

Malaria

Prevention and control: sustaining the gains and reducing transmission

Report by the Secretariat

1. Millennium Development Goal 6 (Combat HIV/AIDS, malaria and other diseases) calls for the world by 2015 to have halted, and begun to reverse, the incidence of malaria and other major diseases (Target 6.C). Further progress in malaria control will also be necessary to achieve Goals 1 (Eradicate extreme poverty and hunger), 4 (Reduce child mortality) and 5 (Improve maternal health). In 2005 the Health Assembly, in resolution WHA58.2 on malaria control urged Member States to ensure that at least 80% of those at risk of, or suffering from, malaria benefit from major preventive and curative interventions by 2010; in 2007, in resolution WHA60.18, the Health Assembly resolved to establish a World Malaria Day. On the first such commemoration in 2008, the United Nations Secretary-General called for universal coverage with antimalarial interventions.

2. Population coverage with antimalarial interventions has risen globally as a result of increased investments. By the end of 2009, 11 African countries were providing sufficient courses of artemisinin-based combination therapies to cover more than 100% of malaria cases seen in the public sector; a further eight African countries delivered sufficient courses to treat 50% to 100% of cases. These figures are an increase from the five countries that were providing sufficient courses of artemisinin-based combination therapy to cover more than 50% of public-sector patients in 2005. In 2009, about 35% of suspected cases of malaria in Africa were confirmed by a diagnostic test. For the 22 African countries with consistent data, the median percentage of women attending antenatal care who received a second dose of intermittent preventive treatment was 55%. Globally, more than 168 million persons were protected against mosquitoes by indoor residual spraying in 2009, 73 million of them in 27 countries in the African Region. The estimated percentage of African households owning at least one insecticide-treated bednet rose from 10% (in 2005) to 42% (in 2010), and has currently reached more than 50% in 19 African countries. Overall, 35% of children under five years of age used an insecticide-treated bednet in 2009; this percentage is below the 80% target set by the Health Assembly, primarily because ownership of insecticide-treated bednets remains low in some large African countries. However, resources for extending their use are now available. More than 88 million insecticide-treated bednets were delivered to countries in 2009, and the number for 2010 was 140 million. In all, that results in approximately 290 million insecticide-treated bednets having been delivered to sub-Saharan Africa between 2008 and 2010, enough to protect about 580 million people.

3. The burden of malaria is declining in many settings. In African countries with a high burden of malaria that have achieved high coverage of vector control and treatment programmes, recorded cases and deaths due to malaria have fallen by 50% or more, reaching the targets set by African Heads of State and Government in the Abuja Declaration in 2000, and suggesting that Target 6.C of Millennium Development Goal 6 can be achieved provided that the coverage rates for WHO-recommended

interventions are adequate. A recent analysis of malaria prevention in 35 African countries estimated that 736 000 lives were saved between 2000 and 2010, nearly three quarters of them since 2006. Overall, about 40% of the 108 malarious countries in 2009 documented reductions in confirmed malaria cases of more than 50% compared to 2000, although the number of cases fell least in countries with the highest burden. Worldwide, 19 countries are in the stage of pre-elimination or elimination of malaria.¹ A further seven countries have interrupted transmission and are preventing reintroduction of malaria. In 2010, two countries (Morocco and Turkmenistan) were certified by the Director-General as free of malaria. All malaria-affected countries in the European Region are somewhere along the elimination continuum; the goal is to have eliminated malaria from all of Europe by 2015. These trends confirm that significant reductions in malaria transmission are possible in various epidemiological situations, including high-transmission areas where previously the focus was only on reducing morbidity and mortality.

CHALLENGES IN SUSTAINING THE GAINS AND REDUCING MALARIA TRANSMISSION

4. The following nine areas for action have been identified as being vital for maintaining the progress already made and further reducing transmission.

Vector control

5. Funding has been secured to complete the initial process of expanding delivery of insecticide-treated bednets and long-lasting insecticide-treated bednets with the aim of achieving universal coverage, but shortfalls remain.

6. There is evidence that the lifespan of current long-lasting insecticidal bednets is variable and sometimes lower than expected. Hence, the maintenance of universal coverage by timely replacement of worn-out bednets of all types is a priority. To do so requires:

- an integrated approach, including mass-distribution campaigns, continuous delivery channels (e.g. antenatal and immunization services) and engagement of the private sector, along with appropriate communication strategies for behavioural change; and
- longer-lasting and affordable long-lasting insecticide-treated bednets, as well as market incentives for such products.

7. Indoor residual spraying remains a highly effective malaria control tool. The extent to which indoor residual spraying provides additional protection or further reduces transmission when added to the use of insecticide-treated bednets needs to be determined in different settings.

8. Effective malaria control will rely on, for the foreseeable future, a limited number of chemical insecticides. One of these is DDT, the use of which for vector-borne disease control remains permitted

¹ WHO's *World malaria report 2010* (Geneva, World Health Organization, 2010) provides the following definition of malaria elimination: "The interruption of local mosquito-borne malaria transmission; reduction to zero of the incidence of infection caused by human malaria parasites in a defined geographical area as a result of deliberate efforts; continued measures to prevent re-establishment of transmission are required".

under the Stockholm Convention on Persistent Organic Pollutants, provided WHO-recommended methods are followed.

