

# FROM Aspiration TO Action

*What Will It Take to End Malaria?*

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*Photo by Esther Havens / Malaria No More*



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# Foreword

In the year 2000, the world committed to “halt and reverse” the tide of malaria as a key element of the Millennium Development Goals. Fifteen years later, we have achieved that goal and more. An estimated 6.2 million lives have been saved from malaria since the year 2000, and the rate of deaths from malaria has been reduced by an astonishing 58% globally.

Based on this success, we have an opportunity to do what was once thought impossible: to end this disease for everyone, everywhere on the planet, forever.

As co-chair of UN Secretary General Ban Ki-Moon’s High Level Panel of Eminent Persons on the Post-2015 Development Agenda I applaud the initiative behind the call for action and the vision that gives us of our potential as a global family to eliminate malaria.

Ultimately leaders of malaria-affected countries are accountable for keeping their citizens safe from malaria and accelerating the elimination of a disease that claims the lives of more than 500,000 people each year. I am gratified that in my own region with the support of Asia Pacific Leaders Malaria Alliance (APLMA), we have set ambitious elimination goals. In November 2014, at the East Asia Summit, 18 countries gathered at the East Asia Summit joined in pledging to eliminate the disease in our region by

2030. Work to achieve that goal is under way and an Asia Pacific Malaria Elimination Roadmap for action has been drafted for consideration at the November 2015 East Asia Summit.

In line with this goal, I welcome the bold vision for global malaria eradication contained in *From Aspiration to Action: What will it Take to End Malaria?* As we all know, a malaria-free world can only be achieved through careful planning, continuous innovation, hard work, and active leadership pointing the way, calling for action and providing necessary resources. The global community must move forward together fully committed to working for achievement of national and regional plans well supported by the new tools, strategies, and the financing required to accelerate elimination of malaria.

For all our progress, more than half of the world’s children still live at risk of malaria. Eliminating malaria will remove a key barrier to social and

economic progress and help to ensure that all children have the opportunity to lead the healthy and productive lives to which they are entitled.

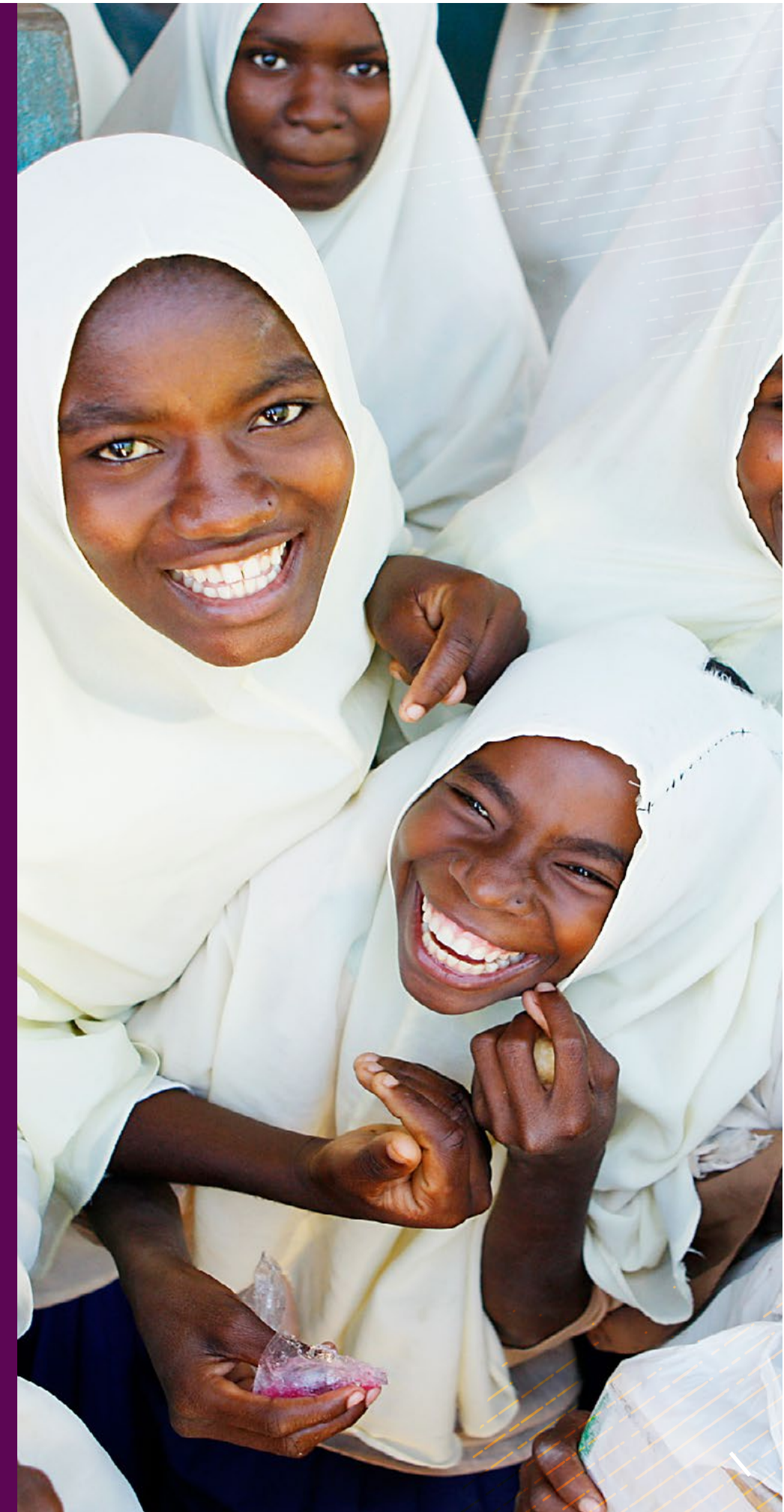
Success will demand the dedication of all stakeholders, and it will require that affected countries strengthen their health systems, enhance their disease surveillance capabilities, and their capacity to treat and care for those affected—in short we need to prevent new malaria, quickly detect infection, and respond rapidly and appropriately.

The most precious resource of any nation is its children, and leaders in all countries are focused on the goal of creating a future where no child suffers or dies unnecessarily. That means we must eliminate malaria. I thank the authors of *“From Aspiration to Action”* for showing us so clearly that this is something we can and must do.

*Jakarta, August 2015*



**Dr. Susilo Bambang Yudhoyono**  
President of Indonesia (2004-2014)  
Co-Chair of the Secretary General’s High Level Panel of Eminent Persons on the Post-2015 Development Agenda







# Foreword

The global community has proven that we can overcome the most formidable of challenges through innovative partnerships and ambitious-yet-achievable targets. An outstanding example is the unprecedented success we have achieved against the scourge of malaria. Since the adoption of the Millennium Development Goals in 2000, we have saved more than 6 million lives globally and reduced malaria deaths in children under five by nearly 70% in Africa. We now stand positioned to accomplish what has evaded prior generations—ending malaria once and for all.

*From Aspiration to Action: What Will It Take to End Malaria?* recognizes this unique opportunity and lays out the key elements to achieve a world free of malaria: country and regional strategies, maintaining political leadership, strong multi-sectorial partnerships, new investments and financing strategies, and the development of innovative prevention and diagnostic tools. All are key in driving this necessary work forward. We embrace the opportunity to contribute to this effort, and we commit to seeing this bold aim of global eradication achieved.

In the past 15 years, Sub-Saharan Africa has made historic progress in turning the tide against malaria. Incidence of the disease has declined by more than one-third, and deaths have fallen by 58% among all age groups. Thanks to strong collaboration between African governments and the international donors, the percentage of Africans who have access to affordable treatment and diagnosis has grown dramatically. Yet, the burden of malaria continues to

impede on the prosperity of our communities, taking huge human and economic tolls across the continent.

In January 2015, Africa’s Heads of State and Government convened at the African Union in Addis Ababa, Ethiopia and pledged to work together to achieve a malaria-free Africa within a generation. Through the African Leaders Malaria Alliance (ALMA), a coalition of 49 African heads of state, the continent’s malaria-affected countries have adopted a rigorous elimination scorecard that will allow them to track their progress toward achieving effective intervention coverage and significant reductions in parasite burden. This scorecard is already helping eight nations in southern Africa scale up their efforts to achieve malaria elimination by 2020.

We must seek the end of malaria—there is no other way forward. The time is now to make the vision of *From Aspiration to Action* become reality.

A handwritten signature in black ink, reading 'Jakaya Mrisho Kikwete'.

**His Excellency Jakaya Mrisho Kikwete**  
President of the United Republic of Tanzania  
Founding Chair of the African Leaders Malaria Alliance  
AWA Champion for Malaria Prevention and Control





Photo by Esther Havens / Malaria No More

To achieve the aspiration of a malaria-free world, we must start taking action now.

# Key Messages

## THE WORLD HAS MADE UNPRECEDENTED PROGRESS AGAINST MALARIA IN THE PAST 15 YEARS.

Since 2000, global malaria deaths have fallen 58 percent, and half of the world’s nations are now malaria-free.<sup>1</sup> Gains against malaria account for 20 percent of the total progress that the world has made in reducing preventable child and maternal mortality under the Millennium Development Goals (MDGs).<sup>2</sup>

## THE LEADERS OF THE WORLD’S MALARIA-AFFECTED COUNTRIES HAVE MADE A STRONG POLITICAL COMMITMENT TO MALARIA ELIMINATION.

Progress against malaria has convinced Asian and African leaders to commit their regions to malaria elimination within a generation.<sup>3</sup> The World Health Organization’s (WHO) Global Technical Strategy for Malaria (GTS) and the Roll Back Malaria (RBM) Partnership’s Action and Investment to defeat Malaria (AIM) have embraced the goal of a “world free of malaria.”

## ERADICATION IS THE ONLY SUSTAINABLE SOLUTION TO MALARIA.

The alternative to eradication—controlling the disease forever without eliminating it—is operationally and politically untenable. It would require indefinite investment in malaria control and the development and delivery of an endless succession of treatment and prevention technologies to stay ahead of resistance in both parasites and mosquitoes. It will be impossible to maintain strong political commitment unless we can define a clear end point—and history has shown that unless countries reduce their case burdens to zero, we will see resurgence on a massive scale.

1 United Nations, *The Millennium Development Goals Report 2015* (New York: UN, 2015).  
2 World Health Organization, *World Malaria Report 2014* (Geneva: WHO, 2014).  
3 Asia Pacific Leaders Malaria Alliance Secretariat, ‘East Asia Summit Adopts Unprecedented Regional Malaria Goal’: November 14, 2014. Web. African Union, ‘High-level Dialogue on Defeating Malaria in Africa by 2030, Addis Ababa, Ethiopia’: April 25, 2015. Web.

## ERADICATION WILL PRODUCE ENORMOUS HEALTH AND ECONOMIC BENEFITS.

Leading economists have identified the fight against malaria as one of the “best buys” in global development, estimating that a 50-percent reduction in global malaria incidence could produce \$36 in economic benefits for every \$1 invested.<sup>4</sup> A new analysis also indicates that malaria eradication could deliver more than \$2 trillion (U.S.) in economic benefits and save an estimated 11 million lives.

## ERADICATION IN THE 21ST CENTURY WILL DIFFER DRAMATICALLY FROM PAST EFFORTS.

Malaria eradication will not rely on the 20th-century model of a large-scale global campaign funded and organized by foreign donors and focused on a single intervention. Its success today will depend on the degree to which countries integrate malaria surveillance, transmission interruption, and treatment programs into their national health systems. Eradication in the 21st century will adapt to emerging challenges by using data to plan interventions and R&D to stay ahead of drug and insecticide resistance. It will also use operational research to identify the most efficient and effective approaches for deploying new tools and strategies as they become available.

## IN CONTRAST TO OTHER ERADICATION EFFORTS, ENDING MALARIA WILL NOT BE A HIGH-RISK, ALL-OR-NOTHING PROPOSITION.

More than 100 United Nations member states have successfully eliminated malaria, and history has shown that elimination “sticks” once it has been achieved. This means that regions that have eliminated the disease will not need to maintain costly and intensive malaria surveillance efforts and can use more general infectious disease surveillance to avoid resurgence. It also means that countries and regions will be able to set their own schedules for elimination once they are confident that the necessary tools, strategies, and financing are in place.

4 Copenhagen Consensus Center, ‘Health - Infectious Diseases’: 2015. Web.



**AFFECTED COUNTRIES AND REGIONS WILL PLAY A DECISIVE ROLE IN LEADING AND FINANCING MALARIA ELIMINATION EFFORTS.**

Traditional donors currently provide most of the funding for the fight against malaria, but domestic financing is growing and it will be the key factor in funding ambitious elimination efforts over the next two decades. The success of eradication will be largely built on a series of successful national and sub-regional elimination programs, driving global eradication from the bottom up.

**WE NEED NEW STRATEGIES, NEW TOOLS, AND NEW FINANCING APPROACHES TO ACHIEVE A MALARIA-FREE WORLD.**

**NEW STRATEGIES:** We need to adopt better approaches to surveillance that will both identify key sources and pathways of malaria transmission and focus diagnosis, treatment, and prevention resources where they can be most effective in accelerating parasite elimination and saving lives. New strategies will also help to identify the most efficient ways to deploy malaria interventions, stretching the life-saving impact of every dollar invested in malaria.

**NEW TOOLS:** The product development pipeline for malaria has never been stronger, with promising new tools that will revolutionize how we detect, treat, and prevent malaria. We can accelerate eradication by increasing investment in R&D and clearing regulatory and market hurdles to the rapid deployment of new tools.

