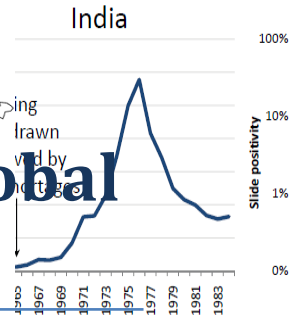


Towards a Malaria-Free World: A Global Case for Investment and Action



Placeholder for a graphic including a selection of photos from a cross section of countries to reflect the global nature of the document

PUBLIC REVIEW DRAFT
17th February 2015

A Call to Action

We are the generation that can turn the tide on malaria. Since 2000, united action has cut malaria infection rates in half and at least 4.3 million lives have been saved. The benefits and economic returns from investing in the reduction and elimination of malaria are unprecedented. Analysis suggests that for every dollar spent, up to sixty dollars' worth of benefits can be gained¹. These returns equate to healthier, more equitable societies, with more productive workforces, and allow people to move across international borders without being at risk of infection in the context of elimination. By suppressing malaria countries can attract international investors, trade, and tourism, all of which are drivers of transformative growth and sustainable development.

The task is challenging and speed is of the essence: the current suite of drugs and insecticides used to fight malaria are at the end of their lifespans, and there is growing resistance to both. Malaria continues to prey on the most vulnerable members of society and disproportionately affects the poor; 584,000 people, the vast majority young children, needlessly lost their lives to this preventable and treatable disease in 2013. The treatment which could have saved most of these lives cost less than US\$ 1, and many could have been prevented by bed nets costing just US\$ 5.

We must rise together to defeat malaria with all the public health resources at our disposal. We recognize the important role that non-health sectors such as agriculture, education, housing, water and sanitation, and tourism play in the reduction and elimination of malaria, as well as the interfaces to land-use, climate change, and environmental policy and call on stakeholders in all these areas to intensify their engagement in the fight.

As a global community, we have a moral obligation to act: the consequences of inaction would be the resurgence of malaria, and a reversal of all we have achieved so far. Beyond the crippling economic cost, resurgence would undermine progress towards the Sustainable Development Goals, and result in devastating levels of sickness, suffering, and death.

The malaria parasite is an ancient scourge that has co-evolved with humanity, causing untold suffering and death over millennia. Now, for the first time, our vision of a malaria-free world is within reach. By combining our resources, knowledge, and technologies, we can develop the innovative tools and efficient approaches that are needed to “go the last mile.” We can accelerate our efforts to master and win the malaria elimination end game. Victory will rank among the highest achievements in human history, and bring new hope and opportunity to those who may otherwise be left behind.

1 Preliminary finding, subject to confirmation and further revision

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Acronyms and Abbreviations

AARM	RBM Advocacy and Resource Mobilization Toolkit
ACT	Artemisinin-based combination therapies
ALMA	African Leaders Malaria Alliance
AMI	Amazonas Malaria Initiative
ANC	Antenatal care
APLMA	Asia Pacific Leaders Malaria Alliance
APMEN	Asia Pacific Malaria Elimination Network
APPMG	All-Party Parliamentary Group on Malaria and Neglected Tropical Diseases
ASEAN	Association of Southeast Asian Nations
BCC	Behavior Change Communication
BMGF	Bill and Melinda Gates Foundation
CCI	Common childhood illness
CAMA	Corporate Alliance on Malaria in Africa
CCM	Country Coordinating Mechanism
CEO	Chief Executive Officer
CHAI	Clinton Health Access Initiative
CHW	Community Health Worker
CSO	Civil Society Organization
DFID	Department for International Development
EMMIE	Eliminate Malaria in Mesoamerica and the Island of Espanola
E2Pi	Evidence to Policy Initiative
EVI	European Vaccines Initiative
FIND	Foundation for New Innovative Diagnostics
GDP	Gross Domestic Product
GMAP	Global Malaria Action Plan 2008-2015
GPARC	Global Plan for Artemisinin Resistance Containment
GPIRM	Global Plan for Insecticide Resistance Management
HMIS	Health Management Information System
IDA	International Development Association
IDP	Internally displaced person
ILO	International Labor Organization
IOM	International Organization for Migration
IPTp	Intermittent preventive treatment in pregnancy
IRS	indoor residual spraying
ITN	insecticide treated bed net
IVCC	Innovative Vector Control Consortium
IVM	Integrated vector management
LLIN	long-lasting insecticide treated net
MCH	Maternal and Child Health
MDA	Mass Drug Administration

MDG	Millennium Development Goal
MMP	Mobile and Migrant Populations
MMV	Medicines for Malaria Venture
MPAC	Malaria Policy Advisory Committee
MVI	Malaria Vaccine Initiative
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organization
OECD	Organization for Economic Co-operation and Development
PDP	Product Development Partnership
PHC	Primary Health Care
PMI	President's Malaria Initiative
PPP	Public Private Partnership
RBM	Roll Back Malaria Partnership
RDT	Rapid Diagnostic Test
R&D	Research and development
SADC	South African Development Community
SBCC	Social and Behavior Change Communication
SDG	Sustainable Development Goal
SMS	Short Message Service
UCSF	University of California, San Francisco
UN	United Nations
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
WHA	World Health Assembly
WHO	World Health Organization

Chapter 1: Introduction

1.1 An Overview of Achievements from 2000-2015

The Roll Back Malaria (RBM) Partnership was launched in 1998 by the World Health Organization (WHO), the United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF), and The World Bank. RBM has successfully united over 500 partners including endemic countries, industry, academia, donors, foundations, and civil society to promote global advocacy, resource mobilization, and coordinated action in the fight against malaria.

To catalyze action, RBM developed the first Global Malaria Action Plan (GMAP) for 2008-2015, which was endorsed by world leaders and the global malaria community during the Millennium Development Goals (MDGs) Malaria Summit in 2008. GMAP became a tremendously valuable advocacy tool, as well as providing the global malaria community with a roadmap for progress, an evidence-based strategy for delivering effective prevention and treatment, and estimates of annual funding needs required to reach global targets.

Since 2000, the commitment of countries and the global community has successfully secured a ten-fold increase in funding, and demonstrated that the delivery of highly cost-effective prevention and treatment interventions can be taken to scale, in particular long-lasting insecticide treated nets (LLINs), indoor residual spraying (IRS), rapid diagnostic testing (RDTs), artemisinin-based combination therapies (ACTs) and intermittent preventive treatment in infants (IPTp). These interventions have proven their effectiveness in reducing malaria-related mortality and morbidity: between 2000 and 2013, malaria mortality rates declined globally by 47 percent in all age groups and by 53 percent in children under 5 years of age, equating to an estimated 4.3 million malaria deaths averted. The ten countries with the highest estimated malaria burden in 2000 accounted for 68% of malaria deaths averted from 2001–2013.²

1.2 The outlook of progress from 2016- 2030

Building on the success of the MDGs, in [insert month] 2015 the UN Members States launched the Sustainable Development Goals. This calls for an end to extreme poverty; a reduction in global inequalities; more inclusive and sustainable patterns of trade, industrialization and growth; responsive and accountable government; the empowerment of girls and women; decent work and schooling; Universal Health Coverage; adequate clean water and sanitation; robust agricultural systems; rural prosperity and sustainable cities; resilient infrastructure; and sustainable energy for all. There are inextricable links between attaining the SDGs and the achievement of a malaria free world. Progress towards the SDGs will be contingent on the continued reduction and elimination of malaria, while ongoing advances in the fight against malaria will contribute to the realization of the SDG agenda.

The SDGs provide an unprecedented opportunity to widen the circle of engagement and intensify multisectoral action and cross-country collaboration to defeat malaria. To ensure that we seize this opportunity, the RBM Board initiated the development of the second generation GMAP, “Towards a Malaria-Free World: A Global Case for Investment and Action” in 2013. Developed through an extensive consultative process, it calls for the global malaria community to stay the course and finish the tremendous work it has started; for “smart

² Countries include: Burkina Faso, DR Congo, Ethiopia, Malawi, Mali, Mozambique, Niger, Nigeria, Tanzania, Uganda, Source: WHO World Malaria Report 2014

integration” in existing health systems; and for the stronger engagement of non-health sectors. By making the case for investment and providing recommendations for action, “Towards a Malaria-Free World” galvanizes this broader audience to mobilize resources and achieve the malaria goals, milestones, and overall vision which are shared with the WHO Global Technical Strategy for Malaria, and laid out below. The RBM Board adopted “Towards a Malaria-Free World: A Global Case for Investment and Action” in June 2015.

1.2.1 The Global Technical Strategy for Malaria

The process of developing the WHO technical strategy was also initiated in 2013 to provide a comprehensive framework for countries to tailor programs to address the heterogeneity of malaria and accelerate towards elimination. The strategy emphasizes that progression towards malaria-free status does not consist of a set of independent stages. Rather it is a continuous process that requires program structuring based on high quality surveillance data and subnational stratification by malaria risk. It highlights the need to achieve appropriate coverage with core malaria interventions in all populations at risk, identifies areas where innovative solutions will be essential and underscores the importance of political commitment and strong health systems for future progress. The World Health Assembly endorsed [The Global Technical Strategy for Malaria 2016 – 2030](#) in May 2015.

Table 1: Joint WHO technical strategy and “Towards a Malaria-Free World” Vision and Goals

VISION	A world free of malaria		
GOALS	Milestones		Targets
	2020	2025	2030
Reduce malaria mortality rates globally compared with 2015	≥40 percent	≥75 percent	≥90 percent
Reduce malaria case incidence globally compared with 2015	≥40 percent	≥75 percent	≥90 percent
Eliminate malaria from countries in which malaria was transmitted in 2015	At least 10 countries	At least 20 countries	At least 35 countries
Prevent re-establishment of malaria in all countries that are malaria-free	Re-establishment prevented		

The methodology used to set these goals and milestones was based on countries’ current malaria targets as stated in their national strategic plans, the historical rate of progress between 2000 and 2012, as well as intervention scenario analyses.¹ The goals will challenge all stakeholders to push the limits of their accomplishments to new levels. All countries will be able to make progress by tailoring and combining interventions to fit local contexts, and improving the efficiency of their response. However, actually achieving these milestones and targets will depend upon continued innovations in tools and approaches for implementation.

1.3 Purpose and structure of “Towards a Malaria-Free World”

“Towards a Malaria-Free World” serves as a reference point for all partners that are engaged in, or want to join the fight against malaria. It demonstrates why malaria is not only a health issue, but also a developmental, economic, political, security, environmental, agricultural, educational, biological, and social issue. It makes the global case for investing in malaria, which can be adapted to build regional or national cases for heads of state, ministers of finance and local government, investors, CEOs in industry and business, researchers, inventors, bilateral and multi-national financing and development agencies, and in so doing provides malaria advocates at global, regional, country and local level with a highly effective tool for advocacy. “Towards a Malaria-Free

World” also makes the case for collective action, and provides direction for future actions, to the RBM constituencies, stakeholders in the non-health sectors, the wider health sector, and affected communities alike.

- **Chapter 2** presents the global case for investment in malaria, and demonstrates the significant returns on investment from an economic, development, humanitarian, and equity perspective.
- **Chapter 3** demonstrates the inextricable links between malaria and the Sustainable Development Goals. In so doing, it emphasizes the important social, environmental, and biological factors that influence the trajectory of malaria and demand a flexible, adaptable response to implementing the WHO technical strategy. It also provides the context with regards malaria research and innovation.
- **Chapter 4** presents recommendations for actions in areas critical to the achievement of the 2030 goals, including: leveraging the broader political and development agenda to work across sectors and borders; the changing financial landscape and mobilizing resources for malaria; improving policy and governance; strengthening health systems and integration; engaging communities to keep people at the center of the response; fostering and sharing innovations and solutions; and strengthening the evidence to inform future progress.
- **Chapter 5** provides a framework for monitoring progress towards the 2020 and 2025 milestones, and the 2030 targets. It also outlines the roles and responsibilities of the RBM Partnership, and its constituencies to strengthen their shared accountability for progress. [this chapter is still under development]

1.4 Looking ahead: Remaining dynamic and relevant

In alignment with the Global Technical Strategy for Malaria, “Towards a Malaria-Free World” is designed to be a living document that will be regularly updated to ensure its continued relevance to the dynamic nature of malaria transmission, the evolving context of the response, new developments and innovations, and progress towards the 2020 and 2025 milestones. As every region, country, and community pushes towards elimination, stakeholders are encouraged to assist in keeping the document up to date via the exchange platform on the RBM website. There will be a number of ways to contribute:

- **SHARE A SUCCESS STORY, OR LESSONS LEARNED.** The RBM Partnership, and the different constituencies, sectors and stakeholders will drive progress and innovation in the critical areas identified in Chapter 4 during the 2016-2030 timespan. Success stories and case studies should be shared to foster joint learning about accelerating to elimination, and to facilitate the establishment of best practices across countries and regions.
- **DISSEMINATE UPDATES.** The platform can be harnessed to share emerging cases for investment, evidence on the links to the Sustainable Development Goals, new tools emerging from the innovation pipeline, new WHO policies, and strategies as they are approved, and other relevant information to assist malaria programs at the global, regional, country, and local level.
- **IDENTIFY AN EMERGING CHALLENGE OR OPPORTUNITY.** As the broader context and the disease itself evolve, new challenges or opportunities may develop or existing ones may take on greater priority. Stakeholders can share perspectives on emerging trends as they advocate, engage new partners, mobilize resources, and make progress towards the 2030 malaria goals.
- **EXCHANGE IMPLEMENTATION RESEARCH FINDINGS AND TOOLS.** New implementation research can be shared through a variety of mediums. Attention can be drawn to findings that are relevant for policy and practice, and implementation tools and programmatic experiences exchanged. Stakeholders might also identify gaps where additional research and tools are needed.

Chapter 2: The Global Case for Investment in Malaria

Malaria prevention and treatment are among the most cost effective of public health interventions, and provide a consistent return on investment.^{2 3} Yet the levels of political commitment and financial investment required to sustain malaria control are high, and experience has shown that they are challenging to maintain.⁴ It is only through the relentless pursuit of elimination and eventual eradication that we can counter the risk of resurgence, halt the constant need to develop new drugs and insecticides, and reap the long-term returns of ending malaria infections and deaths.

There is a compelling case for making this investment: beyond the bottom line return, it will generate unprecedented socio-economic, development, humanitarian, and equity benefits.⁵ Stakeholders at global, regional, country, sub-national, and local levels have a crucial role to play in leveraging the case for investment to advocate and successfully mobilize the full range of resources needed to move countries along the path from control to elimination.

2.1 Building the case: quantifying the return on investment

Investing in malaria control and elimination drives people-centered development, productivity, and progress. Since the launch of the first GMAP, much stronger evidence has been generated. The cost-effectiveness of the main interventions such as LLINs, ITN, and IRS for prevention, improved diagnosis using RDTs, the use of ACTs, and treatment of children, and pregnant women, has been reconfirmed by extensive evidence from Africa, Asia, and Latin America.^{6 7 8 9 10 11 12} Estimates covering 100 countries show that malaria is a “best buy” in global public health, costing only US\$ 5-8 per case averted. Immunization is the only public health intervention that has been shown to have a positive ROI.

Return on Investment (ROI)

A ROI analysis is a way to evaluate the quality and efficiency of investments, taking into account all the resources invested and all the amounts gained through increased revenue, reduced costs, or both. To calculate ROI, the benefit (return) is divided by the cost - the result is expressed as a percentage or a ratio.

1.4.1 Returns in economic development, productivity, and growth

Malaria negatively affects macroeconomic performance. Reduced productivity, reduced economic growth, and reduced inclusive, sustainable growth.

- There is compelling evidence that malaria is a determinant of economic growth in the long term. The yearly growth rate of GDP per capita in endemic countries is 0.25-1.3 percent points lower than in countries without malaria. Over a period of 25 years, GDP per capita growth in countries that are not affected by malaria was over five times higher than in countries affected by a heavy malaria burden.^{15 16}
- An expenditure impact study suggested that for every US \$1 per capita investment in the fight against malaria in Africa there was an increase in per capita GDP of US \$6.75.¹⁷
- Suppressing malaria reduces worker absenteeism and increases productivity in key economic areas, such as agriculture, business, and industry, including the extractive industries.^{18 19 20}
- Companies that invest in the health of the workers and protect them from malaria and other diseases reduce the costs of doing business and boost competitiveness.²¹
- In economies that depend heavily on agriculture, the further reduction of malaria increases the performance of intensive agricultural production, making an essential contribution to the achievement of food security and greater rural prosperity.²²
- By investing in malaria elimination, economic development zones and tourism can benefit from the safe movement of people across regional and country borders.

