MalaFA

Malaria Futures for Africa

ELIMINATION 8

ANGOLA • BOTSWANA • MOZAMBIQUE • NAMIBIA
SOUTH AFRICA • SWAZILAND • ZAMBIA • ZIMBABWE

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UNIVERSITY OF OXFORD

RBM Partnership To End Malaria

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Preface from the co-chairs

Although the world has made monumental progress against malaria in the last 20 years, every two minutes a child still dies of the disease. The vast majority of these children are aged under five and live in sub-Saharan Africa.

African voices are key to the fight against malaria but are not heard enough when decisions are made about policy and resource allocation for malaria. The disease costs the African economy more than USD 12 billion every year and slows the economic growth of countries with high malaria rates by 1.3%[1]. This is why, as co-chairs of the Malaria Futures for Africa (MalaFA) study, we felt this work was so important at a time when we need to refocus and recommit to push forward the new global malaria agenda and look towards a future where no one dies of this disease.

This study has allowed us to gain insights into the views of expert policymakers, researchers, implementers and stakeholders in 14 sub-Saharan African countries on the progress their countries are making towards global goals around malaria. They also told us about the challenges in reaching these goals and the opportunities which African countries can seize.

Respondents were worried about both donor and domestic funding. Many thought that current diagnosis, prevention and treatment tools are not being used to their full potential. Almost all respondents had concerns about emerging resistance in mosquitoes to existing insecticides. Many were also very apprehensive about resistance in the parasite to current frontline treatments.

These challenges come against a backdrop of complacency. There is a great danger of malaria slipping down the donor agenda, both because the problem seems less acutely alarming and because donor institutions, which are often accountable to legislatures, witness less progress than they had been promised. The 2017 World Malaria Report rang alarm bells, showing that, after an unprecedented period of success in global malaria control, progress has stalled and funding has flatlined.

We hope that donors, regional institutions, national policymakers and philanthropists will now listen carefully to the thoughtful recommendations made by the respondents in this report. They want action to address the looming threat of insecticide and artemisinin-based combination therapy (ACT) resistance and they want better surveillance to understand more about the speed at which this resistance may be developing. These actions will include more monitoring, more clinical trial and regulatory capacity and a stronger partnership between national governments and donors. Many interviewees highlighted the important role that operational research plays and the urgent need to continue investing in research and development (R&D) for new tools. In most countries, national budget allocations are inadequate and national policies are thought to be poorly developed or implemented. The need for better, more equal partnerships and for more resources jumps off almost every page.

We would like to thank Novartis Social Business for working with us to commission this research and for funding it. It is an important contribution to the field by a company which, evidently, has a long-term commitment to it. It is important to note, however, that the conduct of the study and the analysis of the data have been done independently of the study sponsors.

Needless to say, this report does not necessarily reflect our views or those of the study sponsor: It reflects what our researchers were told by the respondents on the ground.

Dr Richard Kamwi

Ambassador,
Elimination 8 (E8)

Professor Bob Snow

KEMRI-Wellcome Trust programme, Kenya and University of Oxford, United Kingdom

[1] Gallup JL, Sachs JD. The Economic Burden of Malaria in (Eds) Breman JG, Egan A, Keusch GT. The Intolerable Burden of Malaria: A New Look at the Numbers. Supplement to Volume 64(1) of the American Journal of Tropical Medicine and Hygiene, 2001

The MalaFA study in brief

MalaFA (Malaria Futures for Africa) is an opinion research study. It was commissioned by Novartis Social Business to capture the thoughts of 68 African malaria experts in 14 sub-Saharan African countries – ministers of health, members of parliament, senior civil servants working in health, heads of national malaria control programmes and representatives of academia and non-governmental organisations (NGOs) working on malaria.

Please note that this report expresses the views of study respondents, even if this is not stated explicitly.

MalaFA is the first systematic effort in many years to collect expert African views on malaria policy.

What stands out?

- Nearly all respondents agreed that domestic financing for malaria should increase substantially. This is a case that donors have been making, but here it is clearly a message coming from implementers on the ground
- There was a widespread feeling that the 2030 targets will not be achieved unless big changes occur in funding and delivery. There was also a sharp divide between politicians and government officials, who were more optimistic, and other respondents who were more sceptical
- Much more emphasis should be placed on operational research, which most respondents considered underfunded. They felt there should be much more emphasis on how interventions are best delivered through health systems
- New impetus and funding are needed to persuade people to use bednets – as malaria prevalence has decreased, people may have become complacent and many respondents felt that usage had dropped (although this feeling is not reflected in household survey data on bednet uptake and use)
- Several respondents worried that resistance to the best existing medicines (ACTs) might spread to Africa faster because of vastly increased trade and travel with southeast Asia (where this resistance has been emerging), but many experts think that *de novo* resistance emerging directly in Africa is just as likely
- Tracking of substandard and counterfeit medicines is a big problem: many respondents said they simply did not know how many people were exposed to unregulated medicines

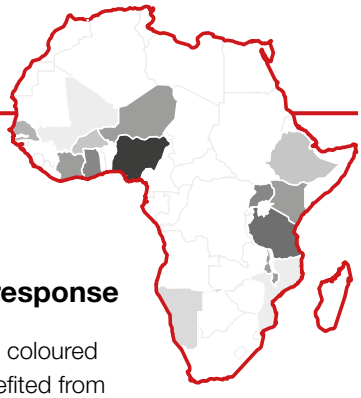
At a glance

Likelihood of eliminating malaria by 2030

Respondents in countries coloured lightest grey were most optimistic about meeting the 2030 targets. Darker grey countries were less optimistic. Not all countries have an explicit target to eliminate malaria by 2030, and countries with more academic and NGO respondents tended to be more pessimistic than politicians and senior officials.

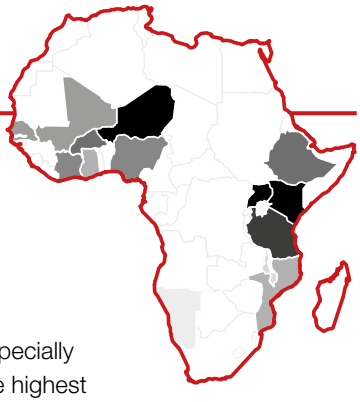
Likelihood of halving number of malaria cases/deaths (timeframe varies)

Respondents in countries coloured lightest grey were most optimistic about meeting the 50% reduction target. Slightly darker grey countries were only slightly less optimistic. Overall, nearly all respondents were positive about reaching the target in their country. Each country sets its own timeframe for achieving this target, which may account for respondents' positive views on achieving it.



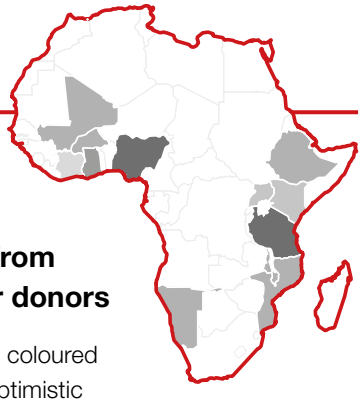
Strength of policy response

Respondents in countries coloured lightest grey felt they benefited from a strong domestic policy response based on three criteria (strength of domestic political support for malaria; importance of malaria on the policy agenda; and leadership commitment to domestic financing against malaria). Southern African respondents were most positive on this measure, with a more mixed picture in West and East Africa.



