

Universal access to core malaria interventions in high-burden countries

WHO Technical Consultation meeting report
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Summary

Between 2000 and 2015, there was significant progress in reducing the burden of malaria, and malaria mortality declined by 60%. Approximately 6.2 million lives have been saved by improving access to core interventions – vector control, preventive therapies, diagnostic testing and effective treatment. However, since 2015, the trends have changed, with the number of deaths due to malaria remaining at 445 000 and the number of cases increasing to 216 million in 2016. These estimates are conservative and in several high-burden countries in sub-Saharan Africa, the number of cases may be underestimated. With the current levels of investment and intervention coverage, it is unlikely that the WHO Global Technical Strategy for malaria’s milestones of reducing cases and deaths by 40% by 2020 will be achieved.

Currently, 80% of malaria cases occur in 14 African countries and India. To reduce mortality due to malaria, significant progress needs to be made in these high-burden countries.

Large gaps in the coverage of the core interventions remain due to health system weaknesses as well as financial and programmatic factors. The effectiveness of these interventions is further threatened by drug and insecticide resistance. In order to “bend the curve” of malaria deaths back down, there is a need to develop new and more focused strategies, and to ensure that current strategies are better implemented. The Technical Consultation on “Universal access to core malaria interventions in high-burden countries” was convened to review the current situation and to make recommendations on steps to improve access to core interventions for those at the highest risk of malaria mortality.

The Technical Consultation reviewed the situation in the 15 highest burden countries, looking at the challenges from the following perspectives:

- Determinants of high mortality in children under 5 in sub-Saharan Africa – the population most vulnerable to malaria;
- Financial factors affecting access to core interventions – funding affecting supply and financial barriers affecting demand for services;
- Technical and operational factors affecting access to each of the interventions – vector control, quality diagnosis and treatment, and chemoprevention (intermittent preventive treatment in pregnancy and seasonal chemoprevention);
- The importance of bringing care close to the patient and the role of integrated community case management and community health workers in achieving this;
- Delivery of care by the private sector and treatment-seeking in the informal sector;

- Prioritization of interventions to target those at highest risk of malaria and dying from it;
- The strengthening of information systems to ensure evidence-based decision-making.

Details of the discussions and key conclusions are presented in the main body of this report. However, some overarching recommendations have emerged and are proposed for consideration by the WHO Malaria Policy Advisory Committee.

Main recommendations

1. There is a significant gap in the funding needed to achieve the Global Technical Strategy milestones and targets. In addition to higher levels of funding from multilateral and bilateral agencies, development banks and foundations, and other nongovernmental organizations, a significant increase in domestic and innovative funding is necessary.
2. Malaria control programmes should promote access to the core interventions by the entire population at risk, namely, malaria diagnosis, treatment and vector control and, where appropriate, intermittent preventive treatment of infants, children and pregnant women. High-risk areas should be targeted and prioritized based on stratification of the risk in each country. Interventions should be selected based on their relative cost-effectiveness and, in Sahelian countries where transmission is highly seasonal, the large-scale implementation of seasonal malaria chemoprevention should be extended to all suitable areas, aiming at full coverage. More investments are needed to strengthen surveillance and data-gathering systems, deployment of new technologies and improved planning systems.
3. More collaboration between malaria and other programmes will improve synergies, optimize the use of resources, and strengthen health services (e.g., maternal and child health, laboratory services, vaccination, supply management, surveillance, etc.). Malaria service delivery can pave the way for the delivery of other programme interventions and integration with these programmes, and strengthen overall national health services.
4. Access to care needs to be brought closer to the patient in order to reduce mortality. Community health workers providing integrated community case management of malaria, pneumonia and diarrhoea for children under 5 can be an effective health workforce, extending the reach of health services to remote rural areas. Malaria programmes should support the role of community health workers as an extension of primary health care services.
5. The private sector plays an important role in delivering malaria care in many high-burden countries, both in urban areas and in remote rural areas underserved by formal health care facilities. Guidance on effective strategies for engaging the private sector in delivering quality malaria care needs to be documented, shared and promoted.
6. Political leadership and support at global, regional, national and local levels is vital to reduce the burden of malaria and reverse the current stagnation in progress. Political commitment to regulatory change is needed to provide an enabling environment for access to core interventions. More investments are needed in economic analysis, comparative cost-effectiveness, adaptation of intervention-mix to local situations, and development of decision support tools for policy makers at national and local levels.

List of Abbreviations

ACT	Artemisinin-based combination therapy
AFRO	WHO African Region
ALMA	African Leaders' Malaria Alliance
AMFm	Affordable Medicines Facility–malaria
ANC	Antenatal care
AQ	Amodiaquine
BCC	Behaviour change communication
CHW	Community health worker
CPM	Co-Payment Mechanism
DHIS	Demographic & Health Information System
DHS	Demographic and Health Survey
DRC	Democratic Republic of the Congo
EPI	Expanded Programme on Immunization
GMP	WHO Global Malaria Programme
GTS	Global Technical Strategy for malaria 2016–2030
HMIS	Health Management Information System
iCCM	Integrated community case management
IPTp-SP	Intermittent preventive treatment in pregnancy using sulfadoxine-pyrimethamine
IRS	Indoor residual spraying
ITN	Insecticide-treated net
IVCC	Innovative Vector Control Consortium
LLIN	Long-lasting insecticidal net
M&E	Monitoring and evaluation
MICS	Multiple indicator cluster surveys
MiP	Malaria in pregnancy
MIS	Malaria Indicator Survey
MPAC	Malaria Policy Advisory Committee
NMCP	National malaria control programme
NSP	National strategic plan
OECD	Organisation for Economic Co-operation and Development
PMR	Private medicine retail
RAcE	Rapid Access Expansion Programme
RBM	Roll Back Malaria Partnership to End Malaria
RDT	Rapid diagnostic test
RMCH	Reproductive, maternal and child health
SBCC	Social behaviour change communication
SDGs	Sustainable Development Goals
SMC	Seasonal malaria chemoprevention
SP	Sulfadoxine-pyrimethamine
SSA	Sub-Saharan Africa
TB	Tuberculosis
TWG	Technical Working Group
UCC	Universal coverage campaign
UHC	Universal health coverage
WHO	World Health Organization

Background

Between 2000 and 2015, there was significant progress in reducing malaria morbidity and mortality and the malaria mortality rate decreased by 62% [1]. An estimated 6.2 million lives were saved during this period by improving access to core malaria interventions, namely, vector control, preventive therapies and malaria diagnostic testing and treatment. Despite this progress, in 2016, there were still an estimated 216 million cases of malaria and more than 445 000 malaria deaths [2].

To prevent avoidable deaths, reduce morbidity and make progress towards malaria elimination and a malaria-free world, in May 2015, the World Health Assembly adopted the *Global Technical Strategy for malaria 2016–2030* (GTS). The three strategic pillars of the GTS are:

1. To ensure universal access to malaria prevention, diagnosis and treatment;
2. To accelerate efforts towards elimination and attainment of malaria-free status;
3. To transform malaria surveillance into a core intervention.

These strategic pillars are complemented by two key supporting elements:

1. Harnessing innovation and expanding research and development;
2. Strengthening the enabling environment through financing, political commitment and multisectoral collaboration.

As presented in Fig. 1, the GTS includes targets for 2030 and milestones for 2020 and 2025 [3].

VISION – A WORLD FREE OF MALARIA			
GOALS	MILESTONES		TARGETS
	2020	2025	2030
1. Reduce malaria mortality rates globally compared with 2015	At least 40%	At least 75%	At least 90%
2. Reduce malaria case incidence globally compared with 2015	At least 40%	At least 75%	At least 90%
3. Eliminate malaria from countries in which malaria was transmitted in 2015	At least 10 countries	At least 20 countries	At least 35 countries
4. Prevent re-establishment of malaria in all countries that are malaria-free	Re-establishment prevented	Re-establishment prevented	Re-establishment prevented

Fig. 1. Global Technical Strategy targets

The highest burden of malaria (representing 80% of total estimated cases) is concentrated in 15 countries, which are, with the exception of India, all in sub-Saharan Africa.¹ Global progress in malaria control can only be accelerated through deliberate action to achieve universal access to WHO-recommended core interventions in these 15 high-burden countries.

¹ Burkina Faso, Cameroon, Côte d'Ivoire, Democratic Republic of the Congo, Ghana, Guinea, Malawi, Mali, Mozambique, Niger, Nigeria, Rwanda, United Republic of Tanzania, Uganda

Emerging analyses of 2016 data show that global efforts are not on track to meet the GTS milestones for 2020. Based on WHO estimates, in the WHO African Region (AFRO), malaria cases have shown an increase since 2013 and the decline in malaria deaths has flattened out (see Figs. 2 and 3) [2].