9. A shortage of skilled vector-control personnel, including entomologists, limits the expansion and sustainability of malaria-prevention efforts.

Mosquito resistance to insecticides

10. Coordinated efforts are needed to slow down the spread of insecticide resistance.

- Entomological monitoring and surveillance are needed in order to evaluate the threat. Regions with evidence of pyrethroid resistance should consider adding sentinel sites in order to detect additional foci promptly. Monitoring for resistance before, during and after vector-control interventions allows for evidence-based insecticide choice.
- A rotational strategy for indoor residual spraying programmes (alternating between insecticide classes) may extend the useful life of insecticides, especially pyrethroids. Avoiding the use of pyrethroid insecticides for indoor residual spraying is recommended in areas with high coverage of long-lasting insecticide-treated bednets.
- The usefulness of mixtures and combinations of insecticides, as a means of reducing selection pressure for insecticide resistance, applying the same principle as in the case of artemisinin-based combination therapies, needs further urgent investigation.
- In order to mitigate the threat of insecticide resistance, research and development are needed for new classes of safe, long-lasting insecticides for use in indoor residual spraying, and for alternatives to pyrethroids for long-lasting insecticide-treated bednets. Investment by industry in new products will be related to forecast needs, expected stability of demand and potential size of the market.
- A comprehensive global plan for the prevention and management of insecticide resistance is needed.

Diagnosis and surveillance

11. Parasite-based diagnosis is essential to distinguish malaria from other causes of fever, and is now recommended by WHO for patients of all ages in all situations before antimalarial treatment is begun. Accurate diagnosis improves disease management and ensures that antimalarial medicines are used rationally and correctly. It also ensures that the use of such medicines is reserved for those actually in need of them. Achieving the goal of universal access to parasite-based diagnosis of malaria requires a major expansion of microscopy and rapid diagnostic tests, along with robust quality-assurance systems. Diagnosis with rapid diagnostic tests can now be practised at the community level. New methods are required to expand quality diagnostic and treatment services into the private sector.

12. Expanding access to diagnostic testing for malaria presents an unprecedented opportunity to improve malaria surveillance. As malaria transmission decreases as a result of successful interventions and becomes more variable, timely surveillance of confirmed malaria cases can guide intensified control efforts.

Treatment of malaria patients

13. Artemisinin-based combination therapy is highly effective for treating malaria, and has been adopted as the first-line treatment in almost all countries where falciparum malaria is endemic. However, many patients are still being treated in the private sector with monotherapies and medicines not meeting international quality standards. Such treatment is a result of weak regulation and poor enforcement of quality standards, and limited access to appropriate combination therapies. This situation is worsened by poor access to diagnostic testing, resulting in unnecessary use of artemisinin-based combination therapy for patients without malaria.

14. Resolution WHA60.18 urges Member States, inter alia, to cease progressively the provision of oral artemisinin monotherapies. In addition, it requests, inter alia, that international organizations and financing bodies cease to fund the provision and distribution of oral artemisinin monotherapies. In order to monitor the implementation of resolution WHA60.18, the Secretariat compiles data on both manufacturers' compliance and regulatory action taken by malaria-endemic countries. Most large companies have stopped production of these medicines, but many small companies have ignored the Health Assembly's call. Weak regulation of pharmaceutical markets remains a major issue. By September 2010, 27 countries were continuing to allow marketing of these products, and 39 pharmaceutical companies were manufacturing them.

15. Treatment of malaria at the community level as part of integrated community case management can improve access to timely treatment of other common childhood illnesses including pneumonia and diarrhoea. However, access to malaria diagnostics and artemisinin-based combination therapies at the community level remains limited in many countries, especially in remote rural communities which most need such services.

16. The timely treatment of severe malaria in tertiary care facilities is not accessible to many patients, therefore, it is vital that patients with severe malaria be given the life-saving treatment of artesunate suppositories before referral. Such treatment, however, remains unavailable in most remote health posts and at the community level.

Plasmodial resistance to antimalarial medicines

17. Emerging resistance to antimalarial medicines is a major threat to malaria control. WHO, working with partners, has developed a global plan for artemisinin resistance containment (due to be issued early in 2011), whose aim is to protect artemisinin-based combination therapies as an effective treatment for falciparum malaria. That plan calls for five primary actions:

- reduce the risk of resistance to artemisinin and its derivatives spreading beyond current foci, with a particular emphasis on expanding efforts to reach mobile and migrant populations with effective malaria prevention and control interventions;
- strengthen monitoring and surveillance of drug resistance; regions with evidence of resistance to artemisinin compounds should consider adding sentinel sites to facilitate early detection of additional foci;
- improve access to diagnostics and rational treatment with artemisinin-based combination therapies; education of patients, health-care providers (in both public and private sectors) and retailers is needed in order to decrease usage of monotherapies and avoid the use of medicines not meeting international quality standards;

- invest in research on drug resistance; continued investment is needed to develop alternatives to artemisinin-based combination therapies and more accurate field-ready diagnostics;
- motivate partners and mobilize resources; public health leaders need to persuade stakeholders, organizations and governments to support implementation of this global plan.