Concern over resistance to ACTs

Countries in dark grey, especially in East Africa, showed the highest level of concern over resistance to ACTs. Southern African countries were least concerned possibly as they are closer to elimination.



Adequate funding from government and/or donors

Respondents in countries coloured lightest grey were most optimistic about the level of funding for malaria they receive (whether domestic or from donors). Most countries fell in the middle of the scale on this question, perhaps reflecting realism around resource mobilisation constraints. In Niger and Senegal, there were insufficient responses to this question, which is why those countries are not shaded.

Changes in donor support

Respondents in countries coloured lightest grey felt that donors were most supportive of efforts to fight malaria in their respective countries. In some countries (e.g., Senegal), less donor support reflects a determined domestic effort to reduce donor dependence.

Key findings

The 2030 malaria targets are at risk but views vary

- There were mixed feelings on the likelihood of meeting the 2030 malaria targets (see table on page 9). In general, politicians and senior officials in ministries of health tended to be more optimistic, but most academics, researchers and NGOs feared that maintaining the status quo would jeopardise meeting the targets. However, respondents in some countries such as Senegal, Ethiopia, Mozambique and Namibia (the latter two are part of the Elimination 8 countries[2]) were very positive about their progress in the fight against malaria
- In West Africa, over half of respondents thought that monitoring was inadequate and reporting of malaria caseload patchy, making it difficult to measure effectively how much progress had really been made
- Over three-quarters of respondents were alarmed about the potential impact of resistance on current prevention methods and treatments, and the impact this might have on reducing transmission

The use of prevention tools seems to be declining, maybe as a result of successful prevention campaigns

- A large number felt that existing prevention tools were not being used as well as they could be, partly due to the success of prevention strategies. The decreasing incidence of malaria thanks to bednets and other interventions may have made people complacent. To get more people to use bednets well, more investment is needed in education and social and behaviour change
- The subsidised provision of bednets, diagnostics and ACTs has greatly contributed to fighting malaria, though some felt it has masked the need for adequate domestic resources and political support
- Resistance to most classes of insecticides is spreading quickly. The few effective insecticides now cost much more, meaning the expense of widespread use has increased substantially, limiting their use
- Seasonal malaria chemoprevention (SMC) was rarely mentioned, despite highly successful programmes in the Sahel region, and vaccines were also only mentioned by a few respondents, primarily in West Africa. This may reflect that the study sample who participated in this research has low interest in these topics

[2] The Elimination 8 (E8) initiative brings together eight Southern African countries which aim to eliminate malaria by 2030. They are Angola, Botswana, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. For more information: https://malariaelimination8.org

Access to ACT treatment has improved but challenges remain, especially for children

- The World Health Organization (WHO) has warned against the proliferation of substandard or counterfeit ACTs in recent years. Some respondents expressed major concerns around countries' ability to track or report this proliferation properly; few mentioned that such medicines actually cause deaths and increase the risks of resistant strains developing
- All applauded the efforts of an increasing number of countries to make ACTs available at little or no cost to the highest-risk groups, such as children under 5 and pregnant women
- A number believed that expanding access to paediatric ACT formulations would improve both treatment adherence and effectiveness in young patients

Improving the organisation and delivery of existing and new interventions is key to progress

- Operational research, which focuses on improving the organisation and delivery of existing and new interventions, was seen as critical to ensuring better access to prevention tools, diagnostics, and treatment
- Almost all said that, combined with existing and new technologies, good operational research could transform prevention, diagnosis and treatment and accelerate the path to elimination and eradication. But, greater investment is needed in building local research and clinical trial capacity
- About half of respondents showed interest in increasing the evaluation and use of lower-tech tools like larvicides and insecticide-treated wall sheeting (despite some expressing concerns about a lack of a strong evidence base). The results should be taken with caution as there was a specific question on larvicides, which may have prompted interviewees to consider an intervention which they might not otherwise have chosen to prioritise
- A few respondents mentioned the need for better use of technology, particularly mobile phones, in helping to detect and track malaria outbreaks

Diagnostics are vital but their availability is still limited

- Rapid diagnostic tests present an invaluable opportunity to ensure proper treatment is prescribed, but their availability was not seen to be widespread enough
- A few respondents also felt that healthcare workers need more training on how to diagnose and carry out clinical testing for malaria

Funding models are inadequate due to an imbalance between donor and domestic funding and a lack of alignment with country priorities

- Donor support and philanthropy provide the great majority of funding but this is unsustainable, according to most participants. In West Africa in particular, donor support for malaria was seen as waning, maybe in reaction to a perception that programmes are not achieving promised targets (exceptions were Mali and Senegal). Many said that donor support is not always aligned with national policies and the situation on the ground. Lack of continuity of donor funds is a particular problem – starting and stopping programmes, and disruptions in NGO and scientific staffing mean that gains are often lost
- Nearly all felt strongly that international donors need to give countries more autonomy over malaria policy and resource allocation so they have the power to make decisions on how best to implement malaria prevention, diagnosis and treatment in their own countries
- Domestic financing for malaria is vital but most thought it was inadequate and needs to be stepped up. Some mentioned there was a gulf between what public officials are saying about allocation of domestic funds and the actual amounts dedicated to malaria programmes. In many countries, malaria is just one of several health priorities and competes with other infectious diseases for funding. In some countries, malaria is counted as part of the general costs of delivering health services. It is clear that without functioning and strong health systems, malaria cannot be fought effectively; yet this type of core health system funding is often not measured well enough
- Some ministries of finance see spending on non-health areas (e.g. country infrastructure) as more important than spending on health. Strengthened in-country policy advocacy is needed to support domestic financing for malaria, even if this is mainly focused on the country building an effective health system

Regional cross-border monitoring and outbreak collaborations are effective, yet they are not receiving sufficient country backing

- Regional cross-border monitoring and outbreak collaborations seem to be working well in East and Southern Africa in controlling malaria and eventually eliminating it
- West Africa needs improvement in this area (though some West African respondents noted that academic collaborations are working well in the region)
- However, national politicians may see "regional interests" as being less politically demanding than national ones, meaning they might not devote the necessary resources and political will to make them fully effective

Although many countries have plans to deal with insecticide resistance, few have plans to manage resistance to antimalarials. There is thus an urgent need to develop plans to address both insecticide and drug resistance in those countries that do not already have them

- There was a high level of concern about resistance issues – in particular around insecticides, seen as an urgent problem almost everywhere, but also around emerging ACT resistance
- Many saw resistance to ACTs as inevitable over the next 10-15 years or even sooner – some thought the spread of resistant strains would be faster than the previous episode in the 1980s-90s because there is now far more trade and travel between Africa and Asia (this was particularly mentioned in Nigeria and Ethiopia). However, although previous strains of resistant malaria spread from Asia to Africa, experts consider that *de novo* resistance to ACTs in Africa is just as likely
- Around a quarter of respondents argued that the lack of global or country resistance plans to drugs and insecticides could be a major shortfall in fighting the disease
- Nearly all respondents supported investment in R&D to develop alternatives to current insecticides and medicines; beyond research for new medicines, some mentioned the need for more convenient dosing regimens (for example, having to take fewer pills would increase convenience and treatment adherence for patients)

Background on the malaria targets

The Global Technical Strategy for Malaria 2016-2030, published in 2015 by the WHO, sets ambitious yet feasible global targets for 2030 with milestones for measuring progress in 2020 and 2025.

Countries set their own national or subnational targets, which may differ from the global targets. When conducting interviews, respondents were asked to assess their country's progress against these goals.