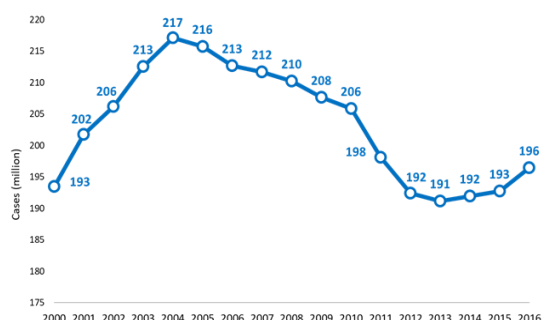


Fig. 2. Malaria cases in WHO African Region

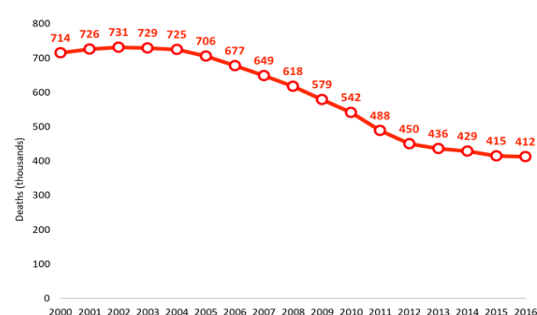


Fig. 3. Malaria deaths in WHO African Region

A WHO analysis comparing data from a group of high-burden African countries using the current method of estimation (based on a parasite-to-incidence model) and a method based on confirmed cases in the public sector (adjusted for confirmation, reporting and treatment-seeking rates) indicates that the current number of cases reported may be an underestimation.

At country level, reduction in malaria deaths is critical to achieving the Sustainable Development Goals (SDGs) and universal health coverage (UHC). If the global community is to get back on track in the fight against malaria, maintaining the status quo is not an option.

Data are limited, but current estimates suggest that large gaps in programme coverage remain due to financial and programmatic factors. The effectiveness of interventions is further threatened by drug and insecticide resistance. This Technical Consultation aimed to develop a better understanding of the relationships between coverage gaps and mortality in high-burden countries, why these gaps occur, who is affected by these gaps, and what strategies can be used to overcome them. These main conclusions and recommendations are proposed for consideration by the Malaria Policy Advisory Committee (MPAC).

Objectives of the Technical Consultation

- To identify particular population groups associated with high malaria mortality and the risk factors for dying, including coverage gaps in malaria vector control and access to malaria diagnosis and treatment delivered through different platforms (public sector, private sector, community-based programmes) in high-burden malaria countries;
- To characterize access to current malaria core interventions (long-lasting insecticidal nets [LLINs], indoor residual spraying [IRS], intermittent preventive treatment of pregnant women [IPTp], seasonal malaria chemoprevention [SMC] and the utilization of malaria diagnostic testing and treatment services), and to identify bottlenecks in service provision (whether in global supply, supply management, policy/regulations, population access to health facilities, availability of staff and equipment, uptake of services by the population, etc.) in high-burden malaria countries;
- To identify the most effective strategies to increase progress in reducing malaria mortality and increase access to malaria core interventions in high-burden countries in order to meet the GTS 2020 milestones;
- To review existing data sources and methods for estimating access to malaria core interventions and to provide clear recommendations for strengthening surveillance via routine Health Management Information Systems (HMISs) and health facility and household surveys in high-burden countries;
- To identify other factors relevant to the provision of effective intervention coverage and to characterize these so as to inform enabling actions with expected maximal impact on malaria mortality.

Process

In preparation for the meeting, the WHO Global Malaria Programme (GMP) commissioned a series of background papers (listed in Annex 1). Additional published papers were also circulated to participants. Each session of the meeting was opened with a short summary presentation of the evidence based on the relevant pre-reads, followed by a discussion involving all participants. At the end of the meeting, the rapporteur presented a summary of the emerging recommendations, which was also discussed and amended as necessary.

The rapporteur then prepared this report from the pre-reads and the discussions that took place at the meeting. It was shared with all participants for comment and any inputs were taken into consideration in finalizing the report. The Co-Chairs approved the final version of the report before submission to the MPAC.

Report of the WHO Technical Consultation

Determinants of high mortality

The priority being addressed by this Technical Consultation is how to “bend the curve” of malaria deaths back down. The majority of malaria-related deaths occur in sub-Saharan Africa in children under 5; in areas of high transmission, malaria is a major contributor to the under-5 mortality rate. Under-5 mortality rates are unevenly distributed across sub-Saharan Africa and also within countries (see Fig. 4). The highest under-5 mortality rates are generally observed in West Africa (where malaria prevalence is highest and where malaria tends to be particularly seasonal).

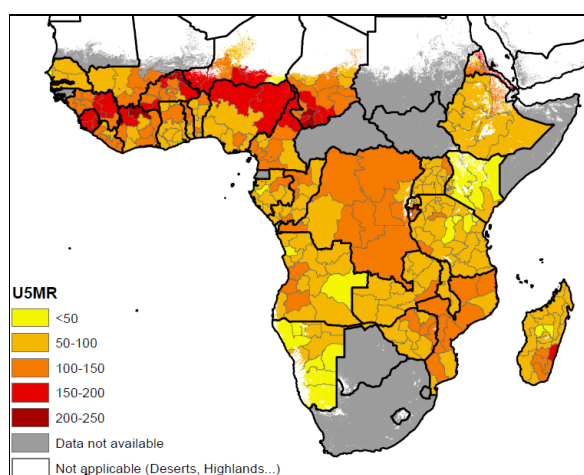


Fig. 4. Under-5 mortality rates by DHS region in sub-Saharan Africa, latest available survey

Source: WHO calculation using Demographic and Health Surveys (DHSs) and Malaria Indicator Surveys (MISs), as of 15 March 2018. DHSs/MISs were conducted in 2016 in Uganda, Senegal and Ethiopia, in 2015–16 in Angola, Malawi and Tanzania, in 2015 in Zimbabwe, in 2014–15 in Chad and Rwanda, in 2014 in Ghana and Kenya, in 2013–14 in DRC, Togo and Zambia, in 2013 in Gambia, Liberia, Namibia, Nigeria and Sierra Leone, in 2012–13 in Mali, in 2012 in Comoros, Gabon, Guinea and Niger, in 2011–2012 in Benin, Congo and Côte d’Ivoire, in 2011 in Cameroon and Mozambique, in 2010 in Burundi and Burkina Faso, and in 2008–09 in Madagascar and Sao Tome and Principe. The indicator is defined as the probability of children dying before their 5th birthday (in the 10 years preceding the survey per 1000 live births).

Reliable estimates of all-cause under-5 mortality are available, but it is difficult to estimate the contribution of direct and indirect malaria mortality and the relationship between the number of malaria cases and malaria deaths in relation to different interventions and malaria transmission. The evidence reviewed was from Demographic and Health Surveys (DHSs) conducted in sub-Saharan Africa between 2010 and 2015. Regression analysis showed that there are associations between all-cause under-5 mortality rates, malaria infection, care-seeking for fever and socioeconomic factors:

- Positive associations:
- % children with positive rapid diagnostic test (RDT) for malaria
 - Number of people sleeping together in one room

Negative associations: % febrile children seeking care from a trained provider²
 % literate women in the population

There is a time lag between the under-5 mortality rate estimated from household surveys and some of the covariates used in the regression analysis. Nonetheless, the association between under-5 mortality rate and malaria is strong, and malaria infection is associated with more than 20% of deaths in areas where the under-5 mortality rate exceeds 100 deaths per 1000 births. Hence, in high-burden countries, there is a strong case for using the under-5 mortality rate to capture both direct and indirect malaria deaths in order to better target interventions.³ The risk of a child dying was found to increase by 1.3 to 2 times in areas where malaria parasite prevalence was >5%. In 2015, 25% of deaths in children under 5 were associated with malaria infection (down from 41% in 2000 – see Fig. 5).

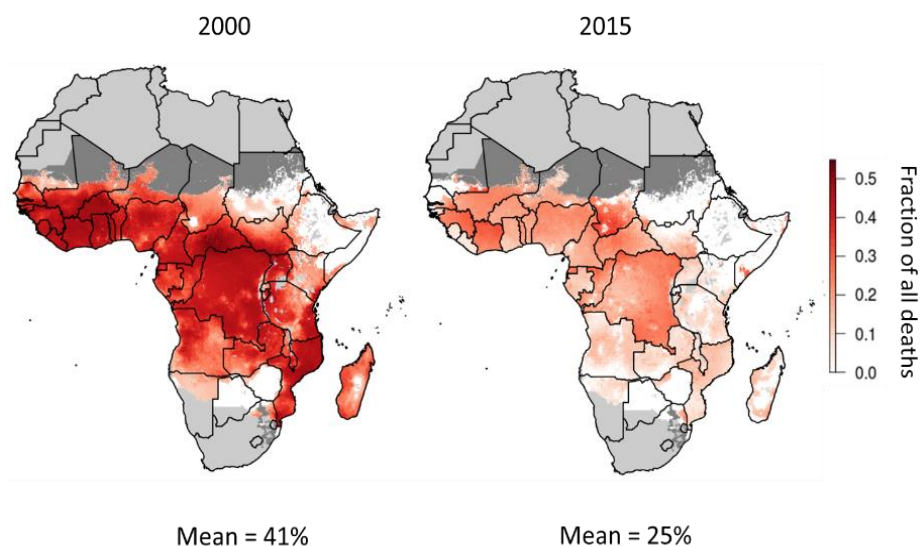


Fig. 5. Distribution of deaths associated with malaria infection

Source: Cox proportional hazards model applied to DHS data 2000–2015, using child variables (age, sex, birth order, birth interval), caretaker variables (age, education level), household variables (wealth, water source, sanitation) and cluster variables (PfPR, exposure to ACT). Analysis undertaken by Donal Bisanzio and colleagues of the Malaria Atlas Project.

