monotherapies; most are located in the African Region, followed by the Region of the Americas and the South-East Asia Region.
7. Parasite resistance has rendered previous antimalarial medicines ineffective in most parts of the world, threatening malaria control. The highly effective artemisinin derivatives and their partner drugs are vulnerable to the same risk. Resistance of *P. falciparum* to artemisinins has been observed at the Cambodia-Thailand border.

### Prevention

8. In 2008, 23 countries in the African Region and 35 outside that Region had adopted the WHO recommendation to provide bednets for all age groups at risk for malaria, not just women and children; this represents an increase of 13 countries since 2007.
9. IRS with WHO-approved chemicals (including DDT) remains one of the main interventions for reducing and interrupting malaria transmission by vector control in all epidemiological settings. In 2008, 44 countries, including 19 in the African Region, reported implementing IRS.
10. Intermittent preventive treatment (IPTp) is recommended for pregnant women in areas of high transmission. Thirty-three countries in the African Region, 3 in the Eastern Mediterranean Region and 1 in Western Pacific Region had adopted an IPTp policy by 2009.

## ● Progress in preventing malaria

*Coverage with ITNs is increasing rapidly in some countries of Africa, household ITN ownership having risen to 31% in high-burden countries by the end of 2008.*

11. Nearly 140 million long-lasting insecticidal nets (LLINs) were delivered to high-burden countries in the African Region in 2006–2008.
12. A model-based estimate showed that 31% of African households owned at least one ITN, and 24% of children under 5 years of age had used an ITN in 2008. Household ITN ownership reached ≥50% in 13 (37%) of 35 high-burden countries in the African Region by 2008. Surveys show that seven countries (Equatorial Guinea, Ethiopia [population living at < 2000 m], Gabon, Mali,

Sao Tome and Principe, Senegal and Zambia) had reached a household ITN ownership rate of  $\geq 60\%$  by 2007 or 2008.

13. The percentage of children  $< 5$  years who had used an ITN the previous night, given household ownership of at least one ITN, was 51% (median; range, 14–68%) in six countries for which data were available in 2006–2007. As all six surveys were demographic and health surveys, which are usually conducted in the dry season; use in the wet season might be higher.
14. In two of four countries in the African Region in which repeated national surveys were carried out, household ITN ownership decreased by 13% and 37% within 24–36 months of mass distribution, suggesting that strong programmes for routine distribution of ITNs are needed. Routine monitoring of the durability of LLINs and of the longevity of the insecticide are needed in order to calculate the requirements for ITN maintenance.

## ● Progress in the diagnosis and treatment of malaria

*ACT procurement is improving, and the percentage of children with fever who are treated with an ACT is rising. Nevertheless, countries received only about 50% of the ACTs needed to treat malaria cases at health facilities in the public sector in 2008.*

15. In 18 high-burden WHO African Region countries for which data were available, 22% of the reported suspected malaria cases were confirmed with a parasite-based test in 2008.
16. Access to treatment, especially ACTs, was generally poor in African countries. Less than 15% of children under 5 years of age received an ACT when they had fever in 11 of 13 African countries for which survey data were available in 2007–2008.
17. Nine household surveys in 2007–2008 showed that 20% of pregnant women received a second dose of ITP.

## ● Impact of malaria control

*Dramatic reductions in the numbers of childhood deaths from malaria and from all causes have been reported in some settings where high coverage has been reached with effective interventions.*

18. Reductions of more than 50% in the numbers of reported malaria cases and deaths were observed in four high burden African countries (Eritrea, Rwanda, Sao Tome and Principe and Zambia) and one area (Zanzibar, United Republic of Tanzania). Reductions of  $> 50\%$  were also observed in five low transmission African countries (Botswana, Cape Verde, Namibia, South Africa and Swaziland). In Sao Tome and Principe and Zanzibar (United Republic of Tanzania) reductions in the number of malaria cases and deaths were found within 2–3 years of widespread use of IRS, LLINs and ACTs. In Rwanda, a reduction was found with only LLINs and ACTs.

19. The numbers of inpatient deaths from all causes decreased by 53% in Sao Tome and Principe and 57% on the islands of Zanzibar (United Republic of Tanzania) after aggressive malaria control. In Zambia, child mortality rates from all causes fell by 35%, as measured both by the number of deaths recorded in health facilities and by  $< 5$  mortality rates derived from the Demographic and Health Survey of 2007. These trends, if confirmed in non-island countries, suggest that intensive malaria control could help many African countries to reach, by 2015, a two-thirds reduction in child mortality, as set forth in the Millennium Development Goals.
20. In other WHO regions, the number of reported cases of confirmed malaria decreased by more than 50% in 29 of the 56 malaria-endemic countries between 2000 and 2008. The number of cases fell least in countries with the highest incidence rates, indicating that greater attention should be given to countries that account for most malaria cases and deaths outside Africa.

## ● Eliminating malaria

*In September 2008, the RBM Partnership set a target of eliminating malaria in eight to ten countries by 2015 and afterwards in all countries that were in the pre-elimination phase in 2008.*

21. Eight countries are in the pre-elimination stage of malaria control in 2009; 10 countries are implementing elimination programmes nationwide (six having entered the elimination phase in 2009), and a further nine countries (Armenia, Bahamas, Egypt, Jamaica, Morocco, Oman, Russian Federation, Syrian Arab Republic and Turkmenistan) have interrupted transmission and are in the phase of preventing re-introduction of malaria.

## ● Financing malaria control

*The funds committed to malaria control from international sources have increased substantially, from approximately US\$ 0.3 billion in 2003 to US\$ 1.7 billion in 2009. The levels of domestic financing for malaria appear to have been maintained over this period.*

22. Funds disbursed for malaria control increased from US\$ 592 million in 2006 to US\$ 652 million in 2007. Commitments for malaria control exceeded US\$ 1 billion in 2008 and US\$ 1.7 billion in 2009, suggesting that the funds continue to increase.
23. Of 108 malaria-endemic countries, 76 received external assistance for malaria control between 2000 and 2007. The highest per capita expenditure was seen in countries with smaller populations at risk.
24. Countries that received more than US\$ 7 in external assistance per person at risk for malaria between 2000 and 2007 were more likely to report a reduction in the number of malaria cases than countries with a lower level of assistance.