**NEW FINANCING:** We need to double malaria funding by 2025 to accelerate progress toward a malaria-free world. This will require sustained support from current donors and significantly increased domestic investment from affected countries, facilitated in part by concessionary lending and novel financing approaches.

**WE MUST TAKE ACTION IN THE NEXT FIVE YEARS TO PUT THE WORLD ON THE PATH TO ERADICATION.**

Malaria eradication is a highly ambitious goal that will require bold thinking and unwavering commitment. Like launching a rocket, if your trajectory is off at the beginning, you have little chance of reaching your ultimate destination. Success during the next 5 years is crucial, even the next 36 months, is crucial to putting the world on a trajectory to achieve eradication in our lifetimes. Key milestones in the above areas must be met by 2020—beginning with achieving or exceeding the 40 percent decline in malaria morbidity and mortality called for in the WHO Global Technical Strategy—to inspire the world to commit to and pursue malaria eradication with confidence and vigor. Ultimately, this commitment should be reflected in a World Health Assembly resolution supporting malaria eradication by a specific end date. To achieve the aspiration of a malaria-free world, we must start taking action now.

Success during the next three to five years is crucial to putting the world on a trajectory to achieve eradication in our lifetimes.

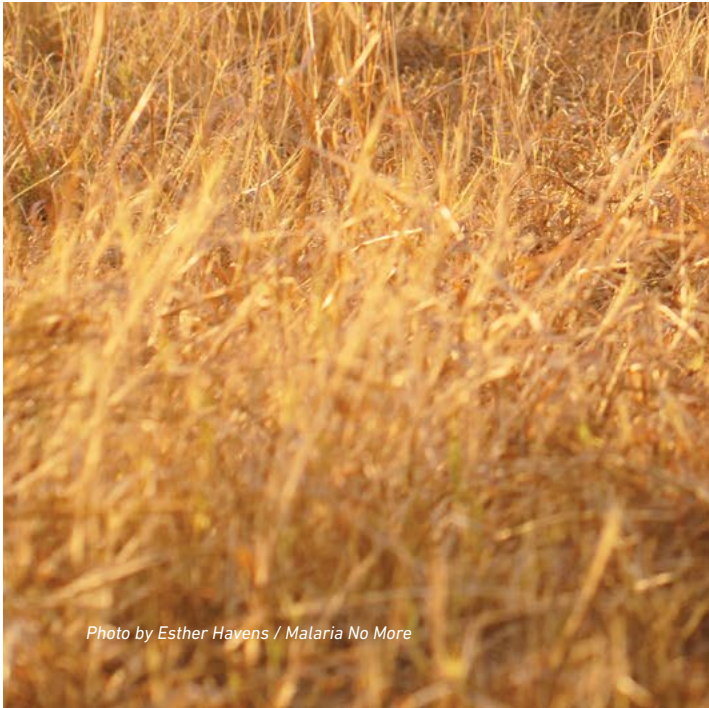


Photo by Esther Havens / Malaria No More







Photo by Malaria No More / John Rae 2008



# Overview

*From Aspiration to Action: What Will It Take to End Malaria?* seeks to spark a serious conversation about what it will take to eradicate malaria within a generation. It is addressed to the key decision-makers—affected country leaders, donor country leaders, multinational institutions, and others—who will need to organize, finance, and implement the effort.

To clarify the hard choices and clear commitments these key stakeholders must make to put the world on the path to eradication, the document works back from a theoretical end date of 2040. This date was chosen as a reasonable assumption that balances stated country ambitions, anticipated technology advances, and implementation realities. It is used to anchor the original epidemiological and financial modeling that is a part of this analysis. 2040 should not be misconstrued as a firm policy proposal. The ultimate target date for malaria eradication must be the result of a consultative process with global leaders and technical experts, and must be reflected in a renewed World Health Assembly commitment.

***From Aspiration to Action*** focuses particularly on the key actions that must be taken in the next five years to create the necessary confidence and consensus for a World Health Assembly commitment to malaria eradication. This should include a robust debate among stakeholders as to the necessary preconditions for eradication. The technical elements of these discussions will need to be led by the Global Malaria Program of the World Health Organization (WHO) in partnership with regional leaders, and they should be built on the solid foundations laid by the WHO's Global Technical Strategy for Malaria<sup>5</sup> and Roll Back Malaria (RBM) Partnership's Action and Investment to defeat Malaria, 2016-2030.<sup>6</sup>

<sup>5</sup> World Health Organization, Global Technical Strategy for Malaria 2016-2030 (Geneva: WHO, 2015).

<sup>6</sup> Roll Back Malaria, Action and Investment to defeat Malaria 2016-2030 (Geneva: WHO, 2015).



# Why do we need to end malaria?

A little more than a century ago, malaria was a leading cause of death in nearly every nation on earth. Then scientists discovered that malaria is caused by a parasite and they determined that this parasite is transmitted between humans by mosquitoes. These insights were applied to the development of effective treatment and prevention tools—and by 2000, nearly half of the United Nations’ member states had eliminated the disease within their borders.

In the past 15 years, the pace of progress against malaria has only accelerated. The number of children who die from malaria has fallen by more than 50 percent,<sup>7</sup> and the United Nations estimates that 6.2 million lives have been saved by malaria interventions between 2000 and 2015. Fifty-five of the world’s 99 affected countries are on track to cut their malaria incidence by at least 75 percent before the end of 2015, with about 30 of those countries aiming to complete elimination by 2025.<sup>8,9</sup>

These results demonstrate what leaders can achieve when they set ambitious goals, and that the will to take action against malaria has never been stronger. In November 2014, 18 Asian-Pacific heads of state pledged to eliminate malaria from their region by 2030—and in January 2015, 49 African heads of state endorsed the desire to eliminate malaria south of the Sahara by 2030.<sup>10</sup> This means that the leaders of nearly every remaining affected country have pledged to end malaria transmission within their borders before the middle of this century. The challenge is that terrible inequities remain. As many as one billion people are currently infected with the

malaria parasite, and nearly 500,000 children still die from this preventable disease each year—the equivalent of one child every minute.<sup>11</sup> While half of the world’s countries have eliminated malaria, a situation where the other half’s children remain vulnerable to death and disability caused by malaria is simply unacceptable.

Today, we have an opportunity to achieve something that was once thought impossible. With the right combination of political will, strategic rigor, technical innovation, and focused investment, we can end malaria forever. The research and development (R&D) pipeline for new diagnostics, treatments, and vaccines has never looked better—and malaria eradication could save an estimated 11 million lives and unlock an estimated \$2 trillion in economic benefits over the next 25 years.<sup>12</sup>

To achieve that end, we must have an open and honest conversation about what it will take to achieve eradication. The key participants in this dialogue must include affected-country and regional leaders, global policymakers, leading donors, heads of international agencies, civil society organizations, scientific researchers, and others who will be essential to planning, organizing, financing, and implementing eradication efforts.

<sup>7</sup> United Nations, *The Millennium Development Goals Report 2015* (New York: UN, 2015).

<sup>8</sup> World Health Organization, *World Malaria Report 2014* (Geneva: WHO, 2014).

<sup>9</sup> Kaiser Family Foundation, *The U.S. Government and Global Malaria* (Menlo Park: KFF, 2015).

<sup>10</sup> Asia Pacific Leaders Malaria Alliance Secretariat, ‘East Asia Summit Adopts Unprecedented Regional Malaria Goal’. November 14, 2014. Web.

<sup>11</sup> World Health Organization, *World Malaria Report 2014* (Geneva: WHO, 2014).

<sup>12</sup> For all original analysis, we provided the following citation: Original financial modeling for *Aspiration to Action*. For details, see “Methods” section in online appendix.

Photo by Esther Havens / Malaria No More

*From Aspiration to Action: What Will It Take to End Malaria?* seeks to initiate this dialogue. It does so by starting to outline the conditions that must be met to secure a renewed World Health Assembly (WHA) commitment to malaria eradication, as well as the time and resources that will be required to end malaria forever. It identifies 2020 as a reasonable target date to secure renewed WHA support, and it identifies 2040 as an ambitious-but-attainable target date to achieve global malaria eradication.

These timelines are intended to provoke vigorous debate. A half-century ago, revolutionary breakthroughs in science and medicine convinced many world leaders that no infectious disease was equal to the power of human innovation, and in 1955 the WHA adopted an ambitious resolution in support of malaria eradication.<sup>13</sup> Elimination campaigns were soon launched across Europe, Asia, and the Americas that sprayed millions of households with insecticide and administered treatment where needed.<sup>14</sup>

This effort succeeded in eliminating malaria from more than two dozen countries, many of them in higher-transmission settings in the Caribbean and Asia. At the global level, overconfidence in the power of insecticides and drugs led to underinvestment in R&D for new tools and technologies. And at the country level, the political commitment to elimination waned as malaria cases approached zero. As a result, the World Health Organization (WHO) officially suspended—but did not formally end—the global malaria eradication program in 1968.<sup>15</sup> Given this history, a healthy measure of caution is

<sup>13</sup> Centers for Disease Control and Prevention, ‘The History of Malaria, an Ancient Disease’. November 9, 2012. Web.

<sup>14</sup> Roll Back Malaria, *Eliminating Malaria: Learning from the Past, Looking Ahead* (Geneva: WHO, 2011).

<sup>15</sup> Roll Back Malaria (2011).

reasonable—indeed essential—to avoid repeating past mistakes. This document addresses the doubts that some experts have raised about the feasibility of malaria eradication by underscoring the essential importance of sustained political will, elimination-focused implementation, ongoing investment in R&D, and new approaches to financing.

It also seeks to distinguish between 20th-century approaches to eradication—with their almost exclusive reliance on large-scale campaigns wholly financed by donors and based on one or two interventions and strategies—and 21st-century approaches to eradication, whose success will be determined by community engagement, country ownership, and the degree to which they are successfully integrated into and financed as part of primary health care systems.

**If we are serious about achieving the vision of a malaria-free world, we need to start talking about what it will take and how we get there. Let the conversation begin.**



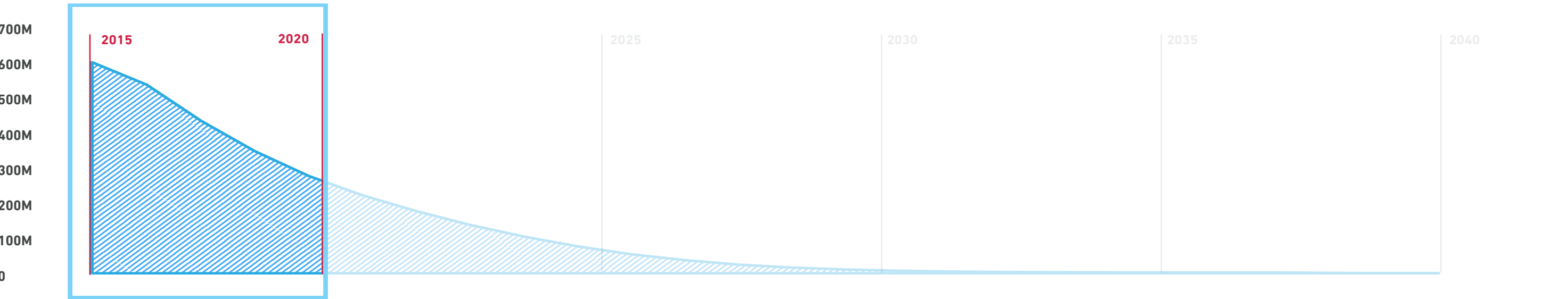


# What will it take to end malaria?

The fight against malaria over the past 15 years  
represents one of the greatest success stories in  
the history of public health.



MILLIONS OF PEOPLE INFECTED



2015-2020

THE FIRST FIVE YEARS:  
A Renewed Commitment  
to Eradication

The fight against malaria over the past 15 years represents one of the greatest success stories in the history of public health. We must sustain that momentum by reducing malaria cases and deaths to the lowest possible levels in the next five years. This will set the stage for elimination in many countries and ensure continued political support from affected countries and donor countries alike.

The World Health Organization's (WHO) Global Technical Strategy calls for at least a 40 percent reduction in malaria-related mortality and morbidity between 2015 and 2020.<sup>16</sup>

To build the case for eradication and demonstrate its feasibility, we must achieve these 2020 morbidity and mortality targets—and go further, by making substantial progress in the following areas over the next five years:

**Increase the resources available to combat malaria.**

Over the next five years, the global malaria community must mobilize new resources to fuel ambitious country plans. This will require securing new commitments from affected-country governments and regional funding bodies, expanding transitional finance opportunities, and sustaining official development assistance (ODA) support provided by leading donor countries.

**Pilot new sub-regional elimination strategies to demonstrate the feasibility of eradication.**

An initial set of countries in the Asia-Pacific region, the Americas, and sub-Saharan Africa will aim to eliminate malaria by 2020, inspiring and igniting action within their regions. These early wins will reinforce political commitment, just as this learning period will provide critical lessons for how individual nations and sub-regional clusters of countries can adopt new strategies to accelerate the pace and efficiency of elimination.

**Introduce a first round of new tools and technologies.**

Promising new drugs and diagnostics are already in the product development pipeline, increasing treatment

options including pediatric formulations, drugs to address resistance, single encounter cures, and longer-acting treatments and transmission-blocking drugs.

**Conduct a technical debate on how to achieve eradication.**

A comprehensive effort, led by the WHO Global Malaria Program, will help develop technical and normative guidance for achieving global malaria eradication within a set timeframe. The debate can build on the foundation laid by the WHO's Global Technical Strategy for Malaria, 2016-2030, recently ratified by the World Health Assembly (WHA), by applying a deliberate timeframe to the strategy's ambitious goals for a malaria-free world.

