Malaria Policy Advisory Committee Meeting
17–19 October 2018, Geneva, Switzerland
Background document for Session 5

World Health Organization

10+1 Approach – An intensified effort to reduce malaria cases and deaths

Getting back on track to achieve the morbidity and mortality reduction targets of the *Global Technical Strategy for Malaria 2016–2030*

Draft, October 2018

WHO/CDS/GMP/MPAC/2018.15

Table of Contents

Abbreviations

ACT	Artemisinin-based combination therapy
ANC	Antenatal care
CHW	Community health worker
DALY	Disability-adjusted life year
DHIS2	District Health Information System 2
DHS	Demographic & Health Survey
EPI	Expanded Programme on Immunization
GMP	Global Malaria Programme
GTS	Global Technical Strategy for Malaria 2016–2030
iCCM	Integrated community case management
IPTi	Intermittent preventive treatment in infants
IPTp	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated net
LLIN	Long-lasting insecticidal net
MICs	Multiple Indicator Cluster Surveys
MIS	Malaria Indicator Surveys
NSP	National strategic plan
PHC	Primary health care
RDT	Rapid diagnostic test
SDG	Sustainable Development Goal
SMC	Seasonal malaria chemoprevention
SP	Sulfadoxine pyrimethamine
UHC	Universal health coverage
WHO	World Health Organization

Executive summary

What is the problem?

Progress in reducing the global malaria burden has stalled. The *World malaria report 2017 (1)* estimates that, in 2016, there were 216 million cases of malaria, marking a return to 2012 case levels. The number of deaths estimated in 2016 (445 000) is similar to that of the previous year. Globally, we are not on track to meet the mortality and morbidity milestones for 2020 set out in the *Global Technical Strategy for Malaria 2016–2030* (GTS) *(2).*

The World Health Organization (WHO) African Region continues to bear more than 90% of the burden of disease, accounting for most of the increases in cases between 2012 and 2016. Around 70% of the globally estimated cases and 71% of the estimated deaths in 2016 occurred in 10 countries in sub-Saharan Africa (Burkina Faso, Cameroon, Democratic Republic of the Congo, Ghana, Mali, Mozambique, Niger, Nigeria, Uganda and United Republic of Tanzania) and India (Fig. 1), with nearly 154 million cases and 311 000 deaths annually in these 11 high-burden countries. Estimates from these countries demonstrate an increase in malaria cases in 2016 compared to the previous year.

Many factors have contributed to the rising malaria burden in these and other high-burden countries, including the underlying intensity of malaria transmission, socio-demographic and epidemiologic risk factors, poor access to care, and suboptimal malaria intervention coverage.

How will it be solved?

It is time for an urgent and intensified political and technical response from high burden countries supported by partners. Getting back on track to achieve the GTS targets will require the efficient use and expansion of resources, particularly domestic financing. Careful analysis of contextual data can be used to guide the appropriate mix of interventions for each setting and identify and strengthen locally appropriate modes of delivery. This knowledge will help fast-track the introduction of new interventions and commodities as they become available.

The approach will be initiated where there is high-level political leadership, country ownership and commitment to make an impact on malaria. Partners are ready to align their technical and financial support behind the country led, data driven approach. It is anticipated that success in the first wave of countries will create incentives to extend the approach to all high transmission and high risk countries and that best practice will be adopted in all countries with malaria.

The approach has the following four key response elements that work synergistically to improve our current business model:

1. **Galvanize national and global political attention to reduce malaria deaths.** No one should die from malaria – a preventable and treatable illness. A successful technical response relies upon a broader societal shift that integrates the powerful role of affected communities, high-level national political leadership and the complementary role of global advocates. The approach will draw upon and amplify the benefits arising from existing social movements, such as Zero Malaria Starts with Me, and the political opportunities of universal health coverage (UHC) and primary health care (PHC) to

identify and overcome the socio-political barriers impeding access to prevention and treatment services for malaria and other health priorities.

2. **Drive impact in country through strategic use of information.** National malaria control programmes and technical partners will use a context-specific analytical framework to identify challenges that affect malaria control in areas of high malaria burden. The analytical framework relies on a comprehensive assessment of transmission intensity, the malaria entomological profile, access to services, and other health system and socioeconomic factors that contribute to high mortality and morbidity. The ambition is to generate a very granular picture that can be used to identify the appropriate mix of interventions and a customized health systems response plan for every unique high-burden area in each country.
3. **Establish best global guidance, policies and strategies suitable for a broad range of contexts**. National and subnational decisions will be guided by global guidance. All available evidence will be analysed to identify the appropriate mix of technical interventions across a broad range of subnational contexts. As part of WHO's core normative functions, the Global Malaria Programme (GMP) will review current WHO guidelines and policy recommendations to take into account different epidemiological and entomological settings, health system characteristics, existing levels of intervention coverage, socioeconomic status and other critical contextual factors. The response will be science-based, data-driven and focused on value for money, and will prioritize different packages of interventions for high impact. The approach will continue to be refined based on programme experience and learning.
4. **Implement a coordinated country response**. Based on the analysis of each country's unique context, ministries of health will work with in-country technical and implementing partners to refine and align their approach for reducing malaria mortality and morbidity in the high-burden target areas. This refined approach will be incorporated into the existing national malaria response roadmaps and into broader sector planning, budgeting processes and subnational plans.

This approach is not a funding mechanism, nor is it a separate programme. It is a renewed movement wherein countries are in the driver's seat and enabled, through strong partnership support, to re-energize their fight against malaria. The approach has the following **guiding principles**:

- country-owned, country-led, and aligned with the GTS, the health-related Sustainable Development Goals (SDGs), national health goals, strategies and priorities;
- focused on high-burden settings;
- aimed at a demonstrable impact (with an aggressive approach to reducing mortality while ensuring progress is on track to reach the morbidity targets);
- characterized by context-specific packages of malaria interventions, optimally delivered through appropriate channels, including a strong PHC foundation;
- enhanced through a multisectoral approach;
- enabled by a diverse mix of partners, working collaboratively and aligning technical and financial support with locally defined priorities.

What will success look like?

The attainment of the GTS targets will be the measure of success. In addition, more efficient and effective use of resources can help to establish long-term national commitments to increase the volume and impact of domestic funding for health, complemented by incremental global finance.

Better malaria control in these and other high-burden countries will contribute to potential demographic, social and economic dividends over the coming decades.

1. Background and context

1.1 Purpose of the approach

The impressive reduction in the global malaria burden has stalled. The overall goal of this approach is to rapidly get the world back on track in its efforts to achieve the WHO GTS milestones by 2025 and to sustain efforts thereafter to reach the GTS 2030 goals *(2)*. There is an urgent need to accelerate the reduction in *malaria deaths* and *case incidence* in the highest burden countries in Africa and in India. According to the *World malaria report 2017 (1),* 11 countries accounted for approximately 70% of the global estimated malaria case burden and 71% of global estimated malaria deaths. All 11 countries individually contribute at least 2% to the global burden of malaria cases. These countries are, in order of decreasing incidence of estimated cases: Nigeria, Democratic Republic of the Congo, India, Mozambique, Ghana, Mali, Burkina Faso, Niger, Uganda, United Republic of Tanzania and Cameroon. These countries are committed to reducing their malaria burden and recognize that business as usual is not an option. This will require the highest level of political commitment. The highest burden countries will be the early adopters of the approach, which will subsequently be extended to other high-transmission and high-risk countries in sub-Saharan Africa.