Goals, milestones and targets for the Global Technical Strategy for Malaria 2016-2030

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

Study objectives and methodology

Novartis Social Business commissioned research consultancy Baird's CMC to conduct an opinion research study involving 68 key African stakeholders in 14 sub-Saharan African countries affected by malaria. Study co-chairs are Dr Richard Kamwi, Ambassador, Elimination 8 (E8), and Professor Bob Snow, of the KEMRI-Wellcome Trust programme, Kenya and University of Oxford, United Kingdom.

The study, called Malaria Futures for Africa (MalaFA), has been designed to help guide domestic and donor commitments towards malaria elimination in the face of increasing challenges.

The countries included were Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Mali, Mozambique, Namibia, Niger, Nigeria, Senegal, Tanzania and Uganda. The list of countries was developed in consultation with the co-chairs, Roll Back Malaria, Malaria No More UK and the African Leaders Malaria Alliance.

This study is qualitative. The sample was chosen deliberately to include only people with a major influence on malaria programmes but it is not representative of any broader group or defined universe of respondents. It may be that a different set of interviewees would have given different responses. However, all the people we interviewed are known to have significant influence in setting national (sometimes also regional and global) malaria policies.

A minimum of four interviews were conducted per country from the following four categories:

- → Category A: Minister or deputy minister of health; parliamentarian with direct interest in malaria
- → Category B: Senior civil servant (either first or second level in the ministry of health)
- → Category C: Director of National Malaria Control Programme (NMCP) or equivalent
- → Category D: Senior malaria researcher (outside the ministry of health) / NGO leader

The breakdown of respondent type by region was as follows:

	Categories				
	A	B	C	D	
Region	**Number of respondents**				
East Africa	3	5	3	8	
Southern Africa	2	5	2	4	
West Africa	5	9	7	15	
TOTAL	**10**	**19**	**12**	**27**	**68**

Each person was interviewed for about 45 minutes in a face-to-face interview from December 2017 to February 2018. In almost every case, the interview was conducted in the interviewee's working language by an expert interviewer based in the same country. Interviewers were trained to minimise variability in interviewing and reporting techniques.

Respondents agreed to participate on the basis that no answers would be attributed to any specific individual. Interviews were not recorded to encourage free discussion but to develop a detailed, standardised report including verbatim quotes.

This study was conducted under the supervision of Mark Chataway, a member of ESOMAR. ESOMAR is the global voice of the data, research and insights community, speaking on behalf of more than 4,900 individual professionals and 500 companies that provide or commission data analytics and research in more than 130 countries, all of whom agree to uphold the ICC/ESOMAR International Code.[3]

The discussion guide contained 21 items grouped under four main sections:

- → Policy and the 2030 malaria targets, based on the targets in the WHO Global Technical Strategy for Malaria Targets 2016-2030 (see table on page 9)
- → Current and future priorities for prevention and treatment
- → Rising threats and the development of new tools and technologies to respond
- → Development of an operational research agenda

[3] The Code is available at: www.esomar.org/uploads/public/knowledge-and-standards/codes-and-guidelines/ICCESOMAR_Code_English_.pdf

Analysis

The data set comprised data from respondents with different levels of responsibility, insight and expertise across 14 sub-Saharan African countries, each with their own unique experience of malaria and public health. For these reasons, the interview questions were not always all answered, or all answered completely, and questions were not always answered with the same level of detail.

All interview scripts for the three African regions (East Africa, Southern Africa and West Africa) were analysed independently by two researchers. The researchers identified key themes which were compared and discussed, resulting in the six overarching themes presented in this report.

The themes are:

- **Policy coherence:** Participants' awareness of the countries' antimalarial policies and the extent to which they are applied
- **Budgetary integrity:** Whether or not there is a specific domestic budget for malaria and the extent to which it is consistently made available
- **Target compliance:** Adoption of international targets for the control and elimination of malaria and the likelihood of achieving them
- **Geographical focus:** Engagement with regional and sub-regional partnerships to optimise programme effectiveness
- **Programme integrity:** Budget and efforts devoted to short-term needs for diagnosis and treatment compared to the longer-term needs for elimination and/or eradication (dependent on country)
- **Evidence-based programming:** Deployment of newer, more effective treatments and chemical agents based on scientific evidence of resistance development

Data was then coded by theme and grouped by region. This analysis resulted in summary statements showing consistency between countries and exceptions to patterns within the region. This demanded judgement given sometimes conflicting responses in a country for example, between government officials and independent scientists.

The researchers did not consider each answer alone but in the context of everything a particular interviewee said. For example, if an interviewee had a consistently positive approach to national malaria policy, each answer was seen in that light – respondents that were positive were seen as part of a pattern; those that were sceptical were given special weight. Or, in another example, if a respondent was consistently negative about all interventions and policies, her/his criticism of a specific policy would be given less weight than would a criticism from a generally-positive respondent. The analysis used similar methods to give an accurate view of the differences between planned or intended policy, funding, approaches and programmes, and the operational reality on the ground.

Detailed results

Policy coherence

East Africa

Government officials in all East African countries surveyed reported high levels of political commitment to the fight against malaria. However, this commitment was not always obvious to those in the field, and there was concern that this commitment was waning as malaria deaths decline. There was a need for policy development and advocacy to educate politicians who may not always be knowledgeable about malaria which has the biggest impact in poor and rural areas of Africa.

Opinion was divided over whether support for malaria prevention and control is slipping, with socio-economic and political stability displacing concerns over malaria. There were also concerns that governments may not be aware of or responding to new threats, like global warming and insecticide resistance. Malaria technical leaders stressed that political support needed to be reflected in the domestic budget supporting the 2030 targets.

Policy coherence was difficult to achieve in some countries, such as Ethiopia. Here, donors were perceived to have at least as much influence as the government regarding which programmes are supported.

Southern Africa

In contrast to East Africa, respondents in Namibia and Mozambique were much more confident in their approach to elimination and said they have already made good progress. Malawi was less confident, reporting ten malaria deaths per day.

In discussing the importance of national strategies, respondents in Mozambique told us that there was a clearly defined national strategy which includes support for healthcare infrastructure. Some noted that donor support can stop or shift at relatively short notice in a way not always conducive to sustainable national strategies. In other Southern African countries, support for development of health infrastructure as part of the fight against malaria was expressed less clearly.

Overall, political commitment was thought to be growing, but support is infrequent and sometimes limited to particular departments or ministries (a Mozambican interviewee noted that HIV has a dedicated parliamentary cabinet representative, while malaria doesn't). Malaria technical leaders said that while political will is there, it is not always obvious to those on the ground. Politicians should provide more leadership.

Progress is seen as being hampered by a lack of funds, particularly perceived in Mozambique, where a recent recession has reduced domestic government spending (though data suggest that malaria programmes remain well-funded)[4]. Other respondents mentioned the threat of complacency resulting from early malaria success, and cross-border coordination issues around malaria outbreaks.

West Africa

There is less evidence of coherent strategies across the region compared to East and Southern Africa. Respondents in Senegal and Mali thought national policies were strong but other countries were less positive. In all countries, there appears to be a disconnect between political rhetoric and delivery, with the possible exception of Senegal. Some felt governments in the region have other health priorities, such as funding for other infectious diseases or non-health priorities such as improving infrastructure.