**Secure a WHA declaration on malaria eradication.**

If key milestones have been met in the above areas, the WHO should develop and endorse a plan to pursue and complete the work of malaria eradication by mid-century. This plan should secure the highest-possible level of support through a resolution passed by the WHA.

2,235,045,491

INFECTED PEOPLE

<sup>16</sup> World Health Organization, Global Technical Strategy for Malaria 2016-2030 (Geneva: WHO, 2015).



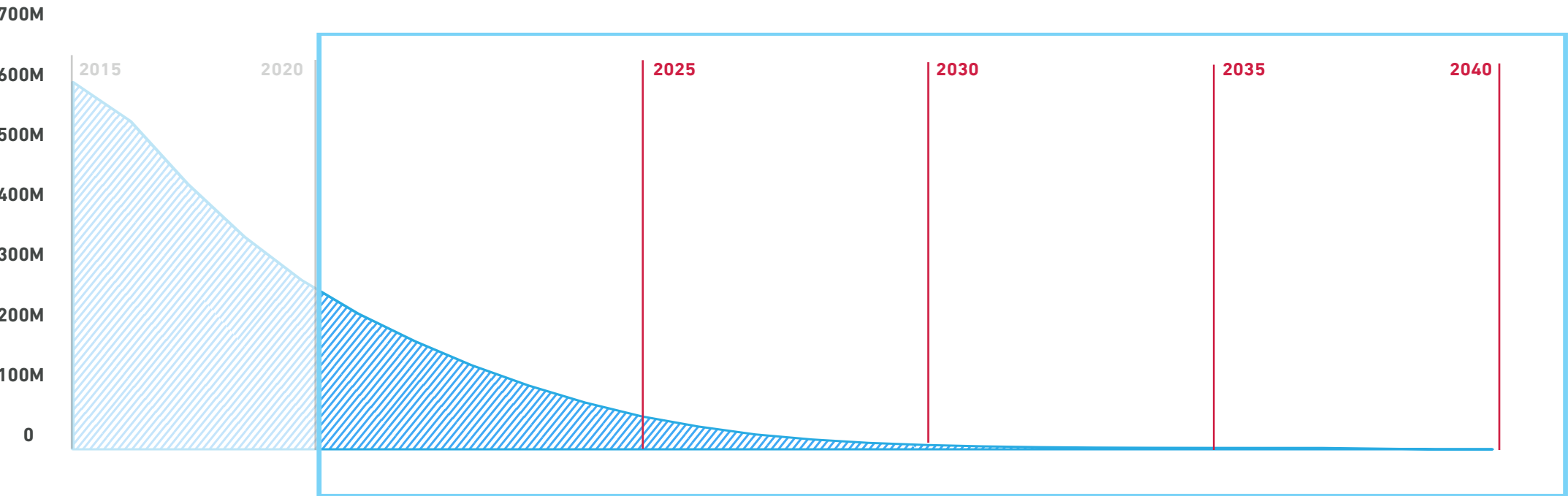
## 2020-2040

### THE NEXT TWENTY YEARS:

#### The Road to Eradication

A malaria free world will not happen by accident. An enterprise of this scale and complexity requires deliberate strategic planning and strong regional coordination. While no 25-year plan can predict all that may emerge on the path toward global eradication, positive or negative, the following timeline provides a high-level outline of the likely phases that would follow a renewed global commitment by 2020 to achieving a malaria-free world:

MILLIONS OF PEOPLE INFECTED



772,442,678

INFECTED PEOPLE

#### 2020-2025

##### Scaling Up for Elimination:

The number of countries actively pursuing elimination would peak in this period, setting the stage for regional elimination in the Americas, the Asia-Pacific region, and lower-transmission countries in sub-Saharan Africa by 2030. These efforts could accelerate with the broad availability of new tools that include single-dose curative treatments and improved diagnostics capable of detecting asymptomatic infections. In this period, current donors will need to sustain their funding to maintain the unprecedented low levels of malaria deaths, and affected countries will need to significantly increase their funding to accelerate progress.

134,010,007

INFECTED PEOPLE

#### 2025-2030

##### Elimination in Lower-Transmission Settings:

Elimination in the Americas and the Asia-Pacific region could be completed by 2030, leaving sub-Saharan Africa's high-transmission areas as the only remaining affected region. To prepare tropical Africa for elimination in the decade that follows, the WHO's Global Technical Strategy target of a 90-percent reduction in malaria morbidity and mortality must be achieved by 2030.

9,878,568

INFECTED PEOPLE

#### 2030-2035

##### Elimination in Most High-Transmission Settings:

To reduce the number of affected countries to a handful and set the stage for global eradication, the majority of African countries will need to achieve elimination by 2035. The introduction of game-changing innovations—including vaccines that interrupt transmission and novel mosquito control strategies—could have a substantial impact in accelerating this phase.

135,248

INFECTED PEOPLE

#### 2035-2040

##### Achieving Global Eradication:

In the final five years, there will likely be three to five countries that remain affected and present tough challenges to global eradication, such as a limited health-care infrastructure and social and political instability. Sustaining commitment at this stage is important to ensure that national caseloads are reduced to zero and resurgence is prevented. Foreign assistance to the remaining affected countries will be essential—possibly through a dedicated "last-mile fund"—to ensure that the resources required to complete eradication are available in the final phase.



KEY INDICATORS TO SUPPORT  
A 2020 World Health Assembly Resolution on Malaria Eradication

Exhibit 1

NEW STRATEGIES	NEW TOOLS	NEW FINANCING
Global efforts strengthened to reduce malaria cases and deaths by the Global Technical Strategy target of at least 40% between 2015 and 2020	New drugs introduced to accelerate the elimination of <i>Plasmodium falciparum</i> and <i>Plasmodium vivax malaria</i>	Sustain U.S. and U.K. government commitments to malaria while seeking new bilateral commitments from new and existing donors
Detailed elimination roadmaps developed and endorsed by regions (Asia, Africa, Americas)	Novel vector-control methods developed to reduce malaria transmission within households and outdoor transmission settings	Ensure successful Global Fund Replenishments in 2016 and 2019, with strengthened requirements and incentives for affected-country and regional counterpart financing
New strategies piloted to reach or exceed Global Technical Strategy target of at least 10 countries eliminating malaria by 2020	First round of new tools and technologies introduced (including highly sensitive RDT, complete-cure treatments, and innovative vector control methods)	Expand affected-country access to long-term loans for malaria eradication through global and regional development banks (Asia, Africa, Americas)
Operational research conducted to inform optimal use of new tools and implementation approaches	Strengthened use of data to inform optimal control and elimination strategies	Demonstrate the potential of transitional financing and novel financing approaches to stimulate increased domestic investment in malaria
WHO leads technical debate on how to achieve elimination, including consultation with global stakeholders	Regulatory review streamlined and new tools and technologies piloted to ensure safe and effective deployment	Secure new or renewed commitments to malaria from institutions including the World Bank, UNITAID, and the Global Financing Facility
GOAL	GOAL	GOAL
Reduce malaria cases and deaths by at least 40% globally and eliminate in at least 10 additional countries	Deliver first wave of new tools and technologies to accelerate elimination and mitigate resistance	Substantially increase and diversify global resources available to combat malaria

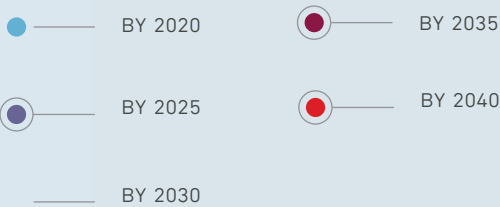




Exhibit 2

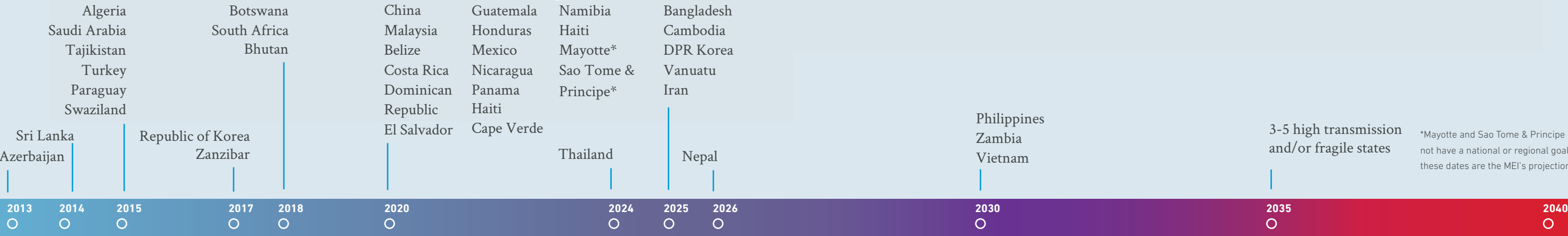
# The Shrinking Malaria Map

Expanded malaria control and elimination efforts are expected to rapidly reduce the geographic scope and intensity of malaria transmission as the world advances towards malaria elimination goals. The map—derived from an epidemiological model by the Malaria Atlas Project—illustrates one potential pathway to malaria eradication by 2040. As indicated below, malaria elimination is expected to progress unevenly across regions and even within national boundaries due to high variability in weather, mosquito vector populations, transmission intensity, human mobility, and health-system capacity.



### NATIONAL ELIMINATION TARGET DATES

Global momentum toward malaria eradication is being driven by bold regional commitments and time-bound country plans for elimination. Below is a summary of declared country and regional targets as tracked by the Malaria Elimination Initiative (MEI) at the University of California, San Francisco Global Health Group.

