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DIRECTIONS

I N G L O B A L H E A L T H

Special issue on
MALARIA

MAY 2006 VOLUME 3, ISSUE 1



Rising up to the malaria challenge

PATH advances long-term solutions for prevention and control

Malaria is among the oldest diseases known to humanity. Despite important advances, however, the burden of disease remains unacceptably high: more than 2.4 billion people are at risk of malaria, and more than 1 million die from the disease each year.

PATH has a longstanding commitment to malaria prevention and control. In the 1990s, with support from the US Agency for International Development (USAID), PATH developed

diagnostic technologies that have been used in several developing countries for years. Since 1999, our Malaria Vaccine Initiative (MVI) and its partners have aggressively pursued a malaria vaccine; they are making critical progress. More recently, the Malaria Control and Evaluation Partnership in Africa (MACEPA) has infused new life into proven malaria prevention and treatment regimens. The Bill & Melinda Gates Foundation, USAID, ExxonMobil, and the Rockefeller Foundation have provided pivotal support for these efforts.

As this special issue of *Directions in Global Health* illustrates, PATH and its partners throughout the global health community are making gains on the malaria challenge—saving lives today and developing interventions that could eliminate the disease as a public health problem.

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Global partnerships for malaria control

Promoting progress through collaboration

Partners

MVI: Bill & Melinda Gates Foundation, ExxonMobil, the Rockefeller Foundation, Roll Back Malaria Partnership, US Agency for International Development, Wellcome Trust, World Health Organization, academic and research institutions, biotechnology and pharmaceutical companies, clinical trial centers, consulting groups, government agencies, nongovernmental organizations

MACEPA: Bill & Melinda Gates Foundation; Global Fund to Fight AIDS, Tuberculosis and Malaria; Government of Zambia; US President's Malaria Initiative; Roll Back Malaria Partnership Secretariat; United Nations Children's Fund; US Agency for International Development; World Bank; World Health Organization; Zambia Roll Back Malaria Partnership

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Partnerships allow individuals and organizations to share financial, technical, human, and information resources, increasing the effectiveness of their efforts and reducing overlap and waste. The PATH Malaria Vaccine Initiative (MVI) and the Malaria Control and Evaluation Partnership in Africa (MACEPA) are modeling partnerships that maximize the impact of local and global resources, bringing all partners closer to the shared goal of reducing the malaria burden.

MVI

MVI has made measurable progress in its bid to remove scientific, financial, and policy barriers to developing safe and effective malaria vaccines, largely by promoting a collaborative strategy for evaluating and testing promising vaccine candidates. Intended to promote information-sharing and reduce costly duplication, this approach has resulted in 11 partnerships for malaria vaccine development that span five continents. MVI also establishes partnerships to explore nonscientific issues that are critical for vaccine deployment, such as public- and private-sector markets for malaria vaccines, malaria vaccine financing, and the pathway to a licensable vaccine.

Partnerships for vaccine development

Malaria vaccine development is complex and costly, and because of a perception that there is no profitable market for such vaccines, few vaccine developers will commit to the process independently. MVI facilitates partnerships that remove barriers and move promising candidates forward.

One example is a partnership that is evaluating the safety, immunogenicity, and protective efficacy of a vaccine candidate in children in Western Kenya. MVI provides technical and financial support and oversees the project in collaboration with the Walter Reed Army Institute of Research, which is responsible for vaccine manufacture, regulatory approval, and Phase 1/2a clinical trials in Kenya. GlaxoSmithKline provides a critical technical component to the vaccine, and the Kenya Medical Research Institute and US Army Medical Research Unit–Kenya conduct the trials. The US Agency for International Development (USAID) provides critical input and support.

After favorable results of a Phase 1 adult trial in Kenya, the partnership launched a Phase 2 trial to evaluate the vaccine's impact on malaria in children. Results are expected in late 2006. The successful completion of these trials and the advancement of the vaccine candidate—should it prove safe and effective—will require the continued participation of public- and private-sector partners.

Partnerships for vaccine advancement

To prepare for deploying a new vaccine in developing countries, MVI participates in partnerships that extend beyond vaccine development to policy, advocacy, and commercialization. MVI reaches out into multiple communities to collaborate and seek expert technical advice. In some cases, this means bringing together stakeholders who have never worked together before.