In general, programmes are donor-led with less input from government than was reported in other regions. Relationships between governments and donors were not always harmonious. Overall, there was a feeling of pessimism which might reflect wider disenchantment with governments in the region.

[4] The research was conducted in Mozambique immediately before the announcement of a USD 515 million Global Fund grant in February 2018. Had respondents been aware of this grant, their answers regarding adequate funding may have been different. See www.theglobalfund.org/en/news/2018-02-08-mozambique-and-global-fund-launch-new-grants

East Africa – *In their own words*

"We are not slipping. Every year the government has allocated more resources to infectious disease although there is no line item for malaria." (Kenya)

"Government support does not fully translate into funding. It needs to increase the funds." (Ethiopia)

"Malaria needs to be conceptualised like the fight against HIV." (Uganda)

"I think that stakeholders, policy makers and technicians often don't speak the same language. This often leads to no consistency in strategies and allocation of resources." (Tanzania)

Southern Africa – *In their own words*

"There has been a significant reduction of malaria incidence which, unfortunately, caused a certain level of complacency. That brought a worrisome recurrence of malaria though deaths remain relatively low." (Namibia)

"Malaria is a disease of the poor that does not affect everyone like HIV/AIDS and so does not receive adequate attention. More people are infected and affected by malaria (24%) than HIV/AIDS (8.9%) but more funding goes to the latter." (Malawi)

"Malaria can be reduced on a large scale but not completely eliminated by 2030. The level of support is now higher within government but with its financial problems, it can't fulfil its commitment to the malaria programme." (Mozambique)

West Africa – *In their own words*

"Nigeria could eliminate malaria if there was political will. However, with the current way Nigeria is handling malaria, it is unlikely the country will be able to achieve malaria elimination by 2030. There are great plans, policies and documents… but very little on the path of the government to make things work." (Nigeria)

"Elimination can be achieved because there has been a steady decline of malaria cases. However, implementation of the 2016-2020 strategic plan is crucial to this." (Ghana)

"The country will not succeed in eliminating malaria before 2030. At present, we are on the path of control, not yet in the meadow of elimination like Senegal. The prevalence is still high even if there is a reduction." (Côte d'Ivoire)

"No, it is not a question of quantity, the funding doubtless increased in volume but it fell in efficiency. I will tell you why: just because a lot of money was assigned to Mali by the [donor] partners that doesn't mean it was effective. It is not effective compared with the volume of money for the simple reason that the donors come with their own schedules which are not coordinated by the PNLP [Programme National de Lutte contre le Paludisme]." (Mali)

"Burkina does not evolve in a linear way. There are socio-political and climatic hazards which prevent planning things in a linear way. Malaria, scientifically, is a disease we can eradicate if all the conditions are favourable. 2030 will be difficult but maybe later." (Burkina Faso)

Budgetary integrity

East Africa

Government funding in the region is seldom ring-fenced for malaria, although governments occasionally pay for specific programmes. Respondents felt that governments find it difficult to plan and execute longer-term strategy in the face of shorter-term donor funding cycles, even though total allocations to malaria programmes have been increasing. The perception is that donor organisations prefer to fund treatment and prevention programmes (primarily bednets rather than other vector control strategies).

International aid organisations co-fund capital projects on a regional basis. This has benefits to regional malaria control, but such programmes can also suffer as politicians sometimes take less interest in multinational initiatives which they can't control, and which may not offer political benefits in their home country.

Country budgets are usually set aside for infectious diseases overall, so malaria treatment competes with other diseases. Government spending on all malaria-related activity normally accounts for only 20-25% of the total spent on infectious disease.

Malaria technical leaders would like to see greater investment in development of local scientific capacity, especially more entomologists. This is despite external analysis by bodies such as the European and Developing Countries Clinical Trials Partnership (EDCTP), which sees East Africa as having stronger academic research capability compared to other regions.

Southern Africa

Although most respondents in this region stated that donor funding was being maintained at current levels, they shared a concern, similar to that seen in East Africa, that donor support may fade. Funding from international NGOs was believed to have dropped slightly, but it was difficult to assess whether this had had any impact on control programmes. All accepted that malaria funding is insufficient, but national budgets are reported to be increasing in line with government support and public commitments.

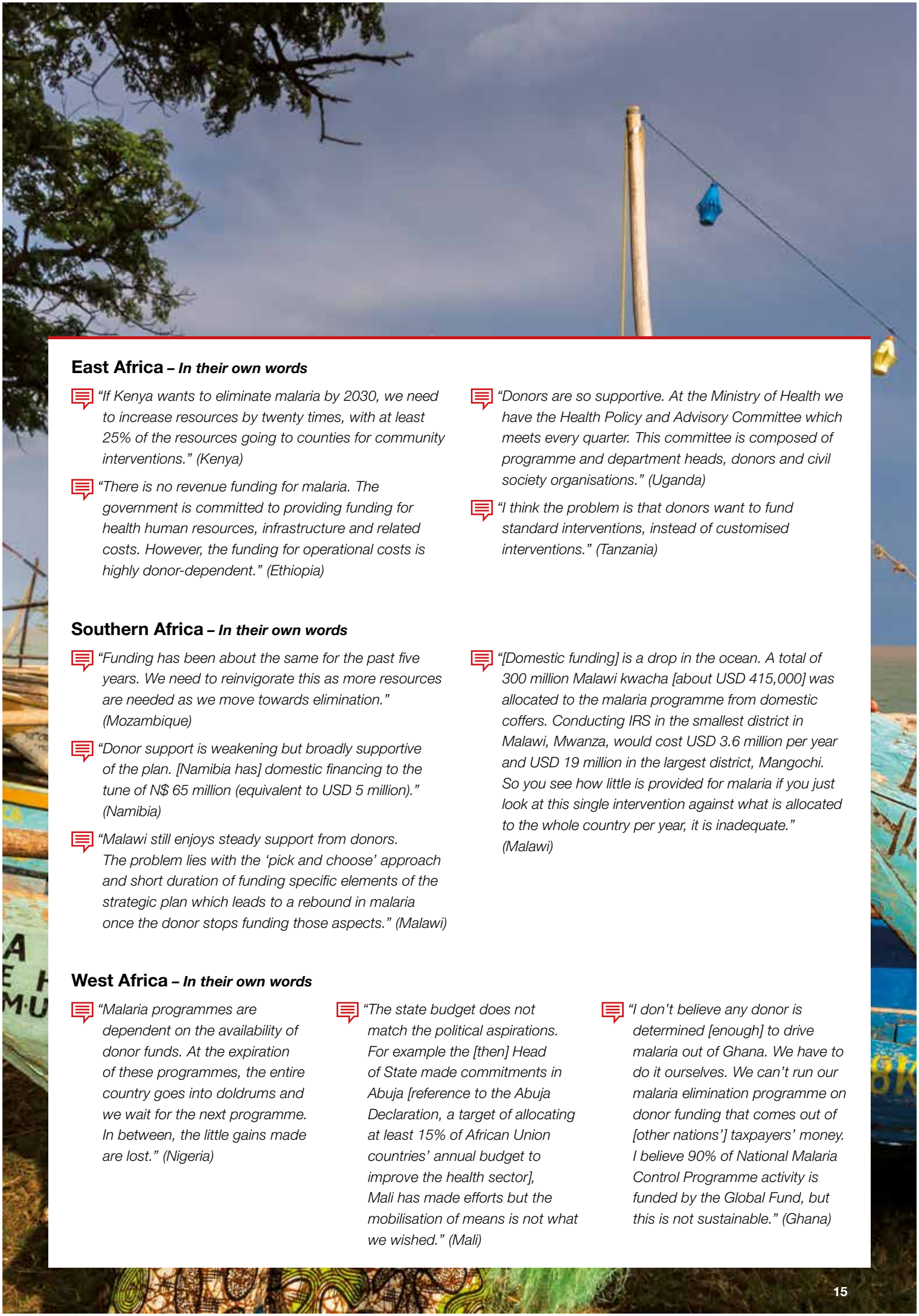
Apart from Mozambique's funding of malaria health workers, there is no dedicated government funding in the region. Malaria prevention and treatment compete with other health priorities and other national priorities. How much they compete varies considerably across countries: government spending on health across all African countries ranged from about 1.1% of GDP to about 7% of GDP in 2014.[5]