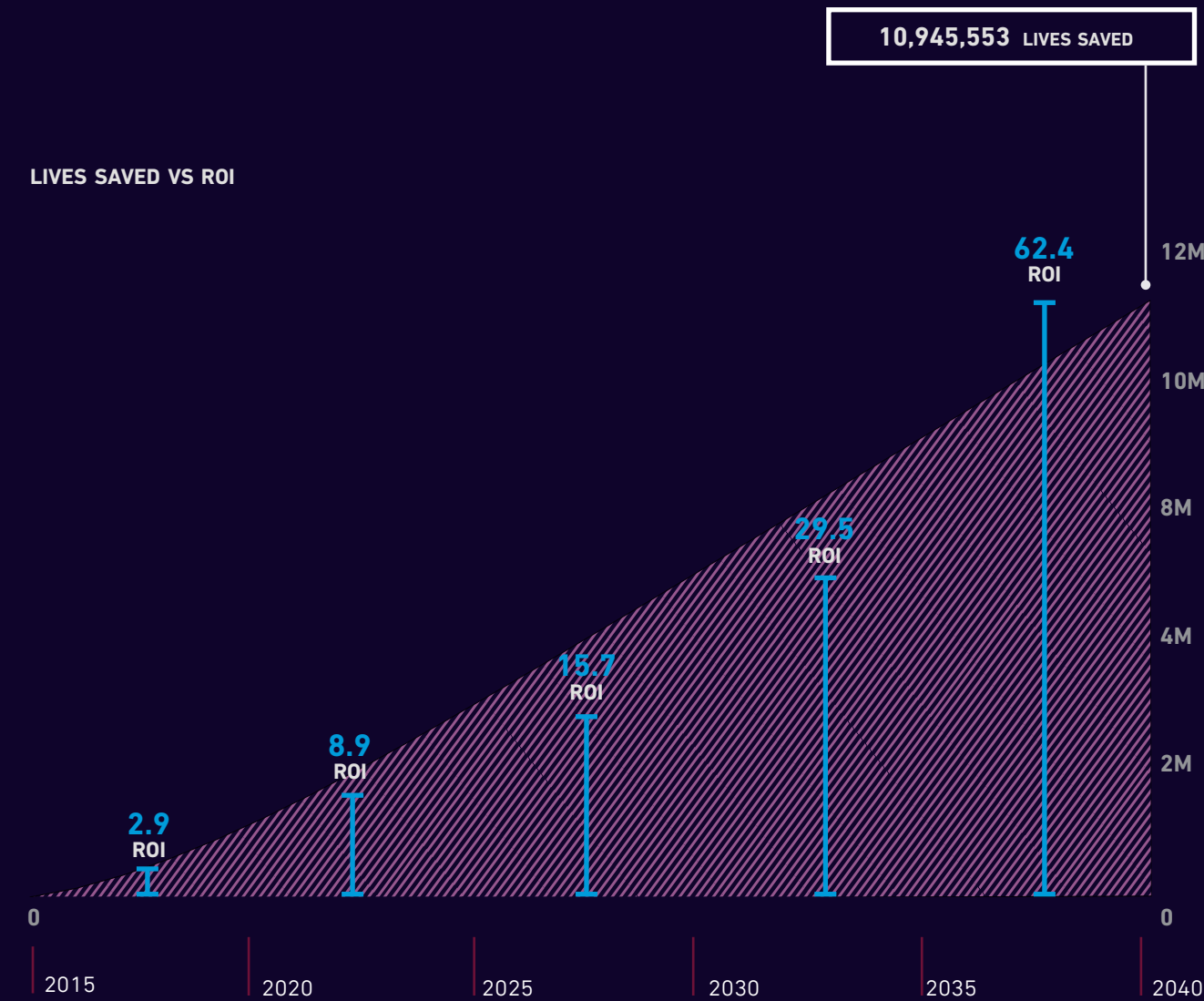




# Impact of Eradication

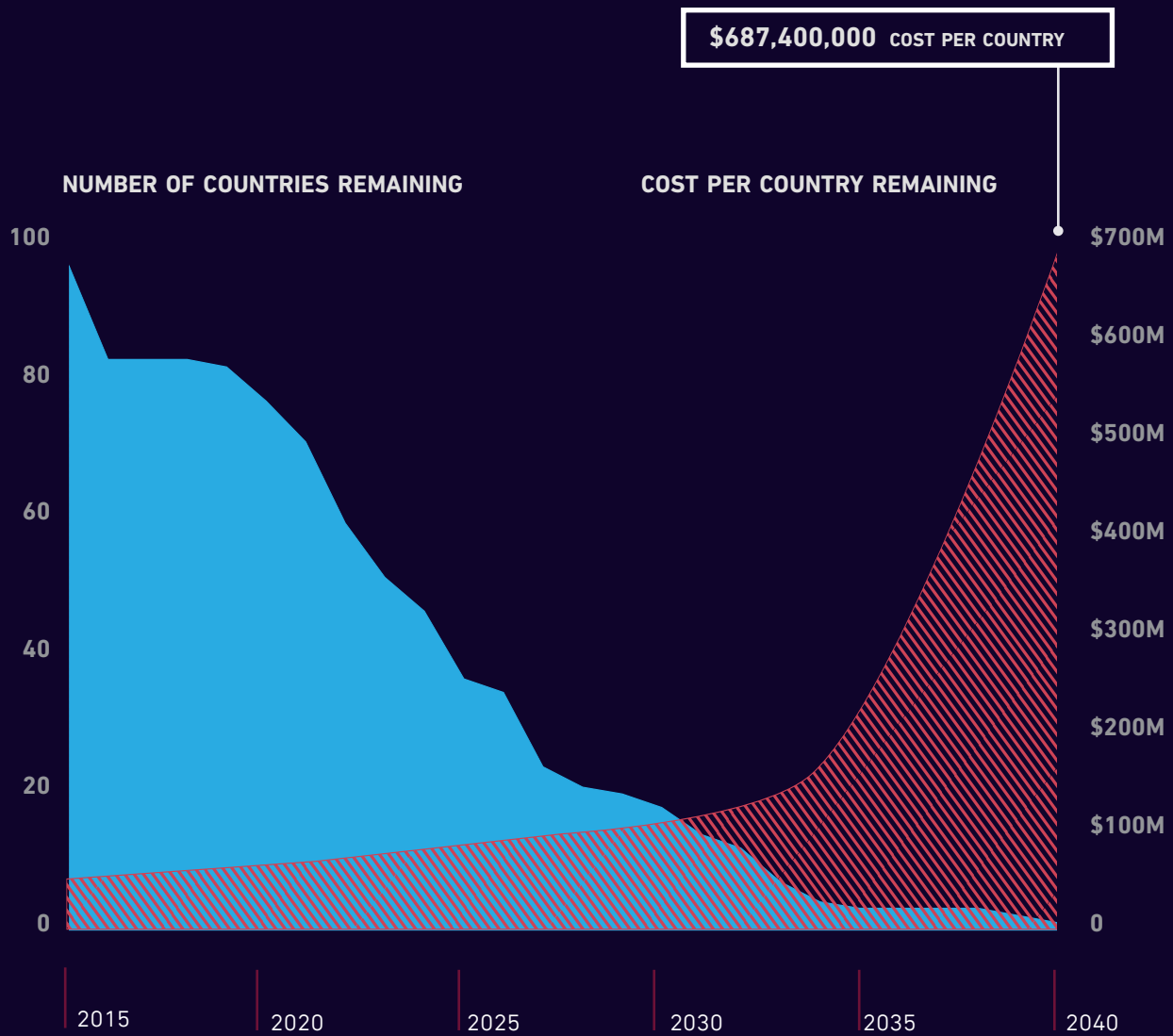
Return on Investment (ROI) grows over time, thanks to the compounding benefits of almost 11 million cumulative lives saved from malaria. Malaria eradication will unlock \$2 trillion in total economic benefits.

10,945,553 LIVES SAVED



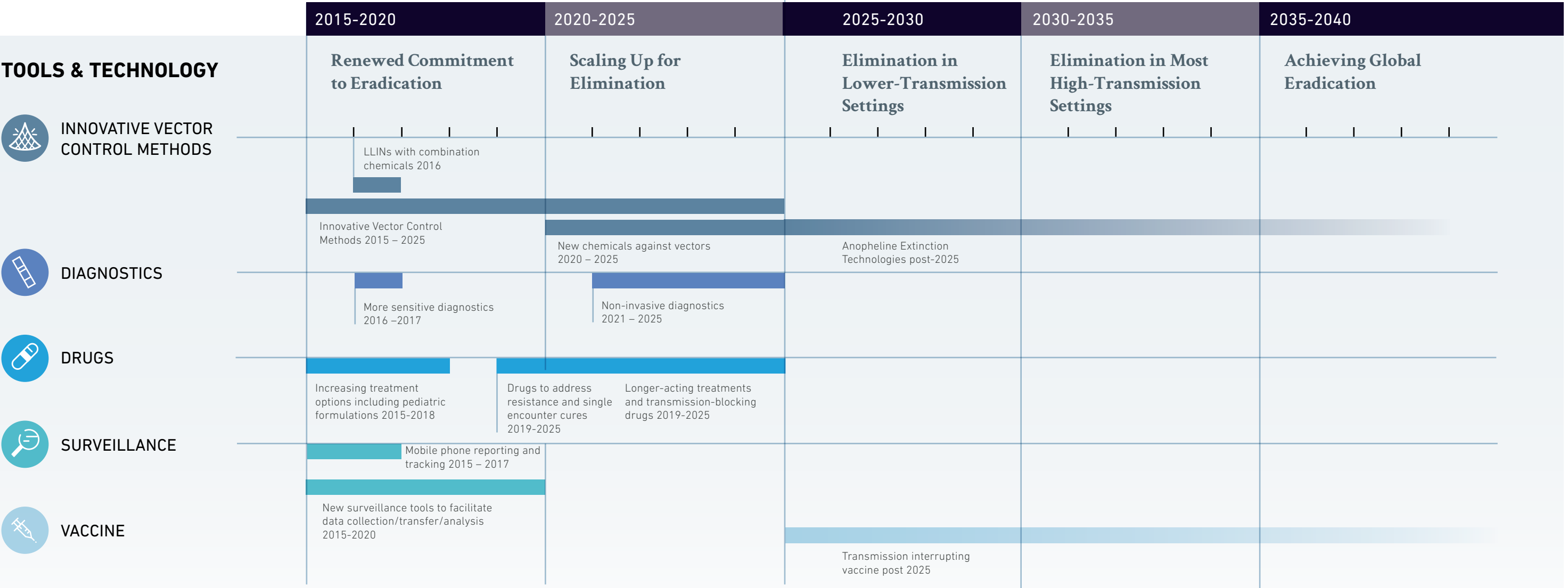
As a growing number of countries eliminate malaria, overall costs decline—but the cost per country eliminating increases sharply. We must be prepared to cover high per-country costs in the critical end-game period.

\$687,400,000 COST PER COUNTRY





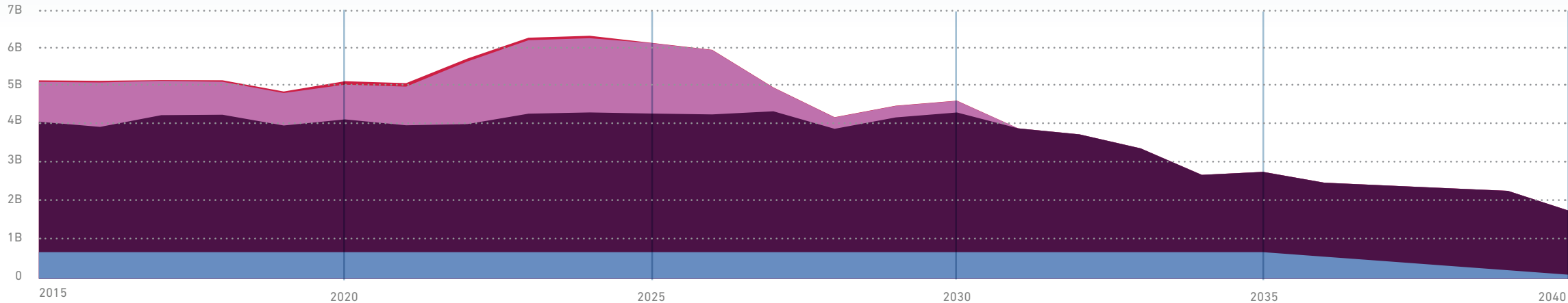
# The Product Development Pipeline for Malaria



## COSTS BY REGION

\$ Billion

- AMERICAS
- ASIA
- AFRICA
- R&D





## I

# New Strategies

Since 2000, the rapid scale up of proven tools—from long-lasting insecticidal nets (LLINs), to indoor residual sprays (IRS), to artemisinin-based combination therapy (ACTs), to rapid diagnostic tests (RDTs)—has achieved unprecedented success in reducing malaria incidence and mortality. We must expand access to these existing tools, particularly in highly affected countries, while applying new strategies and approaches to accelerate the pace of parasite elimination.

Malaria eradication will benefit from key lessons learned from the previous smallpox eradication effort and from ongoing efforts to eradicate polio and guinea worm. However, this effort will also be different in fundamental ways from its predecessors. We must take an adaptive, problem-solving, implementation approach by incorporating new tools and insights as they emerge.

We must apply new strategies to accelerate the pace of parasite elimination.

Five key principles will underpin this effort:

- 1 Find and cure all infections, not just clinical cases
- 2 Make surveillance the backbone of elimination
- 3 Think regionally and act nationally
- 4 Take adaptive approaches to combatting malaria
- 5 Integrate malaria elimination into effective health systems

## 1

## FIND AND CURE ALL INFECTIONS, NOT JUST CLINICAL CASES.

Up to 85 percent of people infected with malaria parasites show no detectable symptoms, but they remain an important source of disease transmission<sup>17,18</sup>. To eliminate and eventually eradicate malaria, we need to reach and cure both symptomatic and asymptomatic cases. This will require expanding existing clinical strategies and developing new treatment approaches (e.g., screen-and-treat campaigns, targeted treatment campaigns, or seasonal malaria chemo-prevention) that engage entire communities to achieve local elimination. When combined with mosquito control strategies that prevent the reinfection of treated individuals, this approach could be effective in achieving elimination.

17 Teun Bousema, Lucy Okell, Ingrid Felger and Chris Drakeley. "Asymptomatic malaria infections: detectability, transmissibility and public health relevance" (2014). *Nature Reviews Microbiology* 12, 833–840.

18 Kim A Lindblade, Laura Steinhardt, Aaron Samuels, S Patrick Kachur, and Laurence Slutsker. "The silent threat: asymptomatic parasitemia and malaria transmission" (2013). *Expert Reviews of Anti-Infective Therapy* 11, 6: 623–639.





MAKE SURVEILLANCE THE BACKBONE OF ELIMINATION

As the WHO’s Global Technical Strategy for Malaria makes clear, effective parasite detection and surveillance are essential to elimination. This is especially true as countries approach zero cases because the risk of resurgence increases the urgency of timely detection, treatment, and follow up. Surveillance needs to be rigorous, using available technologies (including mapping, remote sensing, and real-time data analysis) that are supported by robust community health worker systems.

Effective surveillance includes:

The collection of accurate epidemiological data

to help countries determine the size and location of parasite reservoirs, implement appropriate interventions, and forecast commodity demand.

Effective health information systems

to analyze epidemiological data and make it available in real time to local response teams.

Analysis of human mobility patterns

to understand the spatial dimensions of malaria transmission and help program managers prevent reintroduction in cleared areas. See Exhibit 3

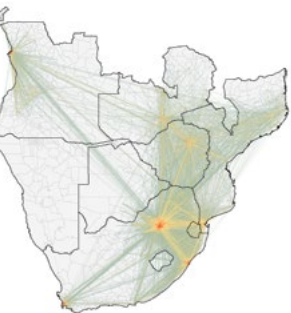
Analysis of entomological data

on the transmission potential of mosquitoes and insecticide-resistance patterns to help countries design appropriate control efforts.

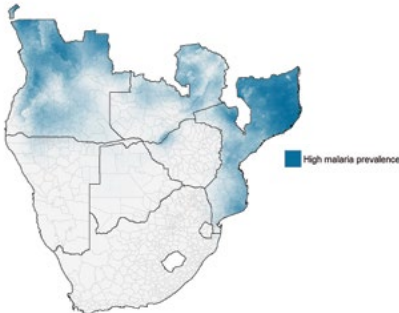
Exhibit 3

A new understanding of parasite mobility is transforming how we track and combat malaria. Combining parasite positivity data with modeling of human movement patterns based on census data and mobile phone call data records (CDRs) produces a map of parasite mobility within and between borders. Applied to regional blocks like Southern Africa (shown here), this enables malaria interventions to be coordinated for maximum impact and efficiency.

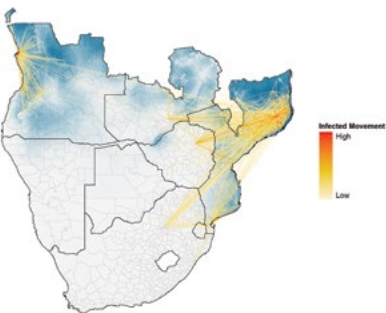
1. POPULATION MOVEMENT



2. PARASITE POSITIVITY



3. PARASITE MOVEMENT



Analyses and images are an output of the WorldPop project ([www.worldpop.org](http://www.worldpop.org)) and the Flowminder Foundation ([www.flowminder.org](http://www.flowminder.org)), and were produced by Andy Tatem, Nick Ruktanonchai, Alessandro Soricetta, Natalia Tejedor, Emanuele Strano, and Matheus Viana.