Strengthening health systems

18. Prevention and control of malaria contribute to and benefit from strengthened health systems. Early evidence shows that the decreasing malaria burden may be relieving pressure on overburdened health facilities in countries where the disease is endemic.

19. In order to sustain the advances made so far, national malaria control programmes must be strengthened, maintained and mandated with clearly defined responsibilities to coordinate essential functions such as situation analysis, strategic planning, budgeting, prevention, provision of diagnostic services, treatment, surveillance and response, capacity development, and supervision of operations at all levels of the system. Malaria programme reviews can serve as a basis for strategic and operational planning in the following ways:

- by ensuring that resources match requirements and flow in a sustainable manner as a result of thorough planning and costing of malaria control activities and detailed analysis of associated expenditures;
- by enabling improvement of the management of the supply chain, for example through forecasting, timely procurement of quality-assured goods, and better stock management systems;
- by ensuring appropriate programme management and implementation through the development, sustenance and supervision of a cadre of skilled staff (including entomologists) at national, district and community levels.

Developing a highly effective malaria vaccine

20. There is currently no licensed malaria vaccine. The Director-General has convened a technical expert group with a view to making a recommendation on policy for a first-generation malaria vaccine. A WHO policy recommendation is likely to be made in 2015 once the complete results of ongoing clinical trials are known.

21. The potential risk versus benefit of any malaria vaccine will need to be considered in the context of other WHO-recommended malaria control measures.

22. Strong links need to be built between national immunization programmes, malaria control programmes and national regulatory agencies in order to facilitate vaccine pharmacovigilance and monitoring of effectiveness.

23. Support is encouraged from agencies and Member States for the development of a second-generation malaria vaccine with at least 80% efficacy and substantial impact in reducing malaria transmission. Such support should not divert resources from the expansion of existing malaria control measures.

Reducing transmission and malaria elimination

24. Malaria transmission has been reduced dramatically in many settings. Plans for malaria control and elimination were endorsed recently by the regional committees for the Eastern Mediterranean¹ and the Western Pacific.²

25. Countries and parts thereof in which malaria transmission has been significantly reduced need to:

- strengthen diagnosis and surveillance systems in both the public and private sectors, and rapid-response systems for malaria outbreaks and resurgences;
- sustain staffing levels and human resource capabilities even in the face of reduced transmission of malaria;
- reduce the burden of disease due to *Plasmodium vivax* by focusing on diagnosis, species differentiation and ensuring a radical cure with effective medicines administered under adequate supervision;
- maintain coverage with appropriate long-term interventions for malaria prevention and control;
- understand the contribution of malaria control and elimination to the broader process of economic development; effective interventions can promote social, economic and environmental development, which can reduce both contact between humans and vectors and intensity of transmission. Such a cycle played an important role in eliminating malaria in parts of Asia, Europe and North America.

Sustaining political and financial commitment

26. In addition to the resolutions of the two regional committees mentioned above (paragraph 24), the Regional Committee for Africa in 2009 endorsed a plan for accelerating malaria control with the aim of eliminating the disease in the African Region.³ The African Leaders Malaria Alliance (launched in 2008) and the African Union have voiced their commitment to achieving malaria goals and the Millennium Development Goals. In 2008, the Roll Back Malaria Partnership launched the Global Malaria Action Plan with the aim of harmonizing the activities of stakeholders. Sustaining this political commitment is essential.

27. Over the past decade, annual donor contributions to malaria control have increased from less than US\$ 200 million (in 2000) to US\$ 1600 million (in 2009); the total global spending on malaria, including domestic investments and funding for malaria research, was estimated to be about US\$ 3000 million in 2009. Continued funding from donors including the United Kingdom Department for International Development, World Bank, Global Fund to Fight AIDS, Tuberculosis and Malaria, Bill & Melinda Gates Foundation, United States President's Malaria Initiative will be essential if the

¹ Resolution EM/RC55/R.9.

² Resolution WPR/RC60.R5.

³ Resolution AFR/RC59/R3.

targets for malaria for 2015 and beyond are to be achieved. In order to meet in full the funding requirements for global malaria control, top priority must be given to expanding both donor and national financing.

28. At its 128th session in January 2011, the Executive Board discussed an earlier version of this report¹ and adopted resolution EB128.R13.

ACTION BY THE WORLD HEALTH ASSEMBLY

29. The Health Assembly is invited to adopt the resolution recommended by the Executive Board in EB128.R13.

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¹ See document EB128/2011/REC/2, summary record of the eighth meeting, section 3; the tenth meeting, section 1; and the eleventh meeting, section 1.