Meeting participants were keen to emphasize the value of connecting malaria deaths and under-5 mortality rates, as it reinforces the use of malaria care as an entry point to UHC. It was suggested that the number of malaria cases and deaths can be a good indicator of poor access to health services. It is therefore important to monitor deaths in children under 5 in as close to real-time as possible, so that response to adverse trends can be rapid. Malaria surveillance is one of the three pillars of the GTS.

The risk of malaria infection has been shown to increase with the age of the child (up to 5 years), living in rural areas, and poverty. The latter two factors can be associated with

² Care-seeking may be related to the ease of access to suitable care.

³ This is thought to not be the case in India, though in high-burden areas, such as for tribal populations in forested areas, malaria may also be concentrated in children under 5.

difficulty in accessing quality health care. Those populations with access to and/or use health services and vector control have a lower risk of infection. However, this relationship is not consistent across all countries. In some countries, the risk of infection has been found to correlate with household size. This is of concern, as the number of people sleeping under an insecticide-treated net (ITN) decreases with household size. A further complicating factor is that, in countries implementing indoor residual spraying (IRS), the decline in ITN coverage with household size has been found to be offset by the higher rates of IRS.

Previous use of health care facilities (for antenatal care [ANC], family planning, etc.) is associated with care-seeking for febrile children. Those most likely to be infected with malaria are least likely to be taken for care. More study is required to better understand the associations between malaria incidence and mortality and the factors that can impact malaria deaths. However, if the objective is to reduce malaria mortality, then interventions need to target the populations at the highest risk of dying from malaria:

- Children under 5;
- Pregnant women;
- Those in remote areas and difficult-to-reach populations;
- Mobile and displaced populations.

Given the variable nature of the relationship between risk factors and health outcomes, it will be important to take into account the particular circumstances of each country in order to develop specific strategies to reduce malaria infection and mortality in children and other vulnerable populations. The identification of specific combinations of interventions that are likely to have the greatest impact in different situations requires further investigation. It is also important to monitor whether the burden is moving to older children, as a result of reduction in transmission.

Key conclusions

- In view of the significant contribution of malaria to under-5 mortality rates in high transmission areas, the under-5 mortality rate should be considered a primary indicator for identifying populations most in need of interventions and for strengthening surveillance to monitor the impact of those malaria interventions. More research is needed on the relationship between the under-5 mortality rate and malaria mortality in areas with decreasing malaria transmission.
- Given the variable nature of the relationship between risk factors and health outcomes, it will be important to take into account the particular circumstances of each country when identifying the best mix of implementation approaches to achieve the greatest reduction in malaria mortality in children under 5 in the highest burden areas of the country.
- More studies are required to better understand the determinants of risk of malaria deaths.
- The groups at highest risk of dying of malaria that should be prioritized are children under 5, pregnant women, remote and difficult-to-access populations, and mobile and displaced populations.

Financial factors

The meeting participants agreed that the most important bottlenecks affecting access to the core interventions necessary to reduce mortality were financial.

Funding for malaria programmes

While there has been a significant growth in funding for malaria control and elimination efforts since 2000, current total investments have flattened out compared to 2010 (see Fig. 6). This flattening out of total global funding, however, hides reductions in per capita funding in high-burden countries as the number of people at risk of malaria increases due to total population increases. Domestic funding is not increasing and there is little prospect at the moment that overall funding will increase significantly in the coming years.

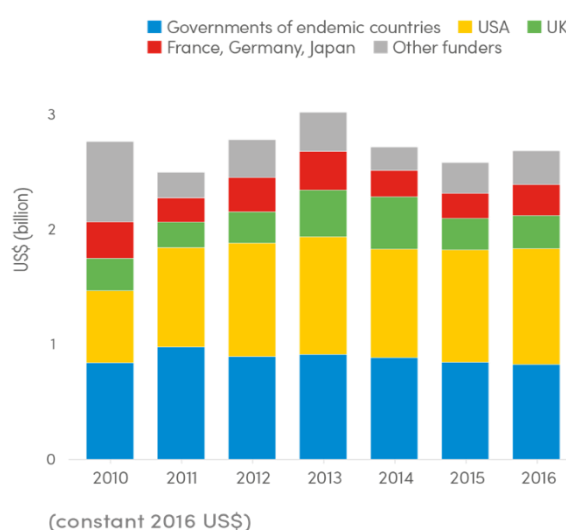


Fig. 6: Malaria funding by source 2010–2016

Analysing the resource requirements to support national malaria strategic plans and the actual funds available for both 2015–2017 and 2018–2020 showed that there are significant gaps between available funding and resource needs.

For 15 high-burden target countries with available gap analyses for 2015–2017, countries estimated that approximately US\$ 7 billion was required to fully implement their national strategic plans (NSPs). Countries estimated that only about 65% of that amount was funded, leaving them with a gap of US\$ 2.5 billion. An analysis of countries receiving Global Fund malaria funding showed that they prioritized their interventions as follows, based on available funding:

- Higher priority:
 - Commodities and basic implementation costs for case management through public-sector facilities
 - Universal coverage of vector control with LLINs and/or IRS where appropriate

- Medium priority:
 - Severe malaria management
 - Basic surveillance, monitoring and evaluation
 - IPTp
- Lower priority:
 - Integrated community case management (iCCM)
 - Private-sector case management

In response to funding limitations for vector control and instructions from the Global Fund, the main approach used by countries was geographical targeting of areas with the highest burden.

For the 12 countries with available gap analyses for the period 2018–2020, countries have estimated that approximately US\$ 7.7 billion is required over the next 3 years to fully implement their NSPs. In 2017, countries estimated that approximately 51% of the plans were funded, leaving a gap of US\$ 3.7 billion. For essential commodities, there is a gap of 128 million LLINs (26.3%) out of the 486 million estimated to be required over the next 3 years; a gap of 276 million ACTs (38%) out of the 715 million needed; and a gap of 56 million RDTs out of the 646 million required.

There is a clear need to i) mobilize more funds and ii) make more efficient use of available funds. Given the current political climate, it does not seem likely that countries that are members of the Organisation for Economic Co-operation and Development (OECD) and are the main sources of international funding for malaria will increase their financial contributions to fill in the gap entirely. For this reason, in addition to the funding from multilateral and bilateral agencies, development banks, foundations and other nongovernmental organizations, a significant increase in domestic and innovative funding will be necessary.

Maximizing value for money of all resources will also be necessary. There needs to be a stronger demonstration to Ministries of Finance and non-traditional financing agencies of the economic gains from supporting malaria programmes. Continued and increased political commitment is needed at the highest levels in malaria-affected countries – reinforced through peer pressure and accountability mechanisms transmitted by organizations such as the African Leaders' Malaria Alliance (ALMA) and the Roll Back Malaria Partnership to End Malaria (RBM).

Key conclusions

- At a global level, there is a need to develop investment cases to document the wide social and economic benefits of reducing malaria cases and deaths that can be used by national malaria control programmes (NMCPs) to mobilize domestic resources to support NSPs.
- At a global level, there is a need for new innovative funding mechanisms to mobilize resources from non-traditional sources.
- At a country level, there is a need for convincing cases to increase mobilization of domestic resources for malaria in the context of decreasing disease burden, availability of external funding, and competing public health priorities.
- At a country level, there is a need to seek efficiencies across all malaria interventions to reduce as far as possible waste and enhance domestic public and private sector contributions.
- At a country level, it is critical to seek co-operation with other health programmes to ensure and develop synergies and reinforce the impact of programmes.

Financial barriers to access/use of malaria control interventions

Demand-side factors. While there have been many studies looking at the different socioeconomic factors associated with the use of preventive and curative services for malaria, there have been comparatively fewer on how these differences affect access. In the reviewed studies, financial and economic factors were reported to affect i) decisions to seek care for suspected malaria, ii) the timeliness of care-seeking, and iii) the type(s) of provider visited.

The decision to seek care is often influenced by the direct affordability of the treatment. Self-medication is often the preferred first option, especially among the poorest. The cost of travelling to health care facilities, and the opportunity cost of spending time travelling and then waiting at the facility are also important factors. Poorer socioeconomic groups were often reported to seek care at lower-level or informal providers. This finding makes the case for having high-quality care as close as possible to those affected and for strengthening the role and capacity of community health workers (CHWs).

Supply-side factors. National central drug procurement, pricing and policies all act as financial barriers to accessing artemisinin combination therapies (ACTs). As part of registration requirements, charges for licences, permits and clearance may contribute to up to 6–7% of import value, and charges for merchandise handling and storage fees may amount to 5–10% of shipment value. This amount is reportedly added to the consumer price, as for other medicines, when treatment is sought in the private sector. Given the move away from user fees, there is a need for alternative funding strategies for peripheral health facilities. In the past, user fees have contributed to operating costs, staff support, non-drug supplies and travel; therefore, such fees will need replacing.

Price subsidies and/or co-payment schemes have been shown to improve access to ACTs by making quality products available through both the public and the private sector. It has been shown that a private-sector co-payment scheme at the national scale for 5 years could be associated with sustained improvements in the availability, price and market share of

quality-assured ACTs [4]. While this scheme on its own was not sufficient to achieve quality of care and optimal ACT use, it contributed to improvements in the availability and affordability of these medicines. Although the Co-Payment Mechanism (CPM) was established by the Global Fund to subsidize ACTs for private-sector distribution as part of country grants, following the reduction in country allocations in 2018, several countries will no longer have access to ACT subsidies via CPM in the Global Fund grant applications.