1.4.2 Returns in equity and household prosperity for this and future generations

Malaria traps the most disadvantaged in an intolerable spiral of sickness, suffering, and poverty. Reducing malaria makes a substantial contribution to global equity. It strengthens the cohesion, stability and resilience of communities by protecting household income from the costs of seeking care and lost earnings due to the inability to work.²³

- Each year 44 million households worldwide, more than 150 million people, face health care expenditures that are so high in relation to the available income that they have a catastrophic effect on the household's financial wellbeing.²⁴
- Preventing, diagnosing, and treating malaria is a significant source of these catastrophic health care expenditures, even when there are no or only modest official charges for public sector primary healthcare.²⁵ Studies conducted in endemic countries demonstrate clearly how very low income households are disproportionately affected, with the total cost of malaria accounting for 32 percent of their annual income compared to 4.2 percent for other health care categories and how a single malaria episode can be enough to push a household further into poverty.^{26 27} Preventing malaria reduces the need for food, housing, education, entrepreneurial initiatives, or other household expenses.
- Reducing the burden of malaria also allows people to engage in income-generating activities, parenting, attending home gardens, house-keeping, care for the elderly, and other activities that generate additional benefits for societies.²⁸
- Investing in malaria is an investment in the future. It stops children from losing their cognitive ability to learn, and increases the chances that they will live.^{29 30}
- By freeing women from the burden of caring for sick family members, they can engage in generation or agricultural work, as well as their empowerment and economic activities is strongly facilitated.³¹
- Furthermore, progress in malaria contributes to the reduction of newborn and child deaths: malaria in pregnancy intervention reduces neonatal mortality by 38 percent and 61 percent, respectively, allowing mothers to be able to care for their children, and gives newborns the chance to survive.³²
- Malaria interventions have slashed child mortality rates in many low-income countries.³⁴ Children that don't suffer repeatedly from malaria have a better response to immunizations, meaning greater protection of their health, while also furthering the cost-effectiveness of childhood immunizations.³⁵
- Reductions in child mortality have been associated with declines in fertility rates.³⁶ As child deaths decline, parents often choose to have smaller families, and to focus on supporting each child to realize its full potential. This investment in human capital is central to the creation of a more equitable world, and critical for improvements in health, household prosperity, and sustainable development.³⁷

Household costs of malaria

Approximately half of the world's population fights for survival on less than US\$ 2.50 per day. Each case of malaria has been shown to cost households at least US\$ 2.67 (range US\$ 0.34 – US\$ 7.66) in direct out of pocket expenses. In adults this causes an average of 3.4 days (range 2-6) days of lost productivity, at a minimum, additional, indirect cost of US\$10.85. Mothers and other caretakers sacrifice a further 2-4 days each time a child or other family member contracts malaria generating still further indirect costs for households. Sources: World Bank 2008, McFarland et al 2012, Chuma & Okungu 2010, Mustafa & Babiker, 2007

1.4.3 Returns for health security and systems

Malaria strains public health systems, and absorbs high levels of systems' capacity. Reducing the burden of malaria enables national systems to function more effectively, and to respond better to emerging health security threats.

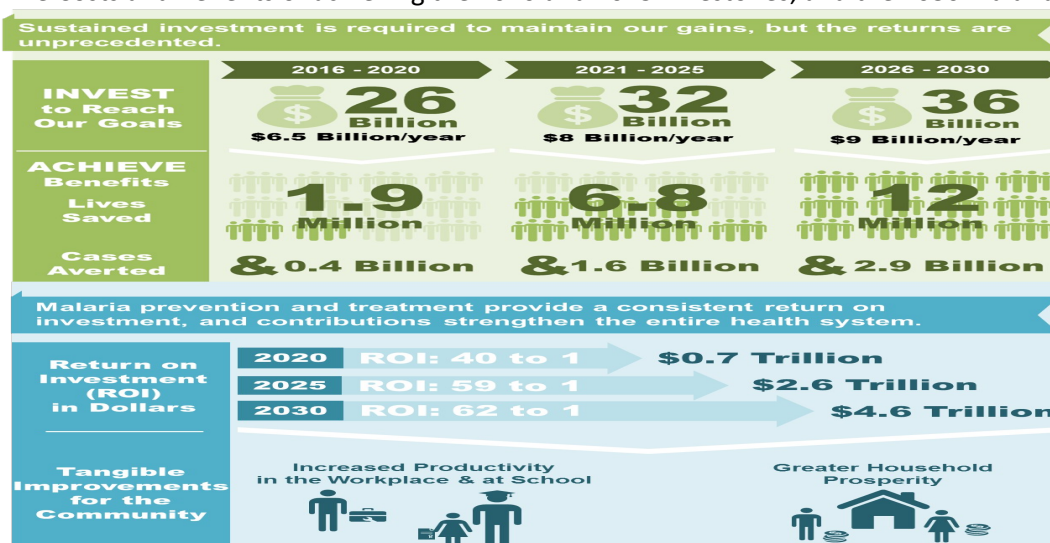
- Malaria can be the cause of up to 50 percent of hospital visits and admissions, and account for 40 percent of public health spending in high transmission settings.³⁸ Reducing this burden frees up resources for the treatment of other diseases like diarrhea, anemia, malnutrition, pneumonia, HIV/AIDS, TB, and cardiovascular disease.³⁹

- Effective malaria diagnosis and treatment with quality ACTs helps to foster trust in the public health sector, making it more likely that people will seek treatment for other illnesses, and ultimately stimulating demand for quality services.^{40 41 42}
- By excluding malaria through effective diagnostics, the risk of other life threatening diseases going undetected is reduced.^{43 44}
- The significant efforts being made to strengthen the use of quality ACTs, and malaria reporting in the private health sector can facilitate improved public-private collaboration in health systems. This collaboration brings system-wide efficiency gains, increases the reach of health service delivery, and contributes to the drive for Universal Health Coverage.
- Surveillance systems and laboratory capacity established for malaria can also be used for other diseases.^{45 46} Experiences, to date, show how surveillance systems established for malaria have been successfully expanded to look at Rift Valley Fever, Dengue, and Yellow Fever.⁴⁷
- An effective malaria control program can concurrently control other vector-borne diseases.^{48 49}
- The tasks of village malaria workers have been successfully expanded to include the management of other diseases, bringing wider benefits to the health of their communities.⁵⁰

2.2 The costs and benefits of achieving the 2030 malaria goals

Achieving the joint milestones and 2030 malaria goals will require the further scale up of proven interventions, the strengthening of surveillance systems, and continued investment in research and development to ensure that the needed innovation in tools and approaches comes to fruition. The WHO technical strategy has calculated the financial cost of this acceleration towards the 2020 and 2025 milestones and the 2030 targets. This cost and the benefits that this investment will generate are shown in Figure 1. [All figures are preliminary and subject to revision].

Figure 1: The Costs and Benefits of achieving the 2020 and 2025 milestones, and the 2030 malaria targets



An additional US\$ 673 million (range US\$ 524-822 million) will be needed annually until 2030 to fund malaria research, ensure new developments and innovations and to contain the threat of drug and insecticide resistance. The details of how these costs were calculated and their breakdown are provided in Appendix C.

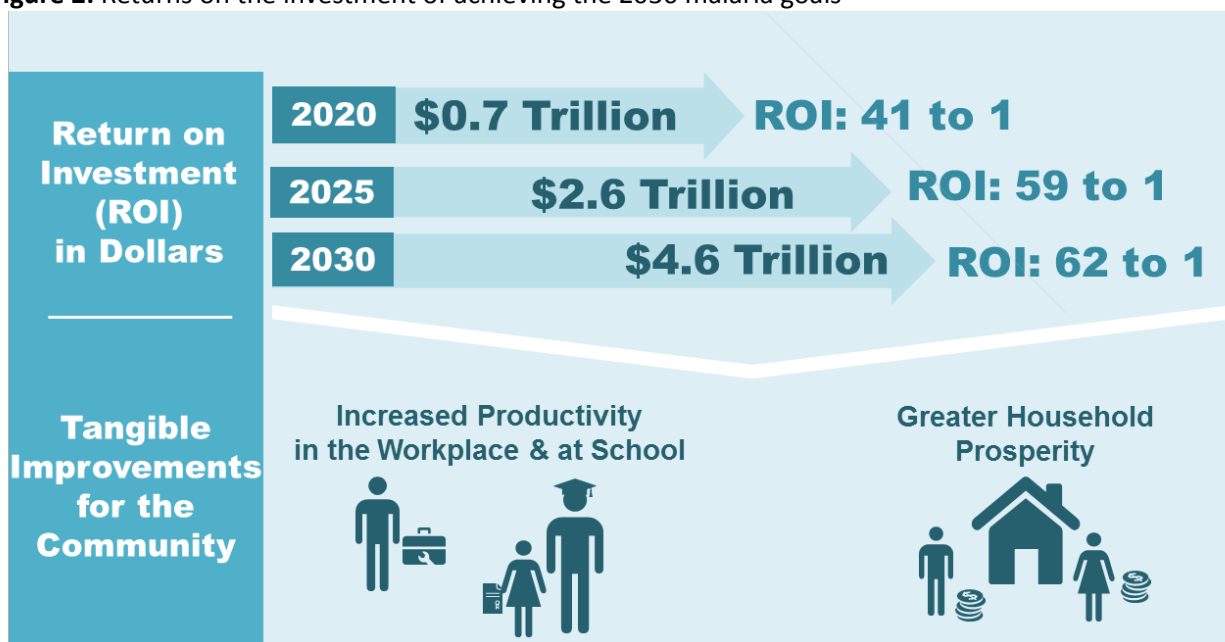
These calculations highlight how attaining elimination requires a significant, long term, and sustained investment. The costs of achieving the 2020 and 2025 milestones, and 2030 goals rise incrementally because of the high level of investment that is required to reach elimination, as well as the ongoing investment that is needed to prevent the reintroduction of malaria in the face of the ever-present threat of resurgence.

However, the returns on the investment needed to achieve “Malaria-Free World” 2030 goals will be unprecedented: A methodology used in the WHO technical strategy demonstrates the attainment of the 2020 and 2025 milestones, giving a return on investment of 41 to 1 when the 2030 targets are realized.^{3 51} The benefits are shown in terms of cost savings, as well as macro-economic savings from the lives of people who are not killed or incapacitated by malaria, and are able to

Placeholder box on the returns of investing in elimination
Content to follow from UCSF by March 2015

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Figure 2: Returns on the investment of achieving the 2030 malaria goals



The results of this analysis show that the economic returns are even higher than previous estimates: A cost-benefit assessment conducted on the goals and targets of the post-2015 development agenda found robust evidence that the economic benefits of reversing the spread of malaria and reducing annual malaria deaths by 95 percent would be 15 times higher than the costs, a ROI that it classified as “phenomenal”.⁵³ Another study

³ A preliminary diagrammatic summary of the cost-benefit analysis methodology is provided in Appendix B, and will be expanded in the next draft. Country level return on investment data is also being prepared and will be annexed to the scientific publication that is under development.

estimated the net economic benefit of eliminating malaria in the AFRO region (i.e. the economic value of work years saved minus the cost of anti-malaria interventions) would be \$269.3 billion through 2030 - a figure that is roughly equivalent to 17 percent of the combined GDP of all the developing countries in sub-Saharan Africa in 2013.^{54 55}

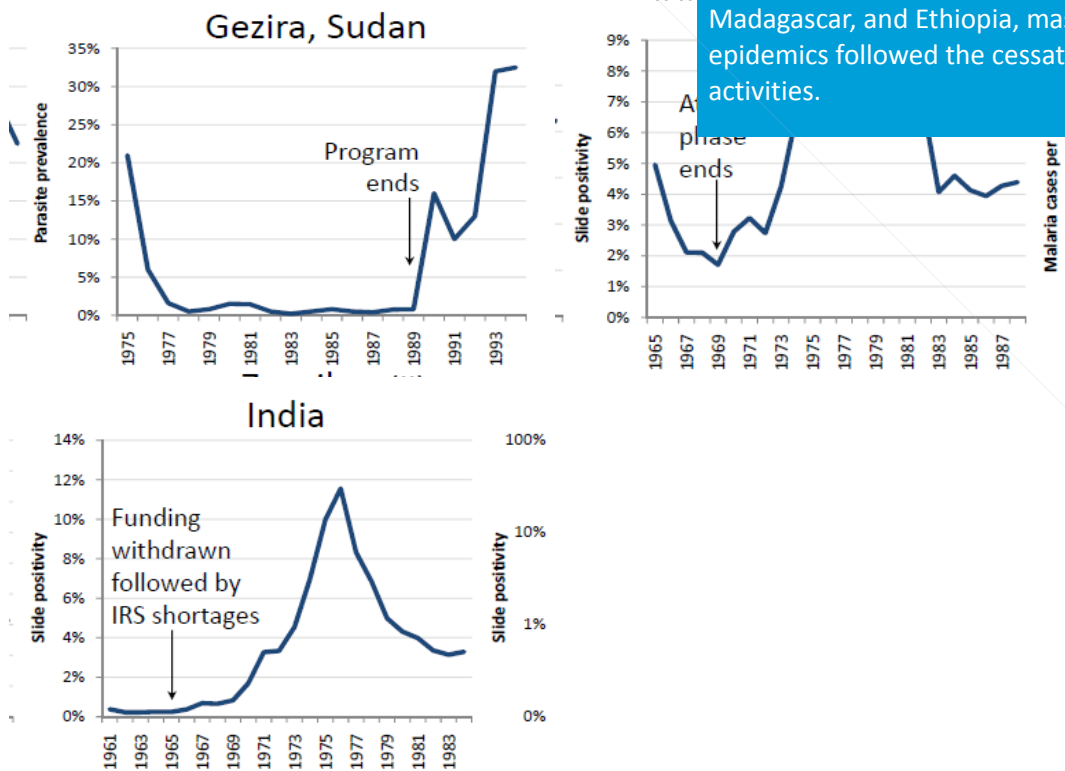
1.5 The Cost of Resurgence

Despite the compelling case to invest in malaria, funding levels fall far short of the amount needed, and have slowed since 2010. We risk allowing the current gains to unravel. If we fail to achieve the 2020 and 2025 milestones and 2030 targets, the costs will be catastrophic. If the coverage of malaria interventions drops, then dramatic increases in prevalence than at baseline (as illustrated in Figure 3), because immunity to malaria declines, leaving everyone vulnerable to a major increase in the burden of disease across all age groups and results in devastatingly high levels of human sickness, death, and economic loss.

Learning from the past

History provides a warning that the gains in malaria are fragile and depend upon sufficient and sustained investment. Between the 1930s – 2000s, 75 episodes of resurgence were reported in 61 countries. The weakening of malaria control programs, due mainly to funding shortages, led to the vast majority of resurgences. In Sri Lanka, Madagascar, and Ethiopia, massive epidemics followed the cessation of control activities.

Figure 3: Removal of control measures leads to resurgence at baseline due to the decline in population immunity



Historical examples from three different countries. Source: Cohen et al, 2012

These costs and losses and the associated economic burden will be borne by countries, economies, businesses, health systems, and households, in particular by pregnant women and children under five years of age - with the poorest families most affected. This reversal would fundamentally undermine the Sustainable Development Goal of seeking to end extreme poverty by 2030, and would mark a failure to protect the unprecedented investment that has been made to date.

Figure 4: Overview of the costs and loss of life over the 2016-2030 timeframe if current malaria intervention coverage levels were to revert to 2007 levels



Calculations based on if coverage of malaria interventions from 2016-2030 decline to 2007 levels. A short non-technical explanation of the methodology will be included in Appendix B in the next draft once the scientific paper has been published.

Case Studies: How a small investment in malaria can bring major returns to families around the world

Neema Gunda is a widow who heads a household in a rural part of Tanzania. She used to lose more than 20 days a year, either through having malaria herself or on time spent looking after others when they got sick. Neema and her family all depend heavily upon being able to grow vegetables and crops for their own consumption, and she always invests the little money available in buying seeds. In the rainy season she needs to plant her field. However, as this is also the time when there are more mosquitos the children always got ill, which negatively impacted her ability to work. The result was that her crops often had low yields, and the household faced severe food security challenges.



After receiving bed nets and information on how to use them correctly, things have improved significantly for Mama Neema and her family. She hasn't been sick again, and the children suffer from malaria far less often. This has enabled her to tend her field more efficiently, and to save money for some fertilizer. She now has much better harvests, and can sometimes even sell some of her produce at the market.

Photo of Family

s wife Subiti live in a slum at a construction site in North-East India. Their home is a shack dugated iron and some sundry items. It offers scant protection from the elements, and the for the onset of the monsoon. The whole family, but particularly the children suffer ria. Mudan goes early every morning to seek work at the site. As he is not always taken on as so has to go out every day and try to earn some money or get some food. Their eldest d to drop out of the local school to care for her two younger siblings.