MVI, USAID, the World Health Organization, MACEPA, and a number of African governments are engaging in a multiyear process to develop a decision-making framework for malaria vaccines. Leadership comes from a steering committee in which all partners participate. "Preparing for vaccine introduction" (page 8) provides more information about this model.

MACEPA

Funded by the Bill & Melinda Gates Foundation, MACEPA has made collaboration the centerpiece of successful and rapid expansion of malaria control programming. It is galvanizing national, regional, and global partners around the need to prioritize and commit to common strategies for rapid scale-up of proven interventions.

Collaboration at the global level

Collaboration among global organizations allows MACEPA and its partners to address malaria as a global issue, develop consistent standards for measuring progress (especially in regions where multiple partners are engaged), and share national planning processes. Such collaboration supports and promotes an evidence-based model for national scale-up of malaria control programs.

Collaboration on regional issues

As a group, the MACEPA partners collaborate with country leaders to help individual nations improve malaria control programming and to develop a model that can be applied to other countries. Zambia, a country with strong national policies and a commitment to fighting the disease, invited MACEPA's participation in improving malaria control in the region and was selected as MACEPA's initial focus country.

Through close collaboration with the Government of Zambia and the Zambia Roll Back Malaria (RBM) Partnership, MACEPA is helping the country implement a national plan for malaria control. MACEPA's primary role is to remove barriers to rapid national scale-up of proven interventions, allowing the Zambian government to fully use the human and financial resources already available. The collaboration is built on a commitment to the "three ones": working from one national plan, using one coordinated mechanism for implementing the national plan, and using one monitoring and evaluation framework.

In the first year of the partnership, the Zambia Ministry of Health, MACEPA, the Zambia RBM Partnership, local organizations, and others developed a comprehensive national plan for rapidly scaling up malaria control coverage rates. MACEPA supported government leaders

by providing technical assistance in developing national strategic and implementation plans and helping local partners procure and distribute 526,000 insecticide-treated bednets and 500,000 insecticide retreatment tablets (see page 4).

MACEPA also responded to the Zambian government's request for assistance in developing a national monitoring and evaluation system that reflects the program's impact and quickly indicates emerging bottlenecks or weaknesses. The partnership is playing a key role in establishing baseline data and coordinating and compiling data from intervention coverage surveys.

Progress through partnership

The MVI and MACEPA partnerships have already paid off: a first-generation malaria vaccine is in sight, and evidence-based prevention and control interventions are being rapidly scaled up in Zambia. Partnership has been essential to these efforts and will remain the centerpiece of PATH's work to reduce malaria in the developing world. ■



Partnerships between PATH and public- and private-sector collaborators have brought a malaria vaccine candidate to the global stage.

Strategies for malaria control

Scaling up national malaria programming in Zambia

Partners

Bill & Melinda Gates Foundation; Government of Zambia; Zambia Roll Back Malaria Partnership; Global Fund to Fight AIDS, Tuberculosis and Malaria; Roll Back Malaria Partnership Secretariat; US President's Malaria Initiative; United Nations Children's Fund; US Agency for International Development; US Centers for Disease Control and Prevention; World Bank; World Health Organization; World Health Organization Regional Office for Africa

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Every 30 seconds, a child in Africa dies of malaria. Through the Malaria Control and Evaluation Partnership in Africa (MACEPA), PATH is working to accelerate malaria control efforts. MACEPA supports the rapid expansion of proven interventions that can reduce the burden on health care systems and, by demonstrating that malaria control is possible, increase commitment to malaria control programs in the Africa region.

Modeling malaria control

Because of its demonstrated leadership and commitment to malaria control, Zambia, as MACEPA's primary national partner, is developing a model for program scale-up that can be replicated across the continent. The model is gaining international recognition for its potential to strengthen malaria control efforts and reduce the malaria burden.

In Zambia—home to 11 million people—malaria is the leading cause of death of children under five and imposes an enormous drain on the country's resources. Rural health clinics invest up to 40 percent of their time and resources caring for people with malaria, and almost half of the people who come to clinics come to be treated for the disease.

MACEPA is collaborating with the Government of Zambia and the Zambia Roll Back Malaria Partnership to support their goal of reaching 80 percent of the population with effective intervention strategies and to cut malaria-related deaths by 75 percent within three years, significantly alleviating the burden that malaria imposes on families, communities, and the economy.

