

ACCELERATED MALARIA CONTROL TOWARDS ITS ELIMINATION IN THE AFRICAN REGION

Ibrahima Socé Fall
Nathan Bakyaïta
Étienne Magroire Minkoulou
Tiéman Diarra
Georges Alfred Ki-zerbo
Rufaro Chatora

Division of AIDS, TB and Malaria
World Health Organization
Regional Office for Africa

Corresponding author:
Dr. Ibrahima Socé Fall
Email: SoceF@afro.who.int

Africa is the continent most affected by malaria, accounting for 86% of the estimated 247 million malaria episodes and 91% of malaria deaths worldwide in 2006. In high endemic countries in the Region, it is estimated that malaria reduces economic growth by an annual average rate of 1.3%, mainly as a result of absences from work or school. The poorest people are the most exposed to malaria and its complications owing to their inadequate housing, bad living conditions and limited access to health care. This paper describes ways of accelerating implementation of malaria prevention and control interventions towards eventual elimination. The principal ways forward described are:

- 1) updating malaria policies and strategic plans,
- 2) strengthening national malaria control programmes,
- 3) procuring and supplying quality antimalarial commodities,
- 4) accelerating the delivery of key interventions for universal coverage and impact,
- 5) consolidating malaria control achievements in high endemic countries,
- 6) moving from control to pre-elimination and elimination when appropriate,
- 7) strengthening surveillance, monitoring and evaluation,
- 8) scaling up partnership coordination and alignment as well as resource mobilization, and
- 9) strengthening malaria research.

RÉSUMÉ

L'Afrique est le continent le plus touché par le paludisme représentant, en 2006, 86% des 247 millions d'épisodes de paludisme et 91% des décès par paludisme dans le monde. Dans les pays à forte endémie de la région africaine, on estime que le paludisme réduit la croissance économique à un taux moyen annuel de 1,3%, principalement en raison des absences au travail ou à l'école. Les personnes les plus pauvres sont les plus exposées au paludisme et à ses complications en raison de leur logement inadéquat, de mauvaises conditions de vie et d'un accès limité aux soins de santé. Ce document décrit les moyens d'accélérer la mise en œuvre de la prévention du paludisme et des interventions de contrôle en vue de son élimination finale. Les moyens principaux décrits à long terme sont 1) l'actualisation

des politiques et des plans stratégiques contre le paludisme, 2) le renforcement des programmes nationaux de contrôle du paludisme, 3) l'obtention et la fourniture de produits antipaludiques de qualité, 4) l'accélération du lancement d'interventions-clé pour avoir une couverture universelle et un impact, 5) la consolidation des réalisations de contrôle du paludisme dans les pays à forte endémie, 6) le passage du contrôle à la pré-élimination et à l'élimination, au moment opportun, 7) le renforcement de la surveillance, du suivi et de l'évaluation, 8) l'élargissement de la coordination du partenariat et l'alignement ainsi que la mobilisation des ressources, et 9) le renforcement des recherches sur le paludisme.

SUMÁRIO

África é o continente mais afectado pela malária, sendo responsável por 86 % dos estimados 247 milhões de casos e 91 % das mortes causadas a nível mundial em 2006. Nesta região, nos países altamente afectados pela malária endémica, estima-se que a malária reduz em média o crescimento económico 1,3 % por ano, principalmente como resultado das ausências ao trabalho ou à escola. As pessoas mais pobres são as mais expostas à malária e às suas complicações, devido a habitações inadequadas, más condições de vida e acesso limitado aos cuidados de saúde. Este relatório descreve caminhos para acelerar a implementação da prevenção da malária e intervenções de controlo para uma eventual eliminação. Os caminhos principais descritos

para obter um avanço são: 1) actualização das políticas e planos estratégicos contra a malária; 2) reforço dos programas nacionais de controlo da malária; 3) procura e fornecimento de produtos contra a malária; 4) aceleração no fornecimento de intervenções chave para uma cobertura e um efeito universal; 5) consolidação dos resultados obtidos no controlo da malária endémica nos países altamente afectados; 6) avanço do controlo para a pré-eliminação e eliminação quando apropriado; 7) Reforço da vigilância, monitorização e avaliação; 8) aumento da coordenação de parcerias e do alinhamento bem como a mobilização de recursos; e 9) reforço da investigação sobre a malária.