West Africa

There was a general feeling across West African countries that donor commitment is waning. Study participants worry that donors are not convinced that the money is well spent, and that the impact of malaria has decreased. Government officials mention their domestic financing contribution, but many non-governmental respondents were sceptical that these funds were actually being delivered. Senegal is the exception – it is working hard to move away from donor dependence.

The overall picture is a clear need for improved funding and improved targeting of anti-malaria efforts supported by increased government investment. Currently, donor dependency is leading to stop-and-go initiatives. This was also noticed by respondents in East and Southern African countries, but in West Africa the problem seemed more extreme.

[5] World Bank data, Health expenditure, public (% of GDP) 2014, available at: https://data.worldbank.org/indicator/SH.XPD.PUBL.ZS



East Africa – *In their own words*

"If Kenya wants to eliminate malaria by 2030, we need to increase resources by twenty times, with at least 25% of the resources going to counties for community interventions." (Kenya)

"There is no revenue funding for malaria. The government is committed to providing funding for health human resources, infrastructure and related costs. However, the funding for operational costs is highly donor-dependent." (Ethiopia)

"Donors are so supportive. At the Ministry of Health we have the Health Policy and Advisory Committee which meets every quarter. This committee is composed of programme and department heads, donors and civil society organisations." (Uganda)

"I think the problem is that donors want to fund standard interventions, instead of customised interventions." (Tanzania)

Southern Africa – *In their own words*

"Funding has been about the same for the past five years. We need to reinvigorate this as more resources are needed as we move towards elimination." (Mozambique)

"Donor support is weakening but broadly supportive of the plan. [Namibia has] domestic financing to the tune of N$ 65 million (equivalent to USD 5 million)." (Namibia)

"Malawi still enjoys steady support from donors. The problem lies with the 'pick and choose' approach and short duration of funding specific elements of the strategic plan which leads to a rebound in malaria once the donor stops funding those aspects." (Malawi)

"[Domestic funding] is a drop in the ocean. A total of 300 million Malawi kwacha [about USD 415,000] was allocated to the malaria programme from domestic coffers. Conducting IRS in the smallest district in Malawi, Mwanza, would cost USD 3.6 million per year and USD 19 million in the largest district, Mangochi. So you see how little is provided for malaria if you just look at this single intervention against what is allocated to the whole country per year, it is inadequate." (Malawi)

West Africa – *In their own words*

"Malaria programmes are dependent on the availability of donor funds. At the expiration of these programmes, the entire country goes into doldrums and we wait for the next programme. In between, the little gains made are lost." (Nigeria)

"The state budget does not match the political aspirations. For example the [then] Head of State made commitments in Abuja [reference to the Abuja Declaration, a target of allocating at least 15% of African Union countries' annual budget to improve the health sector], Mali has made efforts but the mobilisation of means is not what we wished." (Mali)

"I don't believe any donor is determined [enough] to drive malaria out of Ghana. We have to do it ourselves. We can't run our malaria elimination programme on donor funding that comes out of [other nations'] taxpayers' money. I believe 90% of National Malaria Control Programme activity is funded by the Global Fund, but this is not sustainable." (Ghana)

Target compliance

East Africa

With the exception of Kenya, countries' ministerial sources believed they would eliminate malaria deaths by 2020 and eradicate the disease by 2030 in the countries surveyed in East Africa. Programme managers tended to be less optimistic, some declaring elimination by 2030 to be an impossible task and an unrealistic target.

High-level government officials point to past performance in reducing the number of cases of malaria and the number of deaths as an indication of how likely they are to succeed in elimination and eventual eradication. Malaria technical leaders point to the need for a different elimination strategy, one that takes account of cross-border migration and local conditions.

There was interest in the potential of larvicides as a priority intervention to support elimination. However, supporters also highlighted that outside agencies seem reluctant to fund larvicide use, and many recognised that more evidence is needed on the effectiveness of this intervention.

Southern Africa

All three countries in the Southern Africa region are optimistic about reaching the 2030 targets. Mozambique seems confident of achieving mortality reduction targets, and participants from Malawi are also optimistic, despite challenges. Participants from Namibia seemed to be marginally less optimistic.

All interviewees stressed the need for stable funding to keep programmes on track and provide continuity. Namibia, for example, is planning to strengthen its health service management systems, which they believe will support their fight against malaria.

A constant theme that came up during interviews with participants in this region was the important part played by the weather (rather than climate change) on malaria incidence and outbreaks.

Turning to prevention issues and insecticides in particular, some participants felt the side-lining of DDT and its replacement with more expensive alternatives may play a part in reducing the likelihood of achieving the targets.

West Africa

In West Africa, there were equivocal responses to questions about targets and many respondents were non-committal, except in Senegal and Mali. This left the impression that interviewees were not optimistic about the likelihood of achieving the 2030 targets.

Some respondents felt that donor funding levels were shrinking. A few respondents felt this could be attributed to the fact that donors believed there was a lack of results from the programmes they funded.

East Africa – *In their own words*

- *"Yes, I believe if we put all our efforts together, we can eliminate malaria by 2030." (Kenya)*
- *"Those targets are unrealistic and based on an inadequate understanding of malaria transmission… especially on vector control aspects. It is not possible to eliminate malaria or significantly reduce malaria cases and deaths using only the tools we currently have." (Kenya)*
- *"We've made tremendous progress towards the reduction of malaria incidence and prevalence since 2005 but it will be very difficult." (Ethiopia)*
- *"[Elimination is possible] only if we do real interventions customised on the real situation on the ground. For example, we want to be supported to do larvicide but donors would not support these interventions." (Tanzania)*

Southern Africa – *In their own words*

- *"Mozambique aims to achieve malaria elimination in Maputo Province by 2020. The objective is feasible provided the necessary funds continue to be available." (Mozambique)*
- *"Malaria is an ongoing disease which is determined by a lot of factors – areas where people are staying, rainy season and vulnerability of individuals… In one year, the target can be reached but in another year, no." (Namibia)*
- *"The banning of DDT was a serious setback which should be seriously [re]considered. It is cheaper than the available recommended options." (Malawi)*

West Africa – *In their own words*

- *"There has been no strategy, nor specific programme, tailored to a country's specific needs. Decentralisation and social accountability have been ignored." (Niger)*
- *"[The country] will not be able to considerably reduce the number of malaria cases." (Burkina Faso)*
- *"The [donor] funding supports the national programme, but the synergy for greatest impact is often missing." (Mali)*
- *"The strategic plan for malaria control aims to reduce malaria deaths by 75% by 2020. Therefore, we are doing better. We have already halved malaria deaths." (Ghana)*

Geographical focus

East Africa

All respondents in the East Africa region agreed that effective cross-border collaborations and partnerships are vital in the fight against malaria. However, some said that these important partnerships have lost their focus or been dismantled in recent years. Respondents named the following East Africa networks as being useful in their work: African Coalition Against Malaria, African Leaders Malaria Alliance (ALMA), African Network for Vector Resistance, East Africa Regional Network for Roll Back Malaria, Multilateral Initiative on Malaria, Pan African Mosquito Control Association, and Southern Africa Development Community.