The National Malaria Control Centre (NMCC) within the Zambia Ministry of Health has produced a six-year plan to reach these goals. Developed with technical support from MACEPA, the plan emphasizes delivery of prevention tools (including the use of insecticide-treated bednets, application of insecticides in homes, preventive treatment for pregnant women, and effective treatment after infection) throughout the country—at high levels of coverage and minimal or no cost to the people in need.

Procuring and distributing essential supplies

In early 2005, the NMCC identified a shortfall in insecticide-treated bednets and bednet retreatment tablets for the December 2005 through April 2006 malaria transmission season. The partners recognized that key high-risk districts must be provided bednets before the transmission season began. To address this, the MACEPA team and PATH purchased 526,000 bednets and 500,000 insecticide retreatment tablets that could be used to renew old nets.

MACEPA and in-country partners distributed bednets throughout ten districts in the western and northwestern provinces of Zambia and retreatment tablets throughout the country. The Zambian Ministry of Defense and other partners supplied trucks and drivers to ensure that supplies reached even the most remote areas of the country.

To ensure that these supplies reached the households where they were needed, Zambia asked for help in training district health management teams and neighborhood health committees to distribute large quantities of bednets in

rural and hard-to-reach communities. MACEPA staff developed a training module and piloted the training materials and distribution process in a single district before extending it to all by the end of 2005. The partnership also sent skilled health workers to three regions to train others in the correct use of retreatment tablets. In some communities, networks of community members, already established to provide care for people with AIDS, provided additional assistance in distribution to families and individuals.

Strengthening systems to meet future needs

MACEPA is working with the Ministry of Health and local partners to strengthen national procurement processes and coordinate with partners to eliminate future commodity shortfalls and maximize intervention coverage. For example, during its first year, MACEPA assessed Zambia's human resources to inform strategic planning. Human resource challenges in Zambia's health sector include critical shortages in the numbers of qualified staff, poor working conditions with few incentives, and high attrition rates.

Measuring the impact

When MACEPA was proposed in August 2004, no country had documented the positive health and economic impact of a national scale-up of malaria prevention and control programming. A strong model and a reliable assessment of impact were needed to catalyze national and global investment.

MACEPA has worked with national partners to develop a comprehensive model for evaluating the health and economic benefits of the expansion of Zambia's program. Solid evidence of this program's impact is a vital component of an evolving national malaria control case study that the partners are conducting. The study in turn anchors an advocacy program (see article, page 10) to increase support for malaria control. The partnership will support Zambia in strategically disseminating lessons learned so that countries throughout Africa can understand and rapidly implement proven methods of malaria prevention.



With help from the Malaria Control and Evaluation Partnership in Africa, the Government of Zambia is introducing highly effective malaria control strategies.

Moving the model forward

Through scientific documentation, case studies, and personal narratives, MACEPA is addressing the challenges of malaria control and making the successes of the model Zambia program available to the global community. Working with Zambia and the global Roll Back Malaria partners, the partnership is committed to building sustainable support to help national governments dramatically reduce malaria's toll. ■

Bringing malaria vaccines through clinical trials

A crucial step in vaccine development

Partners

Bill & Melinda Gates Foundation, Centro de Investigação em Saúde da Manhica (Manhica Health Research Center), Hospital Clinic of the University of Barcelona, GlaxoSmithKline Biologicals, Kenya Medical Research Institute, Shanghai Changhai Hospital, Shanghai Second Military Medical University, US Agency for International Development, US Army Medical Research Unit–Kenya, Walter Reed Army Institute of Research, Wanxing Bio-Pharmaceuticals, World Health Organization Initiative for Vaccine Research

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The need to test promising vaccine concepts in large-scale clinical trials represents one of the most significant challenges for the malaria vaccine development community. These trials are time-consuming, expensive, and financially risky, since few vaccine candidates survive the rigorous process. In addition, because the countries that need the malaria vaccine most are among the world's poorest, traditional market forces have not drawn sufficient industry investment in the process.

In an effort to overcome these hurdles, the PATH Malaria Vaccine Initiative (MVI) supports clinical trials of promising malaria vaccines, working with partners to share the financial burden in the most strategic way possible. In 1999, when MVI was launched, the global health community seriously questioned whether a malaria vaccine was possible. However, findings from field trials have since provided the malaria vaccine community with some confidence that a successful candidate may be on the horizon.