1.2 Historical context and recent progress

The Global Malaria Eradication Programme was launched in 1955 at the Eighth World Health Assembly under the assumption that the available tools (residual spraying with DDT, diagnosis with microscopy and treatment with chloroquine) delivered through a fairly rigid and circumscribed set of programmatic actions could achieve success. Although malaria was eliminated in a number of countries, the eradication programme eventually failed due to strategic, operational, technical and financial challenges. The programme was ultimately suspended indefinitely in 1969. Over the ensuing several decades, investments in malaria control programmes and research funding for innovative new tools and approaches declined. By the 1990s, an estimated 1–3 million child deaths each year were attributed to malaria.

Several promising developments occurred around the turn of the century. These included a renewed commitment to malaria reduction through the formation of the Roll Back Malaria Partnership, the Abuja Declaration by African Heads of State and the setting of the Millennium Development Goals. Increased financing became available through the creation of the Global Fund along with funding from the President's Malaria Initiative (PMI) and other bilaterals. Revitalized research efforts yielded new and effective tools, such as long-lasting insecticidal nets (LLINs), artemisinin-based combination therapies (ACTs) and rapid diagnostic tests (RDTs), making malaria a preventable and treatable disease.

Over the next decade, the massive scale-up of the WHO-recommended core malaria interventions resulted in unprecedented gains in the fight against malaria. Funding increased dramatically; by 2015, funding was nearly US$ 3 billion annually, representing a more than 10-fold increase from 2004. From 2001 to 2015, the rates of malaria mortality dropped by 62% and case incidence by 41%, with more than 6 million deaths averted.

1.3 Global Technical Strategy (GTS)

Motivated by the successful reduction of the global malaria burden, WHO led the development of a new *Global Technical Strategy for Malaria 2016–2030* (GTS) *(2)*, which was endorsed by all Member States at the World Health Assembly in 2015. The GTS sets ambitious and achievable goals: compared to a 2015 baseline, the world aims to reduce malaria morbidity and mortality by at least 40% by 2020, at least 75% by 2025, and at least 90% by 2030. Malaria elimination milestones are that elimination should have been achieved in at least 10 additional countries by 2020, at least 20 countries by 2025, and at least 35 countries by 2030.

The GTS targets were estimated based on the assumption that funding would continue to increase commensurate with trends observed over the previous decade. The annual investment needed to reach the 2030 targets (i.e. a 90% reduction in malaria incidence and death rates) was estimated to be US$ 6.4 billion per year by 2020, increasing to US$ 7.7 billion per year by 2025.

1.4 Stagnation and reversal in high-burden countries

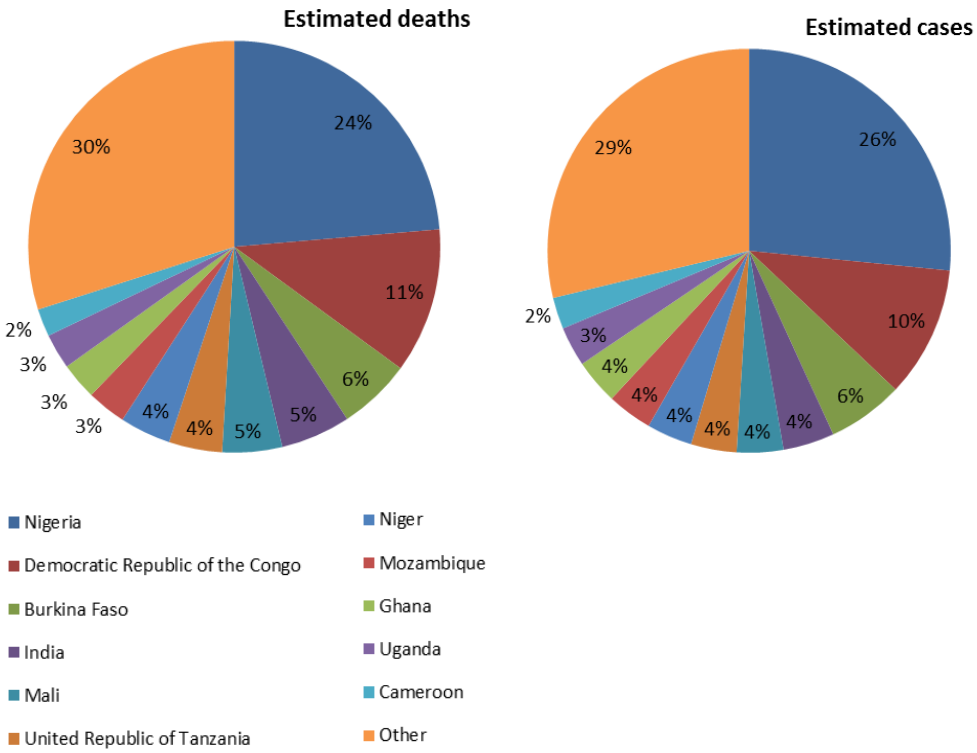
However, while some countries have continued to reduce their malaria burden, the overall global progress has stalled. The *World malaria report 2017 (1)* indicates that there were an estimated 216 million cases of malaria in 2016, marking a return to 2012 case levels. The number of deaths estimated in 2016 (445 000) is similar to that of the previous year.

Malarious countries are falling into one of two groups. On the one hand, a growing number of countries (44) have less than 10 000 cases per year and are therefore nearing elimination. For example, the WHO E-2020 initiative, launched in 2016, identified 21 countries with the potential to reach zero cases by 2020. In stark contrast, several countries carry a substantial burden of malaria (all but one of them in sub-Saharan Africa) and have experienced a recent rise in malaria cases.

1.5 Where is the problem?

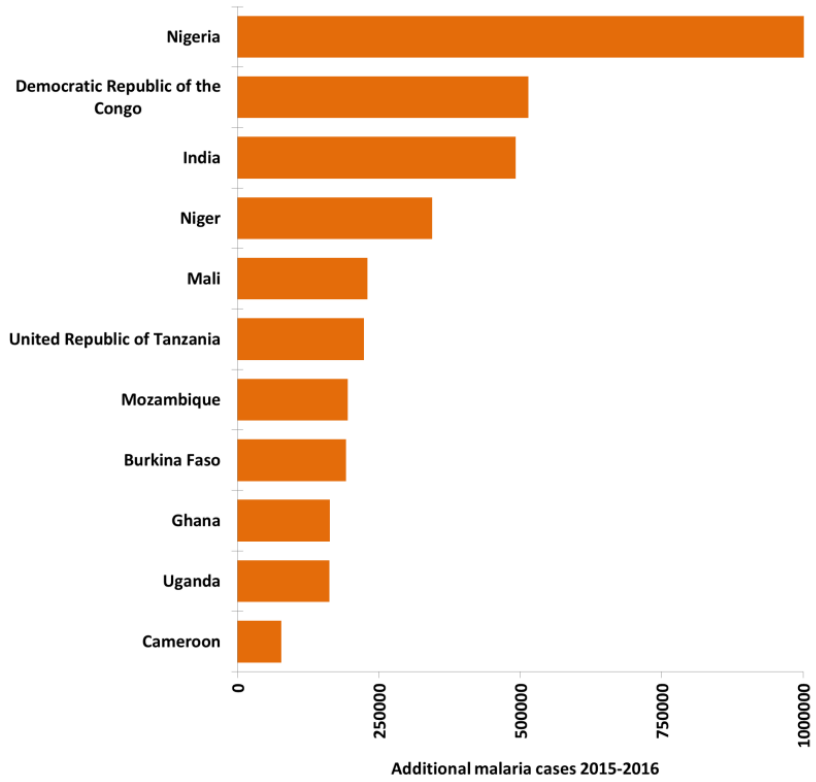
The WHO African Region continues to bear more than 90% of the burden of disease and accounts for most of the increases in cases. Around 70% of the estimated case burden and 71% of the estimated deaths occurred in 10 countries in sub-Saharan Africa and in India (Fig. 1). Nigeria accounts for the highest proportion of cases globally (27%), followed by the Democratic Republic of the Congo (10%), India (6%) and Mozambique (4%). Nigeria, the Democratic Republic of the Congo, Burkina Faso and India account for 47% of all malaria deaths globally. All told, nearly 154 million cases and 311 000 deaths occur annually in these 11 high-transmissions countries.