A local NGO came door-to-door in the slum. Mudan and Subiti received two mosquito nets and assistance to hang them from the roof. The nets are tucked tightly round the makeshift mattresses on the floor. They sleep under one, and their children sleep under r the other. Since having the nets, the family has noticed the difference. Mudan and Subiti have not had malaria since, enabling them to seek work more consistently, which has led to an increase in the household income. They have managed to procure some plastic sheeting to improve their shelter, and have saved a small amount of money so they would be in a position to travel to the hospital if their children needed care. With the onset of the rains, one of the younger children still became sick, but overall the frequency has reduced allowing the children to regain their strength after each episode. Subiti hopes that they will soon be able to pay a neighbor to care for the youngest children, so that Namrata can resume her schooling.

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Chapter 3: Positioning for the future

Since the launch of the MDGs in 2000, the ten-fold increase in direct malaria funding has been translated into a massive scale-up in the delivery of malaria interventions through public and private (for profit and non-profit) providers. In affected countries, steady progress has been made and people now have better access to prevention, diagnosis, and treatment for malaria than ever before. This success has been made in spite of imperfect systems and operational challenges. There is also growing recognition that malaria has an important development dimension, and that the activities of other sectors have multiple interfaces with the disease.

To position malaria more strongly for the future we need to leverage the opportunities presented by the broadening development agenda. Future progress will be dependent upon our working in solidarity and partnership across manmade boundaries, ministries, and sectors to transform our irreversibly interconnected world; to further dignity and reaffirm our common humanity; to address inequalities everywhere; and to promote peace and prosperity, while also protecting the planet and its ecosystems. Political commitment and good governance will be central for the realization of this new development agenda. Moreover, by emphasizing the importance of social, environmental and biological factors, the SDGs provide new entry points for harnessing the potential of other sectors in the fight against malaria.

2.1 The broadening global development agenda

The SDGs seek to take the unfinished MDG agenda forward and have an overarching focus on reducing global inequalities and ending poverty. They underscore the importance of political stability and democratic governance, and call on governments to promote and protect human rights; reform public administration; combat corruption; and increase the free flow of information. Building more robust, representative, and responsive institutions at national and local government level will engender public trust, make it more likely that people will participate in political decision-making, and support and develop community engagement. Greater transparency and accountability are the hallmarks of good governance and are essential to efforts to deliver basic services to those most in need, including for health and malaria.

Optimizing the delivery of malaria interventions will form an inherent component of efforts to provide Universal Health Coverage, and be essential for ensuring healthy lives and promoting well-being for those of all ages. As well as being directly responsible for major burden of morbidity and mortality, malaria is also a significant cause of anemia in children and pregnant women. Scaling up malaria control makes a substantial contribution to reductions in child mortality and improvements in maternal health and is essential for achieving the goals of the “Promise Renewed” and “Every Woman, Every Child” initiatives.

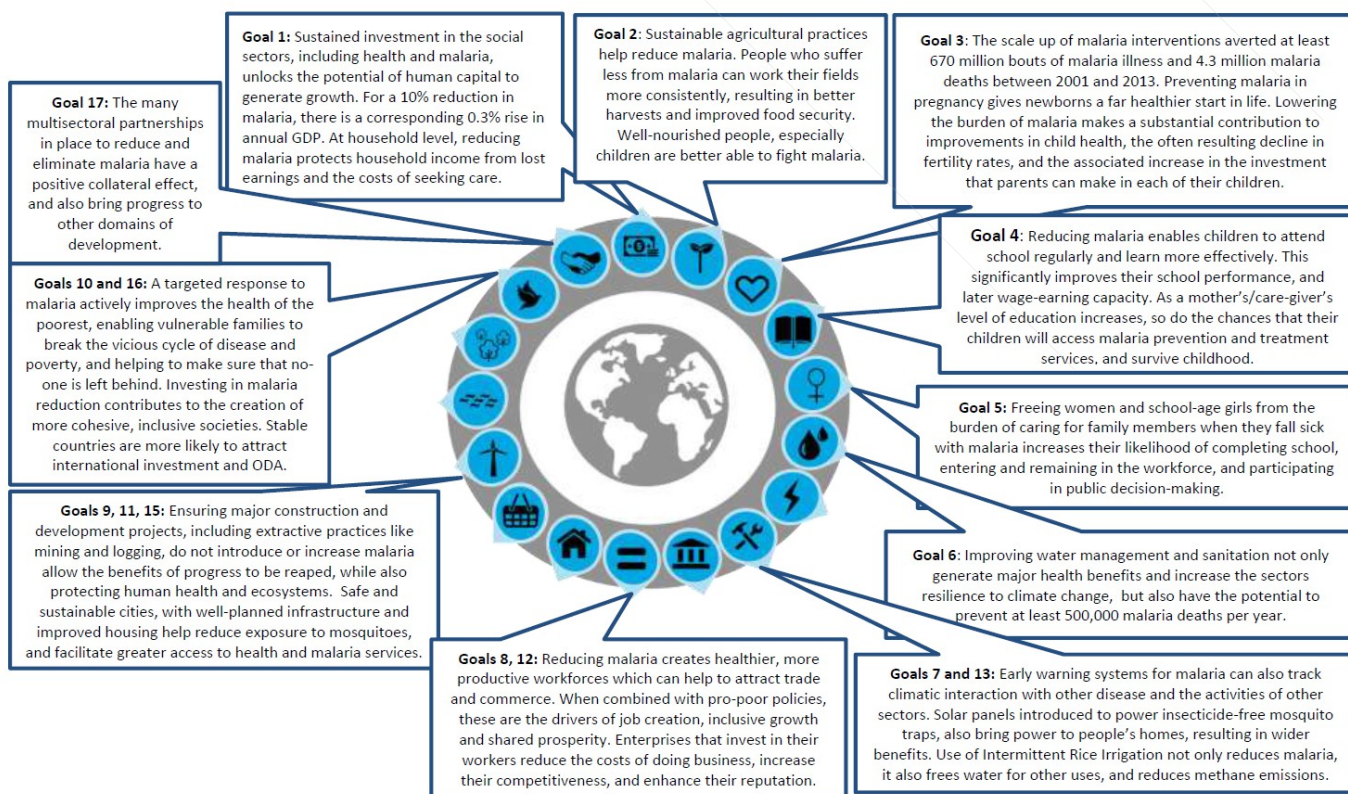
Healthier, more productive societies are the direct outputs of investments in human capital. Such societies provide productive labor markets and stability, which can attract international investors, catalyze trade relations, drive structural transformation, and generate more inclusive, economic growth.⁵⁷ Failure to generate more inclusive growth and sustainable livelihoods threatens to make the world increasingly unequal, fragmented, and confrontational.⁵⁸ Neglecting the importance of reducing malaria in countries affected by political upheaval and humanitarian crisis, will be the “make or break” for achieving the SDG agenda. UNICEF

has highlighted how 17 of the 20 countries with the highest under-five mortality are countries that are affected by violence or in “fragile situations.”⁵⁹ All 17 are countries where malaria is a leading cause of mortality.⁴

It is in the context of the drive to end poverty and reduce global inequities that the explicit call of the SDGs to eradicate malaria [track to ensure continued accuracy] needs to be understood: malaria is both a major cause and a consequence of global poverty and inequity. Its burden is highest in the least developed areas and among the poorest members of society - particularly pregnant women, children, and other vulnerable populations including migrants, refugees, and the displaced. Poverty forces people to live and work in sub-standard conditions, with a high-level of exposure to malaria vectors, while they lack access to malaria prevention, health care, and other basic services. Even within the same locality children of lower socio-economic status are twice as likely to contract malaria compared to those of higher status. The probability of dying from malaria is inversely related to income and education.⁶⁰

For further information on the synergistic positive two-way benefits that progress in SDG and in malaria will generate see Figure 4 below. For more information on how failure to reduce and eliminate malaria will impede the achievement of the SDGs see the table in Appendix D.

Figure 5: Illustrative examples of synergies between advances in malaria and progress towards the Sustainable Development Goals



4 The countries are : Afghanistan, Angola, Bosnia & Herzegovina, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Congo-Brazzaville, Cote d'Ivoire, Egypt, Eritrea, Ethiopia, Guinea, Guinea-Bissau, Haiti, Iraq, Kenya, Kiribati, Korea DPR, Kosovo, Liberia, Libya, Madagascar, Malawi, Mali, Marshall Islands, Mauritania, Micronesia Fed.States, Myanmar, Nepal, Niger, Nigeria, Pakistan, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sri Lanka, Sudan, Syria, Timor-Leste, Togo, Tuvalu, Uganda, West Bank & Gaza Strip, Yemen, Zimbabwe.

The SDG agenda recognizes how many of the challenges facing the global community transcend national borders, and implicitly calls upon countries to work together for the global public good.⁶¹ Population mobility is a feature of our globalized, interdependent world that is set to increase. People move between countries and regional, and from rural to urban areas in search of better opportunities, as well as to escape disasters and unrest, or when they are displaced, such as by land redevelopments. When people travel from low to high transmission areas and have no acquired immunity to malaria, they are much more vulnerable than the local residents. Conversely, those who travel from high to low transmission areas may carry malaria parasites or infection with them, which can contribute to increased transmission at their point of destination. The elimination of malaria proceeds in geographic progression, making the collaborative management of re-introduction between and across country borders imperative.

The new development agenda also acknowledges the inherent links between social, environmental, and biological influences, public health and sustainable development:

2.1.1 Social and Cultural Factors

Social and cultural factors, as well as gender inequities, have been influencing exposure to vectors, health seeking behaviors, and the effectiveness of malaria interventions. The extent to which people are able to make choices about their environments where they live, the options they have to earn a living, and traditional gender roles, and their ability to participate in the implementation of malaria interventions requires innovation and behaviors for the prevention and eventual elimination of malaria.

A gender sensitive approach contributes to both understanding and combating malaria. Gender norms and values that influence the division of labor, leisure patterns, and sleeping arrangements may lead to different patterns of exposure to mosquitos for males and females. There are also gender dimensions in the accessing of treatment and care for malaria, and in the use of preventative measures such as mosquito nets. Integrating a gender sensitive approach in SBCC and treatment approaches optimizes their effectiveness. Source: WHO 2007

by the religion, forms e man- thirds of malaria er access

2.1.2 Environmental Factors

Environmental factors like land use, deforestation, extractive change which can all cause changes in malaria vectors' habit vector contact. The SDGs seek to create more sustainable cities and the global population will live in urban centers by 2050. Urbanization in endemic countries.⁶² This is because cities can bring infrastructure to basic services, and fewer breeding sites. However, these benefits often remain elusive for the world's more than 800 million slum-dwellers, meaning that we need to remain vigilant to the risk of resurgences in urban and peri-urban areas.⁶³ Sub-standard housing, over-crowding, poor sanitation, and the lack of amenities in slums can all increase the chances of people being exposed to malaria, while the proliferation of gardens, agricultural activity, and small-scale farming in urban areas can create new breeding sites for mosquitos.^{64 65}

The SDG agenda also recognizes the need for sustainable agriculture to improve farming productivity and food security, especially in the face of population pressures. Well-nourished individuals, especially young children, are better able to mount an immune response and withstand malaria infection.⁶⁶ In endemic countries, malaria remains an important cause of stunted growth in children. The combination of malaria and malnourishment, including deficiencies of iron, zinc, or vitamin A is particularly deadly.⁶⁷ Agricultural practices, including intense farming, irrigation, and drainage need to be well managed so as not to increase vector breeding sites. Production systems of certain crops, e.g., rice, rubber, sweet potato, salad vegetables have also been associated with increased malaria.^{68 69}

Rainfall has an important influence on malaria: Periods of long-term drought or below normal rainfall can reduce transmission. Periods of high rainfall can result in increased malaria transmission even in areas where control is strong. Weather patterns are major determinants of the inter- and intra-annual seasonality of malaria. Medium term patterns that may lead to droughts or El Nino phenomena are important not only in explaining trends in disease burden but also upsurges in cases.⁷⁰ This means the long-term pattern of climate change presents one of the biggest environmental threats over the coming century. The Intergovernmental Panel on Climate Change (IPCC) has concluded that changes in temperature and rainfall will affect the natural habitats of mosquitos, changing the prevalence of the vector in some regions, prolonging transmission seasons in some areas, and potentially exposing new regions and populations to malaria and other vector-borne diseases.⁷¹ In other locations, climate change will decrease transmission through changes in rainfall and temperatures.

2.1.3 Biological Factors

Biological factors present some of the gravest threats to progress towards the 2030 malaria goals, most notably: the growing problem of antimalarial drug and insecticide resistance; the devastating potential of resurgence in settings where the level of natural immunity in populations has dropped; and the challenge to interrupt transmission amongst latent or asymptomatic carriers of the parasite. Parasite resistance to artemisinin exists in the Greater Mekong region (Cambodia, Lao People’s Democratic Republic, Myanmar, Thailand, and Viet Nam).⁷² Drug resistance is driven, in part, by widespread use of ACTs for undiagnosed malaria cases, the circulation of counterfeit and sub-standard drugs, the continued use of oral monotherapies, and by non-adherence to full courses of treatment.⁷³ The consequences of drug resistance are tragic; the treatment that people and parents seek in good faith is rendered ineffective, giving rise to prolonged suffering, frustration, despair, and loss of life.

Insecticide resistance directly undermines key intervention strategies such as treated nets, treated materials, and indoor residual spraying. Over two-thirds of all endemic countries have some sort of insecticide resistance. Resistance to pyrethroids is most prevalent and is increasing rapidly. If pyrethroids were to lose most of their efficacy, an estimated 55 percent of the benefits of vector control would be lost.⁷⁴ Insecticide resistance may be driven by widespread use of “mono-treated” LLINs and the intensive use of pyrethroids in IRS. Other classes of insecticides used in public health are also showing increasing levels of resistance, and cross-resistance is also being observed. Combination and mixture nets treated with synergists and the longer-term development of different and novel classes of insecticides for use on nets and in IRS must be made more available to help reduce selection pressure and contribute to insecticide resistance management strategies.

2.2 The potential of innovation to “change the game”

The SDG agenda calls for a revitalization of solidarity between countries and peoples, and for us to direct our collective knowledge to tackling the global challenges that we face. In parallel to the launch of the GMAP, the Malaria Eradication Research Agenda (malERA) process was initiated. Led by over 250 experts, malERA examined the feasibility of eradication. Released in 2011, the findings provided guidance on the innovations resource platforms, approaches, tools, and training required for malaria elimination and eradication, encompassing basic research, vector control, diagnostics, drugs, vaccines, health systems and operational research, and mathematical modelling.

While we are currently constrained by the lack of alternative strategies, and other technological advances. We are on

enter the market. Major innovative efforts are also underway to improve delivery mechanisms, although challenges remain with regards to innovation in community participation. These scientific innovations, new technologies, strategies and tools promise to make preventing, diagnosing, and treating malaria more effective. High level of research and development must continue, to ensure that the anticipated innovations are realized to meet the 2030 malaria goals, and eventually achieve global eradication.

Chapter 4: Critical Areas for Improved Control and Elimination

Remarkable progress has been made in the fight against malaria, and the 2014 World Malaria Report shows that more than 55 countries are on track to reach the World Health Assembly target of a 75 percent reduction in the global malaria burden. In particular, many endemic countries have made significant advances in scaling up a number of critical interventions to control malaria.⁷⁵ The report further illustrates how two more countries (Sri Lanka and Azerbaijan) reported zero indigenous malaria cases for the first time, eleven countries have maintained zero cases, and another four reported fewer than ten local cases annually. Indeed, improvements instigated by malaria programs, particularly in the area of procurement and supply management, surveillance, and in strengthening collaboration between public and private providers, are widely recognized to have brought wider benefits to health systems. This trend is set to continue: as countries move along the path to elimination the resource requirements, processes, services all change forcing national systems to adapt and improve, while also deepening the level of community engagement.

Despite the advances made, there can be no complacency. Over three billion people remain at risk of infection and malaria disease, with over one billion of them living in high risk areas.⁷⁶ The alarming global rise of resistance to drugs and insecticides makes continued progress both urgent and imperative. There are still tremendous gaps in our knowledge, particularly about the path to elimination. As more and more currently or recently high burden settings continue to make progress, we can develop a comprehensive evidence base about the feasibility and timing of programmatic changes. Learning from past mistakes, such as; the insufficient integration in existing systems, over-reliance on a single tool, lack of community engagement, withdrawal of funding from malaria programs, neglect of accompanying research and development, will also be critical to future progress.