A landmark trial

In 2004, MVI, vaccine manufacturer GlaxoSmithKline Biologicals (GSK), the Hospital Clinic of the University of Barcelona, and the Manhica Health Research Center in Mozambique embarked on the largest pediatric trial of a malaria vaccine ever conducted in Africa. The results of this Phase 2b clinical trial of the RTS,S malaria vaccine candidate were a landmark achievement for the malaria vaccine field—the trial showed for the first time that it is possible to make a vaccine that can significantly protect children under five years against malaria.

The trial included approximately 2,000 Mozambican children between the ages of one and four years. Although the vaccine offered less protection than do most childhood vaccines, over an 18-month period, the vaccine reduced the rate of infection by 29 percent and the incidence of severe malaria by 49 percent. Reducing the incidence of severe disease alone should reduce treatment costs and the number of children who die of malaria.

After the Mozambique trial, vaccine development experts recommended that, given the vaccine's effectiveness, it should progress to a Phase 3 clinical trial for licensure. MVI plans to pursue continued development of the RTS,S vaccine through Phase 3 trials and introduction. New Phase 2 trials to assess the safety and preliminary efficacy of RTS,S in infants are under way in Mozambique, and additional trials are scheduled to start throughout 2006 in five African countries. If the vaccine continues to prove safe and effective, the partners expect to initiate a Phase 3 efficacy trial program in late 2007 or early 2008.

Candidates in the pipeline

The pipeline of candidate vaccines being evaluated in clinical trials is robust: more than 20 malaria vaccine candidates are currently undergoing clinical evaluation. Increased rigor means that vaccines that are in or headed toward clinical trials are of higher quality and are closer to their final formulations than in the past, making it much more likely that conclusions drawn from the trials are sound.

Scientists are working to develop vaccines that target the malaria parasite at different stages of its complex life cycle, including its most destructive stage—its rapid replication in human red blood cells. Scientists believe that a blood-stage vaccine would lessen the severity of malaria among people in endemic countries,

while allowing them to develop natural immunity to the disease. The MVI portfolio includes a number of blood-stage vaccine candidates. For example:

- In Western Kenya, a Phase 2b trial of a blood-stage pediatric vaccine is under way, conducted by the Kenya Medical Research Institute, the US Army Medical Research Unit–Kenya, the Walter Reed Army Institute of Research, GSK, the US Agency for International Development, and MVI. Previous Phase 1 trials of the vaccine in adults and children in Kenya confirmed the vaccine’s safety. Results from the Phase 2 trial are expected by the end of 2006.
- In China, MVI is working with Wanxing Bio-Pharmaceuticals, Shanghai Changhai Hospital, Shanghai Second Military Medical University, and the World Health Organization Initiative for Vaccine Research to assess the safety and immunogenicity of a blood-stage vaccine candidate that combines portions of two important antigens—MSP-1 and AMA-1—into a single molecule. If effective, the molecule will elicit an immune response to the two antigens. In addition to having the potential to lessen the severity of disease, this vaccine could reduce production costs in comparison with other vaccines. Results from this trial are expected by the end of 2006.

In addition to these and other trials, MVI is supporting several vaccine candidates at pre-clinical stages, and other organizations are pursuing their own vaccine development efforts. All of these efforts contribute to the knowledge pool that will yield an effective malaria vaccine.

Establishing long-term connections

The effort to develop malaria vaccines has been under way for more than three decades and has been delayed largely by the relative scarcity of funding. MVI provides some of the essential funding and collaborates with pharmaceutical and biotechnology companies, academics, government researchers, specialized contractors, and developing-country governments, drawing on each partners’ expertise and resources to build a team with everything necessary to carry promising malaria vaccines through clinical trials.

Once vaccines are found to be safe and effective, such partnerships will be equally important in carrying them through the final steps toward making them widely available. Preparing the way for these future collaborations, MVI is building connections between manufacturers and local institutions and providing manufacturers with the support and evidence they need to invest more heavily in successful candidates. ■

Technologies for malaria diagnosis

PATH has been advancing technologies for malaria diagnosis for more than 20 years. In the 1990s, with US Agency for International Development funding through the HealthTech program, PATH developed an immunochromatographic strip (ICS) test that identifies *Plasmodium falciparum* in whole blood. The test can be completed by minimally trained technicians in less than 20 minutes, overcoming the obstacles that limit microscopy—the standard diagnostic method in many countries—in low-resource settings.