Fig. 1. Estimated country share of total malaria cases and deaths in 2016
(Source: *World malaria report 2017* data)



Comparing 2015 to 2016 figures (Fig. 2), each African country had an increase of at least 50 000 cases, with Nigeria and DRC showing increases of >500 000 cases. However, new data from improved surveillance systems in several countries in the WHO African Region indicate that the numbers of malaria cases reported in the *World malaria report 2017* are conservative, with preliminary indications that even higher numbers may be reported next year. As a result, the world is not currently on track to meet the GTS morbidity and mortality milestones for 2020.

Fig. 2. Increase in estimated malaria cases between 2015 and 2016
(Source: *World malaria report 2017* data)



1.6 Why has global progress stalled?

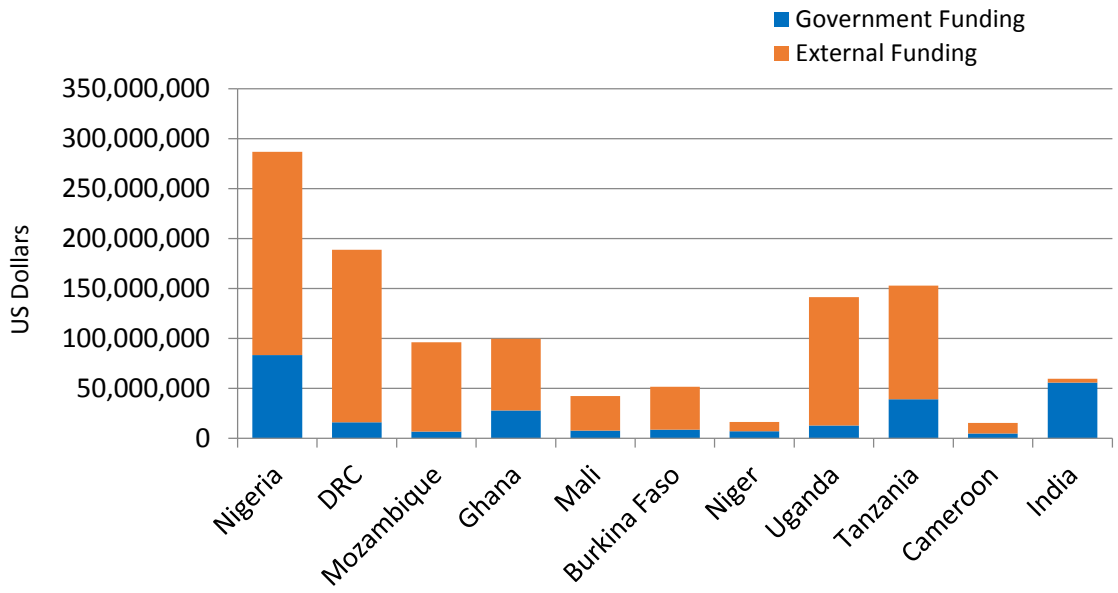
Without more detailed data, it is difficult to identify with certainty why global progress against malaria has stalled. Many factors have undoubtedly contributed to the focal distribution of burden and mortality in these high-burden contexts. These include, among others, underlying vectorial capacity; socio-demographic and epidemiologic risk factors; and weak health systems leading to poor access to care and suboptimal malaria intervention coverage. Coverage gaps could be related to a variety of health system issues, including available financing, commodity shortages, supply chain and delivery challenges, and demand-side issues.

National data from many high-burden countries show coverage gaps for the core malaria interventions (i.e. vector control, case management, and intermittent preventive treatment in pregnancy [IPTp]). In 2016, the proportion of households across sub-Saharan Africa with sufficient LLINs (i.e. 1 net for every 2 persons) remained inadequate at 43%; only one third (34%) of febrile children were taken to a medical provider in the public health sector; approximately 80% of eligible pregnant women did not receive the recommended three or more doses of IPTp; and 13 million children eligible for seasonal malaria chemoprevention (SMC) were not covered.

Malaria funding has essentially plateaued since 2010, hovering at around US$ 2.5–3 billion annually. Given the expected growth in populations at risk in malaria-endemic countries, in sub-Saharan Africa, this has translated into substantial declines (>25%) in per capita investment for most countries. Overall, from 2015 to 2016, 34 African countries faced

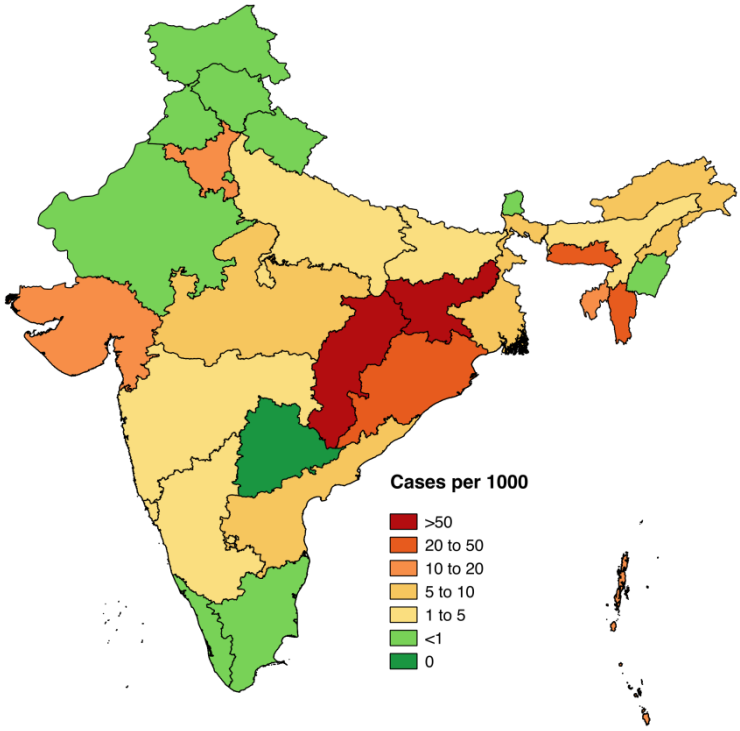
decreases in per capita international funding. All of the 10 high-burden countries in Africa continue to be heavily reliant on external funding for malaria (Fig. 3).