Another universal concern was climate change and its effect on malaria. Climate change alters water flow, land use and historical vector patterns, all of which can have an impact on the shape of the malaria epidemic. As climate change is also responsible for changes in resistance, almost all respondents saw it as a vital factor in the future planning of programmes.

National interagency intelligence was identified as being important to managers of national malaria control programmes. This type of cooperation can provide information on early outbreak identification, mapping and meteorological predictions and is seen as a critical part of the fight. However, some said the need for local action can be in conflict with national strategies.

Southern Africa

Participants felt that countries take a regional as well as local perspective, especially in relation to tracking insecticide resistance and surveillance. NGOs in the region also support cross-border initiatives and this helps to shape wider perspectives. Individuals working in malaria control are active in local and international networks.

Useful regional coalitions named by interviewees include the Elimination 8, MOSASWA (Mozambique, South Africa and Swaziland) malaria initiative, Southern Africa Development Community, Southern Africa Roll Back Malaria Network, Trans Kunene Malaria Initiative and Trans Zambezi Malaria Initiative. Interviewees in Namibia named the Malaria Expert Committee as a useful coalition.

When it came to specific country responses, overall, interviewees felt they were well targeted to meet the needs of the whole population. However, they noted that provision generally involves travel to a clinic, which can be some distance away in rural areas.

West Africa

While respondents recognised the usefulness of regional coordination, they suggested that it could be improved within their region. Within most of the West African countries surveyed, efforts were seen as dispersed into small organisations undertaking their own projects. Any regional coordination that does exist is seen to generally be led by NGOs. However, some respondents did say that cooperation within academic networks has worked well in West Africa.

Networks mentioned by respondents included Organisation Ouest Africaine de la Santé, West Africa Roll Back Malaria Network, West African Network for Antimalarial Drugs, West Africa Network of Excellence for TB, AIDS and Malaria and Malaria Research Capacity Development Consortium.

There was a general feeling that there is a lack of continuity in donor funding, which translated into a lack of continuity in programming. In some countries, participants pointed out that this means countries are constantly having to start and restart basic networks and infrastructure.

Many felt that urban areas swallow up most of the health resources, leading to neglecting the rural areas in which malaria is most prevalent.

East Africa – *In their own words*

"Kenya, Uganda, Tanzania, Rwanda and Burundi (East Africa Network) collaborate and share policy frameworks in malaria control at ministerial level. That is, in my view, the most useful collaboration." (Kenya)

"Yes, there are national coalitions to fight malaria. These are part of the multi-stakeholder [groups] that include civil society, communities, private sector and local and international NGOs that work within the Malaria Control Framework towards achieving the same goals and targets. Regionally, not much in the way of coalitions, but at policy and regulatory level we compare notes with our East African neighbours." (Kenya)

"The Multilateral Initiative on Malaria was the strong coalition and platform as a scientific forum. Still, there is a need to mobilise more resources and maximise participation of scientists from all corners of the continent." (Ethiopia)

"There are national coalitions such as Malaria Control Support Team, Coalition Against Malaria in Ethiopia, Malaria Research Network of Ethiopia. All have roles in the fight against malaria." (Ethiopia)

Southern Africa – *In their own words*

"ALMA and SADC are constructive forums for information exchange." (Malawi)

"I think donor support is getting stronger especially focusing on cross-border issues." (Namibia)

West Africa – *In their own words*

"There are coalitions and cooperations. [One] network has more than a hundred organisations acting in the domain of health but they lack organisation. Actions are scarce." (Niger)

"On World Malaria Day 2017, First Lady Rebecca Akufo-Addo launched the Malaria Foundation, a private sector-led group which advocates for local resource mobilisation. They have been useful." (Ghana)

"In a continental country such as Mali, we are not shielded from the imports of cases of malaria even if we succeed in reducing inside the country." (Mali)

"In the fight against malaria, Burkina does not benefit from the help of a national or regional coalition. There is no help." (Burkina Faso)

"Nigerians do travel a lot with many traveling to Asia on business. This increases the prospects for importation of ACT-resistant parasite strains into the country." (Nigeria)

Programme integrity

East Africa

Respondents in East Africa said that coverage of anti-malaria tools is patchy, particularly diagnostics, and that more training of healthcare workers was needed in this area. Their impression was that bednets are sporadically distributed and poorly utilised. All felt that more education, particularly around bednet usage, could reduce incidence and the need for treatment. There was an urgent need to scale up the use of rapid diagnostic tests to ensure fevers are treated properly. This will also help stave off home-grown ACT resistance.

Turning to treatment, some malaria technical leaders suggested changing current national treatment guidelines so that, for example, paediatric formulations were used to treat children.

Southern Africa

Respondents in general felt optimistic about the fight against malaria. Despite occasional setbacks, they felt that progress to date had been consistent.

Bednets are widely available but interviewees reported that use is consistently poor across the region – below 40% in Namibia and hovering around 50-60% in Malawi. It is vital that existing technologies be leveraged to their full capacity, which led many to discuss the importance of investing in operational research. In contrast to East Africa, participants felt there was good access to diagnostic and treatment services, particularly for children, and a good system in place for tracking migration of malaria across borders.

Pharmacovigilance is seen as an important area as there is widespread concern over the quality of antimalarials. Many felt that improvements are needed at the regional and local level on this front.

Resistance to insecticides is a big concern in Mozambique, where all said that a new generation of insecticides is urgently needed. Respondents from other countries were less forthcoming, possibly because of a lack of data. In Malawi, there were opposing views between respondents working in a government-sponsored programme and those involved in independent research – recent academic publications have shown resistance is a major problem in that country.

Resistance to ACTs was not mentioned as a problem. However, only Mozambique based this on data from regular biannual efficacy studies. Namibian respondents did not comment, and Malawi anticipated issues in the future, but only because neighbouring countries were reporting concerns.

West Africa

In many West African countries, respondents were reluctant to discuss coverage of prevention and treatment tools but it is evident from other answers that coverage is patchy and probably particularly lacking for people on lower incomes. Major barriers to using these tools were seen to be a lack of public awareness and education which has led, among other things, to a low uptake of bednets and inappropriate self-medication. While bednets are the cornerstone of preventive activity, it was felt the public is reluctant to use them and supply is sporadic. Many felt that more attention should be paid to social and behaviour change communication regarding bednet use to ensure people understand their importance and how to use them properly (with a particular emphasis on the most vulnerable, i.e. children under five and pregnant women).

While some were optimistic regarding the control of counterfeit and substandard drugs, others said that underinvestment in surveillance, monitoring and lack of coordination in the region meant that problems in this area could go undetected.

Although all countries point to examples of diagnostic and treatment capability, evidence from the interviews suggests capacity and reach are limited and fall short of universal access. As in other regions, this points to the need for investment, including from donors, in critical operational research.