Africa is the continent most affected by malaria, accounting for 86% of the estimated 247 million malaria episodes and 91% of malaria deaths worldwide in 2006. Malaria also accounts for 25% to 45% of all outpatient clinic attendances and between 20% and 45% of all hospital admissions. Furthermore, it is estimated that malaria represents 17% of under-five mortality in the WHO African Region.^{1,2}

In high endemic countries in the Region, it is estimated that malaria reduces economic growth by an annual average rate of 1.3%, mainly as a result of absences from work or school.³ The poorest people are the most exposed to malaria and its complications owing to their inadequate housing, bad living conditions and limited access to health care.

METHODS

The data presented in this paper come from various sources. The information on malaria interventions coverage for prevention and treatment is from population-based surveys such as Malaria Indicators Surveys (MIS) and Demographic Health Surveys (DHS). Information on malaria cases and deaths is from health facility data. The World Malaria Report 2009 an important sources of information . Published articles in international peer-reviewed journals were also used to complement the information on malaria diagnosis and treatment

Since 1991, several initiatives, resolutions and meetings have put malaria back at the top of the public health agenda.^{4,5,6} In 1998, the Roll Back Malaria initiative was launched to advocate for and coordinate malaria control efforts, aiming at halving the malaria burden by 2010. Roll Back Malaria progressively led to increased commitment to malaria prevention and control, culminating in the 2006 Abuja African Union Heads of State call for universal access to HIV/AIDS, tuberculosis and malaria services by 2010 and the call for malaria elimination. This was followed by launch of the Africa Malaria Elimination Campaign by the African Union in 2007 and the UN Secretary-General's call for 100% coverage of malaria control interventions by 2010⁷.

Malaria control results from deliberate efforts to reduce the disease burden to a level where it is no longer a public health problem. Malaria elimination, for its part, is an interruption of local mosquito-borne malaria transmission in a defined geographic area.⁸ Moving from malaria control to elimination should be seen as a continuum with the ultimate goal of interrupting malaria transmission.

The key malaria interventions are vector control using

insecticide-treated nets (ITNs), indoor residual spraying (IRS), intermittent preventive treatment of malaria in pregnancy (IPTp) and effective treatment. Artemisinin-based combination therapy (ACT) is now the treatment of choice in 41 of the 43 malaria-endemic countries; 20 countries are implementing ACT country-wide. By the end of 2007, IPTp had been adopted in all the 35 endemic countries where it was recommended, and 20 countries are implementing IPTp country-wide.⁹

Between 2000 and 2006, ITN distribution increased three- to ten-fold in most countries. Subsidized or free ITNs have increased bednet coverage. ITN distribution is often linked to antenatal care, routine immunization services and campaigns. By the end of 2007, 17 of the 43 malaria-endemic countries in the African Region were using indoor residual spraying as one of the key malaria control interventions, while six countries were pilot-testing IRS in a few selected districts.

A rapid decline in malaria burden is possible when a comprehensive package of malaria prevention and control interventions is implemented in the same geographic area at the same time, as has been shown in Botswana, Eritrea, Ethiopia,

Kenya, Rwanda, Sao Tome and Principe, South Africa and Swaziland.¹⁰

The purpose of this paper is to describe ways of accelerating implementation of malaria prevention and control interventions towards eventual elimination.

ISSUES

Some countries do not have comprehensive policies and strategies to guide the scaling up of malaria control. The private sector is not usually engaged or involved during adoption of national policies for access to malaria prevention and treatment services. The long wait between policy adoption and implementation has delayed efforts to control the disease in many countries as shown, for example, by the wide gap between the adoption of artemisinin-based combination therapy (ACT) policy and its actual country-wide implementation.

While access to any antimalarial medicine ranges from 10% to 63% for children under five years of age with fever, access to ACT for the same group has remained at only 3% in the 13 countries with data for 2006.¹⁰ The continued use of artemisinin monotherapy, particularly in the

private sector, remains a major setback, potentially contributing to the emergence of resistance and to the shortening of the useful therapeutic life of ACT.

Although progress has been made by countries in scaling up ITNs and IRS, many countries have not yet reached the internationally agreed targets. This is a result of the lack of capacity for large-scale IRS campaigns. As a result, in 2006, only five African countries reported IRS coverage sufficient to protect at least 70% of people at risk of malaria. By the end of 2007, 34% of households in 18 countries of the African Region owned at least one ITN.