THINK REGIONALLY AND ACT NATIONALLY

National boundaries are political constructs that do not offer an effective barrier against the movements of humans or mosquitoes. This means that countries that have eliminated malaria—or those in the process of doing so—could suffer from a resurgence, unless they commit to working with their neighbors to develop and implement trans-national surveillance and elimination programs.

These programs must be based on data-collection and data-sharing agreements among blocks of nations that are linked by shared ecological, epidemiological, and economic features that enable cross-border parasite transmission. By thinking regionally, designated country blocks can map both major infection “hot spots” within their malaria ecosystems, and the human migration patterns that export parasites from hot spots to other areas. This will allow individual countries to concentrate their elimination efforts on high-prevalence areas and work collaboratively with neighboring nations to implement public health interventions that focus diagnosis, treatment, and prevention on those most at risk of acquiring or transmitting malaria (e.g., test-and-treat programs for labor migrants who work in high-prevalence areas).

Countries that share a malaria ecosystem can also share best practices and lessons learned from other national elimination programs. For the most part, malaria elimination is a national effort, driven by country-level political leadership, financing, and public health systems, but the pace and success of elimination in many countries will ultimately rely on effective trans-national collaboration. See Exhibit 4 for information on current regional elimination efforts.

TAKE ADAPTIVE APPROACHES TO COMBATTING MALARIA

In the 1950s and 1960s, the global malaria eradication program relied on a single intervention to interrupt parasite transmission and accelerate elimination—spraying households with Insecticide. This approach was effective in many low-transmission settings, but it was inadequate to the rapidly evolving biological challenges posed by other settings. In the 1970s, insecticide and drug resistance emerged but governments did not invest in the development of follow-on drugs and vector control methods.

By contrast, elimination strategies in the 21st century will operate with a strong respect for evolutionary principles. They will use operational research to identify the most efficient and effective approaches to deploy new tools and strategies as they emerge. And they ultimately will advance through a multi-pronged effort that includes investments in better methods of surveillance, prevention, diagnosis, and treatment.





5

INTEGRATE MALARIA ELIMINATION INTO EFFECTIVE HEALTH SYSTEMS

The 2014 Ebola epidemic in Africa has underscored the central role of effective health systems in disease surveillance, treatment, and prevention—and strong efforts are underway with support from the WHO, the G7, the U.S. Centers for Disease Control and Prevention, the African Union, and others to revitalize integrated health service delivery and surveillance in developing countries.

Efforts to combat malaria both contribute to and benefit from strengthened health systems—specifically, primary healthcare at the community level. The same frontline health workers who diagnose and treat malaria deliver other essential care, and will also be key for case detection as malaria burden decreases. Revitalized, integrated health systems will include the scale up of effective national and regional disease surveillance programs, which will be essential to the detection and treatment of malaria in many affected countries. Although vertical campaigns will be required

at times, ultimately malaria elimination efforts must be deeply integrated into effective health systems to be sustainable and cost-effective.

We are already on the way to a malaria-free world. At the beginning of the 20th century, malaria affected nearly every nation on earth. Since then, more than half of the member states of the United Nations have successfully eliminated the malaria parasite within their borders, and dozens of countries are scheduled to complete elimination in the next decade. Eradication will not be achieved through a single, top-down global effort but through national and sub-regional commitments to elimination led by affected countries, with support from regional and international donor governments and the private sector. Many of these regional elimination efforts are already taking shape. Ultimately, this is where the eradication effort will be won.



Eradication will not be achieved through a single, top-down global effort but through national and sub-regional commitments to elimination led by affected countries, with support from regional and international donor governments and the private sector.





Exhibit 4

# Three Major Elimination Efforts

Three major regional elimination efforts are currently underway in Southeast Asia, Hispaniola, and sub-Saharan Africa, and they can achieve critical milestones by 2020 with support from regional and global stakeholders:

## ENDING MALARIA IN NORTH AMERICA

Haiti and the Dominican Republic (collectively the Island of Hispaniola) remain the only two countries affected by malaria among the 28 independent nations and dependent territories of the Caribbean region. In February 2015, the Haiti Malaria Elimination Consortium (HaMEC) was launched with the goal of eliminating malaria from the Island of Hispaniola by 2020. This innovative partnership brings together committed grassroots health workers from Haiti and the Dominican Republic with global experts in public health, led by the U.S. Centers for Disease Control and Prevention (CDC) and the CDC Foundation. If successful, HaMEC will end malaria transmission and reintroduction across the Caribbean and pay for itself by strengthening the reputation of Haiti and the Dominican Republic with international tourists. A parallel effort to eliminate malaria from Central America is underway with financing and technical support from the Global Fund and the Pan-American Health Organization, which means that we could witness the final elimination of malaria from North America within a decade.

## MALARIA ELIMINATION IN SOUTHERN AFRICA

Sub-Saharan Africa accounts for more than 90 percent of the global burden of malaria, and no nation south of the Sahara has succeeded in eliminating the disease. Thanks to leadership from the Southern African Development Community, that is about to change. SADC members have formed the Elimination Eight Initiative (E8) with the goal of eliminating malaria from four of its member states by 2020 (Botswana, Namibia, South Africa, and Swaziland) and from the remaining four member states by 2025 (Angola, Mozambique, Zambia, and Zimbabwe). The E8 initiative will be led by a transnational coordinating committee, and each E8 country has adopted a rigorous elimination scorecard that will measure national progress toward achieving effective surveillance, treatment, and prevention targets.

## ENDING MALARIA IN SOUTHEAST ASIA

No regional elimination effort is more critical over the next five years than the successful elimination of *P. falciparum* malaria from the five nations of Southeast Asia (Cambodia, Laos, Myanmar, Thailand, and Vietnam) that, together with Yunnan Province in China, make up the Greater Mekong Sub-region (GMS). While the malaria disease burden has been reduced significantly across the GMS, important drug resistance “hot spots” have emerged in forested border areas. These hot spots pose a direct threat to the success of global elimination efforts. If the spread of drug-resistant parasites is not checked through the elimination of all *P. falciparum* parasites in the region, it is likely that (MDR) multi-drug resistant malaria will spread worldwide, increasing the cost and reducing the efficacy of malaria elimination efforts everywhere. With support from regional governments, the Global Fund, Australia’s DFAT, the U.S. President’s Malaria Initiative, UK AID, and the WHO, regional elimination efforts have been launched with the goal of completion by 2020.



## II

# New Tools

Twenty-five years ago, it would have been hard to predict the strides that the world has now made in developing better tools to fight malaria. In 1990, front-line malaria treatments were failing, artemisinin-based combination therapies (ACTs) were unavailable, and low-cost rapid diagnostic tests and long-lasting insecticidal nets (LLINs) were still yet on the horizon. But then a new wave of affordable treatments and prevention tools emerged to reassert the power of human innovation and unlock investment in malaria in the 1990s and 2000s.

The outcome has been a robust pipeline of potential game-changing products. The malaria product development pipeline has never looked better. The table that follows provides a summary of the diagnosis, treatment, and prevention interventions that could be available in the near future. While timelines for product availability may be delayed by several factors—including clinical trials and funding for procurement—the number of high-impact interventions that could be available by 2025 is impressive and perhaps unrivaled in the field of infectious disease R&D. It is also feasible, given enough political will and focused investment.

We need next-generation tools and strategies not only to accelerate elimination, but also to mitigate the challenges posed by multi-drug resistant (MDR) parasites and insecticide-resistant mosquitoes. As many in the global malaria community know, the growth of MDR malaria in the Greater Mekong Subregion currently poses a threat to treatment around the world, and the expansion of pyrethroid-resistant mosquitoes across sub-Saharan Africa likewise threatens the effectiveness of LLINs.

The malaria product development pipeline has never looked better, promising a number of transformative new products that will accelerate malaria elimination efforts.







NEAR-TERM INNOVATIONS

There are a number of potentially transformative products that could be available within 10 years:

COMPLETE-CURE TREATMENTS

Candidate treatments for *P. falciparum* and *P. vivax malaria* that could deliver a single-dose, complete cure for malaria are in advanced clinical trials and could be available by 2020. If successful, these treatments would be capable of clearing all malaria parasites through a single administration of just one or two drug tablets—a clear advantage over ACTs which are effective in clearing the body of asexual-stage parasites that are responsible for transmission but are not effective in eliminating sexual-stage parasites. The real danger with multiple doses is not just that patients remain infected if they stop treatment when they feel better; it’s also that a failure to complete a full course of medication contributes to the development of MDR malaria.

INNOVATIVE VECTOR CONTROL METHODS

In sub-Saharan Africa, where indoor biting at night is the leading cause of malaria transmission, insecticide-treated wall liners, insecticide-embedded paints, eave tubes, and other innovations could strengthen vector control by closing “residual transmission gaps” that occur when people are out of bed at night or in the early morning. The deployment of next-generation LLINs with new combination insecticides could also overcome pyrethroid resistance and extend net effectiveness from three to five years. In Asia, where outdoor transmission is a leading cause of malaria infection, novel vector control measures designed to protect rural workers in the artisanal mining, forestry, and agricultural sectors could play a major role in ensuring the safety of Southeast Asia’s sizable migrant worker populations from infection, while also helping to prevent the re-importation of malaria into areas that have eliminated the parasite when workers return to their families. Potential innovations could include insecticide-embedded clothing and novel repellents.

HIGHLY SENSITIVE DIAGNOSTICS

Malaria detection has been revolutionized by the development of RDTs—cheap yet accurate point-of-care tests that help health workers distinguish malaria infection from other causes of fever. Additionally, new, highly sensitive tests are in development that could detect parasite infection in people who are infected but asymptomatic. These tests could be available for use by 2020.



Photo by Esther Havens / Malaria No More

TRANSFORMATIVE END-GAME PRODUCTS

Beyond the near-term innovations described above, there are two R&D efforts in early phase discovery and development that could deliver game-changing malaria elimination tools between 2025 and 2035.

VACCINES THAT INTERRUPT MALARIA TRANSMISSION

Highly efficacious and long duration vaccines that either prevent parasites from proliferating in the bloodstream or interrupt the parasite transmission between mosquitoes and humans could accelerate efforts to prevent parasite transmission and reintroduction.

NOVEL MOSQUITO CONTROL STRATEGIES

While there are more than 3,400 mosquito species worldwide, nearly all malaria parasites are transmitted by a few dozen species in the *Anopheles* genus. Researchers are seeking to induce genetic changes that could cause sustained reductions in mosquito populations—and could lessen the costs and environmental impact of malaria elimination efforts by limiting insecticide use.



## III

# New Financing

Between 2000 and 2013, annual global investment in malaria grew 2,000 percent—from \$130 million to \$2.7 billion per year. This increase fueled an unprecedented scale up of malaria interventions, primarily the delivery of long-lasting insecticidal nets (LLINs) and artemisinin-based combination therapy (ACTs). Most of the funding came from Official Development Assistance (ODA) provided directly by the U.S. and U.K. governments or through the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund), the World Bank, and UNITAID.

To put the world on the path to eradication, malaria funding will need to double between 2015 and 2025.<sup>19</sup> Global ODA alone, however, is not anticipated to grow at rates that will meet the cost requirements of malaria eradication. Therefore, affected country and regional financing will have to increase significantly to achieve the ambitious elimination targets being set by countries and regions.

The International Monetary Fund (IMF) projects that many countries in Africa, the Americas, and Asia will double or triple the size of their economies in the next decade, buoyed by annual GDP growth rates of 3-10 percent. This should position affected countries and regions to provide complementary funding for malaria interventions or, in select cases, entirely finance malaria elimination within their borders. But economic growth alone does not guarantee investment; more effective revenue collection programs are needed to help countries generate additional health funding. To support revenue

19 Original financial modeling for Aspiration to Action. For details, see “Methods” section in online appendix.

Affected-country and regional financing will have to increase significantly to achieve the ambitious elimination targets being set by countries.

Photo by Esther Havens / Malaria No More

collection, sophisticated country and regional advocacy efforts will be essential to ensure that countries dedicate a portion of increased revenues to malaria, among other critical health priorities.<sup>20</sup> Finally, as economic growth causes affected countries to become ineligible for certain forms of financing, the transition from ODA must be anticipated and carefully managed, as recent examples from the Global Fund and the Gavi Alliance illustrate.

The first decade, in particular, constitutes a critical ramp-up period, as affected countries scale their commitments and as regional funding is introduced. ODA and transitional financing mechanisms will play vital roles in sustaining coverage of life-saving tools, filling gaps, and smoothing the transition to increased domestic financing. Global and regional development banks will play a key role in facilitating the scale up of domestic investment by providing concessionary loans and guarantees and by backing development bonds and other financing instruments that will allow countries to access affordable capital and shift costs into the future.

20 The value of investing in malaria elimination will need to be weighed against other national health and development priorities, and it will be important for advocates to underscore the secondary benefits that malaria elimination delivers in regard to health system strengthening, educational attainment, and economic productivity.

Momentum toward elimination at the regional and sub-regional levels will help drive resource mobilization efforts. Groups of countries that define common elimination targets and timelines will be able to make a compelling case for investment within domestic health budgets, among their neighbors, and with other regional and global partners—particularly to the extent that they can demonstrate that elimination contributes to regional health security and economic growth. Current elimination efforts in sub-Saharan Africa, the Greater Mekong Sub-region (GMS), and the Caribbean have already demonstrated the ability to attract funding on a multi-country basis. Other groups of countries working together toward elimination should build on this approach by fashioning compelling cases for investment aimed at regional and global donors.