Fig. 3. International and government funding for malaria among high-burden countries



In 2016, India had an estimated 13.2 million malaria cases and 24 000 deaths, representing 62% of the estimated cases and 63% of the estimated deaths outside of Africa. Unlike in Africa where cases are mainly due to *P. falciparum* and malaria deaths are mainly among children under 5 years old, in India, *P. vivax* accounts for almost 50% of cases and malaria deaths are predominantly among adults. The exception to this is among tribal communities where pockets of very high transmission (mainly due to *P. falciparum*) occur and cause substantial morbidity and mortality in young children. As shown in Fig. 4, malaria incidence is concentrated in the east and northeast. Of the 36 states/union territories, four states (Odisha, Chhattisgarh, Jharkhand and Meghalaya) contributed 87% of *P. falciparum* cases, 71% of all cases and 60% of malaria deaths reported in 2016, even though these states account for only 8.7% of the total population in the country.

Fig. 4. Annual parasite incidence per 1000 population by state in India in 2016



It is also worth noting that the highest burden countries have weak health delivery systems (Table 1). The UHC service coverage index (UHC SCI) is comprised of 16 tracer indicators that track coverage by essential health services. The index is very low in the high-burden countries, as are measures of health workers and hospital beds per capita.

Table 1. UHC service coverage indices in highest burden countries

Country	UHC SCI	Physicians per 1000 population	Hospital beds per 10 000 population
Burkina Faso	39	Less than 0.05	4
Cameroon	44	0.1	13
Democratic Republic of the Congo	40	0.1	8
Ghana	45	0.1	9
Mali	32	0.1	1
Mozambique	42	0.1	7
Niger	33	0.05	2.8
Nigeria	39	0.4	5
Uganda	44	0.1	5
Tanzania	39	Less than 0.05	7
India	56	0.7	6.6
Greece (for reference)	70	6.3	42.5

1.7 What can be done to get back on track?

There is a promising pipeline of new drugs and vector control products and strategies. However, there are challenges in identifying and scaling up effective innovations in the short term, and being able to demonstrate a significant impact in the coming 3–5 years. The potential impact of a first-generation malaria vaccine will be evaluated in 2019 in three African countries.

While waiting for new tools, there is an urgent need to identify and efficiently address the impediments to malaria control in high-burden countries, leading to a durable impact on the lives of the poorest and most marginalized. Given the diversity of countries and health systems, control programme strategies, epidemiologic contexts, and funding situations, it is apparent that a one-size-fits-all response will not be useful. Rather, what is needed is a systematic approach to develop a country-led, context-specific response plan that is based on a careful and thorough analysis of available data. This will be used to shape implementation in each high-burden subnational area and facilitate the appropriate uptake of new tools in the future.

1.8 Moving forward: the new approach

Malaria remains an infectious disease for which effective prevention, diagnosis and treatment tools and strategies exist. However, delivering them at a scale with high impact remains a challenge, particularly in some areas of sub-Saharan Africa. Over the past several years, the malaria community has enthusiastically embraced and focused on the concept of elimination, and that enthusiasm should continue. At the same time, partners need to come together in a coordinated way to place additional focus on accelerating the reduction of mortality and case incidence in the high-burden countries. A failure to drive home the benefits of better malaria control in these and other high-burden countries will undermine their potential demographic, social and economic dividends over the coming decades.

2. The approach

2.1 Goal

The overall aim of the approach is to get the world back on track to achieve the GTS milestones by 2025 and to sustain the gains thereafter to reach the 2030 goals. The initial focus is to accelerate the reduction of malaria case incidence and malaria deaths in the high-burden countries in Africa, as well as in India, that contributed the highest number of estimated malaria cases and deaths globally as per the *World malaria report 2017*. Success among the early adopters will incentivize other high-burden countries and partners to follow. It is expected that with the smarter investments and aggressive action described in this approach, global trends can be reversed such that the GTS 2025 targets can be achieved.

2.2 Guiding principles

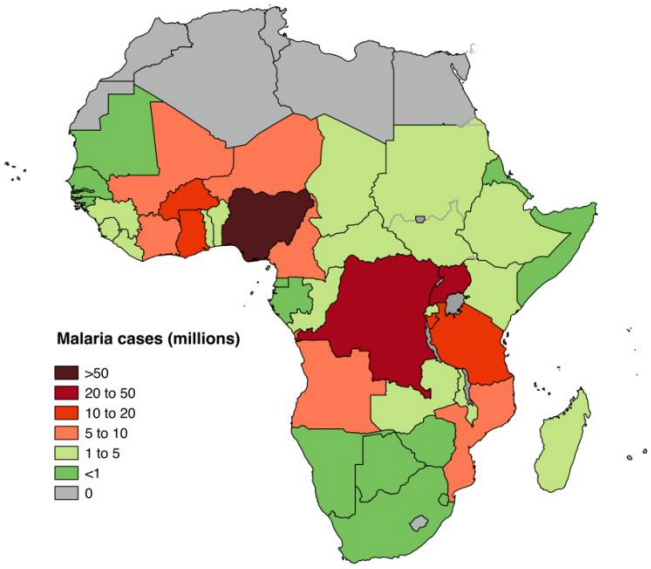
The approach has the following **guiding principles:**

Country-owned and led: The approach will be country-owned, country-led, and aligned with national health goals, strategies and priorities and internationally agreed frameworks adopted

by all Member States (SDGs, UHC and the GTS). In response to the *World malaria report 2017*, the ministers of health from a number of high-burden countries have given their commitment to positively change the trajectory of malaria trends, thus making a national and global impact. They have pledged to take the lead in a focused effort aimed at dramatically reducing the toll of malaria-related death and disease. The approach will provide opportunities and incentives for partners to align their technical and financial support with a single national malaria strategy and planning process, as an integral element of national and subnational health sector planning and coordination.

Focused on high-burden/high-risk settings: There is an urgent need to get back on track in the high-burden countries where progress has stalled. Accordingly, the countries with the highest malaria burden will lead the approach. Fig. 5 shows the distribution of malaria cases in Africa in 2016.

Fig. 5. Distribution of malaria cases in Africa, 2016



Impact driven: This will be an aggressive approach to impact mortality and ensure accelerated progress to get back on track to reach the 2025 morbidity targets. It will build on the incredible success of recent years in reducing malaria burden across the world, acknowledging that malaria remains a preventable and treatable illness and impact is possible.

Intensified action to optimally deliver a context-specific package of malaria services: Based on the in-depth analysis of context and the determinants of disease and mortality, the identified areas contributing to high mortality and morbidity will receive timely and tailored malaria interventions. In addition to identifying "what" should be delivered, the contextual analysis will assess the national health system and local health delivery system to help identify "how" best to deliver the interventions within a specific setting. In most settings, malaria control activities can be delivered cost-effectively and sustainably when they are well-integrated components of the health delivery system. For example, community health workers (CHWs) have been shown to be effective in achieving improved treatment coverage and delivering high-quality care to children with acute respiratory infection (ARI), diarrhoea and malaria. The reproductive health programme is a key partner in delivering prevention

interventions, such as providing LLINs and IPTp with sulfadoxine pyrimethamine (SP) to pregnant women during antenatal care (ANC) visits. Similarly, the national malaria control programme and the Expanded Programme on Immunization (EPI) must work closely on LLIN distribution and the delivery of intermittent preventive treatment of malaria in infants (IPTi), where appropriate. Wherever possible, the approach will exploit opportunities to strengthen the engagement and integration of private sector service providers in the provision of quality care.