Key conclusions

- There is a need to advocate for adequate financial resources to be available at health posts/centres, including for ancillary activities, in order to mitigate the risk of informal payments by patients and disruption of services following policy decisions to remove user fees.
- There is a need to develop and expand an integrated CHW system with strong links to primary health care facilities, in order to ensure that early care-seeking and quality care are close to the patient/carer.
- As part of involving the private sector in the delivery of quality care, multiple alternative mechanisms should be considered that can help increase the use of RDTs and targeting of ACTs to those who test positive, together with relevant enablers and supportive interventions.
- Evaluations of the impact of demand-side initiatives related to large-scale malaria interventions and changes in policies should be prioritized, as robust evidence on the consequences of change (intended and unintended) is limited.

Prioritizing interventions

Cost-effectiveness/efficacy modelling studies were discussed at the meeting. The conclusions from these analyses showed that, in general, vector control interventions are the keystone of cost-effective prevention, particularly in medium and high transmission settings where preventing infection rapidly reduces malaria case incidence and hence has a potential benefit in reducing the burden on the health system. Using modelling, the predicted average cost-effectiveness profiles of LLINs and IRS (assuming an insecticide with an efficacy and durability of Actellic® 300CS) were very similar when averaged across transmission settings, different coverage levels, and with or without other interventions.

As presented in Table 1, all malaria interventions have been shown to be cost-effective, including case management, LLINs, IRS and intermittent preventive treatment (IPTi, IPTp and SMC). The relative cost-effectiveness is therefore important in decision-making.

Table 1. Relative cost-effectiveness of core malaria interventions. Adapted from White et al. [5]

Intervention	Financial cost of protecting one person per year (US\$)	Cost per disability-adjusted life year (DALY, US\$)
ITNs	\$2.20 (\$0.88 - \$9.54)	\$27 (\$8.15 - \$110)
IRS	\$6.70 (\$2.22 - \$12.85)	\$143 (\$135 - \$150)
IPTi	\$0.60 (\$0.48 - \$1.08)	\$24 (\$1.08 - \$44.24)
SMC	\$4.03 (\$1.25 - \$11.80)	
IPTp	\$2.06 (\$0.47 - \$3.36)	
Treatment	\$5.84 (\$2.36 - \$23.65)	Not reported

However, differences in implementation effectiveness, ecological context, mosquito species and their vulnerability to available interventions need to be taken into account along with differences in cost. These models show that SMC of high-risk groups in areas of highly seasonal malaria transmission is appropriate as an add-on, even when vector control covers only a third of the population. A similar picture emerges for the use of IPT in infants in perennial settings. Maximizing diagnosis and treatment is a given in all circumstances, as investments in case management are always made for multiple diseases of public health relevance.

Modelling studies show also that the prioritization of protective interventions based on cost-effectiveness will vary depending on the circumstances in each setting. In effect, the same package is not necessarily the most cost-effective everywhere. The programmatic suitability of the intervention is related to the experience and capacity of the NMCP and the health care system, as well as to the intervention's acceptability by the population and health care providers. This means that each country needs to undertake its own stratification and cost-effectiveness analysis to select and implement a specific mix of interventions in specific areas, with priority given to high-burden areas, and to determine how to progressively introduce other interventions. Minimal data requirements and models need to be developed to support NMCPs' decisions, and specific expertise needs to be acquired in the interpretation of the results of the analysis.

Key conclusions

- All countries should select the most cost-effective packages of preventive and curative interventions and decide on the sequencing of interventions based on malaria stratification and other considerations, including programmatic suitability and acceptability.
- Decision-making tools should be developed and made available to NMCP managers and policy makers at country level in order to support the selection of interventions based on cost-effectiveness data and to enable an efficient and targeted use of available resources.

National malaria programmes

In order to identify the enabling and constraining factors influencing the coverage of key interventions at programme level, the most recent malaria programme reviews of 15 high-burden countries were analysed (covering the period between 2013 and 2017). The main conclusions were:

- All countries have made substantial progress in improving access to malaria core interventions. In the period under analysis, coverage of LLINs, chemoprevention, RDTs and ACTs increased and stockouts decreased. However, almost all countries still missed the main coverage targets outlined in their national malaria strategic plans.
- With the exception of India, the NMCPs have mainly been supported by external funds with limited contributions from domestic funds.
- Lack of skilled human resources is a persistent issue, especially at the subnational level (states, provinces, districts) and in communities.
- Continuous community information and engagement of community leaders is crucial to successful malaria control activities. To various extents, all countries implemented community-based interventions, experiencing problems related to insufficient technical direction, supervision and monitoring by district teams and staff of peripheral health care facilities.
- Advocacy, communication and social mobilization activities remain weak.
- Procurement and supply chain management has improved but remains vulnerable.
- Surveillance, monitoring and evaluation have also improved with the scaling up of the Demographic & Health Information System (DHIS). However, data quality and management at the district and peripheral levels remain weak.
- The private for-profit and not-for-profit sectors are not being fully engaged in malaria control.
- Similarly, non-health sectors are not being mobilized, and advocacy documents targeting national and local authorities and political leaders are missing in all countries.

Key conclusions

Many good practices may accelerate progress towards reaching programme goals, including:

- Strengthening the capacity and accountability of decentralized states and provinces/districts to implement the state budgeted plan of action;
- Strengthening an accurate surveillance system to and from communities;
- Engaging communities with adequate social mobilization tools and clear technical direction from Ministries of Health;
- Increasing the national and local domestic contribution to support strategic interventions;
- Reducing as much as possible out-of-pocket expenditures in countries with a large proportion of people living below the poverty line;
- Seriously investing in research and mobilizing national research institutions to address technical bottlenecks, such as the decreasing effectiveness of LLINs and vector resistance to pyrethroid insecticides, as well as in implementation research to improve and optimize delivery of interventions;
- Exploring ways to meaningfully engage the private sector and private providers;
- Targeting hard-to-reach populations and refugees as at-risk populations in addition to children and pregnant women;
- Encouraging high-level political discussion to share best practices on the progress made against national and international commitments (e.g., UHC and SDGs).

Access to core interventions

Vector control

Pillar 1 of the GTS is to ensure universal access to malaria prevention, diagnosis and treatment. NMCPs need to ensure that all people living in areas at high risk of malaria are protected by the provision, use and timely replacement of LLINs or, where appropriate, IRS. However, coverage in sub-Saharan Africa is still far from universal (see Fig. 7).

The current target for universal coverage of LLINs is 1 net per 2 persons in a household, with appropriate use of these nets. However, in 2016, the estimate of the actual proportion of households with a sufficient number of ITNs to cover all occupants was 43% in sub-Saharan Africa [6].

There is a need to clarify the operational goals of LLIN distribution, as these could lead to different strategies. These goals can be expressed as “Universal Access” (100% of the population with access to an ITN and using an ITN appropriately), “ITN Use” (100% actually sleeping under the ITN) or “Universal Coverage” (100% of households owning ≥ 1 ITNs for every 2 persons). These targets (especially access and coverage) are often used interchangeably, which can lead to confusion. The evidence is that ITN use is driven automatically by access, so increasing access will increase use [6]. In most countries it is

widely accepted that the best way to increase coverage among children under 5 and pregnant women is to have enough ITNs for everyone in the household.

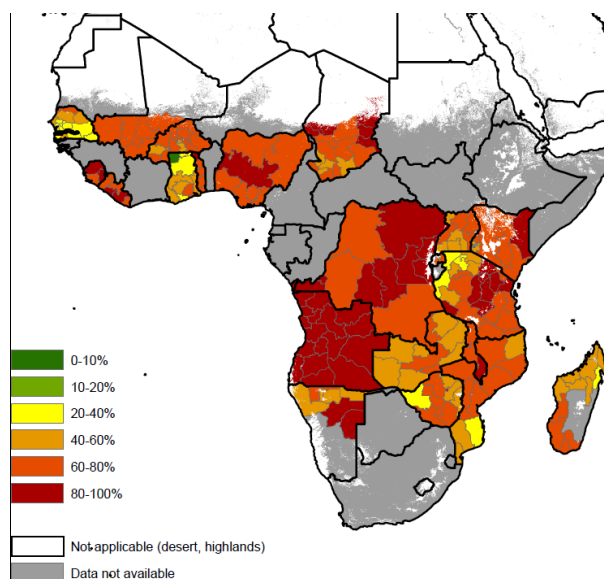


Fig. 7. Percentage of the population not having access to an ITN and/or not living in a house protected by IRS (2013–2016)

Source: WHO calculation using Demographic and Health Surveys (DHSs) and Malaria Indicator Surveys (MISs), as of 15 March 2018. DHSs/MISs were conducted in 2016 in Ghana, Liberia, Madagascar, Uganda, Senegal and Sierra Leone, in 2015–16 in Angola, Malawi and Tanzania, in 2015 in Kenya, Mali, Mozambique, Nigeria and Zimbabwe, in 2014–15 in Chad and Rwanda, in 2014 in Burkina Faso, in 2013–14 in DRC, Togo and Zambia, and in 2013 in Gambia and Namibia. The indicator is defined as the percentage of the population with no access to an ITN in their household or not living in a household protected by IRS.

The resources needed for successful strategies to ensure universal coverage are:

- Robust procurement processes;
- High-quality household registration;
- Improved care and retention of nets;
- On-time delivery of net distribution campaigns;
- Proper caps on the number of nets allocated to large households, which are often underserved.⁴

Late disbursements or bottlenecks in ITN procurement are common causes of delays in the campaigns, leaving the population exposed to increased malaria transmission.