While securing funding for elimination over the next decade will be challenging, consideration must also be given to financing the critical malaria “end game” between 2030 and 2040, when political will is most likely to falter and when the risk of resurgence will be the highest. It is expected that international donors will play a lead role in sustaining this final phase of eradication.



THE COSTS OF ERADICATION

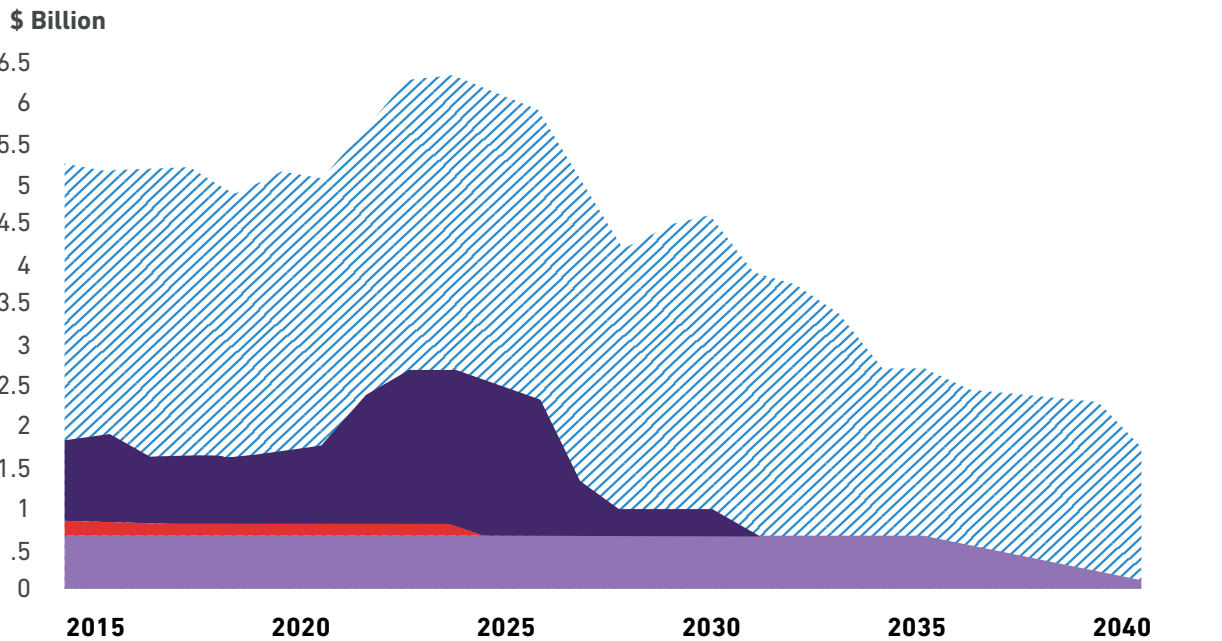
Any costing of a 25-year eradication effort is speculative and involves uncertainties that increase over time. Nonetheless, initial modeling suggests that the costs of eradicating malaria could be \$90-\$120 billion between 2015 and 2040 (see Exhibit 5).<sup>21</sup> This compares to an estimated \$2 trillion in economic benefits between 2015 and 2040 from productivity gains and health savings.

Two trends should mitigate long-term growth in costs. First, advances in surveillance, data analysis, and modeling should improve each country’s ability to focus interventions in specific areas and avert the high costs associated with indefinitely maintaining universal coverage strategies. Second, urbanization trends in affected countries could reduce the number of people at risk of malaria and allow governments to deliver detection, treatment, and prevention more cost-effectively.

As countries aggressively expand control efforts and introduce new strategies and tools to pursue elimination, malaria funding will need to double between 2015 and 2025, when annual costs peak at over \$6 billion. Costs are then expected to decline after 2025, as clusters of countries (and eventually entire regions) achieve elimination. However, while overall costs are expected to decline over time as more countries become malaria-free, the cost per country will substantially increase once eradication reaches an end-game phase—which will almost certainly need to be financed by international donors. Between 2030-2040, 65 percent of the costs are expected to be funded by ODA.

POTENTIAL COST BY REGION

Exhibit 5

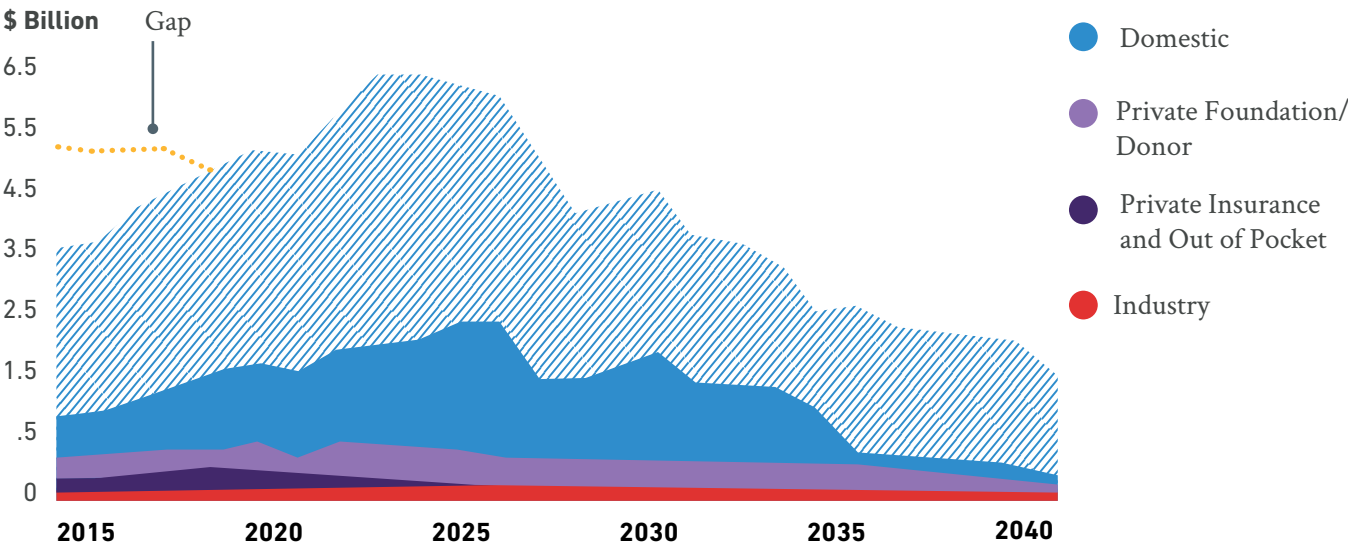


FINANCING SOURCES

Specific approaches to financing malaria elimination will vary by region. In the Americas and the Asia-Pacific region, funding will need to be mobilized principally through domestic and regional financing. In many African countries, it is likely that official development assistance (ODA) will continue to play an important role even as domestic and regional contributions increase.

POTENTIAL FINANCING SOURCES GLOBALLY

Exhibit 6



1

ODA

To date, ODA has provided the vast majority of malaria funding. In 2013, it represented 82 percent of the \$2.7 billion invested annually in malaria efforts. The Global Fund is the single largest source of ODA, and bilateral funding through the U.S. government (the President’s Malaria Initiative) and the U.K. government (the Department for International Development) also has been critical. The World Bank has historically played an important role in ODA for malaria, and it will be critical to current efforts for it to resume that role.<sup>22</sup> Current donors also will need to grow their ODA commitments,<sup>23</sup> while

structuring their contributions in ways that incentivize counterpart financing from affected countries and reward progress toward elimination. This outcomes-oriented approach is already being integrated into the new funding model that the Global Fund adopted in 2013. Donors will also need to sustain efforts where domestic capacity cannot meet eradication financing needs.

Traditional donor governments provide the majority of funding for R&D to develop new tools to fight malaria. Currently, 50 percent of R&D is funded by gov-

21 Further details on the costing methods are provided in the Methods section in the online appendix.

22 New mechanisms, such as the Global Financing Facility (GFF), may present a vehicle for continued World Bank investment.

23 For the purposes of this model, it is assumed that malaria contributions from the U.S. and U.K. governments, as well as the Global Fund, will grow through 2030 at a rate equivalent to the average growth rates of past years, between 2010 and 2014.



ernments, with 30 percent provided by private donors and the remaining 20 percent by private companies. Total R&D investment in 2013 was \$550 million. To accelerate the development of next-generation interventions, we estimate investment will need to reach \$675 million per year.<sup>24</sup> Each contributing sector will need to increase its contribution, as ongoing R&D is required to enhance the impact of existing tools and prepare for potential drug and insecticide resistance.

2 DOMESTIC FINANCING

In 2014, domestic financing represented 18 percent of malaria funding<sup>25</sup>—and this proportion is growing, but at an insufficient rate to meet the rising costs of elimination efforts. To finance ambitious regional elimination targets, affected countries will need to increase their malaria investments over the next decade by an average of ~170 percent (average annual growth of 10 percent between 2015 and 2025), with the bulk of funding coming from a small number of high-burden countries with rapidly growing economies. Most African countries have committed to increasing their health budgets under the Abuja Declaration. To reach the increases required, they will not only need to follow through on this pledge but will also need assistance through concessionary loans and guarantees. Most affected countries in the Americas and rapidly growing economies in Asia could become self-financed in the next decade.

3 PRIVATE SECTOR

The private sector must continue to be a critical driver of R&D. Private foundations and the pharmaceutical, health device, and chemical industries have played a critical role in funding the development of new tools and technologies. To accelerate elimination, the mining, forestry, and energy sectors must likewise play a role by ensuring that malaria detection and treatment are

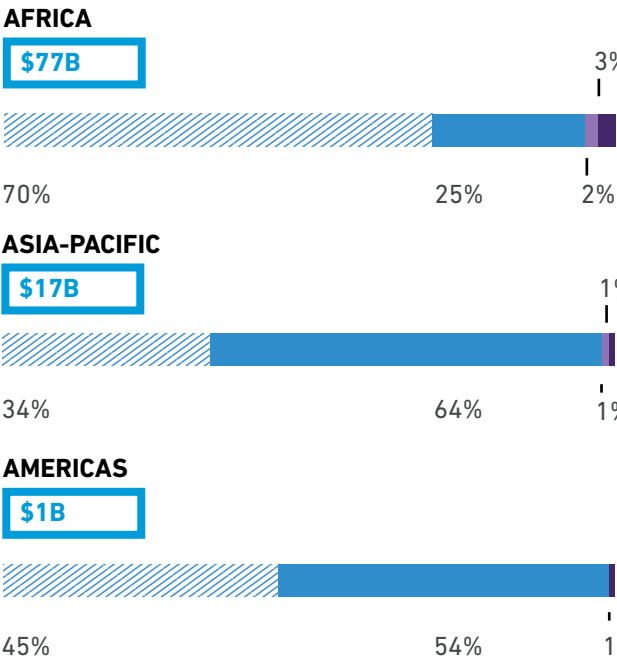
24 Original financial modeling for Aspiration to Action. For further details on the financing methods, see “Methods” section in online appendix.  
25 World Health Organization, *World Malaria Report 2014* (Geneva: WHO, 2014).

integrated into the health care services they provide to workers, dependents, and neighboring communities. Companies with strong supply and distribution chains in rural areas can also support the scale up of donor- and government-financed integrated elimination efforts.

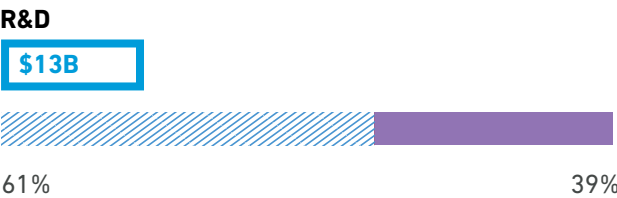
4 REGIONAL FINANCING

Opportunities for regional financing are especially strong in the Americas and the Asia-Pacific region, where economic growth and the regional interests of leading economies—including the containment of drug-resistance in Asia—could encourage wealthy countries to invest in the health security of their neighbors. The Islamic Development Bank and the Asian Development Bank have each developed transitional financing strategies to promote domestic investment in essential health and development needs, and other regional funding bodies should pursue similar approaches.

FINANCING SOURCES BY REGION (2015-2040)  
Exhibit 7



FINANCING SOURCES FOR R&D (2015-2040)





Transitional Financing and New Sources

Just as innovation is required in the arenas of program implementation and tool development, innovation will also play a role in helping countries cover the costs of malaria elimination.

Here, we identify five tangible innovations that could be important to financing malaria elimination and ultimately eradication. Encouraging developments are already emerging in a number of these areas, yet significantly more work needs to be done to meet the future financing needs of malaria eradication.

1

INCENTIVIZE DOMESTIC CONTRIBUTIONS WITH DONOR MONEY

Traditional donor institutions are encouraging increased domestic funding by making grants conditional on country counterpart funding. For instance, the Global Fund’s new funding model (NFM), established in 2013, makes 15 percent of a country’s potential grants contingent on meeting a “willingness to pay” requirement, which varies by income level. Since the NFM was established, domestic financing for HIV, tuberculosis, and malaria has increased by an estimated 150 percent. Similarly, the newly established Global Financing Facility (GFF) uses grants to encourage countries to use World Bank International Development Agency (IDA) monies for health.