Enhanced through a multisectoral approach: Many determinants of malaria will be addressed by non-health sectors, such as agriculture, environmental land management, education, energy, infrastructure, tourism and others. To secure durable impact, the approach will include deployment of a Rapid Assessment Tool to identify "malaria-smart" interventions across the various sectors. A Multisectoral Action Plan will be created to consult, coordinate and engage non-health-sector partners in the development and implementation of the response plans for high-burden areas.

Enabled by a diverse mix of partners, working collaboratively and aligning technical and financial support with locally defined priorities: The malaria community already benefits from the RBM Partnership as a global platform for coordinated action against malaria. Funding streams exist, with generous contributions from the Global Fund, PMI, DFID, other bilaterals and foundations. ALMA is a groundbreaking coalition of 49 African Heads of State and Government, which has established greater political accountability for tackling malaria in Africa. There are many national and international agencies providing technical support and building capacity in high-burden countries. The approach will harness these efforts to help countries and individual agencies achieve their objectives and more effectively contribute to the common goal of reducing the global malaria burden. It will also broaden and strengthen the partnership in countries by ensuring the meaningful engagement of civil society.

3. Response elements

The following response elements will be implemented to get back on track to achieve the GTS targets:

- galvanize national and global political attention to reduce malaria deaths;
- drive impact in country through the strategic use of information;
- establish best global guidance, policies and strategies suitable for a broad range of contexts;
- implement a coordinated country response.

3.1 Galvanize national and political attention to reduce malaria deaths

Achieving the main goal of the approach and ensuring the greatest impact on malaria will require the full political apparatus of heads of state, key ministers, parliamentarians, private sector leaders and social influencers to secure sufficient domestic funding and ensure the delivery of the appropriate package of services to those in need to derive the greatest malaria impact.

Building political commitment

In the highest burden countries, malaria not only contributes to morbidity and mortality, but also results in a continuous strain on the economy, affecting the productivity of the workforce, overstretching health facilities, and costing families through out-of-pocket expenditures for health care *(3,4)*. Available evidence suggests that malaria has a negative impact on aggregate national output, with losses in economic growth ranging from 0.41% to 8.9% *(5)*. Investments in malaria control tools are highly cost-effective and can have direct and indirect positive impacts on producing healthier and more productive societies.

In the heavily affected countries, millions of people, particularly the poor and vulnerable, live in areas with less than optimal malaria intervention coverage and have limited access to essential health services.

With such a significant socioeconomic impact, it is time to further elevate the political profile of malaria in high-burden countries through multiple strategies, which may include:

- galvanizing citizen engagement through initiatives, such as Zero Malaria Starts with Me;[1]
- establishing a National End Malaria Commission or modifying an existing high-level task force or committee. A similar body should be established also at state, province or district level as appropriate;
- creating an All-Party Parliamentary Group for Malaria Control and Elimination;
- ensuring full country ownership and leadership by the ministry of health and the national malaria control programme with partners providing complementary support.

In addition, the approach will link up with other global political processes aimed at establishing commitment and resources for the health-related SDGs. This approach shares the ambition of UHC to achieve health impact by improving efficiency, increasing effective coverage and reducing health inequities. The renewed momentum in PHC provides opportunities to engage and empower communities and establish a more efficient and equitable first point of care.

The Global Action Plan for Healthy Lives and Well-being for All will help identify critical new approaches for accelerating progress towards SDG3 and related health targets. The work to maximize opportunities from community health systems, private sector engagement, technical capacity-building, smart use of data and leveraging domestic financing will help to strengthen the approach.

Malaria financing in high-burden countries

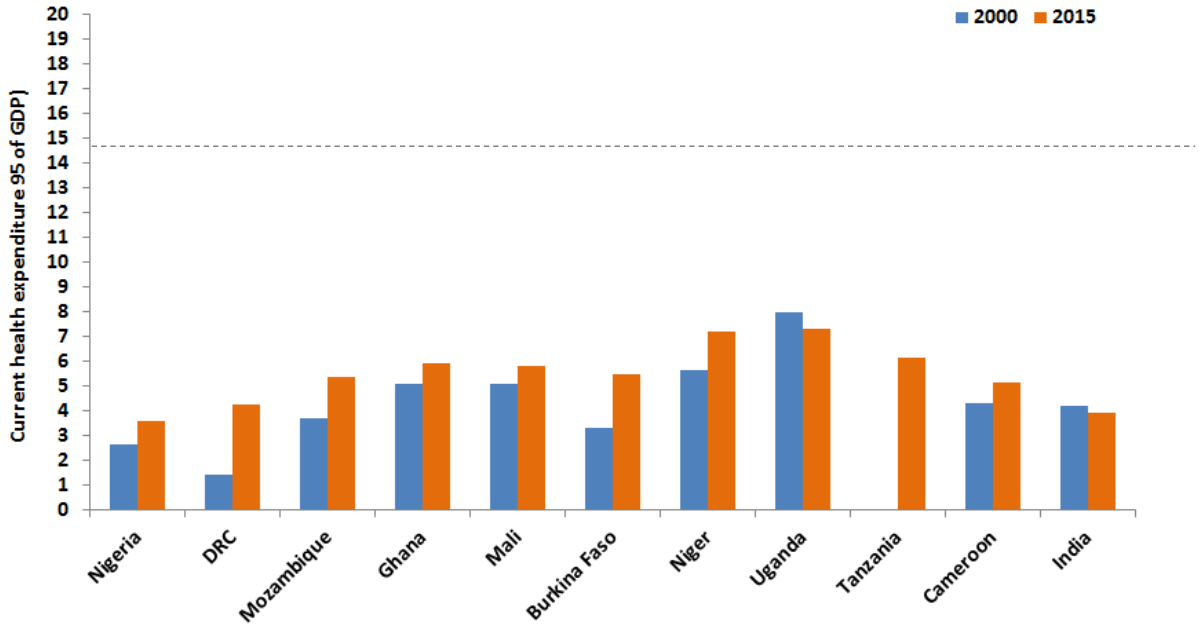
More than 70% of global malaria funding has been allocated to countries in the African Region. Malaria programme commodities, such as LLINs, ACTs and RDTs, constitute the greatest categorical expenditures. The level of funding has been sufficient to improve coverage of essential interventions, which have contributed to initial and significant reductions in morbidity and mortality.

[1] RBM Partnership and AU are launching "Zero Malaria Starts With Me" to build political commitment and galvanize citizen action towards malaria elimination as a pan-African movement. Pioneered in Senegal in 2014, Zero Malaria Starts With Me has greatly contributed to harnessing political will and securing resources for malaria – from H.E. President Macky Sall to businesses to community champions.

However, global malaria funding has plateaued at US$ 2.5–3 billion annually – an amount that is far short of the projected US$ 6–7 billion needed annually to reach the GTS targets. There is now a substantial commodity gap of over US$ 1 billion in the 11 countries for the period 2018–2020.