However, there is a gap between ownership and effective use of ITNs which needs to be addressed through operational research. While uptake of the first dose of intermittent preventive treatment of malaria for pregnant women ranges from 23% to 93%,

coverage for the second dose is still low and ranges from 5% to 68%.¹² The challenge is to ensure that all pregnant women take their recommended doses of IPTp and also that all households with ITNs use them.

Malaria treatment is characterized by gross over-diagnosis and over-treatment. Studies have shown that 32% to 96% of febrile patients receive antimalarial treatment without parasitological diagnosis. In some cases it has been shown that only 30% of febrile patients receiving ACT are proven to have malaria^{13,14,15}. Such improper diagnostic practices undermine the correct management of malaria and non-malarial fevers.

Although many endemic countries have established national malaria control programmes, there is inadequate human resource capacity at all levels to ensure efficient utilization of resources



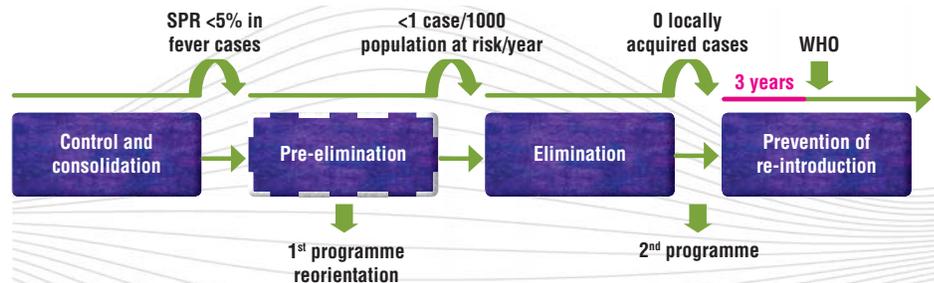
available for scaling up the various interventions. Weak health information systems also make it difficult to report on programme performance and impact.

Despite the increased inflow of external resources, inadequate funding for malaria control is still an issue. By the end of 2008, none of the malaria-endemic countries had fulfilled the Abuja commitment to allocate 15% of government expenditure to the health sector. Resources from African governments represent only 18% of the US\$ 622 million disbursed in 2007.¹ Furthermore, many countries have difficulties accessing international funds, or managing them appropriately where they are available.

The prevailing socioeconomic environment in sub-Saharan Africa further compounds the malaria situation. Poor households in malaria-endemic countries spend significant proportions of their income on malaria treatment, which pushes them further into poverty. The ongoing climate change related to global warming could further expand malaria transmission areas and put more people at risk^{16,17}.

Global and regional political commitment has led to increased interest in malaria elimination in the African Region. Figure 2

Figure 2: Malaria programme phase and milestones on the path from control to elimination in country or area with low to moderate endemicity



SPR: Slide or rapid diagnostic test positivity rate.

These milestones are only indicative: in practice, the transition will depend on the malaria burden that the programme can realistically handle including case notification, case investigation, etc.

shows malaria programme phases and transitions from control to elimination. Countries in stable transmission areas should complete the consolidation phase before engaging in stepwise reorientation of the programme to pre-elimination and then elimination and prevention of reintroduction as per the milestones shown.

All malaria-endemic countries in the African Region are in the control phase but lack reliable data to enable them proceed to programme reorientation. Weak health systems in most moderate and low transmission settings in the Region need to be strengthened in order to meet the requirements of an elimination programme. A major challenge is posed by the large asymptomatic reservoir coupled with high

vector capacities in many sub-Saharan countries. Currently, malaria control relies on a limited number of insecticides and medicines for prevention and treatment¹⁸. Resistance to some insecticides and medicines has already occurred. Therefore, the global elimination of malaria is likely to require research and development of new biomedical tools, operational research, behaviour change and adjustment of existing interventions to meet country-specific requirements. In many countries there is an increasing number of partners investing in malaria control. However, coordination is still a major challenge. In many instances, fragmented implementation of malaria control is a consequence of project-based approaches.