2

SHIFT DOMESTIC FINANCING COSTS TO THE FUTURE

Concessionary loans make domestic investment attractive by front-loading benefits while allowing countries to pay costs over time. The Islamic Development Bank’s new Lives and Livelihood’s Fund aims to provide \$2.5 billion in grants and religiously sanctioned loans to member countries—including high-burden malaria countries such as Nigeria and Indonesia—for health and development projects. The Asian Development Bank is also exploring concessionary lending for

malaria to complement its new Regional Malaria and Other Communicable Diseases Trust Fund. Front-loading investment for elimination in the Greater Mekong Sub-region (GMS) between 2015 and 2020 is especially compelling as it could avert the potentially devastating future loss of effective treatment there and in other parts of the world, making it a true “public good.”

Other instruments—such as health bonds that are similar to “green bonds” used to combat climate change—can help shift domestic financing requirements into the future while meeting up-front financing needs.<sup>26</sup> While much more work is required to concretely “capture benefits,” given that there are clear financial returns for affected countries that invest in malaria elimination, funding mechanisms should try to estimate and capitalize on these returns.<sup>27</sup>

3

REWARD MEASURABLE PROGRESS

Additional domestic and donor financing can be generated through pay-for-performance mechanisms that reward a country’s ability to meet elimination or other program targets. The Global Fund’s Meso-America and Hispaniola Regional Initiative provided \$10.5 million in cash-on-delivery financing to countries that demonstrated reduction in malaria cases. It’s a win-win situation: Countries are encouraged to invest to meet program targets and unlock external funds, and donors only pay when the desired outcome is achieved. A similar approach could reward countries that are nearing malaria elimination to assure them that donor money is in place to finish the job.

26 The transportation sector uses various instruments to finance long-term projects. Eurotunnel, the New York Municipal Bond Bank, and the Initiative for the Integration of Regional Infrastructure in South America used bond structures that frontloaded future financing requirements on the basis of expected future revenue generation.

27 Health bonds could be strengthened by securing credit enhancement mechanisms (e.g., pooled financing) through multilateral development banks or bilateral agencies, as well as by targeting endowment and sovereign wealth funds as investors.

4

TAP ADDITIONAL DOMESTIC REVENUE

Since 2001, novel financing has mobilized nearly \$100 billion for development in other areas, and it has grown by about 11 percent per year.<sup>28</sup> Affected countries should explore revenue generation for health by: introducing new taxes on international investment; facilitating debt swaps; floating bonds marketed to diaspora communities, including tapping into the remittance market; and developing domestic-funded instruments, including incentives to encourage corporate donations, individual philanthropic giving, and employee donations. Examples of novel financing approaches can be found in Appendix 2.

5

ANTICIPATE “END-GAME” FINANCING NEEDS

As with other eradication efforts, the final decade of malaria eradication will likely focus elimination efforts on least-developed countries, failed states, and conflict zones, where elimination will be costly on a per-case basis and may require special funding. Given that the global burden of malaria in the final phase of eradication will be negligible relative to other health priorities, donor-support for malaria could be challenging if

dedicated financing has not already been secured. As demonstrated by the fight for polio eradication, a robust financing strategy will be needed to sustain efforts. A centralized fund provides one mechanism to maintain long-term financing. Such a fund could be established or endowed in the next decade to ensure stable end-game funding.

Over the next five years, we recommend that these financing approaches be evaluated, expanded, and piloted as required to provide national and sub-regional elimination efforts with a suite of financing options. The malaria partnership should evaluate which approaches are most appropriate for specific countries or sub-regional campaigns. Approaches that shift domestic financing to the future may be appropriate for rapidly growing economies that can expect substantial returns from malaria elimination and growing revenues. Diaspora bonds and debt conversion approaches may provide new sources of funding for countries with modest growth. Most importantly, demonstrating the scaled impact of these approaches will lend confidence to a 2020 decision to move forward with a renewed World Health Assembly resolution for eradication.

The significant growth anticipated in affected-country financing (~170 percent by 2025) will not happen without strong partnership and support from existing donor institutions and regional banks. Below are examples of meaningful efforts that are underway to support the growth of affected-country financing.

**The Global Fund’s New Funding Model** – The Global Fund’s new funding model sets clear counterpart financing targets for countries based on income level and funding history. An additional 15 percent of the Global Fund’s allocation can be accessed by countries if they meet a “willingness to pay” target for domestic financing. Counterpart financing for HIV, tuberculosis, and malaria has increased by an estimated 150 percent since the adoption of the new funding model.

**Islamic Development Bank’s (IDB) Lives and Livelihoods Fund** – Announced in July 2014, the Lives and Livelihood’s Fund will be a \$2.5 billion resource that will deliver a mix of grants and religiously sanctioned loans to IDB member countries for health and development projects. Malaria is named as a key priority, and a number of affected countries in Africa and Asia are eligible to apply.

**Asian Development Bank (ADB) Regional Malaria and Other Communicable Diseases Trust Fund** – The ADB Regional Malaria and Other Communicable Disease Trust Fund (RMTF) was established in 2013, with the support of partners DFAT, DFID and CIDA. The RMTF aims to scale-up responses to key challenges in malaria and other communicable diseases in Asia and the Pacific.

**Health Bonds** – As part of its Global Financing Facility, the World Bank Group is currently working to construct two of the largest social impact bonds (SIBs) to be issued, both focused on the health sector. One consists of a potential mass replacement of bed nets, where the principal is to be paid back over time by the borrowing government with potential assistance from the Global Fund, and the other for mass deployment of community health workers (CHW), which also involves spreading out the up-front CHW scale up costs over time to create more fiscal space for government spending.

28 Innovative Financing Initiative, Innovative Financing for Development: Scalable Business Models that Produce Economic, Social, and Environmental Outcomes (Global Development Incubator, 2014).





# Conclusion

Since the turn of the millennium, the world has made unprecedented progress against malaria. Never before have so few people suffered or died from this disease—and never has political commitment been so high, nor the pipeline of new technologies looked so good. The prospect of a malaria-free world should, therefore, no longer be treated as a distant aspiration. It is a realistic objective that could be achieved within a generation with the right commitment of leadership and resources. It will be a hard task, with potential setbacks on the way, including the challenge of insecticide and parasite resistance, funding obstacles, and uncertainties about the right prioritization of tools and implementation approaches. The only way to address these issues is by facing them openly and honestly.

The alternative to eradication—controlling the disease forever without eliminating it—is operationally and politically untenable. Maintaining a strong political commitment will be impossible unless we can define a clear end point: eradication within a generation. And the potential impact is enormous: 11 million lives and \$2 trillion dollars of economic impact are at stake.

When a distant goal is identified, there is a tendency for people to lose focus on the present. We cannot afford to lose sight. This document calls for us to change the way we think about the fight against malaria—through new strategies, new tools, and new financing—with an emphasis on meeting or exceeding the near-term targets of the WHO’s Global Technical Strategy and putting the world back on a clear path to eradication.

Everyone has the right to live in a malaria-free world. We can deliver on that aspiration if we take action now to make it a reality.

*Bill Gates*

**BILL GATES**  
Co-chair  
Bill & Melinda  
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Maintaining a strong political commitment will be impossible unless we can define a clear end point: **eradication within a generation.**



## Appendix I:

### REGIONAL APPROACHES TO MALARIA FINANCING

#### THE AMERICAS

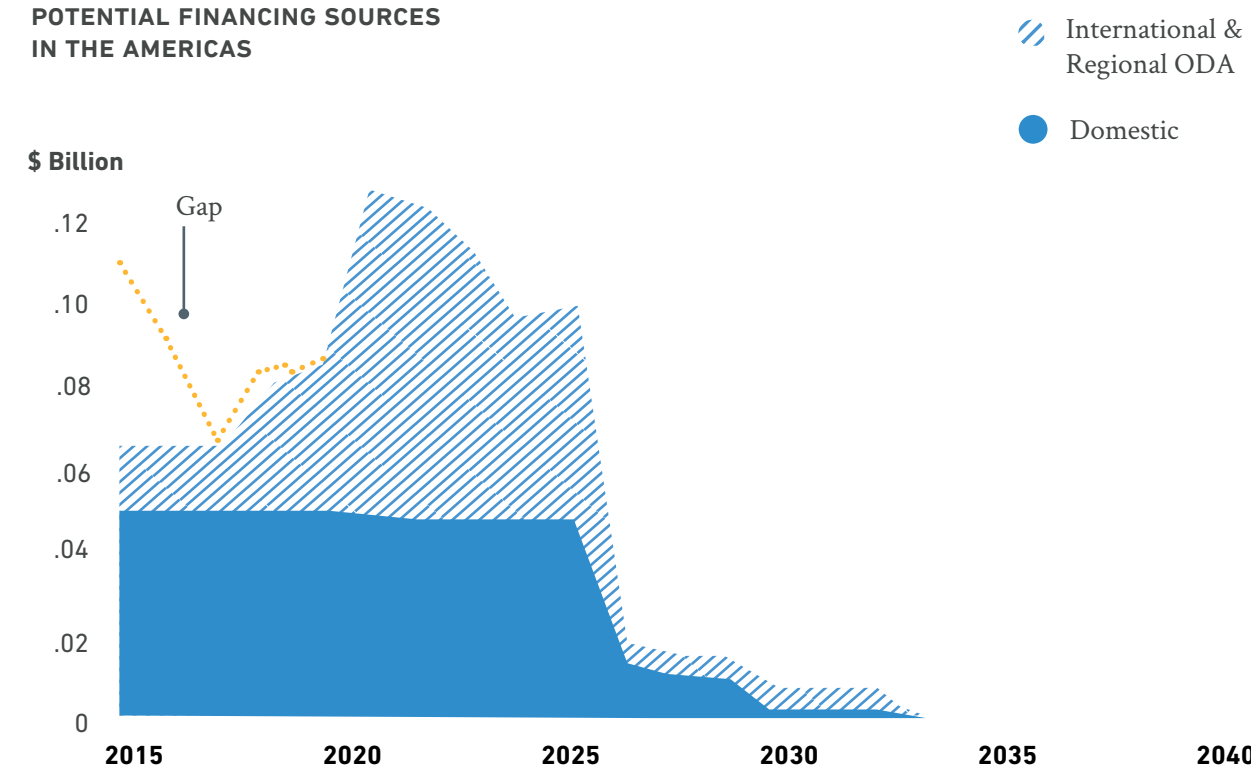
Given the comparatively low disease burden of the Americas and the region's rapidly emerging economies, it is likely that all countries in the Americas, except for Haiti and a small number of countries in Central America, will have the capacity to cover their elimination costs through domestic financing. International and regional official development assistance (ODA) may make up an estimated 45 percent of elimination costs, and ODA will continue to play a key role in financing between 2015 and 2020. For example, ODA will be the primary source of funding for malaria elimination in Haiti, with funding from private foundations also playing a role. In Central America, ODA support will also be needed over the next decade and could be attracted through coordinated regional elimination initiatives, such as the Meso-America Initiative, which could be co-funded and is already being supported by the Global Fund.

#### THE ASIA-PACIFIC

In the Asia-Pacific region, momentum is building to support high-level elimination commitments. In November 2014 at the 9th East Asia Summit, 18 regional heads of state and government committed to eliminating malaria from the Asia-Pacific by 2030. Governments in the Greater Mekong Sub-region (GMS) are also working collaboratively to accelerate elimination to stem the spread of drug-resistant malaria.

As countries in the area develop, international ODA as a percentage of public health funding will likely decline. Indeed, this trend has been well underway for more than two decades. Funding from within the Asia-Pacific region in the form of domestic financing, regional ODA, or regional lending has the potential to replace international funding.

#### POTENTIAL FINANCING SOURCES IN THE AMERICAS



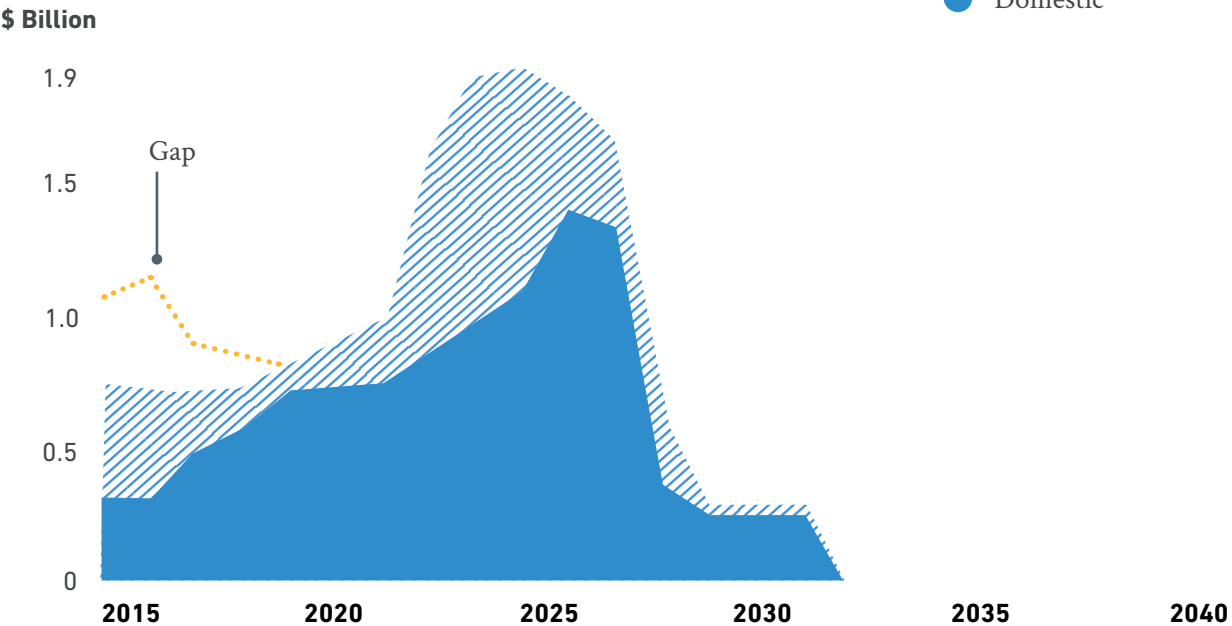
Source: Original financial modeling for Aspiration to Action. For details, see "Methods" section in online appendix.