East Africa – *In their own words*

"The challenge is ensuring that the public understands how to use insecticide-treated nets properly and consistently to prevent malaria." (Kenya)

"Insecticide-treated bednets are used consistently in Ethiopia. Re-supply every three years is not an issue." (Ethiopia)

"People should be as conscious of getting infected with malaria as they are with HIV. There is a need to strengthen this prevention agenda." (Uganda)

"I think there is an opportunity to scale up mRDT [rapid diagnostic test] across the country so that all fevers are diagnosed." (Tanzania)

Southern Africa – *In their own words*

"The country is not practising integrated vector control as recommended by the World Health Organization. The focus in the country is bednets only. As a country, we are not doing enough around social and behaviour change communication. I do not see much success as long as there is no behaviour change." (Malawi)

"Pharmacovigilance improvements should be made at the district, provincial, health facility and community levels. There is a lack of info on proliferation of poor quality/counterfeit antimalarials but international trends suggest it is a problem." (Mozambique)

West Africa – *In their own words*

"We are not organised. There is a lack of leadership and commitment at the level of councils." (Niger)

"There is a prevailing culture among doctors to prescribe antimalarial drugs even when the test proves negative. This leads to drug resistance, and abuse of subsidies." (Ghana)

"The challenge for me is the persistence of prejudices about the use of mosquito nets." (Côte d'Ivoire)

"Challenges: the health staff does not have the rigour to apply the regulation that recommends to not give medicine without diagnosis. The matter of the training of health staff is a big challenge." (Mali)

"Education should be modelled after HIV prevention. Malaria budget should be committed at least 30% to prevention." (Nigeria)

"The healthcare system is well-organised and the health plan is well structured. Information sharing is effective, enabling effective, efficient and rapid response." (Senegal)

Evidence-based programming

East Africa

There was an overwhelming recognition among respondents in East Africa that good operational research, combined with new technologies, could transform diagnosis, treatment and make eventual eradication possible. Applying new solutions means rethinking traditional ways of working. Some respondents pointed out that, in the absence of strongly increased funding, adoption of new evidence-based approaches may require reduced investment in some current practices.

Operational research has the power to model the impact of programme changes or new programmes and interventions prior to implementation, increasing the chances of success. New discoveries are adopted slowly, or not at all, because countries lack the operational research infrastructure to test different deployment methods and to assess the impact that each has. Countries also need more high-quality data on how to use the tools they already have as effectively as possible. For example, how are supply chains working, particularly in rural areas where the need for malaria prevention and treatment is greatest? And how do we ensure that the uptake of prevention tools is working as effectively as possible? Social and behavioural science, in particular, has an important part to play in operational research on prevention.

Participants also identified strengthened surveillance as a key issue: the capability to detect disease at low levels straddles prevention and treatment issues and is vital to elimination efforts. In areas with very low transmission, patients are often asymptomatic or have very few symptoms, so identifying them through surveillance and diagnosis is essential to achieve elimination.

Southern Africa

The value and benefits of new technologies for malaria control and management are recognised in Mozambique and Malawi, yet new technologies are not used for delivering improvements, largely because of cost. Further, most respondents felt current interventions already serve them well.

There is support for doing things differently among malaria technical leaders. However, evidence for the benefits of adopting new approaches is needed. This is where operational research is vital. In Namibia, there was strong support for increased investment in operational research, but it was not seen as a research priority in Malawi and Mozambique.

Interviewees knew about climate change but had varying responses on whether it would have a great impact on malaria control in their country. Respondents felt more research into the effects of climate change on malaria was needed.

When it came to resistance, respondents said insecticide resistance was already affecting them. All saw surveillance as a priority for national programmes.

West Africa

Although some highlighted the advantages a more scientifically informed approach to malaria elimination might bring, current practices were not seen as conducive to their introduction. Lack of a scientifically trained workforce, piecemeal initiatives and stop-and-go donor funding mean that even keeping current malaria control programmes going will be problematic.

Surveillance was seen as important, particularly in tracking emerging resistance, but there does not appear to be a strong capacity for this in most countries. There is certainly awareness of the problem, but a lack of means to do much more than what is put in place at the local level. The large turnover of NGO staff and scientists makes any continuity and improvement difficult to sustain.

East Africa – *In their own words*

"Operational research is the big issue. I'd invest between 40% and 60% of the total research budget in operational research." (Kenya)

"For sure, resistance [to ACTs] will be a problem in the next 10 to 15 years. By that time, another generation of ACTs or others with good compliance should be in place to effect elimination." (Ethiopia)

"We have no research capacity. We just implement tools. There is no research desk at the Ministry of Health which focuses on treatment and control." (Uganda)

Southern Africa – *In their own words*

"Climate change is one of the biggest challenges for malaria control in Mozambique. Changing patterns are being witnessed in correlation with changes in rainfall and temperature. More research and funding are needed." (Mozambique)

"There has not been much change in malaria prevalence and incidence over the years that one would attribute to climate change." (Malawi)

West Africa – *In their own words (on regulation and pharmacovigilance)*

"Resistance to ACTs is not something we should be too worried about. The important thing is having the system to respond." (Ghana)

"The capacity of regulators to check an influx of substandard malaria products needs to be strengthened." (Nigeria)

"They [substandard and counterfeit medicines] are much more worrying than five years ago." (Mali)

"We need support for pharmacovigilance. Yes, it exists within the DPML [Direction de la Pharmacie, du Médicament et des Laboratoires], a structure that fights against counterfeit medicines. It has pharmacists but also judicial authorities." (Côte d'Ivoire)

Areas for action

We hope the important points made by these African malaria leaders will assist the global malaria community in refocusing and recommitting at the global, regional, national and local levels to push forward the malaria elimination agenda and achieve the targets by 2030.

Respondents focused on the five following areas for action:

1.

Increase focus on operational research in order to ensure programmes and tools are working to their full potential and reaching those who need them most

Operational research has the power to model the impact of programme changes or new interventions, increasing chances of success. It is vital to ensuring that existing tools are deployed as effectively as they can be. Donors and countries should increase their support for new and expanded operational research.

2.

Explore why many respondents felt that bednet usage has gone down as this appears to be in contrast to household usage data

Respondents across all regions expressed fears that bednet usage is decreasing; however, household usage surveys across the continent do not show this.[6] It is important that we understand the gap between reported usage and this perception.

3.

Make funding models more sustainable through a mix of donor and increased domestic funding, and aligned to national country priorities

Participants felt strongly that international donors need to give them more autonomy over malaria policy and resource allocation so that they have the power to make decisions on how best to implement malaria prevention, diagnosis and treatment in their own countries. They also all felt strongly that there is an urgent need for increased domestic funding for malaria to ensure sustainability of programmes – more research is needed on how countries can support the mechanics of improved domestic financing.

4.

Increase surveillance and create national action plans against resistance in countries that do not already have them

Insecticide resistance is already seen as an urgent problem almost everywhere. And many see ACT resistance as inevitable over the next 10-15 years, or even sooner. Some thought resistance would spread faster than resistance to older medicines due to increased trade and travel between Africa and Asia. There were also worries over counterfeit drugs and substandard treatment for which surveillance is lacking in many countries.

5.

Continue the vital investment in R&D for new tools in the fight against malaria

As we are faced with both insecticide resistance and emerging resistance to ACTs, there is an urgent need to continue investing in scientific research to create tomorrow's tools to help achieve elimination and eventual eradication.