The situation calls for urgent action to address the funding gap and make more efficient use of all malaria resources (domestic and international). An increase in malaria funding can and should be derived largely from a progressive increase in domestic financing for health, in accordance with countries' commitment to the Abuja Declaration target of allocating 15% of their annual budget to health. However, there has been limited progress towards this target (Fig. 6).

Fig. 6. Progress towards the Abuja Declaration target of 15% of GDP expenditure on health
(Source: WHO Global Health Observatory)



3.2 Drive impact in country through the strategic use of information

Rapid reductions in mortality will be achieved through the appropriate mix of interventions and improved delivery mechanisms to: i) prevent infection and disease, and ii) effectively manage uncomplicated and severe malaria.

The decreasing per capita funding for malaria and recent increases in the number of infections highlight the need for even more specific prioritization suited to the local context and driven by renewed focus on rapidly reducing mortality. The biggest impact will not necessarily be achieved through coverage of a single intervention everywhere, but through coverage of the right mix of interventions that takes into account feasibility, need and potential impact.

Malaria national strategic plans (NSPs) are currently used to identify a broad mix of interventions and strategies for achieving national goals, and to identify and fill resource gaps through external and domestic funding. However, the process is hampered by the lack of guidance on the best approaches for stratification and how to identify the best mix of

interventions to improve efficiency and equity, as well as capacity constraints in generating and analysing data.

National malaria control programmes, with support from relevant local institutions and partners, will guide the generation of subnational data (at the finest population unit feasible) and its use in identifying the locally adapted mix of interventions that will maximize existing resources. Countries will be supported to establish a cycle of strategic use of information (Fig. 7). The following key components will be assessed at each unit of analysis:

- epidemiology of under-5 mortality (including pre-intervention mortality rate and its relationship to malaria transmission and interventions);
- epidemiology of malaria morbidity;
- entomological profile of malaria transmission, including knowledge of local competent vector populations and patterns of insecticide resistance;
- review of existing subnational programme operations and performance;
- analysis of the national and subnational health system, conduits of health service delivery and health-seeking behaviour;
- other locally relevant determinants of malaria.

Although parameters for stratification may vary from country to country or across areas in a country, consideration will be given primarily to mortality and access to interventions. Results of the detailed analysis will be used for stratification and to identify an optimal mix of interventions for each stratum, with an emphasis on the highest burden contexts.

Impact will be improved by optimizing the delivery of the interventions. The analytical framework will incorporate an assessment of the delivery system (community, public and private sector) in order to understand the contextual barriers impeding access to quality care and prevention interventions. This information will be used to identify locally appropriate health delivery solutions.

Based on the analysis, national health sector strategies, malaria programme policies, strategies, operational plans and budgets will be updated In accordance with existing planning processes in order to support the achievement of the goals of the national strategic plan (aligned with the GTS).

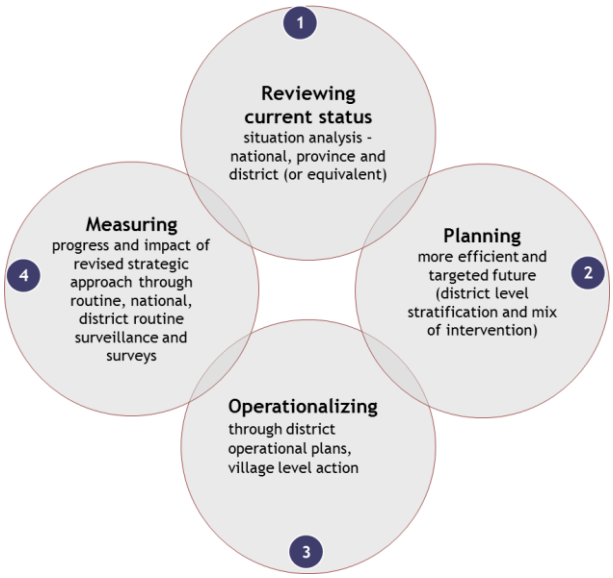
Administrative policies and/or guidelines will be developed to provide an enabling environment for securing political support at all levels, ensuring predictable and sustainable financing for the programme, addressing bottlenecks, improving government stewardship of private health care providers and strengthening intra- and inter-sectoral collaboration.

The national malaria control programme will be supported to update its tools for operational planning and to conduct annual operational planning at national and subnational (state/province/district) levels. In order to avoid duplication and fragmentation of efforts, the annual operational plan at each level should be comprehensive, reflecting what needs to be done, when and where, and the logistics required (including budget) to achieve the agreed programme objectives for the year. The annual operational plan should take into account the stratification and package of interventions for reducing mortality.

Progress in implementation will be tracked by measuring key parameters in order to assess changes in coverage and impact. Countries will be supported to establish the right data

platforms and strengthen existing data systems in order to routinely monitor progress and impact. This will be accompanied by locally appropriate operational research to build a compendium of information for strategic decision-making.

Fig. 7. Process of intensified technical analysis and strategic use of information



3.3 Establish best global guidance, policies and strategies suitable for a broad range of contexts

Broadly, WHO recommends the following core interventions for use in high-burden areas to reduce morbidity and mortality:

- diagnostic testing and treatment;
- vector control (LLINs, indoor-residual spraying [IRS]);
- chemoprevention (SMC, IPTi, and IPTp);
- surveillance to inform programme implementation, progress and impact.

These interventions have been evaluated in randomized control trials and have been demonstrated to be effective in the majority of settings. Published estimates of the efficacy of interventions have shown an approximately 95% clearance rate for the treatment of uncomplicated *P. falciparum* malaria using ACTs, and integrated community case management (iCCM) has the potential to decrease all-cause mortality for children under 5 by up to 63%. In addition, SMC can lead to a more than 40% reduction in malaria cases and deaths; LLINs to a 50% reduction in uncomplicated malaria episodes; and IPTi to a 30% reduction in uncomplicated malaria episodes. Initial trials assessing IPTp with SP have demonstrated a 40% reduction in severe anaemia, 61% reduction in antenatal parasitaemia and 27% reduction in low birthweight. These results are indicative of the likely impact of individual interventions, although local context will play a part in determining the overall effectiveness of any given package.

High coverage of vector control interventions across a population at high risk will continue to be the bedrock for reducing malaria incidence and mortality. However, a large number of deaths still occur in hyper-endemic areas despite high vector control, disproportionately affecting populations with poor access to curative services. Therefore, in addition to vector control, the use of other interventions with proven high impact will be maximized. These include SMC, IPTi and IPTp; improved case management using appropriate channels of delivery; and improved referral systems, treatment of severe disease, availing of blood and transfusion services, logistics, etc.

In the literature, the median financial cost of protecting one person for one year has been reported to be US$ 2.20 (range US$ 0.88–9.54) for ITNs/LLINs; US$ 6.70 (US$ 2.22–12.85) for IRS; US$ 4.03 (US$ 1.25–11.80) for SMC; US$ 2.06 (US$ 0.47–3.36) for IPTp; and US$ 0.60 (US$ 0.48–1.08) for IPTi *(6)*. Similarly, the median cost of treating an episode of uncomplicated *P. falciparum* malaria at public health facilities was reported to be US$ 5.84 (US$ 2.36–23.65) and for severe malaria US$ 30.26 (US$ 15.64–137.87). Some evidence suggests that there are economies of scale in the implementation of ITNs, IRS and IPT, with lower unit costs reported in studies with larger numbers of beneficiaries *(6).* However, it should also be acknowledged that there are additional costs involved in providing for marginalized populations and those that are difficult to reach.

