
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. 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 should have access to antimalarial interventions by 2010; in 2007, by 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, 13 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 five 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 17 African countries. Overall, 29% 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 in 2009, and the projected number for 2010 is 140 million. In all, that should result in nearly 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, 18 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 10 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. 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 for the foreseeable future on a limited number of chemical insecticides. One of these is DDT, whose use for vector-borne disease control remains permitted under

¹ As defined by WHO in the *World Malaria Report 2010* (Geneva, World Health Organization, 2010): elimination is the interruption of local mosquito-borne malaria transmission in a defined geographical area.

the Stockholm Convention on Persistent Organic Pollutants, as long as 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 and that their use is reserved for those actually needing 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 as 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. In order to monitor the implementation of resolution WHA60.18, the Secretariat compiles data on both manufacturers' compliance and regulatory action taken by countries in which malaria is endemic with the call for the halting of provision and distribution of oral artemisinin-based monotherapies. 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 still allowed 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. Because timely treatment of severe malaria in tertiary care facilities is not accessible to many patients, life-saving treatment of patients with severe malaria with artesunate suppositories before referral is vital. 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/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. The regional committees for the Eastern Mediterranean and the Western Pacific recently endorsed plans for malaria control and elimination.¹

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 environment development, which can reduce both contact between humans and vectors and intensity of transmission. Such a virtuous 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.² 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 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, and other donors will be essential if the targets for malaria for 2015 and beyond are to be achieved. Expanding both donor and national financing in order to meet in full the funding requirements for global malaria control is a top priority.

¹ Resolutions EM/RC55/R.9 and WPR/RC60.R5, respectively.

² Resolution AFR/RC59/R3.

ACTION BY THE EXECUTIVE BOARD

28. The Board is invited to consider the following draft resolution:

The Executive Board,

Having considered the report on malaria,¹

RECOMMENDS to the Sixty-fourth World Health Assembly, the adoption of the following resolution:

The Sixty-fourth World Health Assembly,

PP1 Having considered the report on malaria;

PP2 Recalling resolutions WHA58.2 on malaria control and WHA60.18 that established World Malaria Day;

PP3 Recognizing that increased global and national investments in malaria control have yielded significant results in decreasing the burden of malaria in many countries, and that some countries are moving towards elimination of malaria;

PP4 Aware that recent successes in prevention and control are fragile and can only be maintained with sufficient investment to fund global malaria control efforts fully;

PP5 Realizing that current approaches to malaria prevention and control, when fully implemented in an integrated manner, are highly effective, rapidly make an impact and contribute to stronger health systems and the achievement of the health-related Millennium Development Goals;

PP6 Acknowledging that full expansion of malaria control and prevention activities will need adequately-resourced national programmes functioning within effective health systems that provide for an uninterrupted supply of quality-assured commodities and services;

PP7 Conscious that many countries continue to have unacceptably high burdens of malaria and must rapidly increase prevention and control efforts to reach the targets set by the Health Assembly and the internationally agreed health-related goals contained in the United Nations Millennium Declaration;

PP8 Cognizant that strategies need to be re-oriented in countries that have reduced their disease burden due to malaria in order to sustain those gains;

PP9 Mindful that antimalarial prevention and control relies heavily on medicines and insecticides whose utility is continuously threatened by the development of resistance of plasmodia to antimalarial agents and of mosquitoes to insecticides,

¹ Document EB128/14.

1. URGES Member States:
 - (1) to keep malaria high on the political and development agendas, to advocate strongly for predictable long-term international financing for malaria control, and to sustain national financial commitments for malaria control in order to accelerate implementation of the policies and strategies recommended by WHO, thereby achieving Target 6.C of Millennium Development Goal 6 and the targets set by the Health Assembly in resolution WHA58.2;
 - (2) to undertake comprehensive reviews of malaria programmes as an essential step in developing strategic and operational plans for achieving and maintaining universal access to and coverage with malaria interventions, notably:
 - (a) recommended vector-control operations for all people at risk, and maintenance of effective coverage through well-designed and executed strategies for replacement of long-lasting insecticide-treated bednets and targeted communication about their usage;
 - (b) prompt diagnostic testing of all suspected cases of malaria and effective treatment with artemisinin-based combination therapy of patients with confirmed malaria in both the public and private sectors at all levels of the health system including the community level, and to use the expansion of diagnostic services as an opportunity to strengthen malaria surveillance;
 - (3) in order to sustain the advances in malaria control, to take immediate action to combat the major threats, namely:
 - (a) resistance to artemisinin-based medicines, by strengthening regulatory services in the public and private sectors, working to halt the use of monotherapies and medicines not meeting international quality standards, introducing quality assurance mechanisms, and improving supply chain management for all malaria commodities and services;
 - (b) resistance to insecticides, by adopting best practices such as rotation of insecticides used for indoor residual spraying and avoiding the use of pyrethroid insecticides for indoor residual spraying in areas where usage of insecticide-treated bednets is high;
 - (4) to use the expansion of interventions for malaria prevention and control as an entry point for strengthening health systems, including laboratory services, maternal and child health services at peripheral health facilities, integrated management of illnesses at the community level, and timely and accurate surveillance;
 - (5) to maintain core national competencies for malaria control by sustaining a strong cadre of malaria experts, including entomologists, at all levels of the health-care system;
2. CALLS upon the international partners, including international organizations, financing bodies, research institutions, civil society, and the private sector:

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- (1) to ensure sufficient and predictable global funding so that the global malaria targets for 2015 can be met and malaria-control efforts can be sustained in order to contribute to attaining the health-related Millennium Development Goals;
 - (2) to harmonize the provision of support to countries for implementing a single national strategic plan based on WHO-recommended policies and strategies, using commodities that meet international quality standards, in order to secure universal access with vector-control and other prevention measures, diagnostic testing of suspected cases of malaria, and rational treatment of patients with confirmed malaria, as well as timely malaria surveillance systems;
 - (3) to support initiatives for the discovery and development of new medicines and insecticides to replace those whose usefulness is being lost through resistance, and to support both basic research on innovative tools for control and elimination of malaria (including vaccines) and operational research to overcome constraints limiting the expansion and practical effectiveness of existing interventions;
 - (4) to collaborate with WHO in order to support countries in accomplishing malaria goals and to progress to elimination;

3. REQUESTS the Director-General:

- (1) to support the development and updating of evidence-based norms, standards, policies, guidelines, and strategies for malaria prevention, control and elimination in order to chart a course for reaching the 2015 malaria-related targets set by the Health Assembly and in the Millennium Development Goals and for responding to the rapidly declining burden of malaria;
- (2) to monitor global progress in control and elimination of malaria and provide support to Member States in their efforts to collect, validate and analyse data from malaria surveillance systems;
- (3) to provide support to countries in defining their human resource needs and strengthening human resource capacity for malaria and vector control at national, district and community levels by revitalizing international training courses and sub-regional training networks and promoting adequate systems of supervision, mentoring and continuing education;
- (4) to provide support to Member States in identifying new opportunities for malaria control, as well as combating major threats, notably plasmodial resistance to antimalarial agents and mosquito resistance to insecticides, through the development and implementation of the Global Plan for Artemisinin Resistance Containment and a global plan for the prevention and management of insecticide resistance;
- (5) to report to the Sixty-sixth and Sixty-eighth World Health Assemblies in 2013 and 2015, through the Executive Board, on implementation of this resolution.

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