This chapter presents some of the highest priority actions needed to ensure progress towards the 2020 and 2025 milestones, and 2030 malaria goals. Actions are divided into eight main areas:

- 1. leveraging the broader political and development agenda to work across sectors and borders,**
- 2. understanding the financial landscape and mobilizing resources**
- 3. improving policies and the enabling environment**
- 4. strengthening and integrating in health systems,**
- 5. engaging communities for a people-centered response**
- 6. strengthening the evidence to inform future progress, and**
- 7. fostering and sharing innovation and solutions**

Each area includes recommendations for action based upon findings from the “Towards a Malaria-Free World” development process. While some actions will result in quick wins or short-term impacts, other actions will be long term and require stronger evidence, the engagement of new partners, or the creation of innovative solutions before moving to implementation. These areas of focus are not disparate, but fit together to form solutions that encompass existing complexities and dependencies. It is important that actions are not conducted in a vacuum, but analyzed in context. This chapter also provides examples of where organizations or individuals have taken action, to avail additional insight and facilitate successful implementation.

3.1 Leveraging the broader political and development agenda to work across sectors and borders

To maintain the gains and build on current momentum we must strengthen the linkages between the 2030 malaria goals and the Sustainable Development Goals. The SDGs provide opportunities to elevate the political positioning of malaria. This political positioning will be essential for the collaboration across sectors and borders which is required to further progress in the fight against malaria. Action is required to ensure continued political commitment, strengthen the engagement of the non-health sectors, to raise awareness of opportunities to “mainstream malaria,” and to build and expand regional partnerships:

Ensuring political commitment

Strong government commitment is required at all stages of the path to elimination and to prevent resurgence. As countries or sub-national entities move closer to elimination, government support becomes ever more crucial for maintaining funding as the malaria incidence declines and the problem seems to disappear, while the threat of resurgence remains ever-present. The establishment of the African Leaders Malaria Alliance (ALMA) and Asia Pacific Leaders Malaria Alliance (APLMA) are of tremendous significance, and allow the global community and national citizenry to monitor the extent to which political leaders honor their pledges. The establishment of the African Leaders Malaria Alliance, and the Asian Pacific Leaders Malaria Alliance created mechanisms for ensuring political commitment, and it is vital that they remain optimally funded to continue their important work. Leveraging these organizations and replicating their accountability scorecards hold important potential for the successful positioning of malaria in the SDG agenda and ultimate achievement of the 2030 malaria goals.

Spotlight on ALMA and APLMA

ALMA is a groundbreaking coalition of 49 African Heads of State and Governments. At the request from the Heads of State to monitor key indicators (e.g. policy, financial control, commodities) on a regular basis and be able to compare progress with other countries, ALMA created the ALMA Scorecard for Accountability and Action.

APLMA was established at the East Asia Summit in 2013 and brings together 18 national Heads of State representing 55 percent of the global population. Together, they committed to making the Asia Pacific malaria-free by 2030 in partnership with the United States, Japan, China, the Republic of Korea, India, Australia, and New Zealand.

Strengthening the engagement of other sectors

UNDP, RBM, and other partners developed the **Multisectoral Action Framework for Malaria** in 2013 www.rbm.who.int/malaria-multisectoral-approach.html. It provides evidence of the many interfaces between the non-health sectors, malaria transmission and our ability to respond to the disease. To strengthen the engagement of other sectors we must:

- Leverage mechanisms such as ALMA and APLMA and sensitize Heads of States, Sector Ministers, and key business partners on the importance of continuing to reduce and eliminate malaria for the overall development of countries.
- Wield political influence to ensure that reducing and eliminating malaria is integrated in the priorities laid out in regional and national development strategies.
- Advocate for progress in malaria to be regularly reported at the meetings of regional trade and economic blocs.

- Identify context-specific organizations or persons with the power to convene a wide variety of sectors.
- Jointly make use of the matrix provided in the Multisectoral Action Framework (Figure 6 below) to explore the determinants of malaria from a societal, environmental, population group, or household perspective and establish how different sectors are affected by, or are able to influence the identified determinants.
- Work to establish multisectoral partnerships at all levels (see the “Making Partnerships Work” box below).

Figure 6: Matrix showing determinants of malaria and potential sector matches

	Foreign affairs & int. cooperation	Finance & economy	Food & agriculture	Trade, industry, etc.	Infrastructure, transport, works	Education	Social protection	Justice	Science & technology	Environment	Water & sanitation	Communication & information	Security (military & police)	Community development	Health	Public admin., incl. local governments
1. Society																
Inequitable distribution of power & resources across countries	✓	✓		✓				✓		✓		✓	✓			
Demographic change: population growth, family size & structural people movements			✓			✓	✓	✓				✓	✓	✓	✓	✓
Government's ability to regulate, manage land & tax revenues	✓	✓		✓				✓							✓	✓
Organization of societies & services		✓			✓	✓	✓	✓		✓	✓			✓	✓	✓
Social status and power: gender, ethnicity		✓			✓	✓	✓	✓					✓	✓	✓	✓
2. Environment																
Agricultural practice production systems			✓		✓					✓						
Urban/peri-urban settings & infrastructures		✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓
Housing					✓	✓	✓			✓	✓			✓		✓
Land use & management			✓	✓	✓			✓		✓	✓	✓	✓	✓	✓	✓
Economic development		✓	✓	✓	✓			✓	✓	✓			✓	✓	✓	✓
3. Population group																
Poverty & education		✓	✓	✓	✓	✓	✓	✓						✓	✓	✓
Population mobility	✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓
Nutrition		✓	✓	✓		✓	✓					✓		✓	✓	✓
Occupation			✓	✓	✓		✓	✓				✓	✓	✓	✓	
Community control							✓	✓						✓		✓
4. Household & individuals																
Choice/adoption of malaria-safe practice		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓
Awareness & knowledge						✓	✓					✓		✓	✓	
Access to/use of health care		✓				✓	✓					✓		✓	✓	✓
Provision of health care		✓						✓	✓						✓	✓

Multisectoral Action on Malaria in the Islamic Republic of Iran

Iran is in the process of eliminating malaria. An in-depth assessment using the Multisectoral Action Framework resulted in the importance of malaria elimination being taken up in National and provincial poverty alleviation programs. There are now multisectoral malaria elimination committees in each district chaired by the respective Governors. Members include departments of education, energy, water supply, broadcasting, agriculture, and municipal and community-based Islamic councils. These committees integrate means and measures to eliminate malaria in all development projects and facilitate community involvement. Initiatives include: schools teaching pupils about malaria as part of the curriculum from age 11, and the engagement of rural teachers for community education. Local broadcasting centers provide malaria information and education prepared by the provincial health authorities during the malaria transmission seasons. The energy department prioritizes connecting residences of malaria endemic areas in their electrification projects. Elected local Islamic councils work with health staff to mobilize communities and households for safe water storage, including larviciding with *Bacillus thuringiensis* and peer-to-peer education to adopt malaria-safe practices and care-seeking behaviors.

Source: National Malaria Programme, Iran

Mainstreaming malaria

Despite the compelling evidence that malaria is a development issue, it is unlikely that other sectors will channel direct funds to the fight against malaria. It is essential that we take advantage of the new development agenda to identify potential “win-win” situations where progress towards the SDGs will also bring benefits in the fight against malaria. To mainstream malaria in the routine activities of other sectors we must:

- Convene potentially receptive “champions” and present the available evidence on the joint benefits that could be achieved if their sector were to engage/strengthen its engagement in the further reduction or elimination of malaria.
- Encourage these sectors to address the malaria needs of their own staff and their families as a first step. There is strong evidence that this investment will quickly pay off. Worker absences due to malaria decline, and productivity and profits increase as a result.
- Explore possibilities for these activities to be extended to address the malaria needs of clients (e.g., students, farmers) or businesses.
- Use the Multisectoral Action Framework to examine whether the operation, practices, procedures, and production systems of a given sector are potentially contributing to sustaining or increasing vector abundance, parasite transmission, or insecticide or drug resistance.
- Develop strategies for mitigating any potential contribution that is identified. Ensure that the strategies can be readily integrated in the routine operations and budgets of the sector concerned.
- Document and monitor the experiences made for dissemination and potential scale up by other stakeholders in a given sector.

Win-win situations – how countries are making progress towards sector and malaria goals

- In Ghana, the Ministry of Education established a participatory program that provides all children with sufficient LLINs for their household and teaches them how to prevent and control malaria. The children were used to spread these messages to the wider community. This resulted in a decrease of misconceptions about the cause of malaria and improved the uptake of LLINs. It also achieved a 20 percent decrease in parasite prevalence in the children, enabling the children to attend school more regularly and learn more effectively.⁷⁷

- On the Peruvian Northern coast, a desert area, where flooded rice pads may represent up to 90 percent of available breeding surface for malaria vectors intermittent rice irrigation (IRI) was introduced via the local farmers' association in 2006. The results included favorable rice yields, a significant decrease in malaria, and considerable water savings. Subsequently, IRI has become the standard rice irrigation practice bringing benefits for the farmers and further reductions in malaria.
- In Sri Lanka the Ministry of Agriculture uses its network of Farmer Schools to provide combined training and support on organic management for vectors and crop pests, and favorable crop varieties and planting strategies. This has not only reduced malaria transmission, but improved the yield of crops, the costs per yield. The intervention further assisted farmers to identify markets for organic crops/rice where they could sell their outputs for a higher price.⁷⁸

Exp **Malaria and Housing:** UN Habitat has calculated that given population growth projections, over 96,150 housing units would need to be built every day until the end of 2030 to upgrade slums and achieve SDG11, many of them in countries where malaria remains a major public health problem. There is strong evidence that house design is an important determinant of malaria risk (Kirby et al 2008, Ogoma et al 2010). The presence of ceilings, the replacement of thatched roofs with tiled or metal roofs, and closing open eaves can all have a protective effect by, for example, removing a common day time resting place for mosquitoes (Atieli et al, 2009, Liu et al 2014, Anderson et al 2014). Many of these features also have additional functional and aesthetic benefits, meaning that they are likely to be valued by residents. Incorporating these features in housing standards and the designs used by corporation and public housing programs will bring benefits to the housing sector, while also supplementing conventional malaria interventions.

gaps emerge or are filled, as new actors enter the landscape or engage in the malaria agenda, or as countries identify emerging challenges or opportunities.

- Create a network of regional experts able to provide quality technical assistance.
- Work to obtain sustainable funding and long-term political support for the partnership from countries in the region concerned.
- Make sure the partnership creates a space for cross-border collaboration to be implemented at all levels of government, including at local level. An example is the innovative 'Twin-cities' project that is being piloted along the Thai-Myanmar and Thai-Cambodian borders to help detect and contain drug resistant malaria.
- Continue to document our experiences of working across sectors and national borders. Stronger evidence will encourage the development of further malaria partnerships, and allow those working on other diseases to learn the lessons from malaria.

The Asian Pacific Malaria Elimination Network (APMEN)

APMEN was established in 2008 and now brings 16 countries and a wide range of international malaria institutions together to support each other's efforts and to achieve the long-term goal of eliminating malaria regionally. The network provides a collegial platform for experience/knowledge sharing on malaria elimination, and builds advocacy capacity and leadership for elimination. It has facilitated the establishment of technical working groups on *P.vivax*, vector control and surveillance. By bringing different partners together, it works to mobilize funding for elimination, and to fine-tune elimination implementation approaches involving private-public partnerships, community engagement, multisectoral work, and cross-border activities.

The Elimination 8 Initiative (E8)

Established by the Southern African Development Community (SADC), the E8 is a coordinated effort across eight countries (Botswana, Namibia, South Africa, Swaziland, Zambia, Zimbabwe, Angola, Mozambique) to bring the Southernmost four countries closer to malaria elimination, and to reduce incidence in all eight nations. The E8 aims to achieve malaria elimination, by complementing national efforts with a targeted joint and strengthened cross-border approach that entails:

- Mobilizing financial and technical resources for to further reduce and eliminate malaria
- Increasing health systems capacity regionally to effectively implement, sustain, monitor and evaluate progress at national and sub-national level
- Coordinating multi-sectoral efforts among all partners working on malaria
- Strengthening cross-border collaboration to address the dynamics of regional migration
- Promoting program ownership at sub-national (district and community) levels

The Amazonas Malaria Initiative (AMI)

AMI provides support to Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, and Suriname. As incidence has dropped, drug companies are losing interest in the antimalarial markets. This confronts countries with problems to assure constantly uninterrupted treatment availability and to stop stocks expiring. In response to country concerns, AMI facilitated the establishment of a multi-country monitoring system. This is based on the use of readily available data on current and project stocks. Once reported, the information is used for immediate decision-making and triggers the redistribution of medications within the region. Between 2009 and 2013, the system has allowed for more than 50 exchanges of antimalarial drugs between countries, or from PAHO's Strategic Pool to countries. This meant that sick patients received treatment consistently, and drug wastage due to expiration was significantly reduced.

Making Partnerships Work

Strategic and operational partnerships have the potential to overcome expected challenges and significantly impact the effectiveness of the response in the coming years. Understanding a partner's or sector's motivation for investing in malaria holds the key to the establishment of enduring and productive partnerships, where every partner both contributes and enjoys the synergistic benefits. The traditional roles of the different constituencies in the fight against malaria continue to evolve. For example, the incentives for investing in malaria are different depending on whether malaria is part of a company's core business (e.g. mining, logging industries); or whether the industry is affected by malaria (e.g. mining, logging industries); or whether the industry has a social or environmental responsibility or sustainable businesses practices. For additional information on incentives and expectations for investing in malaria, please see Appendix 2.

Operationalizing partnerships

Engaging with many partners can be time consuming and give rise to tensions between partners of each stakeholder group and establishing clear roles and responsibilities. To operationalize partnerships at any level, whether within communities, at national level or across borders. To operationalize partnerships of any type, we must:

Illustrative incentives include:

- A malaria-free world
- Better quality services
- Reduced out of pocket costs
- Increased productivity due to healthier workforces
- Stronger local economies
- Better resource management
- Recognition
- Image or branding
- Market access

- Create a convening mechanism or network secretariat to coordinate activities and ensure effective knowledge management.
- Develop coalitions and networks to simplify coordination, at any level, while also amplifying the voice of partners.
- Jointly agree the purpose, goals, and expected outcomes of the partnership.
- Establish a funding mechanism for the partnership.
- Establish formal or informal governance structures to clarify leadership, and agree to the roles and responsibilities of each partner. For example, national partnerships can leverage the sample Terms of Reference that RBM has developed and is available at [XXX](#).
- Create a clear action and monitoring framework.
- Hold regular joint progress reviews to hold one another accountable for commitments and to reward progress towards the agreed partnership goals.

3.2 Understanding the financial landscape and mobilizing resources for malaria

3.2.1 The Current Financial Landscape

Development Assistance for Health (DAH)⁵ is increasingly marked by transitions, with the sources and recipients shifting in recent years. Nonetheless, it has shown resilience in the face of the financial and economic crisis of 2008. The OECD's Development Cooperation Directorate (OECD-DAC), to which most bilateral aid agencies and foundations report their aid expenditures, showed total DAH disbursements reaching US\$22.7 billion in 2013. The Institute of Health Metrics and Evaluation estimates that number to be even higher at US\$ 31.3 billion, over five times more than in 1990.

Expenditures from foundations and non-traditional donors increased even more rapidly than overall DAH.⁷⁹ However, the total amount of DAH provided by the richer countries remains small - less than 1 percent of the amount they spend on improving and maintaining health in their own countries. Only a few countries have achieved the internationally agreed goal to allocate 0.7 percent of gross national product (GDP) to aid.^{80 81}

The first GMAP estimated that US\$5.1 billion would be required each year between 2008-2015 to reach its goals, as well as an additional annual US\$750-900 million to fund malaria research and development (R&D). Donor disbursements targeting malaria increased dramatically from less than US\$ 100 million in 1998 to US\$ 2.7 billion in 2013, increasing by 43 percent per year between 2005 and 2009. In addition, substantial international investment has been made to strengthen health systems. There has also been some success in leveraging innovative financing mechanisms at the global level. Perhaps most successful is UNITAID which was established as a channel for government's earmarking of taxes on airline tickets. This has generated over US\$ 1 billion in international health funding between 2007-2011, of which 85 percent was allocated to low-income countries.

Between 2005-2011, domestic funding of malaria programs has been increasing on average by four percent per year in Africa, and by two percent in the other WHO regions, and accounted for one-fifth of all funding (US\$ 527 million, 20 percent).⁸² It should be noted that figures on domestic funding exclude expenditures on health worker salaries and other shared costs of diagnosing and treating patients; and therefore do not reflect the full extent of the contribution being made.⁸³

Figure 7: Sources of funds spent on malaria since 2005 and projected funding through 2016

See also Appendix F for a breakdown of international and domestic funding sources for malaria control and elimination, and the proportion that was provided by out of pocket payments in 2013.