⁴ In many national campaigns, there is a maximum number of nets that can be allocated to each household, but this number is not necessarily based on the size of the family in the household. This means that larger households may not have enough nets to ensure that everyone can sleep under a net and so are at increased risk. Eliminating or raising these caps will ensure that entire households are properly protected. However, this would require good household registration and population censuses.

Cost-effectiveness analysis indicates that both of the following ITN delivery strategies can be equally cost-effective:

- a) one universal coverage campaign (UCC) followed by robust continuous distribution through schools, ANC and the Expanded Programme on Immunization (EPI);
- b) UCC every 3 years with routine distribution through ANC and EPI.

The choice of the optimal delivery strategy for a particular situation depends on the local context and operational feasibility.

The current data and modelled estimates indicate that the requirements for LLINs to achieve universal coverage have been underestimated and durability overestimated. If obtaining universal coverage remains an accepted goal of the international community, then larger LLIN volumes must be considered and planned for at the national and international levels. This should be done in parallel with renewed focus on maximizing the efficiency of coverage, investing in high-quality household registration, eliminating caps on the number of ITNs per household (so that large families are fully covered), and improving care and retention of ITNs. It will be important for NMCPs to find the balance between the target of universal coverage and the cost-effectiveness of pursuing lower operational targets with different malaria control investments. Care, however, is needed to not undermine the unequivocal message of the importance of universal protection of all at-risk populations.

The introduction of next-generation ITNs will require updates to policy guidance in order to ensure that these can be rolled out rapidly. This policy guidance should be written ahead of the need, rather than as a response to the arrival of the ITNs. Maintaining higher continuous coverage requires some combination of more frequent campaigns, greater ongoing distribution between campaigns, more durable nets and improved care behaviour by users, leading to longer overall retention times.

In 2016, there were 25 countries in sub-Saharan Africa who undertook IRS campaigns. These campaigns covered 5–10% of the at-risk population, predominantly in high incidence districts. However, coverage of IRS has declined overall since its peak in 2011:

2011: 7.2 million structures treated, protecting 30 million people

2016: 4.3 million structures treated, protecting 16 million people

The key driver of this drop in IRS coverage is the need to shift to more expensive insecticides due to the rise in insecticide resistance. In turn, this has prevented the use of strategies such as rotation of insecticides to reduce resistance pressure. Cost is the main barrier to the implementation of IRS.

Two strategies to address insecticide resistance and the increasing costs of IRS are being implemented and assessed:

- *Insecticide co-payment systems.* This is being piloted in the Unitaid NgenIRS project.
- *Development of new insecticides.* Led by the Innovative Vector Control Consortium (IVCC), two new classes of insecticide are expected to be available by 2019. This should help to reduce prices of insecticides overall and allow for rotation in IRS campaigns.

Several strategies are being implemented to reduce the operational costs and improve the efficiency of IRS, namely:

- Reducing the number of days of the IRS campaign and vehicle rental days;
- Targeting higher density areas;
- Using more refined planning/logistics tools;
- Improving community mobilization;
- Utilizing CHWs for community-based IRS;
- Enhancing supervision.

It was noted that outside of sub-Saharan Africa in particular, the focus on universal coverage of ITNs may not be appropriate, given the history of malaria strategies in the past and the behaviour of human and vector populations. For these reasons, IRS may be more effective in many places of India, and its withdrawal in favour of increased ITN coverage may have a negative effect.

Key conclusions

- To reach higher coverage of LLINs as an accepted goal of the international community, larger LLIN volumes must be considered and planned for at the national and international levels. This should be done in parallel with renewed focus on maximizing the efficiency of coverage, investing in high-quality household registration, eliminating caps on the number of ITNs per household (i.e., so that large families are fully covered), selecting the most appropriate delivery strategies, and improving the care and retention of ITNs.
- To increase coverage of IRS in target groups, strategies to address the increased costs of alternative insecticides should be actively pursued in combination with improved efficiency of operations.
- The targeting of different vector control interventions in relation to malaria stratification should be reviewed so that resources are not wasted. Investments in larval source management in high-burden countries should be reviewed and aligned with international guidelines and recommendations.
- Behaviour change communication (BCC) campaigns and community mobilization should be employed to help improve the use and care of LLINs and the uptake of IRS (in areas where this has been shown to be an issue) so as to maximize the effectiveness of malaria vector control.

Diagnosis and treatment

Significant gaps remain in the number of children properly covered by appropriate diagnosis and treatment. Based on 18 national-level surveys conducted between 2014 and 2016 in sub-Saharan Africa, a median of 39% of febrile children did not seek care (see Fig. 8). Among those who did seek care, a median of 47% of children were taken to a trained health care provider.

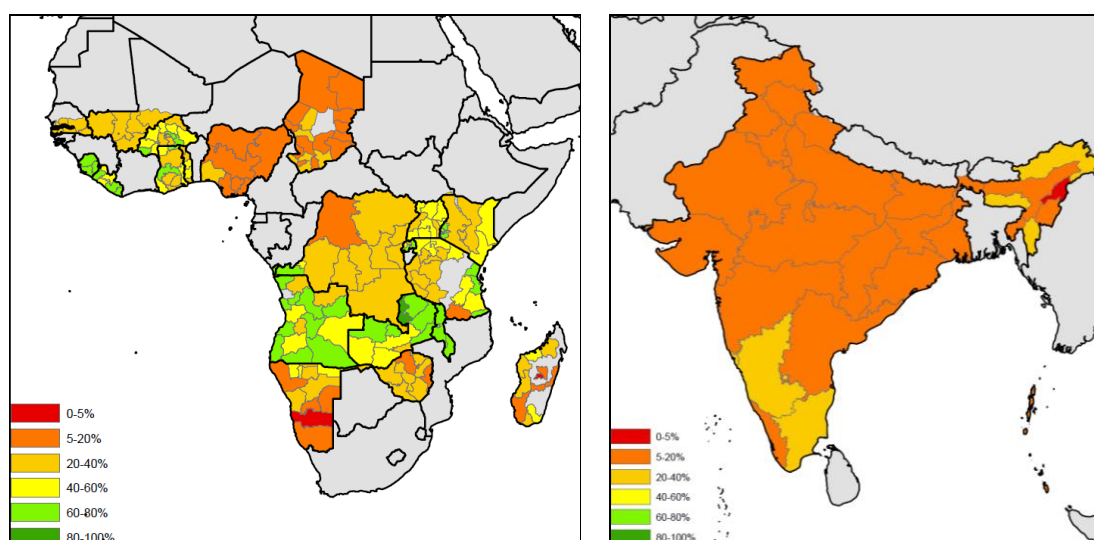


Fig. 8. Proportion of febrile children under 5 seeking care and receiving a diagnostic test: sub-Saharan Africa 2013–2016, India 2015–2016

Source: WHO calculation using Demographic and Health Surveys and Malaria Indicator Surveys (as of 16 January 2018): 2016 for Ghana, Liberia, Madagascar, Senegal and Sierra Leone, 2015–16 for Angola, India, Malawi and Tanzania, 2015 for Kenya, Mali, Nigeria and Zimbabwe, 2014–15 for Chad, Rwanda and Uganda, 2014 for Burkina Faso, 2013–14 for DRC, Togo and Zambia, 2013 for Gambia and Namibia. The indicator is defined as the percentage of children under 5 who had blood taken from a finger or heel for testing among those who had fever in the two weeks preceding the survey and for whom care was sought.

The availability of quality-assured diagnosis (with RDTs) and treatment (with ACTs) has increased significantly since 2005 but has stagnated since 2013. In 2016, 409 million quality-assured ACTs and 312 million RDTs (269 million in AFRO) were procured worldwide. However, the percentage of febrile children under 5 receiving a diagnostic test remains low in many places, particularly in the private sector.

Based on the positivity rates among patients with suspected malaria who have sought treatment, the number of RDTs needed should be 3–4 times the number of antimalarial medicines, but in recent years the number of RDTs has never equalled the amount of ACTs procured. This is a clear signal to NMCPs that more investment needs to be made in scaling up malaria RDTs, particularly in the private sector.

Since 2010, WHO has recommended that all cases of suspected malaria receive a confirmatory test using microscopy or an RDT to confirm the diagnosis. RDT technology has facilitated malaria testing in remote locations and resource-constrained settings. Without the confirmatory diagnosis of malaria, there would be no knowledge of malaria distribution, no way to stratify the risk, no proper treatment of patients (particularly those with non-malaria febrile illnesses), no guidance for vector control, and no reliable malaria

surveillance. Confirmatory testing prior to treatment also curbs the irrational use of antimalarials.