# Appendices

Appendix I | Appendix II



POTENTIAL FINANCING SOURCES  
IN ASIA PACIFIC



Higher-income countries and those experiencing rapid growth, such as India, China, Malaysia, and Indonesia, will be expected to fund most or all of their national elimination costs over time, but others might need assistance as they scale up domestic commitments. Given the magnitude of the malaria burden in these countries, particularly India and Indonesia, fully funded elimination programs by these four countries alone would represent approximately 60 percent of total elimination costs for the Asia-Pacific region. This would translate into about \$10 billion in domestic contributions between 2015 and 2030.

For other countries, international and regional ODA will be required. The World Health Organization (WHO) estimates that \$3.2 billion to \$3.9 billion will be needed between 2015 and 2030 to achieve *P. falciparum* malaria elimination in the GMS. These costs outstrip GMS countries' capacity to finance their own elimination plans, and overreach the demonstrated willingness of global donors to support the effort. International ODA (i.e., ex-Asian funds provided by the Global Fund, the

U.K. and the U.S.) to the GMS is currently ~ \$50 million per year.

Regional funding could be an important resource for filling this need, as Asia's leading economies could be incentivized by economic and health security concerns and regional geopolitical dynamics to contribute to GMS elimination. The global spread of multi-drug resistance from the GMS could imperil elimination efforts throughout the Asia-Pacific region, and regional funding could be characterized as a public good for the region and the world.

Given that elimination requires coordinated efforts and generates regional benefits, regional institutions such as the Asian Infrastructure Investment Bank could support these efforts. Another mechanism is the Regional Malaria and Other Communicable Disease Trust Fund (RMTF), which was established in 2014 by the Asian Development Bank (ADB). While direct contributions to the fund are still being mobilized, ADB has already prioritized the financing of development

loans focused on malaria and other health issues. Australia has also played an important historic role in mobilizing health funding for the Asia-Pacific region, and it continues to explore opportunities to channel funding toward malaria elimination and malaria R&D through the country's growing impact-investment model and the Australian Government's Future Fund.

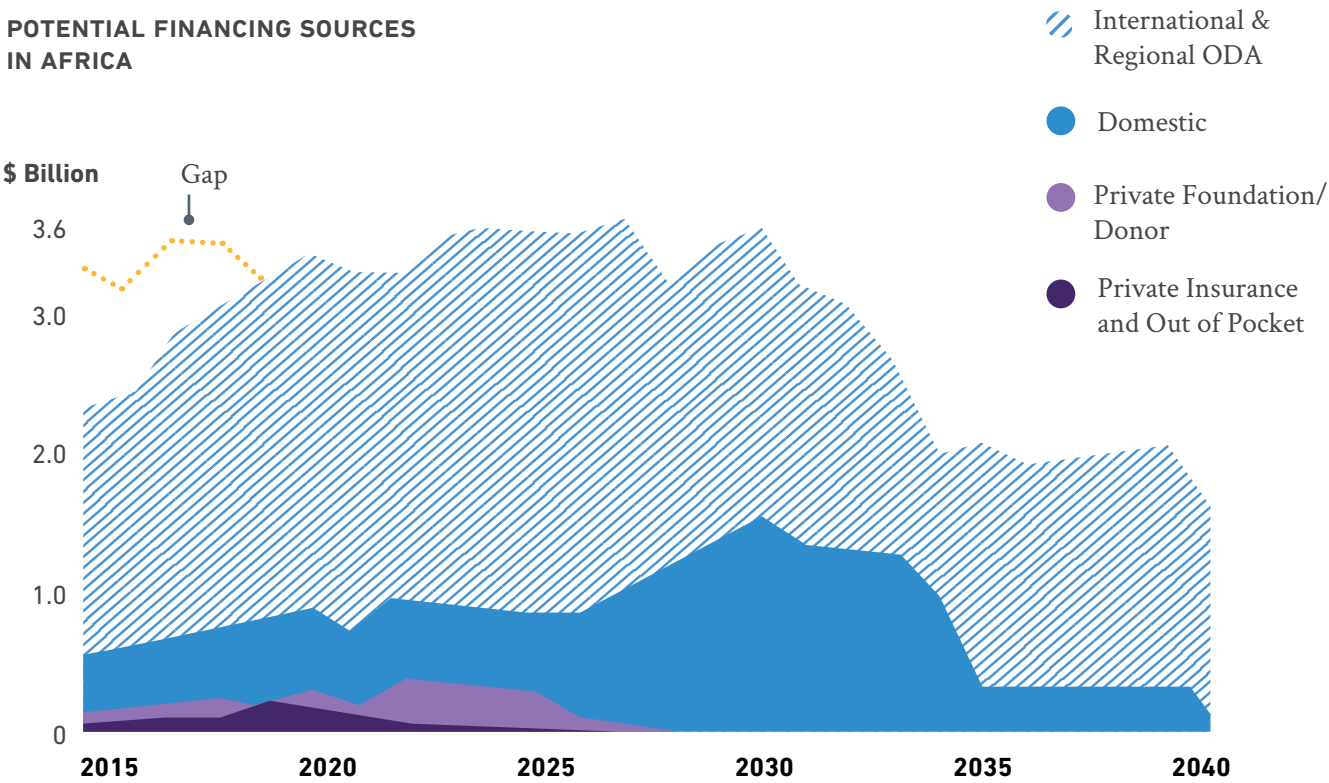
AFRICA

Most national economies in sub-Saharan Africa are projected to grow substantially over the next 25 years, and the region's GDP is likely to increase nearly 40 percent between 2015 and 2020.<sup>29</sup> If realized, this growth will create expectations among traditional donors that sub-Saharan Africa should bear a greater proportion of the costs for health interventions, including malaria elimination.

According to the World Bank, sub-Saharan Africa will have 26 low-income countries by 2030 (down from 31 today), and this number is expected to decline to 9

by 2040.<sup>30</sup> Countries that graduate from low-income status may become ineligible for ODA or have difficulty securing traditional donor support. In light of this, the modeling for From Aspiration to Action projects a 50 percent increase for ODA to Africa in the first ten years, with domestic funding growing ~55% over the same period to meet the cost requirements of control and elimination efforts. Increasing domestic financing over the next decade will be one of the major challenges to putting Africa on a path to malaria elimination. Despite the Abuja declaration, which committed 40 sub-Saharan African countries to spend at least 15 percent of their national budgets on health, only 8 countries have met their targeted health-care expenditures to date. Most are contributing less than 50 percent of their commitment. Yet for most countries, the cost of eliminating malaria would constitute just a fraction of total health care spending if they were to reach the Abuja target.

POTENTIAL FINANCING SOURCES  
IN AFRICA



29 World Bank, 'World Bank Open Data'. 2015. Web.

30 World Bank, 'World Bank Open Data'. 2015. Web.



Increasingly, continued ODA commitments are being tied to growing expectations of domestic financing, as evidenced by the Global Fund’s “willingness to pay” incentive in its new funding model. Under this provision, 15 percent of allocated Global Fund resources are contingent on counterpart financing from recipient countries. According to the Global Fund’s initial analysis, the first four waves of concept note submissions under the new funding model included a 150 percent increase in domestic commitments to Global Fund projects over previous rounds.

In addition to traditional domestic financing sources, alternative revenue-generating mechanisms should be explored for Africa. These may include tax revenues, tariffs, and insurance schedules, as well as more innovative financing approaches.

For example, additional taxes could come from extractive industries or infrastructure projects. Foreign direct investment (FDI) in Africa has been increasing and in 2014 was projected to reach \$80 billion. Small levies on FDI could help countries secure the resources required for malaria elimination and other health needs. The floating of diaspora bonds should also be considered, given the significant flow of remittances to Africa; the World Bank estimates that \$5-10 billion could be raised

annually through diaspora bonds. Remittances have been used by Israel and India to raise \$25 billion and \$11 billion respectively in bond funding. Small tariffs on remittances could also be used to generate national health or malaria funds.

Health bonds and pay-for-performance mechanisms could unlock significant additional funds. This is especially true given both the expected economic growth projected for Africa and the improvement in national productivity from reducing malaria disease burden, a leading drain on worker productivity and health systems. Within the malaria community, the Nigeria Bond for replacing long-lasting insecticidal nets (LLINs) is currently being explored by the government of Nigeria, and partners such as the World Bank and Global Fund illustrate the opportunity for health bond financing.

Finally, advanced market commitments (AMCs) are another mechanism that mobilizes funds by linking investment to results. Specifically, AMCs secure quantities and price reductions from manufacturers and could be used in Africa to fund the development of vaccines or treatment campaigns. AMCs could help fund the estimated \$8 billion cost of mass testing and treatment campaigns between now and a 2040 eradication target.



Appendix II:

INNOVATIVE FINANCING EXAMPLES

UNLOCK DOMESTIC REVENUES

REMITTANCE FUNDS

**Israel and India government programs** have enabled Israel to raise \$25 billion and India to raise \$11 billion in diaspora bonds.

DEBT CONVERSION MECHANISMS

**Debt2Health**, a trilateral debt swap through the Global Fund that converts country debt into a grant.

SOLIDARITY TAX

**UNITAID Airline Ticket Levy**, a compulsory tax on airline tickets, committed to by nine participating countries. Fund from this tax have accounted for 65 percent (US \$1.2billion) of UNITAID’s total financing resources.

CITIZEN FOCUSED FUNDRAISING INITIATIVE

**RED** is an organization that develops (RED) branded products and services, whose proceeds flow to the Global Fund for investments in HIV/AIDS programs in Africa.

SHIFT DOMESTIC FINANCING INTO THE FUTURE AND ATTRACT PRIVATE CAPITAL

DEBT-RAISING MECHANISMS

**World Bank Green Bonds** raised over \$7 billion of funds through fixed income investors since 2008 to support World Bank lending for eligible projects focused on climate change.

**Global Health Investment Fund**, a \$108 million fund, provides debt funding for the development of global health products.

**International Finance Facility for Immunisation (IFFin)** is a longer-term commitment from governments to issue vaccine bonds in the capital markets in order to support GAVI programs. Front-loading of funds leaves ~70 percent of contributions available for use. By 2013 \$3.5 billion had been made and \$6.3 billion committed.

INVESTMENT FUNDS

**Global Fund Supports ETF** is a financial product based on the Dow Jones Global Fund Index SM.

CREDIT ENHANCEMENTS

**Pledge Guarantee for Health** is a financing partnership that can leverage \$100 million in credit through partial guarantees with donor governments (e.g. U.S., Sweden).

ACCELERATE TECHNOLOGY UPTAKE

ADVANCED MARKET COMMITMENTS

**Pneumococcal Advance Market Commitment (AMC)** is an initiative sponsored by GAVI under which \$1.5 billion of donor commitments provided to guarantee a low price of vaccines (i.e., 2 billion doses of pneumococcal conjugate vaccine (PVC)).







# Acknowledgments

A great number of people were consulted in the creation of this document. In particular, we would like to thank the following people for their contributions:

*From Aspiration to Action* is dedicated to the memory of the late Alan Magill, who served as Director of the Gates Foundation Malaria Program. This document reflects his vision for a malaria-free world.

The Bill & Melinda Gates Foundation (Alan Magill, Bruno Moonen, Chris White, Bryan Callahan, Kieran Daly, Julie Walz); the UN Special Envoy’s Office (Suprotik Basu, Alan Court, Katherine Rockwell, David Alport, Robert Valadez, Jay Winsten); Malaria No More (Martin Edlund, Josh Blumenfeld, Christine McKenna, Jeff Doyle); the African Leaders Malaria Alliance (Joy Phumaphi, Melanie Renshaw); the Asian Pacific Leaders Malaria Alliance (Benjamin Rolfe, Bill Parr); the World Health Organization (Pedro Alonso); the U.S. President’s Malaria Initiative (Tim Ziemer, Bernard

Nahlen and team); the U.S. Centers for Disease Control and Prevention (Larry Slutsker); PATH (Paul LeBarre); the Malaria Elimination Initiative of the University of California, San Francisco (Richard Feachem, Colin Boyle, Allison Phillips, Gretchen Newby); Medicines for Malaria Venture (David Reddy, George Jagoe); The Global Fund to Fight AIDS, Tuberculosis and Malaria (Mark Dybul, Scott Filler); and Gabriel Jaramillo.

We want to thank Malaria No More for leading the development of this report and Christine McKenna for her coordination and project management.

We would also like to give special thanks to Simon Hay, David Smith, and Peter Gething for their pro bono contributions of analytical and modeling support.

Analyses and images for the malaria connectivity maps used throughout the document are an output of the WorldPop project ([www.worldpop.org](http://www.worldpop.org)) and the Flowminder Foundation ([www.flowminder.org](http://www.flowminder.org)), and were produced by Andy Tatem, Nick Ruktanonchai, Alessandro Sorichetta, Natalia Tejedor, Emanuele Strano, and Matheus Viana.

Analytical support was provided by McKinsey & Company.

Designed by Column Five.