As Figure 7 shows, external resources financed the large bulk of spending specifically for malaria in 2013. Domestic funding of malaria programs increased and accounted for one-fifth of all funding (US\$ 527 million, 20 percent), but it is dwarfed by the resources provided by the Global Fund (US\$ 1 billion, 40 percent), the US

⁵ DAH comprises financial and in-kind contributions by channels of development assistance i.e. institutions whose primary purpose is to provide development assistance to improve health in developing countries." It includes non-concessional loans and funds from private foundations and NGOs that contribute directly to the promotion of development and welfare in the health sector in developing countries (IHME 2011). Official Development Assistance (ODA) for health is the component provided by official government agencies - bilateral donors (http://www.oecd.org/dac/dac-glossary.htm#Aid_Activity).

government (US\$ 675 million, 26 percent in 2013), which provides a third of the Global Fund funding, but also through its bilateral President's Malaria Initiative (PMI), the UK government (US\$ 179 million, 7 percent) and the World Bank (US\$ 71 million, 20 percent).⁸⁴

In 2013 the main funder of R&D was the US National Institutes of Health (25 percent), followed by the Gates Foundation (22 percent) – which is also a major funder of global health efforts and malaria beyond R&D. The third largest source of funding for malaria R&D is the pharmaceutical and biotechnology industry (15 percent), followed by DFID (5 percent) and the Wellcome Trust (5 percent).

Impressive though the increases in malaria-specified financing have been, the US\$ 2.7 billion raised in 2013 only amounts to 52 percent of the US\$5.1 billion target, far below the amount that is actually needed to achieve our targets. In addition, both the rate of increase and the proportion of DAH allocated to malaria have declined since 2010 and funding for malaria R&D activities actually fell in 2013 by 7 percent to US\$ 549 million.⁸⁵

Economic growth in the past 20 years in low-income and middle-income countries has generated fiscal headroom for growing public spending on health - for example, two-thirds of the countries in Africa have witnessed 10 or more years of uninterrupted growth – yet domestic funding for malaria programs has not increased at a similar pace and in fact declined in the two most recent years for which data are available, from its peak of US\$598 million in 2011. While recognizing the many competing priorities that governments must fund, many of these countries have the potential to raise or allocate additional funds for health and for malaria.⁸⁶ However, a recent study of 46 low-income and middle-income countries showed that general government health expenditure remains less than 10 percent of general government expenditure for more than half of these countries, and less than 5 percent in ten countries. Similarly, in 2001, African heads of state pledged to allocate 1 percent of their national budgets to health, yet by 2011 only two of the 55 African Union member states, Rwanda and South Africa, had met this target.⁸⁷ The remaining countries continue to forfeit the potential for transformative growth that sustained investment in the social sectors can generate. Too many health systems continue to rely too heavily on direct payments, the least equitable form of health financing. As a result, too many people are still being asked to pay too much from their own pockets to access health and malaria services.

3.2.2 Mobilizing Resources

Achieving the 2030 malaria goals will be dependent upon the mobilization of higher levels of predictable and sustained funding. Resource mobilization for health and malaria require an exponential effort in an increasingly complex world. Many major donors will struggle to maintain current levels of support unless the global economy starts to pick up. Commitments to development assistance are declining even if the result has not yet been seen in terms of disbursements,⁸⁸ while malaria endemic countries have a myriad of health problems to deal with. Powerful emerging markets such as Brazil, Russia, India, and China (the so-called BRIC states) and (Mexico, Indonesia, Nigeria and Turkey) the MINT states, as well as the Gulf States, are increasingly important economic forces. As of 2013, China, Turkey, South Africa, Brazil, and India all provided health-related support to low-income countries⁸⁹ and might be a source of future malaria funding. It is noteworthy that these countries are generally adopting different approaches to giving than those used by traditional donors, emphasizing South-South cooperation and sharing experiences of their own health problems with cost-effective domestic solutions.

Malaria financing is a particularly challenging area because it remains so dangerous to reduce funding in low transmission contexts. There is a need to keep funding malaria control, while also mobilizing additional

resources to address the growing financing gap for malaria elimination. Reducing and eliminating malaria is a global public good, and the international community needs to support countries as they transition to greater domestic funding in the middle-longer term. Failure to sustain elimination will result in resurgence which will, in turn, generate still higher costs for countries.⁹⁰ Action is required to increase domestic investment, expand innovative financing strategies, maintain and expand the base of traditional donors and increase investment from emerging economies, scale-up private sector engagement, optimize efficiencies, and strengthen transparency.

Increase domestic funding

Regardless of where a country is on the path to elimination, domestic funding for malaria is essential for a sustainable response. As development assistance becomes more focused on low-income countries, and with the Global Fund’s encouragement of counterpart financing requirements, more and more countries are moving to scale up domestic funding for malaria, and health in general. However, this remains challenging. Many governments do not prioritize health in their budgets for a combination of fiscal and political reasons, or because of the perception in Ministries of Finance that Ministries of Health are not efficient. The impressive case for investing in the fight against malaria, including the evidence of the benefits this investment generates for the wider health systems, can help to counter this perception, and presents a window of opportunity for championing increased funding for health.

To find new way to raise funds for health and diversify sources, we must:

- Explore possibilities to improve revenue collection. Many countries are taking steps to broaden their tax bases and improve their tax administration. The International Monetary Fund (IMF) estimates that lower-middle-income countries, in aggregate, increased their tax revenue from 16 to 20 percent of GDP between 1990 and 2011. For low-income countries, in aggregate, the percentage increased from 13 to 17 percent, although the possibilities are more constrained in countries with large informal sectors.
- Leverage the important progress that has been made to increase transparency in the dealings of multinational corporations. In the extractive industries this is being championed by the campaign group “Publish What you Pay” and by the Extractive Industries Transparency Initiative. Hosting countries are starting to get a fairer share of tax receipts and royalties, some of which are flowing into the social sectors.
- Low income countries with large informal economies will need to collect such as import or export duties of various types. For example, Indonesia meets 70-75 percent of funding needs for its National Health Accounts through tax funding, notably through a 2.5 percent national health insurance levy.
- Leverage the potential of health sector reforms to advocate for increased funding, as demonstrated by the experiences of Burkina Faso, Chile, and Cambodia.
- Mainstream malaria prevention into the routine activities of health care, water and sanitation, education, agriculture, and settlements, that further progress towards sector goals, while also facing the challenge of financing.

Indonesia increases tax revenues by encouraging compliance

The Directorate General of Taxation simplified the tax system to encourage voluntary compliance, where taxpayers self-assess, then pay the tax in income declared. Positive results followed, with the tax yield rising from 9.9 percent to 11 percent of non-oil GDP in the four years after implementation. The additional tax

Expand innovative financing solutions for malaria

Various options to generate additional funding for malaria exist and could be introduced at either global, regional or country level. The sums that could be generated, political acceptability and precise modalities need to be considered carefully in advance. To move forward we must:

- Analyze potential options for example, the introduction of mandatory solidarity levies on airline tickets; taxes on pharmaceutical company profits, or foreign currency transactions; or so called “sin taxes” on alcohol and tobacco. Higher income countries could use these to raise funding for health and malaria

control in lower-income settings, while lower income countries could use them to raise domestic funding for health.

- Explore possibilities to introduce mobile phone voluntary solidarity contributions. The global market for mobile phone services is forecast to have a value of \$203.8 Billion in 2016.⁹¹ Even tapping into just 1 percent of this, by allowing individuals and corporations to make voluntary donations via their phone bill payments, could raise a lot of money for malaria. Depending upon penetration rate, this could even be workable at country level.
- Assess the possibilities to introduce tourist taxes in countries where tourism is an important sector, or add a malaria component to airport departure taxes which are already well accepted.
- Introduce diaspora bonds (the selling of government bonds to nationals living abroad) in countries with significant out-of-country populations. The revenue from bonds sales could be dedicated to health. With the right messaging, there could be potential to ear-mark part of the funds for malaria.
- Further assess the potential of Malaria Bonds, which have been proposed as a way of raising more funds for malaria control with a specific link to payment for results. Donors would guarantee full payment of their assistance only on completion of results. To finance part of the work, malaria bonds would be offered to investors with aid money used to repay the bonds with interest on security. This assumes that the results would be achieved.
- Promote the advantages of the Pledge Guarantee for Health (PGH) for increasing the availability and predictability of funding from international donors for health commodities. Through a 5-year partial guarantee from the governments of the United States and Sweden, PGH is able to leverage \$100 million in credit from commercial banking partners which, in turn, extend short-term credit to traditional donor aid recipients. This enables recipients to use committed donor funding in advance of disbursement, resulting in increased buying power, and accelerated procurement and delivery.
- Scale up the use of debt conversions deals, whereby developing country debts can be written off so long as the amount agreed is invested in health or malaria. The deals work at the bilateral level between a donor and a country. The Global Fund has had some success with its Debt2Health mechanism.⁹²
- Leverage regional partnerships to attract funding from governments that have an interest in contributing to improving health and suppressing malaria in the wider context of their geographical vicinity.

Maintaining emergency donors from

Examples of regional funding initiatives:
A Regional Trust Fund for Malaria and Other Communicable Disease has been set up by the Asian Development Bank (ADB). It is the first fund to emerge from ADB's new Health Financing Partnership Facility, which seeks to attract co-financing from regional economies, development partners, the private sector, and foundations. ADB hosts the APLMA Secretariat and will strengthen and provide support to APLMA's two task forces on sustaining financing for elimination and ensuring quality and affordable malaria medicines and technologies.

- The Global Fund has allocated US\$ 10 million to the Eliminate Malaria in Central-America and Hispaniola (EMMIE, for its acronym in Spanish) Initiative to support 10 countries as they move towards elimination. Countries receive the requested funding once they have met their targets in an attempt to catalyze progress towards elimination **Engaging new funding sources** and by rewarding performance.

In 2011, the government of Benin approached World Bank International Development Association (IDA) to solicit additional US\$ 120 million to fight malaria, as there was consensus this would positively impact GDP. To trigger funding the Ministries of Finance and Health had to work in close collaboration. They built a compelling socio-economic case for the investment and the request was processed within 3 months (APLMA 21)

- Position malaria in the broader global health agenda, e.g. align with the Every Woman Every Child campaign to leverage the World Bank’s new Global Financing Facility, and across the broader context of integrated health systems strengthening initiatives.
- Continue to identify funding needs and align them with available funds, including by supporting the GFATM grant proposal process.
- In regards to emerging economies such as the BRIC, MINT, and Gulf States, malaria is only one of many areas that are vying for attention and funding. Further efforts are needed to determine priorities of domestic agendas and potential alignment with malaria mainstreaming and programming.

Scale up private sector engagement – leveraging smart policies, and social corporate responsibility

- Develop a corporate engagement strategy to leverage private-sector led successes in malaria control to bring more companies into the malaria space, at global, regional, and country level. The engagement could take the form of challenge grants or matching gift mechanisms.
- Leverage smart policies: For example, India has introduced legislation that obliges companies to invest two percent of their profits in Corporate Social Responsibility.
- Continue to encourage the pharmaceutical sector to engage in R&D and innovation in malaria.
- Engage more strongly with civil society organizations in community settings (e.g. Rotary and Lions Clubs) to interest them in malaria.
- Leverage the SDG agenda to engage corporate and private sector mandates in funding the fight against malaria.
- Target high net-worth individuals in countries of all income levels for philanthropic financing.

Engaging the extractive industries

In Brazil all enterprises operating in the Amazon region are required to fund programs to prevent and control malaria in their influence areas. This has been made a legal requirement for obtaining an environmental license. These programs are monitored by Federal Government and implemented at the local level with the municipal health administration. Between 2007 and 2014 companies have invested over US \$ 40 million in improving local health services, malaria surveillance and

Optimize efficiencies and strengthen transparency

While raising additional funds is critical, the 2008 financial crisis has led to a focus on efficiency in the use of international and domestic funding flows. In the public and private sector began to stress the importance of ensuring the “best value for money” or the optimal use of resources to achieve intended results. Value for money seeks to balance the “four Es” – economy, efficiency, effectiveness, and equity,⁹³ and requires the use of different value measures depending on the context and investors. For example, investment in low transmission settings needs to be measured in terms of cases and deaths averted, or the economic gains associated with the long-term avoidance of resurgence, rather than the costs per case, which may rise dramatically as cases drop. Robust financial management will be essential for greater transparency of funding flows and to tackle inefficiencies and corruption. Increasing the transparency of the distribution of funding and accountability for results will provide confidence to existing investors and spur additional investment. To strengthen transparency and optimize resources, we must:

- Advocate for the creation of legislation to regulate public finance management.
- Establish expenditure review processes to monitor investment in health and malaria.
- Carry out performance reviews and allocate funds to those who are achieving outputs and outcomes related to the reduction and elimination of malaria.
- Distribute regular reports and develop communication strategies to strengthen accountability for the implementation of malaria programs.
- Increase the flexibility of funding modalities to respond to emerging needs.

- Optimize the ways in which malaria funds are spent and strive for increased value for money in the delivery of targeted malaria interventions. Demonstrating improved value for money makes the return on investing in malaria even higher and is a way of competing better for the limited resources.

Advocating for resources for malaria

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It is vital that we build and strengthen global, regional, and in-country advocacy coalitions to ensure that funding for malaria is maintained and increased.

An essential resource is the Advocacy and Resource Mobilization Guide which provides malaria stakeholders in-country with an advocacy implementation guide, case studies and tools to assist in the mobilization of resources for malaria control and elimination. It is organized into a five-stage process as follows: Stage 1. Analyzing the situation; Stage 2. Building relationships; Stage 3. Making the case; Stage 4. Monitoring and evaluation; Stage 5. Ensuring sustainability.

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alone guidance to countries interested in strengthening their resource mobilization efforts. For more information about the ARM workshop, send an email to inforbm@who.int or contact your RBM Sub-regional Network focal person. For a copy of the document, please visit: [XXXXX](#)

Environmental policies; Ministries of Agriculture often set the policy on which insecticides can be used for IRS; animal health authorities may also need to be involved in policies designed to manage human health risks. To strengthen the enabling environment, we must:

- Conduct a rapid policy analysis as described in the WHO Handbook for Integrated Vector Control http://whqlibdoc.who.int/publications/2012/9789241502801_eng.pdf to assess the strengths and weaknesses of the regional and national policy environment, identify gaps and inconsistencies, and take this as the basis for amendments, rephrasing, withdrawing or creating policies in support of the fight against malaria.
- Introduce tax policies to limit bureaucratic barriers to investment, incentivize private sector involvement and reduce taxes and tariffs on health commodities.
- Advocate for the introduction of occupational health regulations, as promoted by the UN's International Labor Organization's *Decent Work Agenda*, to protect workers from injury and sickness, including malaria, during employment.⁹⁴
- Use civic by-laws as an entry point E.g., in various municipal corporations in India building by-laws require companies and individuals to take precautions to prevent conditions for vector breeding on the exterior of buildings and in curing waters, masonry tanks, etc. during building construction and demolition. Compliance is a precondition for the issuing of occupancy certificates for the resulting structure on the part of the municipal authorities.⁹⁵
- Ensure that health and social impact assessments that pay particular attention to malaria are carried out before decisions are taken on moving forward with major new constructions like dams, natural resource extraction, establishing plantations, or breaking new settlement frontiers.

The health and malaria policy environment

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Placeholder for social, health, and environmental impact assessments:

Case study where malaria was pivotal and long-term effects/mitigation needs to be found.

Possibly from Brazil/ or under consideration: The Addax Bioenergy Sierra Leone (ABSL) project which cultivates sugarcane for the production of ethanol for export to Europe (an estimated 85 000 m³ per annum) and electricity (100 000 MWh per annum). The generated electricity will supply the refinery and the irrigation system for the sugarcane estates. A capacity of up to 15 MW of power will be supplied to the national grid of Sierra Leone. The assessment showed that the ABSL project is located in an area with a high burden of malnutrition, malaria, anemia, and hook worm infection. The potential risk, were balanced with the probable project related health benefits linked to improved socioeconomic status, farmers development programs and ongoing health interventions and gained

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activities. The costs of investing in the development of new tools and drugs are staggering, and every year of delay impacts heavily on the potential return on investment.

- Promote the provision of Universal Health Coverage and consolidate social protection mechanisms so that people do not have to pay for health care at the point of delivery.
- Ensure that Universal Health Coverage developments are genuinely inclusive of migrants, including undocumented migrants.
- Increase the transparency of user fees and ensure the prices of all services, including malaria diagnosis and treatment are prominently displayed in all public health facilities.
- Strengthen mechanisms to exempt the poor from the payment of user fees.
- Ensure that regulations are in place to refund non-government providers for services that national policies require them to provide free of charge.
- Align national malaria policies with the WHO technical strategy and recommended WHO policies. This will also help to strengthen regional alignment and facilitate cross-country collaboration and regional partnerships.
- Leverage the Malaria Policy Advisory Committee (MPAC) of the WHO to assess and develop new policy recommendations on malaria control and elimination.
- Ensure that swift action is taken to review and advise on new tools to reduce the “go to market” time.
- Explore possibilities for regional policies (e.g. to register drugs and other health commodities) to improve efficiency.
- Promote the ACT watch approach to have accurate up to date information on the quality of ACTs in a given country to lobby decision-makers, raise awareness, and strengthen accountability for change. ACT Watch studies a nationally representative sample every 2 years to show market share, price and availability of different antimalarials and diagnostic tests in public facilities and private retail outlets (hospitals, private pharmacies, street hawkers), as well as provider knowledge and case management practices in the public and private sector.