Challenges to increasing the availability and uptake of quality antimalarial medicines and diagnostics were identified as follows:

- *Health systems:*
 - *Registration, quality control and inspection issues:* Issues include levels of bureaucracy, fees and inadequate capacity at ports of entry, and not enough trained staff.
 - *Policy gaps:* The policy of free diagnosis in the public sector is not being universally applied and RDTs are not available and/or used at the community level.
 - *Proximity of care:* A key barrier to early access to quality appropriate treatment is the access to health care facilities, particularly in remote rural areas.
 - *Unregulated private market:* This results in heterogeneous practices and quality of care, particularly in the informal sector that serves a significant fraction of the population.
- *Procurement and supply management:* In-country distribution systems remain weak despite improvement and investment in recent years. Limited procurement and distribution of sufficient amounts of RDTs has resulted in the overuse of ACTs, and RDT stockouts have driven ACT stockouts. Interventions using mobile health technologies to strengthen drug supply management should focus on proving integration and large-scale effectiveness.
- *Health workforce:*
 - *At health facility level:* There is a need to develop better skilled, trained and motivated staff. More positive attitudes need to be developed, as well as systems to reduce waiting times, more timely access to services, and closer supervision and oversight for community services.
 - *At community level:* CHWs have proved to be an effective health workforce, particularly in remote areas beyond the reach of health facilities. However, access to CHW services is very low and only 1.3% of children with fever were taken to a CHW for care.
 - *At private medicine retail level:* High staff turnover has been reported with heterogeneous quality of care. Evidence, tools and guidance are needed on how to generate and retain competencies, and how to scale up diagnostic testing and reporting.
- *Patient/community factors:* Factors influencing patients' access to care include lower cost and close proximity of services, positive provider attitudes and behaviours, patients' belief that the medicines will cure them, and timeliness of services.

Key conclusions

- Reducing the barriers to care-seeking in remote rural areas by extending the coverage of iCCM and ensuring affordable prices of quality medicines and diagnostics provided through the private sector may significantly expand access to quality case management for the population in need.
- National procurement and supply chain systems should be strengthened in order to ensure that quality care interventions (ACTs and RDTs) are reliably available at all levels of the health care system, including the continuous supply of commodities from primary health care facilities to community health services.
- The health care workforce should be well trained, motivated and supported to provide quality care in both the public and private sectors in line with national policies and international guidelines for case management.
- Changing policies to extend the provision of malaria diagnostics and treatment beyond the reach of formal health facilities, thus meeting the requirement of UHC in rural, remote and underserved areas, will require major commitments and investments from policy makers, stakeholders and regulatory bodies.

IPTp-SP

IPT in pregnancy using sulfadoxine-pyrimethamine (IPTp-SP) is recommended, starting as early as possible in the second trimester and given at each ANC contact at least 1 month apart until delivery. IPTp has been shown to be highly cost-effective. However, in 2016, it was estimated that only 56% of eligible women received the first dose of IPTp-SP, 43% received two doses of SP for IPTp, and only 19% received three doses of SP for IPTp. The gap between these coverage rates and the high proportion of women attending ANC (in sub-Saharan Africa in 2016 78% attended three times and 57% four times) indicates a significant number of missed opportunities to deliver IPTp-SP as part of routine ANC. This is exacerbated further by the fact that most pregnant women do not attend ANC early in their pregnancy, often not until the 5th month of pregnancy, leaving the woman and her fetus unprotected from malaria.

Strengthening existing reproductive, maternal and child health (RMCH) platforms to deliver services, including IPTp, to eligible pregnant women is essential to maximize opportunities for eligible pregnant women to receive at least three doses of IPTp. Several challenges to increasing coverage of IPTp at all levels of the health system have been identified:

- *Policy:* There is often discordant guidance and poor implementation of policies between RMCH programmes and NMCPs. This leads to provider confusion about the timing and dosing of IPTp, as well as duplication in training efforts.
- *Commodities:* Stockouts of SP still occur at ANC centres and at the national level, reflecting the lack of proper co-ordination between the RMCH and NMCPs, as well as the weakness of distribution systems from national level to point-of-care. Since SP is provided free-of-charge, there is little incentive for health facilities to collect or order it from distribution centres. There is also a perception among health care providers that, following the introduction of ACTs for malaria treatment, SP is no longer an effective antimalarial medicine despite evidence of its efficacy for IPTp.

- *Quality assurance:* The degree of quality assurance to reinforce the supervision and mentoring of health care providers varies and in many countries is not standardized. Using performance standards, based on national guidelines, to help improve the quality of care has also contributed to improving IPTp uptake.
- *Capacity-building:* ANC providers are asked to perform a myriad of tasks, often with little supervision, guidance or mentoring. The quality and frequency of training varies between countries, depending on national and external resources. Focused efforts to improve training have been shown to improve uptake.
- *Community engagement:* Many countries have had some level of community involvement to improve community education and mobilization for malaria in pregnancy (MiP). However, community engagement is not always prioritized.
- *Monitoring and evaluation (M&E):* Data quality remains a problem across all the monitoring systems, and what is recorded in the health registers is not always consistent with what is recorded in the HMIS. A number of countries do not collect data on three-dose IPTp in their HMIS. Updates to current data collection tools and the WHO M&E Framework are overdue.

If countries are to achieve 100% coverage of three-dose IPTp, each of the key MiP programme areas discussed must be addressed. These areas are synergistic: If one is weak, it will negatively affect each of the other areas, leading to poor uptake overall. Strengthening existing RMCH programmes to deliver appropriate services to eligible pregnant women, including IPTp, is a priority. Ownership of IPTp by RMCH is considered vital and this may well be best served by transferring full responsibility for delivery to RMCH, along with the funding required and the accountability for implementation and monitoring. NMCPs would act as technical advisers and serve in joint technical working groups (TWGs) to ensure good alignment of policies and operations.

Key conclusions

- It is important to emphasize that SP is a low-cost commodity that is still effective for IPTp and that its administration is very cost-effective.
- Responsibility for IPTp implementation and monitoring should be transferred to RMCH along with the required budgetary support.
- There should be alignment between NMCP and RMCH policies, guidelines, and training and communication materials through the establishment of TWGs.
- As countries adopt the new WHO ANC guidelines, the IPTp uptake schedule should be adapted to the newly recommended ANC contact schedule.
- There is a need to include SP for IPTp in the WHO Model List of Essential Medicines and to increase the number of pre-qualified suppliers of SP for IPTp.
- Better training and supervision of ANC delivery, including IPTp, should be prioritized.
- Community involvement and civil society should be improved in order to promote comprehensive care for pregnant women, including MiP prevention.
- WHO should be urged to update the MiP M&E Framework 2007. This should include the standardization of indicators and data elements and improvement of M&E capacity.

Seasonal malaria chemoprevention

SMC is the intermittent administration of full treatment courses of an antimalarial medicine during the malaria season to prevent malarial illness. Its objective is to maintain therapeutic antimalarial drug concentrations in the blood throughout the period of greatest malarial risk. SMC is recommended in areas of highly seasonal malaria transmission throughout the Sahel region. A complete treatment course of SP plus amodiaquine (AQ) should be given to children aged 3–59 months at monthly intervals, beginning at the start of the malaria transmission season, up to a maximum of four doses during the season.

Since its introduction in 2013, SMC has been quickly adopted and, by 2016, 12 countries had SMC programmes. It has been shown to be deliverable at scale with limited safety concerns [7], relatively easy to deliver, and with cost-effective results. Countries are now transitioning away from specific project funding and incorporating SMC into their NMCP budgets as one of the malaria core interventions.

Clinical trials (with three monthly treatments) have indicated that SMC can prevent 75% of malaria cases and 75% of severe cases during the transmission season. The ACCESS-SMC project between 2015 and 2017 delivered over 60 million SP+AQ treatments in supporting seven countries to implement SMC programmes (Burkina Faso, Chad, Guinea, Mali, Niger, Nigeria and Gambia). It was estimated that up to 6 million cases and 40 000 deaths were averted in 2015–2016 through SMC. In this project, the cost per four cycles per child treated was estimated at US\$ 3.40 in 2016. Multiple country experiences have shown that SMC is feasible at scale, reasonably priced, safe and highly effective. The cost-effectiveness of the intervention takes into account the reduction in the number of malaria cases that would require treatment.⁵ In addition, in multiple pilot experiences, the SMC contacts with children have been leveraged to enable contacts by other programmes (e.g., nutritional screening, vaccination, TB outreach), and this requires more evaluation.

SMC programmes are estimated to have reached 14 million children in 2017 (>50% of eligible children) and the mean number of courses delivered across the Sahel region in 2016 was 3.12 (target = 4). This figure is similar to in 2015, despite a doubling of the targeted population. However, there remain significant gaps in coverage, with an estimated 12 to 18 million children who could benefit from SMC not currently included in SMC programmes. The coverage gaps are significant in Burkina Faso, Chad, Niger and especially Nigeria.

The main bottlenecks and challenges identified were:

- *Product:* There is currently only one pre-qualified product and, due to the single-source manufacturer's limited manufacturing capacity, it faced challenges in 2015 in responding rapidly to the expanding demand for SP+AQ. There is a need for over 100 million treatments every year if all eligible children are to be treated, and current capacity is chronically short of the potential demand.
- *Planning, disbursements and procurement:* SMC is a time-bound intervention and the drug should be delivered on time at the point of distribution. Delays in the disbursement of funds to NMCPs lead to late operational planning and ordering of the drug. As with other programmes, optimization of procedures, timeliness of funding from donors and buyers, and strengthening of planning, procurement and

⁵ Provided that routine diagnosis with RDTs is also implemented properly

supply management systems at country level are required. It is also crucial to ensure sufficient funding for operational costs.