Core malaria control interventions have consistently been reported as being cost-effective against traditional cost-effectiveness thresholds. For instance, the median incremental cost-effectiveness ratio per DALY averted was reported as US$ 27 (range US$ 8.15–110) for ITNs/LLINs, US$ 143 (range US$ 135–150) for IRS, and US$ 24 (range US$ 1.08–44.24) for IPTp.

However, all countries with high malaria burdens operate in resource-constrained environments. It is therefore necessary to decide which interventions to make available where, to whom and when, and the extent to which they are supported with public funds. With a fixed resource envelope, selected interventions in some areas of low risk may need to be withdrawn in order to enable enhanced coverage or a broader range of interventions in higher burden settings. These risk calculations will consider overall burden, as well as the risk for resurgence and the need for active surveillance as effective interventions are withdrawn. Other factors, such as feasibility and acceptability, will also need to be considered.

Although most countries follow WHO recommendations, the approach and rationale for defining the most appropriate and impactful mix of interventions for different contexts are not currently explicit in WHO guidelines or national strategies. WHO guidance on malaria control is relatively broad and high-level. The evidence base is insufficient, and it is not possible to conduct all the studies that would be required to generate the requisite evidence to guide decision-making in every situation. There is also very limited information about the merits of combining multiple interventions in different settings. Mathematical models have been used to generate insights, but their use in policy decisions will need to be further explored.

It is possible to take steps to enhance the utility and impact of WHO malaria guidance by laying out considerations for tailoring packages of interventions to specific situations. To address some of the questions around intervention mixes and prioritization, and as part of its core normative function, WHO (in collaboration with other technical agencies) will review its current policy recommendations to better suit country needs. The aim of this review will be to provide improved and practical guidance that can help countries to make better decisions within the context of their specific malaria epidemiology, health system structure and function, including capacity and performance within a given financial framework. The review

will be data-driven and incorporate comparative cost-effectiveness analysis and other measures of value for money. Routine country data will be the primary source for these analyses.

To strengthen the evidence base for decision-making, it will be important to track, prospectively and deliberately, progress in malaria control with respect to the interventions and strategies deployed in different settings. This will require the systematic gathering and curation of relevant data so that, over time, it will be possible to discern patterns of change in malaria burden when intervention strategies are changed.

3.4 Implement a coordinated country response

Countries will lead the approach, as a means to: i) strengthen national health policies and strategies; ii) facilitate national and subnational planning, and iii) improve implementation. The approach will be incorporated into existing planning cycles, including those of other relevant sectors. Partners should align their planning processes with this approach and be ready and flexible to implement and support any perturbations to current strategies based on data-driven decisions.

Each country will identify the specific roles of different layers of the health system necessary for taking forward the approach and means of strengthening capacity. Although these will be context-specific, it is anticipated that the following levels of engagement will be necessary:

Household and village level

Every household and village leader is a partner in the approach and should be empowered to play a part in preventing and controlling malaria. Communities understand the challenges they face and can play an important role in shaping locally appropriate solutions and defining services that respond to their unique context. Therefore, communities, as owners of their own health, need to be empowered and engaged in preventing malaria and seeking care. They need to be the architects of quality primary care suited to the health needs of their community. As advocates of their own health, they need to be empowered to demand quality services. To be effective actors, communities need access to the knowledge, skills and resources to make healthy choices. Community mobilization will be critical to support potential programme activities such as iCCM, which includes assisted community-based referral for severe febrile illness and increasing ANC attendance to access IPTp.

This initiative needs to be guided by an overarching community engagement strategy that each country can adapt to its context and health system. The approach will recommend a meaningful set of practices that contribute to strengthening community engagement and allocation of resources to support mechanisms enabling the role of communities within the health system.

Health facilities

There is substantial variation by country in terms of the levels and organization of health facilities. However, certain key functions are typically addressed at specific levels.

The health post or dispensary typically serves as the first point of contact in many settings and provides a link to higher level health facilities. When strengthened, these sites can facilitate prevention activities and provide timely engagement for those seeking care. The renewed emphasis on PHC provides an opportunity to invest in comprehensive (promotion, prevention

and treatment), people-centred, integrated and quality health services. This will require adequate numbers of competent health workers who are appropriately trained, recruited and retained to serve all those in need.

To strengthen performance at this level, a number of activities could be considered. These might include strengthening linkages with the community being served through competency-based training, mentoring, supportive supervision and recognition/reward; providing practical job aids; ensuring continuous availability of malaria diagnostics and medicines; improving the quality of microscopy where this is available; improving supply management and providing tools and training for this; ensuring availability of LLINs for continuous distribution; improving recording, reporting and use of data; and improving referral for severe illness. It will also be critical to identify barriers to accessing health services within the catchment area and to work with community leaders, supervisors and users of the services to address those barriers.

Hospitals serve as referral centres for cases that cannot be managed at community and health centre levels. Some hospitals also serve as training centres for health staff with clinical functions. Although emphasis should be on improving case management at the periphery, improving case management services in the hospital setting is also important. Enhanced actions and support at this level include ensuring continuous availability of needed diagnostics and medicines, including those for severe and complicated malaria; improving the quality of microscopy; improving the availability and quality of blood transfusion services; and improving patient triage, flow and management within the hospital system. It will be critical to strengthen the knowledge and skills of medical doctors, nursing staff and other paramedical staff involved in case management through competency-based training, mentoring, and supportive supervision, as well as ensuring availability of updated case management guidelines and practical job aids. Other potential supportive actions include establishing a system for continuous improvement of case management, and improving reporting and use of data.

In many high-burden countries, people seek care and treatment from the private sector. Harnessing the private sector as a means of delivering reliable malaria services will require locally appropriate to secure quality and accountability. Efforts are needed to support the ministry of health in strengthening accreditation, regulation and coordination with the rest of the health sector. In addition, where applicable, the ministry should support a more functional private sector through training for case management, provision of commodities, and oversight of quality of care.

Regional / provincial / district health office

It is acknowledged that there is significant heterogeneity in the managerial, technical and coordinating roles at these levels. Support is often needed to improve coordination and partnership building, planning and implementation, surveillance, monitoring and evaluation, supply chain management, capacity-building, operational research, advocacy, bottleneck identification and resolution.

In the short to medium term, WHO and/or the key partners may consider deployment of staff at the subnational level to support local governments in planning and implementing this initiative.

National level

The national level is responsible for planning, budgeting and prioritization. Other key functions to be strengthened at the national level include generation of strategic information;

programme review; strategic and operational planning; training; supervision; surveillance, monitoring and evaluation; procurement and supply chain management; quality assurance; coordination of a multisectoral national response to malaria; managerial and technical support to subnational levels; and advocacy to generate political and financial support.

The full potential from the approach will arise from strengthening national health systems to deliver health services and achieve maximum health impact. Countries will be supported in establishing a sound evidence platform for making healthy decisions based on global and national research, local data and specific contextual knowledge. Regional and national institutes, global partners, academia and other networks will lend their support in building the analytical capacity to generate and use reliable, timely, verifiable data and actionable information for local response. Partners will move away from collecting data to meet their own reporting and accountability pressures towards supporting country-led strategies and data ecosystems.