THE WAY FORWARD

Significant progress has been made thanks to the opportunities offered by high-level political commitment and the increased resources from various partners such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, the World Bank Booster Programme, the US President's Malaria Initiative, and the Bill and Melinda Gates Foundation. However, important issues and challenges remain at national and international levels. Various actions to address these issues and challenges are needed for countries to accelerate the scaling up of malaria elimination in the African Region. These are described below.

➔ UPDATE MALARIA POLICIES AND STRATEGIC PLANS

Where required, the national health policy should be updated and correctly implemented. It is important to undertake comprehensive country programme reviews in order to identify the gaps between the targets and the current situation; it is also necessary to assess the interventions and resource gaps in order to minimize the time lag between planning and implementation. Health system bottlenecks should be identified and addressed in order to accelerate and scale up malaria control interventions towards elimination.

➔ STRENGTHEN NATIONAL MALARIA CONTROL PROGRAMMES

The structures of national malaria control programmes should be based on the national health strategic plan, human resource strategic plan and the local epidemiological setting. It is important to ensure that enough financial resources are provided so that key functions related to programme management, planning, partnerships, resource mobilization, case management, integrated vector management, surveillance, monitoring and evaluation, procurement and supply management, and community-based interventions are carried out. Countries should decentralize their programmes to ensure appropriate flow of resources and work towards appropriate integration at the operational level.

➔ PROCURE AND SUPPLY QUALITY ANTIMALARIAL COMMODITIES

Countries should ensure uninterrupted availability of quality, affordable malaria medicines and commodities while avoiding stock-outs by implementing adequate procurement and supply-chain management systems. This can be done by strengthening quantification, forecasting, acquisition, stock and logistics management, distribution, quality

assurance, appropriate use, information system management, and pharmacovigilance, involving both the public and private sectors in the context of existing national systems for essential medicines and health technologies procurement and management.

➔ ACCELERATE THE DELIVERY OF KEY INTERVENTIONS FOR UNIVERSAL COVERAGE AND IMPACT

Countries should ensure that a comprehensive package of interventions is progressively implemented nationwide for impact. Interventions for prevention include long-lasting insecticide-treated nets (LLINs), indoor residual spraying (IRS) using an integrated vector management approach and intermittent preventive treatment of malaria in pregnancy (IPTp). Interventions for case management are parasitological diagnosis and effective treatment. Quality control and assurance systems for microscopy and rapid diagnostic tests (RDTs) must also be ensured. The interventions should be delivered free-of-charge or at an affordable cost through health facilities and community structures and integrated with other programmes. Community involvement is critical for accelerating implementation of proven interventions. Where effectively implemented, community-based interventions including appropriate use of

case management guidelines and algorithms contribute significantly to the scaling up of interventions.

➔ **CONSOLIDATE MALARIA CONTROL ACHIEVEMENTS IN HIGH ENDEMIC COUNTRIES**

Areas which were formerly of high stable transmission and which achieve a marked reduction in the burden of malaria should have a consolidation period before embarking on pre-elimination if their slide positivity rates are less than 5%. Cross-border collaboration should be promoted and supported by regional economic communities

and partners to maximize impact.

➔ **MOVE FROM CONTROL TO PRE-ELIMINATION AND ELIMINATION WHEN APPROPRIATE**

In some countries natural conditions or control efforts have reduced the risk of malaria transmission to low levels and have localized unstable transmission in well-defined areas. Such countries should conduct comprehensive malaria programme reviews followed by programme reorientation to pre-elimination. In the pre-elimination phase, the surveillance system should be adapted to detect and respond

to all malaria outbreaks by active case detection, parasitological diagnosis, effective treatment and focal vector control.

➔ **STRENGTHEN SURVEILLANCE, MONITORING AND EVALUATION**

There is need to strengthen malaria surveillance in the routine work of health information systems and integrated disease surveillance and response, including reporting confirmed malaria cases. The surveillance, monitoring and evaluation systems should use the health information system as the main source of data, complemented by surveys. Drug efficacy and



insecticide susceptibility tests should be performed annually to enable timely identification of resistance as well as the necessary actions and policy decisions.

➔ **SCALE UP PARTNERSHIP COORDINATION AND ALIGNMENT AS WELL AS RESOURCE MOBILIZATION**
Partner coordination and alignment using the established mechanisms should be strengthened at country, regional and global levels to avoid duplication of efforts and to improve efficiency. Strong advocacy for increased and

sustained funding as well as effective and efficient use of existing resources to fill existing gaps needs to be maintained at all levels for sustainable impact on malaria. To maximize resources and to address the socioeconomic determinants of health, the fight against malaria should be linked to poverty alleviation programmes.