[6] Vectorworks ITN Access and Use Report 2018. Available for download at: https://www.vector-works.org/resources/itn-access-and-use

Glossary

Source: World Health Organization

Antimalarial medicine

A pharmaceutical product used in humans for the prevention, treatment or reduction of transmission of malaria

Artemisinin-based combination therapy (ACTs)

A combination of an artemisinin derivative with a longer-acting antimalarial drug that has a different mode of action

Diagnosis

The process of establishing the cause of an illness (for example, a febrile episode), including both clinical assessment and diagnostic testing

Elimination, malaria

The interruption of local transmission (reduction to zero incidence of indigenous cases) of a specified malaria parasite species in a defined geographic area; continued measures are required to prevent re-establishment of transmission. Note: The certification of malaria elimination in a country will require that local transmission is interrupted for all human malaria parasites

Eradication, malaria

The permanent reduction to zero of the worldwide incidence of malaria infection caused by all species of human malaria parasites. Once eradication has been achieved, intervention measures are no longer needed

Incidence, malaria

Number of newly diagnosed malaria cases during a defined period in a specified population

Indoor residual spraying (IRS)

Operational procedure and strategy for malaria vector control involving spraying interior surfaces of dwellings with a residual insecticide to kill or repel endophilic mosquitoes

Insecticide

Chemical product (natural or synthetic) that kills insects. Ovicides kill eggs; larvicides kill larvae; pupacides kill pupae; adulticides kill adult mosquitoes. Residual insecticides remain active for an extended period

Intermittent preventive treatment in infants (IPTi)

A full therapeutic course of sulfadoxine-pyrimethamine delivered to infants in co-administration with DTP2/Penta2, DTP3/Penta3 and measles immunisation, regardless of whether the infant is infected with malaria

Intermittent preventive treatment in pregnancy

A full therapeutic course of antimalarial medicine given to pregnant women at routine prenatal visits, regardless of whether the woman is infected with malaria

Larvicide

Substance used to kill mosquito larvae. Note: Larvicides are applied in the form of oils (to asphyxiate larvae and pupae), emulsions or small pellets or granules of inert carrier impregnated with insecticide, which is released gradually when they are placed in water

Long-lasting insecticidal net (LLINs)

See below

Net, insecticide-treated

Mosquito net that repels, disables or kills mosquitoes that come into contact with the insecticide on the netting material. The two categories of insecticide-treated net are:

1. Conventionally treated net: a mosquito net that has been treated by dipping it into a WHO-recommended insecticide. To ensure its continued insecticidal effect, the net should be re-treated periodically
2. Long-lasting insecticidal net: a factory-treated mosquito net made of netting material with insecticide incorporated within or bound around the fibres. The net must retain its effective biological activity for at least 20 WHO standard washes under laboratory conditions and 3 years of recommended use under field conditions

Note: Untreated mosquito nets can also provide substantial protection against mosquito bites, but they have less effect against vectorial capacity and transmission rates

Operational research

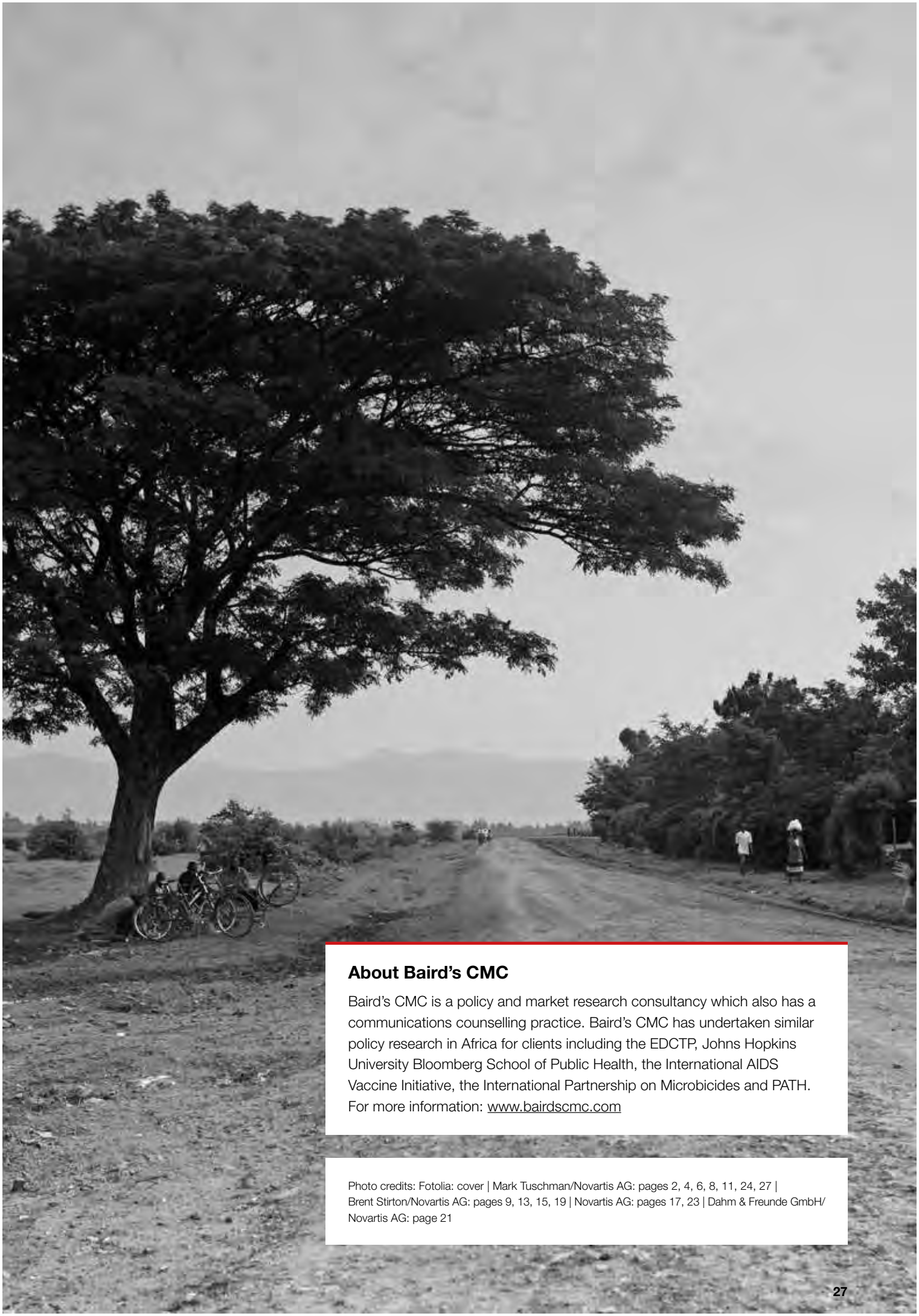
Research carried out using data routinely collected by disease control programmes, to provide ways of improving programme operations, and deliver more effective, efficient and equitable care

Rapid diagnostic test (RDT)

Immunochromatographic lateral flow device for rapid detection of malaria parasite antigens

Seasonal malaria chemoprevention (SMC)

The intermittent administration of full treatment courses of an antimalarial medicine to children during the malaria season in areas of highly seasonal transmission



About Baird's CMC

Baird's CMC is a policy and market research consultancy which also has a communications counselling practice. Baird's CMC has undertaken similar policy research in Africa for clients including the EDCTP, Johns Hopkins University Bloomberg School of Public Health, the International AIDS Vaccine Initiative, the International Partnership on Microbicides and PATH. For more information: www.bairdscmc.com

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