- *Delivery approaches and access:* A mix of approaches has been used to deliver SMC, including door-to-door delivery, fixed point approaches, and semi-mobile approaches that combine the two. The door-to-door approach provides better coverage and more equitable access, with a negligible increase in global costs and lower unit costs thanks to gains in coverage. Door-to-door distribution allows better engagement with communities, builds trust, opens dialogue about malaria and malaria prevention, and improves adherence to treatment.
- *Human resources:* SMC requires a massive network of human resources, including but not limited to trained health volunteers/distributors and Ministry of Health staff (health workers, supervisors, M&E and logistics personnel). It is key to maintain a high level of management and commitment from the large teams of health care workers that are needed to deliver the programme. Careful management of training, remuneration and supervision are critical to success.
- *Sustainability:* As countries transition to including SMC as a core intervention in their national malaria strategic plans, funding and resources need to be secured to support this intervention in addition to other elements of the national malaria strategy. Strong political commitment is necessary to ensure success of the programmes.
- *Community:* SMC, as with other preventive interventions, requires a strong community engagement component. Social behaviour change communication (SBCC) activities should address local social norms and communities' understanding of the needs, risks and benefits of accepting MDA campaigns. A challenge found in many communities has been the pressure to include children older than 5 in the SMC programme.

SMC has been rapidly adopted by all eligible countries and implemented as a valuable and cost-effective programme complementary to other malaria interventions. In high-burden countries with highly seasonal transmission, SMC plays a clear role in producing a rapid and demonstrable impact on malaria deaths and cases. However, as the effect of SMC is rapidly noticeable in communities that have benefited from the campaign, CHWs and primary health care facilities need to be sensitized to the need to continue to provide care for febrile children, recognizing that the likely cause is not going to be malaria.

Key conclusions

- Supply security for SP+AQ should be prioritized by bringing in additional manufacturers with international quality standards and sufficient production capacity in order to remove the supply bottleneck.
- A high level of political support for the SMC programme should be maintained in order to ensure that the programme can be sustained after transitioning from time-limited project funding to core national malaria programme strategies and operational plans.
- Considerable additional support and financial investments will be needed to reach all SMC eligible children in the Sahel region. Country contributions already make considerable contributions to SMC through the payment of Ministry of Health personnel involved in programme management, supervision and SMC distribution, and through other recurrent costs. As with other interventions, the challenges of transitioning most SMC programmes from external donor financing to more diversified and sustainable financing remain.

Integrated community case management and community health workers

At the community level, the implementation of iCCM and CHWs has proved to be an effective way to extend the prompt diagnosis and treatment of malaria, especially in remote areas beyond the reach of formal health facilities. As stated by WHO: *“Appropriately trained and equipped community health workers, provided with the necessary system supports, can deliver iCCM for malaria, pneumonia and diarrhoea as an effective intervention that increases access to and availability of treatment services for children”* [8]. The large-scale feasibility and potential impact of iCCM was examined by the Rapid Access Expansion (RAcE) programme. The results clearly showed the positive impact of CHWs in providing diagnostic and treatment services across a range of common childhood diseases. This can be illustrated by the RAcE programme’s implementation of iCCM in the Tanganyika Province of the Democratic Republic of the Congo (DRC) between 2013 and 2016 (see Fig. 9).

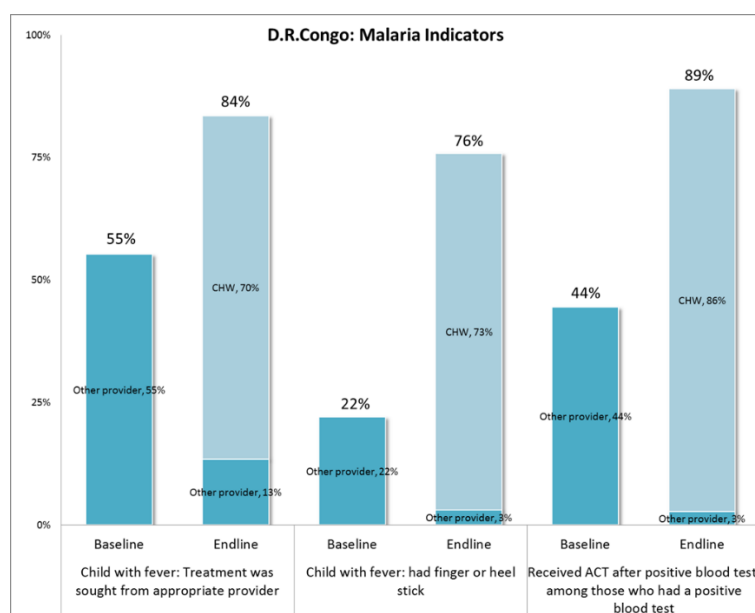


Fig. 9. Impact of iCCM introduction 2013–2016

Besides improvements in treatment coverage, there was a 15% reduction in under-5 mortality in RAcE programme implementation areas in DRC. The conclusions of the programme were:

The strength of the intervention lies in the availability of a trained, supplied, supervised CHW in the village when a child falls ill.

- Effective iCCM should be an integral part of the primary health care system and a priority strategy at the community level.
- Caregivers, communities and peripheral health staff place a high value on the intervention.
- Volunteer CHWs are also highly effective at delivering iCCM.

Studies from DRC and Niger show that iCCM is not a costly strategy. The unit cost of malaria treatment under iCCM has been estimated at US\$ 2.17 in DRC and US\$ 5.70 in Niger. It is important for iCCM to be seen not as a standalone strategy, but as an integral part of the health care delivery system in a country. CHWs allow for the extension of health care coverage to remote populations. However, to improve efficiencies and synergies, maximal value from the deployment of CHWs skilled in delivering iCCM services is found in communities that are located 5 km or more from the nearest health facility.

The promotion of CHWs and iCCM as part of the drive to reduce malaria deaths can support the development of iCCM in a country. CHWs can also play a role in promoting other interventions and programmes, such as increasing attendance at ANC contacts, distributing bednets and encouraging and promoting their proper use and care. The support of the NMCP and the inclusion of CHWs in the national malaria strategy should be encouraged. A challenge for scaling up iCCM is that most of its inputs come from outside. An additional challenge lies in the disjointed implementation support by donors/partners (e.g., some will only support the malaria component and/or platform leaving the non-malaria commodities unfunded; instead of aligning implementation with Ministry of Health plans, supporting

implementation through NGOs in districts/regions of their choice). It is important for donor/partners to come together through a common platform to support Ministries of Health to scale up iCCM and for Ministries of Health to take more responsibility for mobilizing domestic resources for the essential commodities for implementation, especially medicines for diarrhoea and pneumonia.

Key conclusions

- CHWs and iCCM should be promoted as part of the drive to reduce malaria deaths.
- The expansion of iCCM and use of CHWs should be supported as a key part of the delivery of primary health care in order to fill the health care coverage gap.
- Malaria at the community level should be treated following the iCCM guidelines for the management of febrile illnesses, rather than as a standalone disease.
- CHW training, supervision, supply chain, data collection and reporting systems should be strengthened, with health centres as the focal point for these activities.

Private sector involvement

The private sector is often the part of the health care system that is closest to the patient, being located in their village or urban suburb, and so is frequently the first place for seeking treatment. However, private health services are not included in national strategies or plans for delivering appropriate and quality care close to the patient. The principal challenges for the private sector are:

- Its unregulated and unsupervised nature leading to non-conformity with national policies and WHO guidelines;
- Poor or unknown quality of its products and quality of care;
- Low use of diagnostics for malaria in informal treatment outlets;
- No clear guidance or policies for collaborating with private medicine retail (PMR) outlets;
- Lack of clear guidance on the design and implementation of routine reporting and surveillance systems integrated with the national HMIS.

Guidelines on how to manage patients with negative test results, report cases, train and supervise private sector outlet staff, and manage patients' expectations will be crucial to improving the quality of care provided by PMR outlets.

A key challenge in improving access to appropriate diagnosis and treatment through PMRs is ensuring that quality products are affordable and can compete with poor-quality products. In the past, co-payments have been used (notably in the Affordable Medicines Facility–malaria [AMFm]), but the overall reduction in malaria funding has contributed to a deprioritization of this type of approach. Strengthening the alignment between national malaria case management policies and drug regulatory laws and policies, and their proper enforcement, could help to reduce the availability of poor-quality products.

The private sector's role in prevention, especially vector control, has been looked at in the past through social marketing interventions (e.g., through voucher schemes). However, the results were not satisfactory in terms of equitable access; the most needful tended to be unable to access the ITNs and coverage never exceeded 50%. New approaches could be considered for mixed distribution of ITNs via the private sector in urban areas, where the malaria risk is lower, reserving the public sector driven free distribution for rural areas. This would require a range of features for the paid-for nets (colour, shape, etc.) in order to meet consumer expectations, as well as competition among manufacturers to offer acceptable prices to consumers.

There are still gaps in our knowledge of the impact of governance and national regulatory policies on the private-sector use of malaria diagnostics and antimalarials, and appropriate studies are needed. New strategies for engaging the private sector need to be developed for multiple diseases of public health importance. These strategies and plans should be developed jointly with the private sector, taking into consideration its challenges and needs.

The non-health care private sector (e.g., logging enterprises, mining companies, large-scale plantations and other enterprises) can also play a role in incorporating malaria into their corporate health programmes (including for the casual workforce and communities living around their facilities), advocating with government for more resources, and helping to mobilize resources and services. Furthermore, the impact of the activities of private sector organizations on malaria risk needs to be better understood, and the environmental risk assessment and management of new projects needs to be included in the planning and implementation process (e.g., projects affecting distribution of malaria vectors, population movements, exposure of resident communities, workforce and their families, etc.).