➔ **STRENGTHEN MALARIA RESEARCH**
For countries in the control phase, operational research, including behavioural aspects should focus on the best approaches and tools

to quickly deliver and sustain the main interventions at community and health facility level. For countries which have achieved sustained impact, operational research should focus on the technical and financial feasibility of moving to pre-elimination and elimination. Countries and partners should advocate for operational research to expand the knowledge base as well as research and development for new tools. 🌐

ACKNOWLEDGEMENTS

We gratefully acknowledge the contributions of all those professionals at HQ and IST for the review of the paper and at the country levels who are involved in data collection, processing and dissemination. Assessment of the magnitude of malaria or monitoring its control would not have been possible without their crucial efforts.

REFERENCES

- WHO, World malaria report 2008, Geneva, World Health Organization, 2008; WHO, Africa malaria report 2006, Brazzaville, World Health Organization, Regional Office for Africa, 2006.
- RBM/WHO/ UNICEF, World malaria report 2005, Geneva, World Health Organization 2005; WHO, World health statistics, Geneva, World Health Organization, 2008.
- Gallup JL, Sachs J, The economic burden of malaria, *American Journal of Tropical Medicine and Hygiene* 64(1–2 Suppl): 85–96, 2001.
- WHO, Resolution AFR/RC50/R6, Roll Back Malaria in the African Region: a framework for implementation. In: Fiftieth session of the WHO Regional Committee for Africa, Ouagadougou, Burkina Faso, 28 August–2 September 2000, Final report. Brazzaville, World Health Organization, Regional Office for Africa, 2000, (AFR/RC50/17), pp. 19–22.
- WHO, Resolution AFR/RC53/R6, Scaling up interventions against HIV/AIDS, tuberculosis and malaria in the African Region. In: Fifty-third session of the WHO Regional Committee for Africa, Johannesburg, South Africa, 1–5 September 2003, Final report. Brazzaville, World Health Organization, Regional Office for Africa, 2003 (AFR/RC53/18), pp. 20–22.
- Resolution WHA58.2, Malaria control, Geneva, World Health Organization, 2003 (WHA58/2005).
- On World Malaria Day in April 2008, UN Secretary-General Ban Ki-moon called for universal coverage with proven malaria tools by the end of 2010, and appointed Ray Chambers as the UN Special Envoy for Malaria to mobilize global support for action on the disease.
- WHO, Malaria elimination: a field manual for low and moderate endemic countries, Geneva, World Health Organization, 2007.
- WHO, The work of WHO in the African Region 2006–2007, Brazzaville, World Health Organization, Regional Office for Africa, 2008.
- WHO, World malaria report 2008, Geneva, World Health Organization, 2008.
- http://www.who.int/malaria/world_malaria_report_2009/en/ (last accessed 18 December 2009).
- WHO, Roll Back Malaria—Global malaria action plan, Geneva, World Health Organization, 2008.
- Hamer DH et al, Improved diagnostic testing and malaria treatment practices in Zambia, *Journal of the American Medical Association* 297: 2227–2231, 2007.
- Amexo M et al, Malaria misdiagnosis: effects on the poor and vulnerable, *Lancet* 364: 1896–1898, 2004; Reyburn H et al, Overdiagnosis of malaria in patients with severe febrile illness in Tanzania, *British Medical Journal* 329:1212, 2004.
- Zurovac D et al, Microscopy and outpatient case management among older children and adults in Kenya, *Tropical Medicine & International Health* 11: 1185–1194, 2006; WHO, World malaria report 2008, Geneva, World Health Organization 2008.
- Thomson MC et al, Malaria early warnings based on seasonal climate forecasts from multi-model ensembles, *Nature* 439: 576–579, 2006.
- Teklehaimanot HD et al, Weather-based prediction of *Plasmodium falciparum* malaria in malaria epidemic prone regions of Ethiopia, I. Patterns of lagged weather effects reflect biological mechanism, *Malaria Journal* 3: 41, 2004.
- WHO, Global malaria control and elimination: report of a technical review, Geneva, World Health Organization, 2008.