Partners should consider the provision of in-country technical support to the ministry of health to accelerate reduction of malaria mortality and morbidity.

4. Tracking progress

4.1 Tracking progress and evaluating outcomes and impact in the targeted areas

Surveillance, the third pillar of the GTS, is critical to the overall analysis, planning, implementation and monitoring of progress in each country. Stratification and prioritization of interventions will be guided by strong surveillance. Countries will be supported to further improve their surveillance, monitoring and evaluation system – from efficient recording and reporting of data to analysis and use – with strong community participation and an adequately resourced health workforce (Fig. 8). Best practices and guidance on surveillance system enhancement are available in the recently updated WHO malaria surveillance, monitoring, evaluation reference manual *(7)*. Given the difficulties in measuring malaria mortality, preferred methods will be agreed and a system put in place to track progress. Granular spatial and temporal data will be used for periodic monitoring of progress in reducing mortality and morbidity in prioritized areas (see Section 3.2).

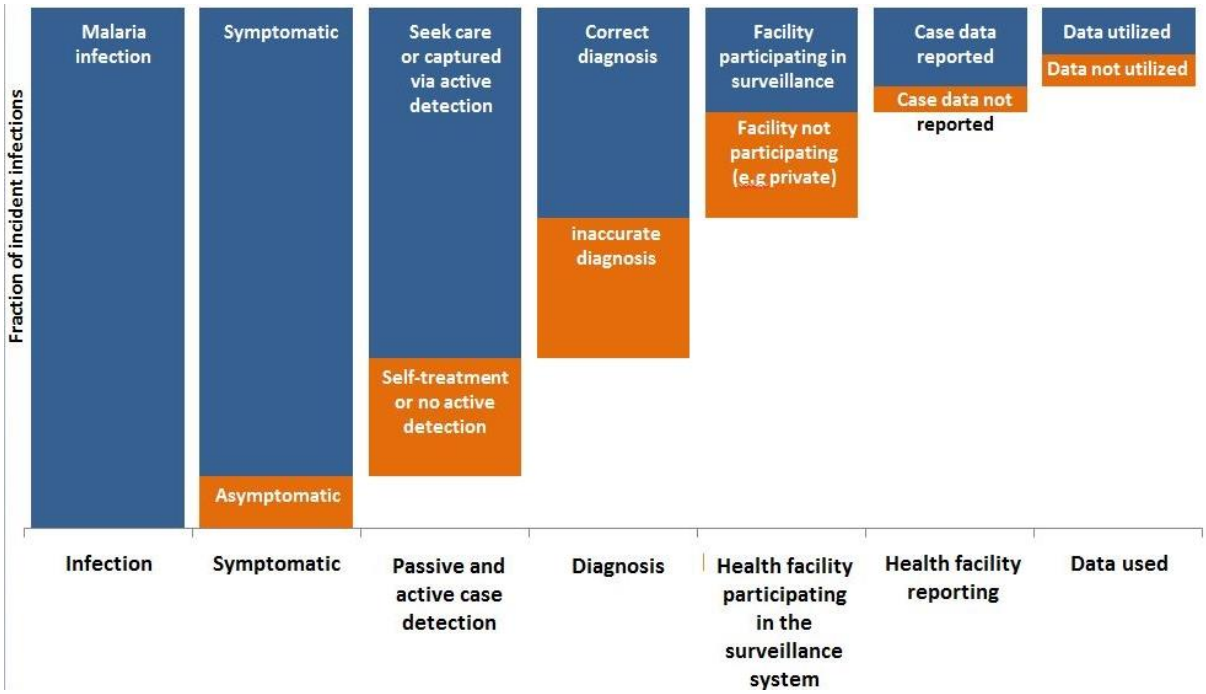
Tracking progress will also consider means of assessing the different elements of the approach. Indicators will be established to measure:

- political commitment and domestic financing;
- the application of the data for making more efficient and effective decisions;
- the relevance and use of global guidance;
- improvement in planning processes.

Fig. 8. Health information cycle, centred on a competent and adequately resourced health workforce

Important bottlenecks in malaria surveillance systems include low treatment-seeking in the public health sector, the exclusion of the private sector from reporting, low coverage of parasitological diagnosis at health facilities, incomplete reporting rates, underutilization of existing data, and related lack of analytical capacity (Fig. 9). Resolution of these bottlenecks will require regulatory, technological, analytical and health worker capacity-building. In many countries, the District Health Information System 2 (DHIS2) is the main platform for surveillance, and support will be provided in installing the DHIS2 malaria modules and dashboards recently developed by WHO in collaboration with partners. These modules should be available at least at all district levels to support operational planning, and where possible in major health facilities to track malaria in-patients and deaths. A comprehensive surveillance system assessment will be conducted in all relevant countries to guide best possible solutions.

Fig. 9. Common bottlenecks in malaria surveillance systems in malaria-endemic countries



Countries will be encouraged to establish or strengthen existing surveillance, monitoring and evaluation working groups or task forces, under the leadership of the ministry of health, in particular the Health Management Information Systems (HMIS) departments mandated to track progress and evaluate outcomes and impact. The task force will report to a designated high-level body within the ministry of health in order to ensure that key information is reaching national leadership. This will be supported by a national DHIS2-based national malaria control programme central data repository that brings together intervention distribution and population-level coverage data, intervention efficacy studies, trends in cases and deaths, climate, and other programmatic and management information. Annual review and operational planning will be carried out and institutionalized at national and subnational levels with participation of key donors and implementing partners. Existing mid-term reviews will provide opportunities for assessing progress.

Household surveys such as Demographic and Health Surveys (DHS), Malaria Indicator Surveys (MIS) and Multiple Indicator Cluster Surveys (MICs) will continue to be important sources of information for national malaria control programmes and wider ministries of health. In some countries, these surveys are supplemented with parasite prevalence surveys among school children. Better adaptation of these surveys to different transmission geographies may be needed.

References

1. World malaria report 2017. Geneva: World Health Organization; 2017 (http://www.who.int/malaria/publications/world-malaria-report-2017/en/).
2. Global Technical Strategy for malaria 2016–2030. Geneva: World Health Organization; 2015 (http://www.who.int/malaria/publications/atoz/9789241564991/en/).
3. WHO Commission on Macroeconomics and Health, World Health Organization. Macroeconomics and health: investing in health for economic development. Geneva: World Health Organization; 2001 (http://www.who.int/iris/handle/10665/42435).
4. Sachs J, Malaney P. The economic and social burden of malaria. Nature. 2002;415:680–5.
5. Okorosobo T, Okorosobo F, Mwabu G, Orem JN, Kirigia JM. Economic burden of malaria in six countries of Africa. European J Business and Management. 2011;3(6).
6. White MT, Conteh L, Cibulskis R, Ghani AC. Costs and cost-effectiveness of malaria control interventions: a systematic review. Malar J. 2011;10:337.
7. Malaria surveillance, monitoring & evaluation: a reference manual. Geneva: World Health Organization; 2018 (http://www.who.int/malaria/publications/atoz/9789241565578/en/).