Meeting participants concluded that, in order to expand access to quality care for malaria patients, it is important for the private sector to be seen as a valid delivery platform that complements the public health sector. However, many government and public sector agencies have little experience working with the private sector and need guidance and advice on how to properly engage with it.

Key conclusions

- Government agencies need to engage more with the private sector and recognize its potential complementary role to the public sector in delivering proper diagnosis and treatment, and in contributing to surveillance and routine reporting.

Outbreaks and emergency situations

The importance of promptly tackling malaria outbreaks and maintaining good malaria control in emergency situations (e.g., Ebola outbreak, civil unrest) was raised in the meeting but not discussed in depth. The example of Cameroon was presented and how it has been able to deliver SMC in insecure areas. Failure to address these situations can cause setbacks in efforts to considerably reduce malaria mortality. Plans to reach at-risk populations in these situations need to be developed by NMCPs.

Annex 1: List of meeting pre-reads

1. Bhatt S, Weiss DJ, Mappin B, Dalrymple U, Cameron E, Bisanzio D, et al. Coverage and system efficiencies of insecticide-treated nets in Africa from 2000 to 2017. *eLife*. 2015;4:e09672.
2. Biondi N. Indoor residual spraying coverage
3. Cibulskis R, Biondi N. Analysis of the association between malaria programme coverage gaps and health outcomes.
4. Conteh L, Grant C, Patouillard E. A literature review of economic and financial factors influencing population access to core malaria interventions: preventive therapies, rapid diagnostic tests and antimalarial treatment.
5. Conteh L, Thompson S, Patouillard E. An overview of the literature on economic and financial factors influencing population access to vector control interventions: long lasting insecticidal nets, indoor residual spraying and supplementary interventions.
6. Delacollette C. Analysis of recent Malaria Programme Review reports in high-burden countries.
7. Fosah-Achu D, Ateba JM, Ewane GE, Fosso J, Ngwafor RA, Abomabo M, et al. Seasonal malaria chemoprevention in Cameroon.
8. Global Malaria Programme. Integrated community case management (iCCM) Rapid Access Expansion Project (RAcE).
9. Koenker H, Ricotta E, Olapeju B. Insecticide-treated nets (ITN) access and use report – 2018. Baltimore, MD: PMI | VectorWorks Project, Johns Hopkins Center for Communication Programs; 2018.
10. Moroso D, Tchouatieu A-M, Milligan P, Gilmartin C, Collins D. Seasonal malaria chemoprevention (Background paper).
11. Renshaw M, Olumese P. Country programmatic gap analyses 2015–2017 and 2018–2020.
12. Roman E, Wolf K, Biondi N, Gutman J, Youll S, Florey L, Ferencik E. Access determinants to intermittent preventive treatment during pregnancy.
13. Suleman F, Perumal-Pillay V, Biondi N. Review of non-financial determinants of access to malaria medicines and diagnostic devices, including gaps affecting populations underserved by public and private sectors and community services.
14. Winskill P, Walker P, Ghani A. Prioritising interventions for malaria control and elimination.
15. Winskill P, Walker PG, Griffin JT, Ghani AC. Modelling the cost-effectiveness of introducing the RTS,S malaria vaccine relative to scaling up other malaria interventions in sub-Saharan Africa. *BMJ Global Health*. 2017;2:e000090.

Annex 2: List of participants

Dr Dorothy Achu

National Malaria Control Programme
Yaoundé
Cameroon

Dr B M Audu

National Malaria Control Programme
Abuja
Nigeria

Dr Constance Bart-Plange

Senior Public Health Specialist
Accra
Ghana

Dr Neeraj Dhingra

National Vector Borne Disease Control
Programme
New Delhi, India

Dr Sabite Idrissa

National Malaria Control Programme
Niamey
Niger

Dr Alexandre Fonseca Santos

National Malaria Control Programme
Brasilia
Brazil

Dr Baltazar Candrinho

National Malaria Control Programme
Maputo
Mozambique

Dr Diahara Traoré Kone

National Malaria Control Programme
Bamako
Mali

Mr Leo S Makita

National Malaria Control Programme
Port Moresby
Papua New Guinea

Prof Elfatih M Malik

University of Khartoum
Khartoum
Sudan

Dr Renata A Mandike

National Malaria Control Programme
Dar es Salaam
United Republic of Tanzania

Dr Eric Sompwe Mukomena

National Malaria Programme
Kinshasa
Democratic Republic of Congo

Dr Jimmy Opigo

National Malaria Control Programme
Kampala
Uganda

Dr Dieudonné N Soma

National Malaria Programme
Ouagadougou
Burkina Faso

Dr Antoine Méa Tanoh

National Malaria Control Programme
Abidjan
Ivory Coast

Presenters:

Dr Lawrence Barat

US President's Malaria Initiative
Washington DC
United States of America

Mr Ian Boulton (Rapporteur)

TropMed Pharma Consultants
London
United Kingdom

Dr Charles Delacollette

Independent Consultant
Ferney-Voltaire
France

Dr Lesong Conteh

Imperial College London
London
United Kingdom

Dr Peter Hansen

Global Fund to fight AIDS, Tuberculosis, and
Malaria
Geneva, Switzerland

Dr Elizabeth Chizema Kawesha (Co-Chair)

Ministry of Health
Lusaka
Zambia

Dr Hannah Koenker

Johns Hopkins Center for Communications
Programs
Baltimore MD
United States of America

Dr Paul Milligan

London School of Hygiene and Tropical
Medicine
London
United Kingdom

Dr Diego Moroso

Malaria Consortium
London
United Kingdom

Dr Diego Moroso

Malaria Consortium
London
United Kingdom

Dr Bernard Nahlen (Co-Chair)

University of Notre Dame
Notre Dame IN
United States of America

Dr Melanie Renshaw

African Leaders' Malaria Alliance
Nairobi
Kenya

Ms Elaine Roman

JHPIEGO
Baltimore MD
United States of America

Prof Fatima Suleman

University of KwaZulu-Natal
Durban
South Africa

Dr André-Marie Tchouatieu

Medicines for Malaria Venture
Geneva
Switzerland

Dr Stephen Thompson

Institute of Development Studies
Brighton
United Kingdom

Dr Peter Winskill

Imperial College London
London
United Kingdom

Agencies

Dr Kesete Admasu

RBM Partnership to End Malaria
Geneva
Switzerland

Dr Ana Alvarez

UNITAID
Geneva
Switzerland

Mr Adam Aspinall

Medicines for Malaria Venture
Geneva
Switzerland

Ms Valentina Buj

UNICEF
New York NY
United States of America

Dr Alexandra Cameron

UNITAID
Geneva
Switzerland

Dr Dereje Dengela

Abt Associates
Bethesda MD
United States of America

Dr Xavier Ding

Foundation for Innovative New Diagnostics
Geneva
Switzerland

Dr Erin Eckert

US President's Malaria Initiative
Washington DC
United States of America

Dr S Patrick Kachur

US Centers for Disease Control
Atlanta GA
United States of America

Dr Joshua Levens

RBM Partnership to End Malaria
Geneva
Switzerland

Dr Bruno Moonen

Bill & Melinda Gates Foundation
Seattle WA
United States of America

Dr Sussann Nasr

Global Fund to fight AIDS, Tuberculosis, and
Malaria
Geneva
Switzerland

Dr Patrick Okello

Global Fund to fight AIDS, Tuberculosis, and
Malaria
Geneva, Switzerland

Mr Ricki Orford

PSI
Washington DC
United States of America

Mr Stephen Poyer

PSI
Washington DC
United States of America

Dr Larry Slutsker

PATH
Seattle WA
United States of America

Dr James Tibenderana

Malaria Consortium
London
United Kingdom

Dr Theodoor Visser

Clinton Health Access Initiative
Nairobi
Kenya

Dr Ambachew Yohannes

UNITAID
Geneva
Switzerland

Observers

Dr Jennifer Daly

Independent Consultant
Denver CO
United States of America

Dr Gladys Tetteh

JHPIEGO
Baltimore MD
United States of America

Dr Amal Medani

RBM Partnership to End Malaria
Geneva
Switzerland

Dr Daddi Wayessa

RBM Partnership to End Malaria
Geneva
Switzerland

WHO Secretariat

Dr Minghui Ren

Assistant Director-General for Communicable
Diseases

Dr Gawrie Loku Galappaththy

Global Malaria Programme

Dr Pedro Alonso

Director, Global Malaria Programme

Dr Abdisalan Noor

Global Malaria Programme

Dr John Aponte

Global Malaria Programme

Dr Peter Olumese

Global Malaria Programme

Mr Gunther Baugh

Global Malaria Programme

Dr Leonard Ortega

Global Malaria Programme

Ms Nelly Biondi

Global Malaria Programme

Dr Edith Patouillard

Global Malaria Programme

Dr Andrea Bosman

Global Malaria Programme

Dr Salim Sadruddin

Global Malaria Programme

Dr Richard Cibulskis

Global Malaria Programme

Dr David Schellenberg

Global Malaria Programme

Ms Catherine Kane

Global Malaria Programme

Ms Silvia Schwarte

Global Malaria Programme

Dr Jan Kolaczinski

Global Malaria Programme

Dr Jackson Sillah

Global Malaria Programme

Mrs Shook Pui Lee Martin

Global Malaria Programme

Ms Saira Stewart

Global Malaria Programme

Dr Kimberley Ann Lindblade

Global Malaria Programme

Dr Maru Aregawi Weldedawit

Global Malaria Programme

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