Improving the implementation and impact of policies

Functional regulatory bodies and community engagement are needed to oversee policy implementation.

We must:

- Strengthen the capacity of regulatory bodies, and ensure that they are functional, sufficiently resourced, and their mandate is backed by legislation.
- Further promote the World Health Assembly resolution on monotherapies, enforce national legislation banning their sale and use, and clamp down on inappropriate drug prescribing practices.
- Facilitate partnerships between national drug agencies and the pharmaceutical industry to tackle the use of counterfeit and substandard drugs, including ACTs.
- Liaise with customs staff to heighten their awareness of the damage that fake drugs can cause.
- Raise awareness of fake drugs amongst health workers, traders and the general public using messaging from the “Fight the Fakes Campaign” <http://fightthefakes.org/>
- Establish national hotlines where people can register concerns about the quality of drugs.
- Strengthen bidirectional communication between legislative and technical bodies establishing the policies, and those affected by the policies.
- Monitor and evaluate the impact of policies and regulations (positive or negative) to inform future policy development and updates.

3.4 Strengthening and integrating into health systems

Sustaining progress along the path to elimination cannot be considered in isolation from the broader health system, which enables or prevents people’s access to health services. Leveraging the current drive towards Universal Health Coverage, optimizing the use of resources across the public and private sectors and at community level, steps to reduce system inefficiencies, customizing the response to local contexts, and smart integration in existing health systems will all help facilitate progress towards the 2030 malaria goals. Actions required are: improving health sector governance, leveraging human resource capacity, strengthening procurement and supply chain systems, and customizing the response.

Improve health sector governance

Health sector governance rests on the strategic vision set out for people’s health, and whether it enshrines the values of solidarity, equity, and social justice. Health sector reviews raise concerns about the degree of participation and consensus in the development, implementation, and monitoring of national health and malaria strategies and plans. Governance in health systems also depends on there being mechanisms in place for citizens to provide feedback on health services, or to register complaints.

To strengthen health sector governance we must:

- Ensure a high degree of participation and consensus building in the development, implementation, and monitoring of national strategies for health and malaria.
- Advocate for public agencies, including national drug agencies, to disclose information on their health related actions (e.g. procurements), as well as audits and financial statements.
- Work with communities to establish transparent criteria for identifying the families and individuals who are genuinely unable to pay for health care, and should be exempted from user fees.
- Establish mechanisms for citizens to give feedback on the quality of care at facilities, including about stock-outs and to be informed about the response.

mTRAC in Uganda

To complement health worker reporting, community members are encouraged to report stock-outs or other problems via a free and anonymous SMS hotline. A dedicated team at the Ministry of Health reviews and responds to the anonymous SMS reports. Each report is categorized by District and issue area (e.g. stock-out, drug theft, fraud) and forwarded to an action center. This includes the District Health Management Team, and other institutions as needed (e.g. National Medical Stores). In addition, mTRAC arranges a regular radio talk show that is focused on health issues of concern to communities, and provides a means to give feedback about the actions being taken based on the SMS reports received. The mTRAC team also publishes regular articles in the national press to highlight health issues of national interest, promote the SMS hotline, and provide feedback on improvements.

Leverage Human Resource Capacity

Health systems, malaria programs, and environmental health have been plagued by capacity shortages for decades. Progress has been achieved through multipurpose health care providers and community health workers on a best effort basis. As the WHO technical strategy stresses, expanding human resource capacities at national, district, facility, and community level needs to be considered as an integral part of health system strengthening. There need to be enough general health workers with sufficient skills to support malaria programs to deliver the needed interventions as a specialized, yet integrated service. Building up national capacity to collect, analyze, manage, share and use entomological data is crucial, especially in elimination and in areas that are affected by epidemic malaria – be this due to seasonal factor or increased population mobility – where the establishment of epidemic preparedness and responsiveness is imperative. Having sufficient

capacity in place is also essential for the effective management of insecticide resistance. To leverage human capacity, we must:

- Support malaria programs to conduct human resource needs assessments at all levels to establish the availability of required competencies and training opportunities in relation to where a country or sub-national entity is on the path to elimination.
- Work with malaria programs, the wider health sector, and other sectors and communities to develop a forward-looking HR policy as well as a strategic and operational plan.
- Consider if existing human resources can be shared through partnerships between programs, across regions, districts or even with neighboring countries.
- Strengthen support and supervisory mechanisms, including the use of innovative training methods, to optimize the contribution that human resources at all levels can make.
- Ensure that any changes in national strategies are rapidly integrated in the pre-service and continuous training of all those involved in the fight against malaria.

Improve the quality of care and optimize efficiency

Malaria programs can spearhead improvements in quality and help overcome inefficiencies for the benefit of the entire health system. To tackle inefficiencies in malaria programs we must:

- Raise health staff awareness of the benefits of quality assured ACTs and generic medicines in general.
- Improve prescribing guidance, information training and practice.
- Disseminate public information to counter inappropriate consumer demand/expectations e.g., to receive an ACT even if the RDT gives a negative result.
- Monitor and publicize the price of ACTs and other medicines.
- Strengthen the capacity of national laboratories to regularly monitor the quality of malaria products.⁹⁶

Strengthen procurement and supply chain systems

Challenges in procurement and supply chain systems are widespread due in part to ill-equipped human resources, poor forecasting, and tracking systems, logistical issues, and inadequate quality assurance processes. This can negatively impact the availability of prevention, testing, and treatment products for example through over-stocking which can lead to waste. Stock outs, in particular, undermine confidence in public health systems and their consequences can kill. They deny people, particularly the poorest, access to timely diagnosis, ACTs, or other essential medicines, as well as to prevention tools.

Malaria programs have the potential to improve procurement and supply chains for the benefit of the entire health system. In malaria control settings need to be able to manage large-scale distribution of commodities. In elimination settings, systems must evolve to be able to respond quickly to outbreaks and target residual foci of infection and systems for redirecting supplies to areas in need.

To strengthen the procurement and supply chain systems, we must:

- Strengthen the monitoring and tracking of consumption data at all levels to better inform procurement needs.
- Assess and conduct a mapping of parallel public and private populations that operate independently (e.g. governments, negotiate agreements to cooperate either routinely or in partnership)
- Leverage cost-effective and adaptable technologies to facilitate expected deliveries, inventory management, and early warning systems for rapidly redirecting supplies to areas of need.

“Project Last Mile” is a public-private partnership that applies Coca-Cola’s logistic, supply chain, distribution, and marketing expertise to assist African governments in providing critical medicines and medical supplies to those who need it most. Since the project was launched in 2010, 20 million people have benefitted from better access to critical medicines due to reduced lead-time for medicines by as much as 25 days and direct delivery to over 5,000 health facilities.

- To counter active leakage from supply chains and reinforce accountabilities, it is imperative that community representatives are present when drugs and other commodities are ordered, received, inventoried, or need to be destroyed.

Customize the response

As the burden of malaria decreases, its epidemiology becomes more heterogeneous and there is a growing need for sub-national entities to stratify their malaria situation and programming. Sub-national data on transmission risk are essential for targeting strategies and interventions to reach vulnerable populations and/ or remote areas. It is crucial that national malaria programs have sufficient capacity to support those working at lower operational levels to customize their response to the local context.

This will facilitate a shift from country or region wide implementation of all interventions to a more specific localized implementation of selected intervention packages – making the investment in malaria more efficient and giving greater value for money. To customize the response we must:

- Assess and secure the specific malaria skills and infrastructure that are required to reach programmatic goals. These needs are dynamic and need to be reviewed at frequent intervals.
- Stratify epidemiological data, and layer it with other relevant data to better understand transmission risks and patterns and customize the response accordingly.

Placeholder for a case study: From 2000 to 2014, Tanzania made significant progress in reducing its burden of malaria. However, this progress came at an extremely high cost, giving rise to concerns about sustainability. The national program took steps to stratify epidemiological data on transmission with data on socio-economic status (wealth, housing, caretaker education level), setting (urban/rural), and programmatic/operational data (access to malaria interventions, distance to health facility) to identify areas with groups of particular vulnerability. The results of this profiling facilitated the targeting of interventions to low, medium, or high transmission areas. In low and medium areas some interventions could be reduced in frequency, or even carefully discontinued. This freed up resources which could be focused on high transmission areas, and the introduction of additional targeted interventions to reach those identified to be vulnerable.

Strengthen collaboration between private and public health systems and “smart integration”

Stronger cooperation and collaboration between the public and private (profit, not-for-profit and military) health systems not only increases the reach of service provision, but is likely to strengthen the private sector’s willingness to adhere to national regulatory structures and systems (e.g. surveillance and reporting, use of generics, etc.). Integration across interventions and sectors provides a platform for widespread access to populations and has the potential to improve outcomes and efficiencies for the entire health system, as well as to address community health issues more holistically, for example: comorbidities between malaria and malnutrition, or malaria and HIV. To strengthen collaboration between public and private providers and take advantage of integration, we must:

- Strengthen communication channels and clarify roles and responsibilities between the private (profit and non-profit) and public health sectors at all levels.
- Align malaria programming and the broader health sector planning processes to take full advantage of opportunities to integrate in existing systems.
- Ensure that malaria and health sector planning is undertaken with strong representation of the private health sector (service providers, training institutions, private pharmacies, etc.). Greater private sector engagement will be critical to strengthen partnerships and tap into the many resources the private

sector can bring to the fight against malaria including technical expertise, operations, supply chain management, marketing, etc.

- Scale up the integrated Community Case Management (iCCM) approach that seeks to complement and extend the reach of public health services. For example, Community Health Care Workers can be supported to provide access to timely and effective treatment of malaria,⁹⁷ pneumonia,⁹⁸ and diarrhea,⁹⁹ - a strategy that is saving many lives - especially in children under five.

3.5 Engaging

The achievement of fight against malaria behind. People are the key health and choices for themselves commitment that is of a community's pre empowering commu communication chan emergencies, and inc

Smart integration has two way benefits:

- Integrated vector management seeks to leverage health and other sector funds, expertise and infrastructure like laboratories and communications to improve vector control for several diseases concurrently. This saves costs, and by combining interventions, monitoring and evaluation other efficiency gains can be made. At the same time, the reach of other health services can be extended by combining them with IVM activities at community level (IVM Handbook, WHO).
- Interventions to prevent malaria in pregnant women in sub-Saharan Africa can be delivered via routine antenatal care. However, it is still the case that coverage with 3 or more doses of IPTp remains insufficient, in part because many women only attend ANC 1-2 times in the course of a pregnancy. A combined effort by ANC and malaria teams would increase the take up to at least 4 ANC visits as recommended, and ensure they are used to deliver life-saving

Empowering Co

The active engagement of community members holds the key to the acceptance of interventions (e.g., early care-seeking at public health facilities, involvement in distribution campaigns, successful vector control activities). Empowered communities and civil society groups will use malaria products and services effectively and increase the demand for them, play an active role in pu holding providers accountable.¹⁰¹ To empower communities

- Facilitate civil society involvement in malaria programs via seats on political advisory groups, country-coo coalitions, as well as on health facility governing co
 - Ensure the involvement of civil society is represent ethnicity.
 - Raise awareness about the purpose of civil society malaria programs and activities are aware of best
 - Facilitate the sharing of community level experie effective health facility governance, initiatives to e
 - Identify "voices" of those affected by malaria and
 - Increase awareness of best practices on how to en
- In Malaysia, a community participation health program (Sukarelawan Penjagaan Kesihatan Primer or SPKP) was developed as an adjunct to anti-malarial measures. The monthly number of malaria patients diagnosed by the village health workers correlated significantly with the number of true malaria patients. When local communities took over the program, the improvements in its functionality as a malaria surveillance system and an antimalarial drug distribution were statistically significant.

Mobilization Guide for Malaria (see details in 4.2) can be leveraged for guidance, e.g., on how to access key influencers like business owners, athletes, musicians, movie or TV celebrities.

Place holder for example of impact created by use of champions
e.g. United Against Malaria Campaign in Ghana and Tanzania
Leveraged the popularity of football to rally the public and private sector to the fight against malaria.
The campaign brought massive exposure to malaria messages. In Tanzania, it built a highly visible platform for malaria education and protection through the Tanzania Football Federation, Counsel of

Central and Eastern Africa Football Association and FIFA – representing thousands of players and millions of fans. Of the estimated 22 million exposed to at least one World Cup match, 64 percent recalled seeing a UAM spot, according to an Omnibus survey.

Strengthening social and behavior communication change strategies

Social and Behavior Change Communication (SBCC) uses knowledge of target audiences and their behaviors to inform the development of effective communication strategies. In 2012, RBM's Communication Community of Practice developed The Strategic Framework for Malaria Communication at the Country Level. Its findings highlight how SBCC programs need to be implemented and supported as an integral component of malaria control and elimination efforts. It also underlines challenges to monitor and evaluate the impact of SBCC, and how there are still important gaps in our understanding of how best to target, package and deliver communication campaigns to effectively impact individual and community behaviors. To strengthen SBCC strategies, we must:

- Ensure all national malaria control program communication strategies are culturally sensitive, evidence-based, and results-driven.
- Identify who is best placed to communicate messages. Engage community agents, including parents who have lost children to malaria, women, and youth.
- Enable sharing and discussion of messages within communities through group participation, and active ownership of health issues, including decision-making.
- Build capacity in communication planning, management, implementation, and evaluation at global, regional, national, and sub-national levels.
- Invest adequate resources to ensure communication interventions are implemented at the country level.
- Leverage the Malaria SBCC Indicator Reference Guide and the Malaria Communication Evaluations to improve monitoring of SBCC programs, and disseminate the findings to strengthen the body of evidence about what works.

Across a variety of cultural and country contexts, a “town-crier” approach, whereby someone is engaged to make public announcements by shouting in the streets, has proven to be an effective strategy for informing local communities about the delivery of ITNs, or the timing and importance of indoor residual spraying, or seasonal malaria chemotherapy.

Overview of important evidence that has been generated to inform SBCC moving forward:

- In the Greater Mekong Sub-Region the “positive deviance” approach, whereby people who already demonstrate positive, preventative and care-seeking behaviors for malaria are identified and encouraged to share those behaviors with the rest of their community has been effective in increasing knowledge about malaria and improving health-seeking behaviors, such as consulting village malaria workers or visiting a health center for malaria diagnosis and treatment. The approach has improved the use of malaria services in a variety of contexts, including public health facilities, private clinics and private health providers, and in specific population groups including resident communities and mobile, migrant workers.¹⁰²
- Studies in Cameroon and Zambia have demonstrated that net use was impacted positively by combining SBCC with vector control programs.¹⁰³
- Further evidence from Zambia suggests that malaria messaging increases awareness about the disease and that community-level interpersonal communication contributes to positive health behavior change.^{104 105}

Making sure no-one is left behind

Malaria preys on the most vulnerable members of society, including pregnant women and children in extreme poverty, marginalized groups, populations that are widely dispersed, and those who have been displaced within and across countries for whatever reason. When people move, they often have to trade familiar habitats for ones that are largely unknown and often inherently unhealthy and precarious. This may be due to general poverty, sleeping outdoors or working at night, proximity to forest areas, poor quality housing, and limited use of prevention measures. Issues of stigma, language, and legal status also impede the ability of refugees, displaced and mobile migrant populations to access health services.¹⁰⁶

It is challenging for malaria programs to “go the last mile” and deliver services to hard to reach populations, and in remote areas. Targeting the response helps to ensure that vulnerable groups, such as scattered tribal populations, where a reservoir of the disease exists, and low transmission areas do not get left behind. Interventions should be deployed, as well as how they should be delivered. Civil Society Organizations (CSOs) can play a significant role in reaching to hard to reach populations and in understanding the barriers – as well as facilitators – to the elimination settings. To ensure that no one is left behind, malaria programs should consider which groups are most vulnerable, when and how they should be reached, and how to ensure that health workers and attitudes can be changed to support behaviors in both control and elimination settings.

Mobile and migrant populations

Mobile and Migrant Populations (MMPs) are groups of people who travel to, through, within, or from areas where malaria is present, thereby increasing their likelihood of being exposed to malaria vectors. MMPs specifically vulnerable to malaria include groups as diverse as migrant workers, displaced persons, seasonal agricultural workers, nomadic peoples, people visiting family, tourists (including from endemic countries), soldiers and military personnel, communities in border regions, and many others. Source: Smith & Whittaker 2014

- Promote broader access to malaria services and interventions to target interventions to these groups.
- Involve the targeted communities in monitoring to increase the likelihood of reaching them.
- Document the processes and outcomes to increase the evidence on the effectiveness of malaria programming.
- Document and share lessons learned from pilot projects to strengthen the evidence base, as well as disseminate results back to communities where activities occurred.
- Take utmost care to avoid further stigmatizing these groups with regards to their role in malaria transmission.

Best practice examples for extending services to migrants and mobile populations

To be able to reach MMPs information is needed on where they are and their patterns of movement. This has been achieved by using data from social networks (Koita et al 2013), mobile phone technology (Tatem et al 2009), respondent driven sampling (Wangroongsarb et al 2011, Khamsiriwathcara et al. 2011), or by utilizing existing data and interdisciplinary and cross-sectoral expertise (Pindolia et al 2012). Once obtained, these data can be used to develop implementations at possible points of interaction. For example, one program in Cambodia found that taxi drivers were the main transporters of MMPs to border regions, and so they trained them to deliver health promotion messages to border crossers (WHO 2011).

Employers of migrant workers can play an important role in malaria control. For example, the Malaysian government has collaborated with palm oil, rubber, and acacia plantation operators in Sabah, to distribute ITNs to migrant workers and to ensure febrile workers report to health facilities (Sanders et al 2014).

Important efforts are also being made to expand the network of migrant friendly health services. This involves, for example training staff at public health facilities to recognize the particular health vulnerabilities of migrants, and to publicize the fact that they will not ask patients for any form of

identification or official papers.

Programs themselves can seek to extend services in border regions, and other areas where program reach has traditionally been limited. For example, Sri Lanka used mobile malaria clinics to carry out active case detection during the final stages of elimination (Wickremasinghe et al 2014); a mobile laboratory is being used in Cambodia to bring real-time PCR technology to remote areas (<http://www.pasteur-kh.org/international-call-for-candidates>); while Myanmar is trialing the use of volunteer Mobile Malaria Workers (<http://www.usaid.gov/results-data/success-stories/mobile-volunteer-malaria-workers-drive-down-cases-rural-burma>). Many countries have established malaria posts at border crossing points to deliver health promotion messages and/or administer RDTs (Edwards et al, forthcoming).

Reaching people in humanitarian situations with malaria interventions

An ever-increasing number of disasters, emergencies, and protracted humanitarian crises affect the world. Such events can quickly disrupt the provision of health and other basic services, including the implementation of malaria control or elimination activities. Moreover, the resulting volatility and the targeting of civilians in modern conflict can cause mass population movements. In 2014, the global number of refugees, asylum-seekers, and internally displaced people (IDPs) exceeded 50 million.¹⁰⁷ Sub-Saharan Africa continues to host the largest number of IDPs (12.5 million of the global 33.3 million)¹⁰⁸ and 3.4 million refugees¹⁰⁹, yet there has also been a dramatic increase in wars and population displacement in the Middle East, and other world regions.

Despite the challenges, progress in controlling malaria in crisis situations in Sub-Saharan Africa has played an important role in the gains made since 2000. UNHCR and other agencies provide LLIN to refugees as part of a set of Core Relief Items during refugee emergencies in malaria endemic countries. This may be difficult while people are on the move, but should be included as soon as they are settled. Particular efforts are needed to overcome challenges to hang LLIN in temporary shelters or to facilitate their use by those that sleep outside to escape the heat of temporary shelters in refugee camps.¹¹⁰ IRS may work well in refugee camps and other community-based settings in emergencies, but can be logistically and operationally challenging and requires access to the household level, which is not always possible in insecure settings. Alternative tools for protecting people living in camp, village and town settings in emergencies, include the use of insecticide treated plastic sheeting (ITPS) for shelter construction, and other insecticide treated materials.¹¹¹

Campaigns to deliver any malaria prevention tools and commodities in all kinds of emergencies must be accompanied with targeted SBCC prior to, during, and after the intervention, as abuse and resale rates for LLINs, ITPS, and even IRS can be higher amongst stressed communities in emergency settings, due to high levels of extreme poverty and desperation.¹¹²

With the tools available today, uncomplicated malaria case management can be very effectively rolled out in emergency settings at community level.¹¹³ Community based treatment approach can significantly scale up access life-saving treatment for communities living in remote and insecure areas in ways that static health facilities alone cannot achieve. While community based treatment can supplement access significantly, and even ensure the first treatment point for severe malaria cases, in-patient facilities remain essential for managing severe cases. Support needs to focus on both these aspects in emergency settings and practical solutions found to facilitate the referral of severe cases from the community or primary health center level to a hospitalization unit.

Ensuring that malaria prevention, diagnostics and treatment are available during emergencies often falls back to NGO partners and UN agencies such as UNICEF, UNHCR and WHO, as national programs and infrastructures may struggle to cope. Allocating sufficient funding and planning for procurement and supply of LLIN, RDT and ACT are essential. So is integrating malaria diagnostics and treatment into primary health care services, be it at the community or facility level.

Case Study: Community based malaria management in the Central African Republic 2008-2014

Central African Republic (CAR) has suffered conflict, mass population displacement, and poverty for the last decade. Health infrastructure is responsible for the overwhelming burden of disease, while <20 percent of people in the north-west have access to health facilities. Since 2008, a challenging area. A hundred volunteers, serving 208,700 community members have been trained and equipped to deliver health education and artemether-lumefantrine (AL) treatment.

In 2012, there were 55,319 consultations. Of these, 44,971 were RDT confirmed and treated. However, successful treatment with AL required adherence. In July 2012, an AL adherence study of 460 patients from 80 malaria communities was conducted. Patients that were RDT positive and treated were 82 percent non-adherent. Overall, 82 percent of patients were found to be adherent, exceeding progress in many developing countries. The adherence was the longest. These results show that community based RDT and treatment services can be feasible, accessible, acceptable, scalable, and high quality. This model is being incorporated into the National Malaria Control Strategy, and is being duplicated by other NGOs in the country and beyond with funding from the UN.



Essential resources

- The Malaria Control in Humanitarian Emergencies – An inter-agency field hand book (October 2013 Edition 2) that provides guidance for protecting people living in camp, village and town settings in emergencies, including the use of insecticide treated plastic sheeting.
- The Sphere Handbook, Humanitarian Charter and Minimum Standards in Humanitarian Response, which contains the most widely known standards in life-saving areas of humanitarian response. <http://www.spherehandbook.org/en/what-is-sphere/>

Strengthen disaster preparedness for countries at all stages on the path to elimination

In all settings, the impact of disasters, humanitarian crises, or health security threats are strongly determined by the effectiveness of health systems, and their capacity to respond. To improve disaster preparedness we must:

- Strengthen the guidance that is available to address malaria in emergencies in eliminating settings. Population displacement in elimination can contribute to the reintroduction of malaria in areas that had eliminated the disease, as well as to the massive and devastating epidemics that are the hallmarks of resurgence.
- Share and scale-up good practices like community based malaria management where appropriate.
- Build capacity at sub-national and facility level for the establishment of emergency preparedness, and clarify contingencies for assuring the delivery of medical supplies.
- Prepare contingency plans and allocate flexible funding and resources.

3.6 Strengthening the evidence for future progress

To control and eliminate malaria, accurate data must be obtained to identify foci of infection, to test and deliver interventions, to hold actors accountable, to document successes, and to make the investment case for the required resources. Quality data has the power to transform malaria programs when it is available. Conversely, unreliable, inaccessible, or non-existent data is a consistent barrier to progress. Routine health information systems should be the main source of data for public health decision-making, health sector

reviews, analysis, and planning. However, in 2012 in as many as 41 of the 99 countries with ongoing malaria transmission health information systems were not functioning optimally and malaria indicator surveys and sentinel sites remained essential for estimating malaria morbidity and mortality.¹¹⁴ Particular challenges surround the ability of health systems to mount a rapid and appropriate response when surveillance starts to indicate a potential outbreak. New technologies have made a rapid response to real time data possible. Nonetheless, there are often barriers that deny implementers access to data, which could help them improve their response. Differences in metrics, reporting cycles, and software, as well as data protectionism all impede the sharing of readily comparable data, especially between different sectors or across national borders. Action is required to: generate evidence on the returns of investing in malaria, strengthen surveillance and early warning systems use data for decisions and actions; increase access to information.

Generate evidence on the returns of investing in malaria

Stronger and more compelling evidence is needed to strengthen the case for investing in malaria. Improving how we quantify the benefits of investing in malaria will further strengthen the case, and holds the key to winning political support and mobilizing future funding. As stronger surveillance systems are created, we need to use this information smartly, to show that malaria financing is being invested wisely and efficiently with demonstrated effect. To generate evidence, we must:

- Build new models to capture improved health outcomes, system-wide benefits, and savings resulting from progress in malaria, particularly for elimination.
- Strengthen the evidence on the potential costs of malaria resurgence.
- Take advantage of innovation in the field of data analytics to find ways to better understand data, particularly complex data.
- Continue to document the impacts of reducing and eliminating malaria (see the Progress and Impact Series), and find other effective ways to attractively package and communicate evidence used for advocacy.

Placeholder for call out box on the Progress and Impact Series, listing the current volumes, and those planned for the future.

Strengthen surveillance systems and early warning systems

As the WHO technical strategy stresses, responsive surveillance systems are essential for progress towards elimination. Moreover, in areas where malaria is seasonal, the establishment of early warning systems can optimize the use of resources. Such systems provide programs with greater lead times so that they can act more effectively. We must:

- Start to build up surveillance systems and the capacity to use them as part of health system strengthening efforts during periods of low transmission. This requires patience and is likely to take a minimum of 10 years.
- Work to make surveillance systems inclusive and foster the active participation of health providers' participation in national systems.
- Take full advantage of the potential of new technologies to collect and analyze data. For example, the Zanzibar Malaria Elimination Surveillance program, a mobile application that builds on the Malaria Early Epidemic Detection System. This system can identify outbreaks within two weeks of their onset.
- Enhance entomological surveillance and insecticide susceptibility monitoring through the creation of sentinel sites to provide adequate data to deploy the insecticide resistance management strategies that are essential to preserving the effectiveness of current tools.
- Engage research and academia to layer different types of environmental, societal, biological, and other data with malaria surveillance to better understand causal relations and associations as the basis for early warning systems.

Fighting malaria with climate knowledge

Botswana has established an early warning system that integrates a seasonal rainfall forecast with population and health surveillance information. The use of the seasonal rainfall forecasts has added a four-month lead-time over previous epidemic warnings that provides the time needed to mobilize resources and arrange an effective response.

- Leverage developing data architecture, such as the National and Africa Health Observatories and the real-time Strategic Information System to facilitate cross-border information sharing.

Use data for decisions and action

Obtaining information is not enough: data are only useful if they inform decisions and trigger actions to support the response to malaria. To use data for decisions and actions, we must:

- Build capacity at all levels to use and act on data.
- Advocate for targeted responses that are evidence-based and use resources.
- Provide continuous feedback to those that collect and analyze data are used.
- Conduct data quality audits to increase awareness of the impact of the use of data for planning and resource allocation have on malaria programs.

Placeholder for example of a country that has put a targeted approach in place based upon evidence, and used it to attract investment for the fight against malaria

Increase access to information

Open Data has enormous unfulfilled promise to change how governments work, citizen empowerment, strengthen transparency and foster accountability. For example, the Open Data Initiative in Burkina Faso holds over 50 freely available government datasets, including Ministry of Health data on the number of malaria deaths and vaccination coverage across the country.¹¹⁵ We must:

- Facilitate platforms for sharing data, and push for a change of “mindset” around sharing data across ministries, sectors, and countries.
- Support the efforts of civil society/watch dogs in demanding their right to data on progress in health and malaria e.g. monitoring outbreaks, interruptions of services, or supply chain failures.
- The results of risk mapping can be effectively linked to messages in the media of protective measures that specific high-risk communities can take.¹¹⁶

In response to the absence of reliable data in the water and sanitation sector, UN-Habitat and Google developed the “h2.O Monitoring Services to Inform and Empower Initiative,” which uses an open platform to share easily understandable maps showing the density of clean water points and drainage systems. It is intended to be used by consumers, service providers, policy makers, and donors to monitor the impact of interventions and strengthen accountability. It builds on UN-HABITAT’s Urban Inequity Surveys, and extends the Benchmarking of service providers to include geo-referencing and could be readily adapted to show malaria prevalence, and intervention coverage levels.

3.7 Fostering and sharing innovations and solutions

Innovation is essential to accelerate progress towards elimination. Innovation can take many forms, whether implementing new technologies or identifying new methods for existing interventions to add value or quantifiable gain. To reach our 2030 targets innovative, cutting-edge science will be required to address the threat of drug and insecticide resistance, develop more efficient strategies for use of existing control methods, and develop new tools and medicines to provide benefits to the world’s poorest and most vulnerable populations and move countries along the path to elimination and eradication.¹¹⁷ Action is required to develop the necessary tools, bring products to market, optimize operations for control and elimination, and to strengthen the research to policy and practice cycle.

Develop the necessary tools

The malERA process provided important guidance to the tools that will be required to reach eradication. In the near term, there is expected to be much progress in developing a wide range of tools that will move us towards the goal of eliminating and eventually eradicating malaria. Priority actions include:¹¹⁸

- Develop new active ingredients (chemicals) for use in LLINs and IRS. The threat of insecticide resistance is putting the identification of new ingredients as a highest-priority.
- Create new treatments for malaria to complement or replace ACTs. Ideally, new malaria medicines should be single-dose and should aim to treat all types of malaria, prevent relapse, provide post-treatment prophylaxis against all malaria lifecycles and species, and can be used by new patient groups (e.g. pregnant women and infants). In addition, a drug should be suitable for mass administration and protect against malaria for up to a month. This drug, too, should be effective against all species of mosquitos.
- Continue to support the development of and financing for vaccines, including transmission blocking malaria vaccines and those that are active against *P.vivax* and/or *P.falciparum*.
- Explore new cutting-edge diagnostic technologies, especially to detect low-level, asymptomatic parasitemia, and/or that does not require blood being drawn.
- Continue to conduct basic research of malaria disease processes, pathogens, vectors, etc.
- Keep a healthy pipeline. Continually assess the efficacy of the tools, develop back up products in all areas of malaria prevention, diagnostics, and treatment and remain abreast of future research and development needs

Leveraging product development partnerships (PDPs) remains central to progress. PDPs offer a unique modality for combining the expertise and knowledge of the public and private sectors to find efficient and effective solutions for malaria interventions. The Medicines for Malaria Venture (MMV) is making progress developing the next generation of antimalarials; the Innovative Vector Control Consortium (IVCC) is bringing forward vector control innovations with new active ingredients and new paradigms; the Foundation for Innovative New Diagnostics (FIND) works with WHO to develop new diagnostic approaches; and PATH's Malaria Vaccine Initiative (MVI) and the European Vaccines Initiative (EVI) are supporting the development of malaria vaccines.

Bring products to market

As these tools become available, WHO and other regulatory bodies must review the effectiveness and appropriate use of the tools while providing evidence for policy recommendations. Many countries and donor organizations only purchase products that have been recommended by the WHO Pesticide Evaluation Scheme (WHOPES). In addition, early stage new paradigms are evaluated by the Vector Control Advisory Group (VCAG). The VCAG has the following functions: (1) To review and assess the public health value, "proof of principle" (epidemiological impact) of new tools, approaches and technologies; and (2) To make recommendations on their use for vector control within the context of integrated vector management in multi-disease settings. UNITAID applies innovation to create healthier markets for malaria products, due to the challenges to achieve purely consumer driven markets.¹¹⁹

Optimize operations for control and elimination

Operational and implementation research remain essential to optimizing the modes of delivery and implementation strategies for current and future tools and products.¹²⁰ Findings will help to identify and

overcome implementation challenges, while also maximizing the impact of interventions. Ongoing and expanding investments in implementation research will strengthen the evidence base for the path to elimination and the investment case for malaria. We must:

- Prioritize funding, identify human resources, and develop partnerships dedicated to addressing operations/implementation research priorities.
- Build the capacity of implementers to conduct operations/implementation research as well as to develop study protocols and publish findings e.g. through the TDR supported SORT IT malaria operational research and training program.¹²¹
- Ensure operational research focuses on overcoming bottlenecks, or adding knowledge to facilitate the more efficient and effective delivery of interventions.
- Develop information sharing platforms to disseminate findings of research conducted across partners, sectors, and throughout the health system.
- Leverage the findings from implementation research and adjust strategies accordingly.

Strengthen the research to policy and practice cycle

As countries move along the path to elimination, it will become even more critical that we minimize the gaps between research, policy, and practice. By involving implementers and communities early in the policy and practice cycle, they are more likely to be active partners in testing, helping bring innovations to scale, and ensuring their sustainability. We must:

- Develop or leverage existing platforms to facilitate the timely exchange between researchers, policy-makers, service providers, program implementers, and community representatives to share and execute findings of research.
- Develop nationwide research agendas and align partnership activities to meet their needs.
- Ensure research topics have relevance to malaria programs, especially at a provincial and district levels.
- Create a level playing field for local and international researchers to ensure the generation of locally relevant evidence.
- Increase interdisciplinary dialogue and cross-sectoral knowledge sharing.
- Use community-based participatory research methodologies to better engage communities in the definition of research questions, tailoring interventions to their realities, taking part in clinical trials, and field-testing.
- Ensure that research findings are appropriately packaged into policy briefs, flyers, posters etc.
- Disseminate new insights through local media – newspapers, radio, TV, social media; including SMS and the internet, community based channels, and groups such as trade associations or coalitions.

Chapter 5: Monitoring Framework

Note: This Chapter will provide indicators to monitor progress towards the 2020 and 2025 milestones and 2030 targets.

Appendices

Appendix A: Development process

“Towards a Malaria-Free World” was developed through a participatory consultative process. Prior to the public online review, a multisectoral audience of over 1340 people from more than 90 countries were directly engaged. Various constituencies were involved in the regional consultations which were held back-to-back with consultation for the WHO Global Technical Strategy for Malaria in the Republic of Congo, Panama, Zimbabwe, Morocco, India, and the Philippines, followed by 11 further country consultations. These included site visits to consult with the leaders and members of affected communities, first line service providers, and aid workers to learn more about the challenges of basic service provision, particularly in hard-to-reach populations, remote areas, and humanitarian situations. Many more engaged via social media or took part in the public online review held in early 2015.

The work was carried out under the guidance of, and with active support from, a Task Force ([List members](#)).

Figure 7: Representatives from over 90 countries participated in the development of “Towards a Malaria-Free World”

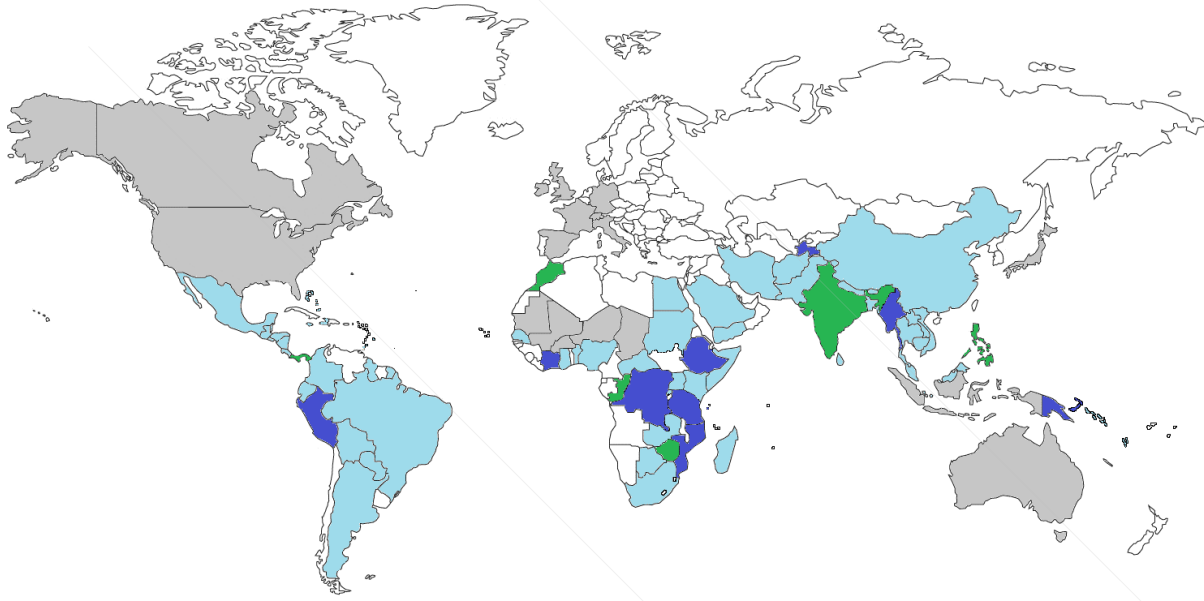
Hosted regional consultation

Participated in regional consultation

Hosted country consultation

Location of expert or key informant





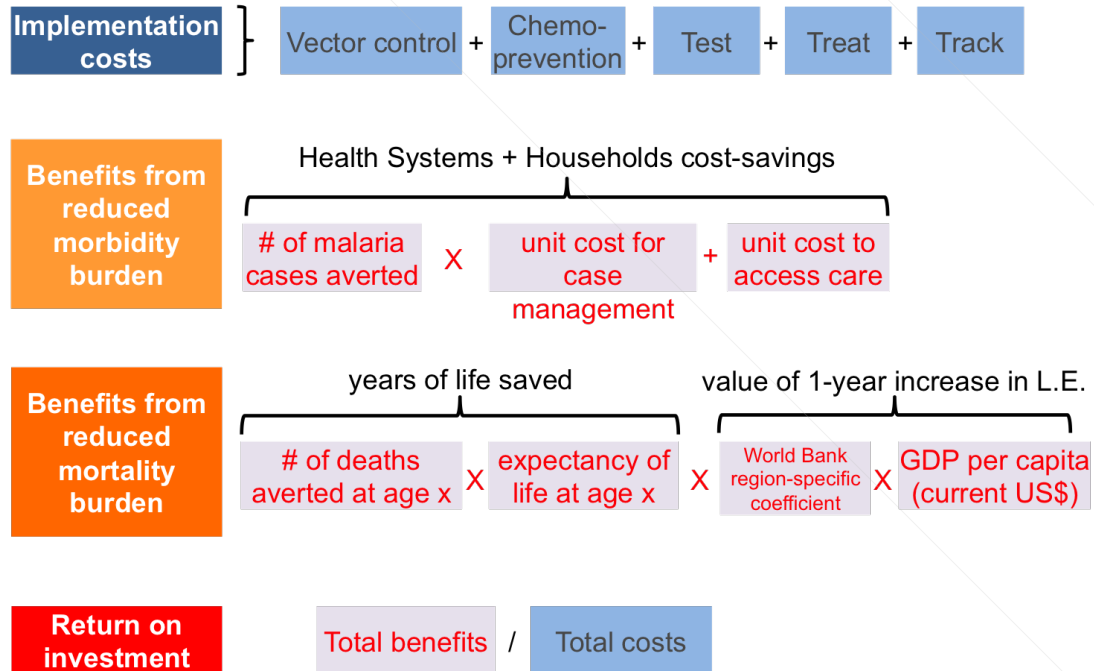
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Figure 8: Distribution of participants across constituencies for the community, country, and regional consultations

Appendix B: Cost-Benefit Analysis – Methodology

We estimated the potential value of investing in malaria control and elimination to reach 90% reduction in cases and deaths by 2030 and elimination in at least 35 countries by 2030, in terms of direct cost savings to health systems and households due to the reduction in malaria incidence; and of social value of increased longevity due to malaria mortality reduction.

Figure 9: Diagrammatic summary of the cost-benefit analysis methodology



Appendix C: Breakdown of the malaria R&D costing figure

Figure 10: Breakdown of the annual malaria R&D funding requirement by research category, 2016-2030 (in million 2014 USD)

Source: Policy Cures; 2014 work commissioned by the Global Malaria Programme, WHO for the development of the Global Technical Strategy for Malaria 2016-2030

Information on the methodology used to calculate the funding requirements for the R&D figures will follow, pending the development of a possible publication.

Appendix D: Malaria and the SDGs

#	Description	How failing to further reduce and eliminate malaria will impede achieving the Sustainable Development Goals
1	End poverty in all its forms everywhere	<p>Malaria has a negative effect on macro-economic performance, trapping countries in poverty,¹²² and significantly impeding the ability of some of the most affected countries to generate sufficient domestic investment to fight the disease.</p> <p>Malaria can account for 40 percent of health sector budgets, and up to 30 percent of out of pocket health spending in endemic countries, making it a key cause of household poverty. It disproportionately affects the disadvantaged, especially pregnant women and children in the poorest quintile. These are also the people who have least access to quality malaria prevention and treatment services. At facilities, the poor are least likely to be seen or have their medication prescribed by qualified staff,¹²³ while their rights to fee exemptions or free diagnosis and drugs are often abused.¹²⁴</p>
2	End hunger, achieve food security and adequate nutrition, and promote sustainable agriculture	<p>As the world's population increases and greater food production is needed, farming sites will continue to increase. Poorly constructed or maintained irrigation systems and some agricultural practices can increase the risk for malaria transmission, and agricultural pollutants may also favor resistance.¹²⁵ Urban farming is increasing rapidly, and is associated with adaptations in vectors' preferred habitats and breeding locations.</p> <p>The groups at highest risk for the adverse effects of malaria, children and pregnant women, are also most affected by poor nutrition. There is consistent evidence that general malnutrition is an important risk factor for greater frequency or more severe malaria.^{126 127}</p>
3	Ensure health lives and promote well-being for all at all ages	<p>Malaria is one of the leading causes of childhood death worldwide, and leads to morbidity and mortality across all age groups when it resurges. Malaria is an important cause of anemia, which particularly compromises the health of pregnant women and children. Malaria makes a substantial contribution to maternal and neonatal deaths in high transmission settings. Contracting malaria in pregnancy can lead to hemorrhage, spontaneous abortion, neonatal death and low-birth weight. In Sub-Saharan Africa 10,000 women die annually as a result of malaria in pregnancy.¹²⁸</p>
4	Provide inclusive and equitable quality education and life-long learning opportunities for all	<p>Malaria causes children to miss school. Frequent attacks have a sustained, adverse impact on the school performance of children aged 6-14 years.¹²⁹ Children that have malaria repeatedly may also suffer cognitive damage, impairing their ability to learn in the long term.</p> <p>The probability of dying from malaria in sub-Saharan countries is inversely related to income and education.¹³⁰</p>
5	Achieve gender equality and empower all women and girls everywhere	<p>The majority of care-giving is provided by female household members: mothers, aunts, grandmothers and older female siblings. In high transmission settings, in addition to time lost by being sick themselves, care givers invest at least an additional 2 days for every malaria episode in any one of their children.¹³¹ In high transmission settings where children suffer from malaria frequently and family size is large, this rapidly accumulates to form a</p>

#	Description	How failing to further reduce and eliminate malaria will impede achieving the Sustainable Development Goals
		significant loss of productive time.
6	Ensure availability and sustainable management of water and sanitation for all	Areas with poor drainage and standing water are prime breeding sites for some malaria carrying mosquitos. The construction of major dams, extractive practices, poorly planned human habitats, and sub-standard irrigation systems can all increase vectors and malaria transmission. ¹³²
7	Ensure access to affordable, sustainable, modern energy for all	Electric lighting and cooling enable people to increase time spent indoors, where vectors are more easily controlled through insecticides, bet nets and temperature. ¹³³
8	Promote inclusive and sustainable economic growth, full and productive employment, and decent work for all	Workers in some occupations are more exposed than others, including rice farmers (while they work and sleep), highland migration laborers, forest workers and rubber tappers. Exposure to malaria risk because of working practices (e.g. working through the night) is higher in low-status occupational categories. Low-level workers are far less likely to have access to malaria prevention and treatment services. ¹³⁴ Adults miss one to five days of work per malaria episode, and are often less productive when they return to work during the recovery period, particularly workers that are assigned physical tasks. Malaria costs businesses in Africa at least US\$ 12 billion in lost productivity every year. ¹³⁵
9	Build resilient infrastructure, promote inclusive and sustainable industrialization, and foster innovation	Infrastructure development and industrialization can have both negative and positives impacts on malaria transmission – e.g., by increasing/decreasing breeding sites, exposure to vectors, overall transmission. ¹³⁶ Poor prevailing infrastructure can severely impede service provision. ¹³⁷
10	Reduce inequality within and among countries	The malaria burden remains highest in the countries with the lowest human development, within countries in the least developed areas, and within populations amongst the most disadvantaged groups. These include pregnant women, infants and children, refugees, the displaced, migrants, nomads and people living with HIV/AIDS. ¹³⁸ Very poor families are hardest hit because the direct and indirect costs of malaria consume such a high proportion of household income. ¹³⁹
11	Make cities and human settlements inclusive, safe, resilient and sustainable	Sub-standard housing, poor sanitation and lack of amenities in slums can increase malaria transmission. ¹⁴⁰ Poor security impedes the delivery of life-saving malaria prevention and treatment services. ¹⁴¹
12	Ensure sustainable consumption and production patterns	Forest cover and proximity to gold mining operations are important large-scale drivers of disease risk. ¹⁴² Increases in deforestation of just 4 percent can increase malaria incidence by as much as 48 percent. ¹⁴³ The logging and extractive industries attract migrant workers to meet labor needs. The mobility of these workers may put them at increased risk of malaria infection, particularly if they lack immunity.
13	Take urgent action to combat climate change and its impacts	Temperature increases of just 2-3 degrees Celsius will increase the number of people at climatic risk of malaria by around 3-5%, which represents several hundred million people. ¹⁴⁴ It is projected that climate change will have

#	Description	How failing to further reduce and eliminate malaria will impede achieving the Sustainable Development Goals
		increased the population at risk of malaria in Africa by over 80 million by the middle of the next decade. Climate change is likely to result in increased flooding which not only affects the effectiveness of sanitation systems and leads to contamination of water sources, but also increases mosquito breeding sites and malaria transmission. In China, rising temperatures could set back progress in reducing infectious diseases, including malaria, by as much as seven years by 2030.
1 5	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Unsustainable use of natural resources can result in the risk of malaria being introduced or increased. P. Knowlesi, a kind of malaria common in monkeys, is increasingly infecting people in Malaysia, and other countries, and is probably due to logging and deforestation into ever deeper forest, resulting in the animals coming into closer contact with humans. Poorly managed initiatives, such as the introduction of Nile Perch in Lake Victoria resulted in a decimation of the cichlids population, which had played a crucial role in eating mosquito larvae, causing the income-generating benefits to the fishing industry to be rapidly undermined by the sharp increase in malaria transmission.
1 6	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Countries in fragile situations, where government is ineffective, governance poor and accountability lacking are unlikely to reach the 2030 malaria goals, or the other SDGs. Instability impedes malaria control, and the provision of health and malaria services. ^{145 146} Countries engaged in conflict are highly unlikely to engage in the regional collaboration that is required for the sustained reduction and elimination of malaria.

Appendix E: Definition of Malaria Stakeholders and Incentives and Expectations for Investing

Note: This section will include definitions for each of the RBM constituency groups

Appendix F: Breakdown of international and domestic funding sources for malaria control and elimination, and private household out-of-pocket spending in 2013

Sources of funds spent on malaria in malaria control countries

Sources of funds spent on malaria in malaria pre-elimination, elimination and prevention of re-introduction countries

Methodology: We estimated the share of funding spent on malaria in 2013 in 2 sets of countries: countries in control program phase, and countries in pre-elimination, elimination and prevention of re-introduction program phase (country classification as of December 2013). Figures for domestic public funding and international funding were collected from the World Malaria Report 2014. Figures for private household out-of-pocket spending were based on estimated size of private market for vector control (LLINs), diagnostic testing (RDTs) and malaria treatment (ACTs).

Private household out-of-pocket spending on LLINs in 2013: US\$ 16.59 million

143 million LLINs were delivered in Africa in 2013 (for the rest of the world no reliable estimates on the size of the private market for LLINs were available). Among those, around 2% were sold through the private sector, a 2.86 million volume. With a fully loaded cost of US\$ 5.80, private household out-of-pocket spending on LLINs in Africa totaled US\$ 16.59 million in 2013. Data source: Malaria Vector Control Commodities Landscape. UNITAID, December 2014.

Private household out-of-pocket spending on RDTs in 2013: US\$ 149 million

319 million of RDTs were sold to public and private sectors in 2013. Among those, 160 million were distributed by NMCPs in the public sector. From the 159 million RDTs sold in the private sector, we assume that 60% were *P. falciparum*-specific tests, and 40% were *P. falciparum* and *P. vivax* combination tests. With a fully loaded cost of US\$ 0.78 for *P. falciparum* RDTs and US\$ 1.17 for *P. falciparum* and *P. vivax* combination tests, private household out-of-pocket spending on RDTs totaled US\$ 149 million in 2013. Data source: World Malaria Report 2014; GMAP 2008-2015

Private household out-of-pocket spending on ACTs in 2013: US\$ 181 million

392 million ACTs were delivered from manufacturers to the public and private sector in 2013. Among those, 133 million were for the private sector only. We assume a share of sales of pediatric ACTs and adult ACTs of 70% and 30% respectively. With a fully loaded cost of US\$ 1.08 for pediatric ACTs and US\$ 2.025 for adult ACTs, private household out-of-pocket spending on ACTs totaled US\$ 181 million in 2013. Data source: World Malaria Report 2014; GMAP 2008-2015

This methodology has many limitations and efforts are underway to improve it going forward

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