PATH then licensed the technology to companies in Germany and India, which sold more than 300,000 tests by mid-2005. PATH also provided technical assistance to two other commercial manufacturers for developing their own ICS tests; sales have been in the range of 10.5 million tests worldwide.

PATH’s newer technologies also seek to improve malaria diagnosis. The microfluidics card, or “lab on a card”—currently being developed with Micronics, Nanogen, and the University of Washington—will test for six of the most common causes of rapid-onset fever, including *P. falciparum*. See *Directions in Global Health*, volume 2, issue 3, for more information about the microfluidics card.

Preparing for vaccine introduction

Information helps pave the way

Partners

Benin Ministry of Health, Bill & Melinda Gates Foundation, Boston Consulting Group, Swiss Tropical Institute, US Agency for International Development, World Health Organization (WHO), WHO Initiative for Vaccine Research, WHO Regional Office for Africa

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Getting vaccines to people in poor countries can be almost as challenging as developing the vaccines themselves. The slow introduction and uptake of vaccines against hepatitis B and *Haemophilus influenzae* type b illustrate how policy, cost, and programmatic challenges can delay access in the developing world—sometimes by as much as 10 or 15 years.^{1,2}

From the outset, the PATH Malaria Vaccine Initiative (MVI) has worked with vaccine development partners and other organizations to push science and address market and delivery issues simultaneously. By assessing what is known about the malaria vaccine market, defining the economic implications of a malaria vaccine, assessing the policy environment, and identifying information gaps that could affect decision-making and investments, MVI is preparing the way for fast uptake of an eventual malaria vaccine. The goal is to have the maximum public health impact in the shortest period of time.

Assessing the market for a malaria vaccine

To evaluate the market for a malaria vaccine, MVI and the Boston Consulting Group conducted interviews with more than 200 health leaders and professionals in Brazil, Ghana, India, Mozambique, Nigeria, Senegal, Tanzania, and Thailand; opinion leaders such as donors, global policymakers, and military and travel advisors were also included.

The assessment yielded substantial insight into the profile of malaria vaccines that would be acceptable to countries. Most important, the findings indicate that a vaccine with partial efficacy could play a valuable role in the portfolio of malaria interventions. In West Africa, interviewees said that a vaccine with approximately 30 percent efficacy against clinical disease and 50 percent efficacy against severe disease would likely be considered for introduction into malaria control programs. Demand varies by region, however: many stakeholders in East Africa would require at least 50 percent efficacy against clinical and severe disease. In non-African countries, 80 percent efficacy may be the lowest acceptable level, given the investments in and performance of existing control and treatment programs.

In addition, the assessment found that:

- The most promising malaria vaccines will need to have a minimum duration of protection of one year; a duration of two or more years is preferred.
- The vaccine should be offered via existing immunization services.
- Cost is an important factor. Donor funding in Africa will be critical to vaccine uptake, as most governments will need assistance financing the vaccine purchase.
- The support of key stakeholders—such as the World Health Organization and governments—is essential to countries' decisions to introduce vaccine and shortening the lag time between licensure and introduction.

While challenges will vary by market, these findings indicate that several factors—including efficacy thresholds, minimum duration of protection, and ease of access—will drive uptake of the eventual vaccine.

Analyzing returns on investment

In addition to health risks, malaria brings high economic and development costs. It drives poor families further into poverty and costs African governments an estimated US\$12 billion dollars in GDP each year.

Estimated impact of a malaria vaccine among infants vaccinated in Africa.

Implementation level	Deaths averted per 100,000	Cost per death averted	DALYs saved per 100,000	Cost per DALY saved
Vaccine with 50% efficacy*				
At current EPI/funding levels	153	\$4,711	4,910	\$144
At maximum EPI/funding levels	491	\$4,900	15,547	\$151
Vaccine with 80% efficacy*				
At current EPI/funding levels	225	\$584	7,489	\$17
At maximum EPI/funding levels	865	\$687	30,227	\$20

EPI = Expanded Programme on Immunization. DALY = disability-adjusted life-year. Costs presented in US dollars.

*Efficacy rates refer to both clinical and severe disease.

In 2005, MVI worked with the Boston Consulting Group and the Swiss Tropical Institute to conduct analyses that quantified both the social and financial returns of potential malaria vaccines. As with the market assessment, this work found that a vaccine with partial efficacy could have a significant impact. Effective implementation of a high-efficacy vaccine could avert 10.6 million deaths and 369.4 million disability-adjusted life-years (DALYs) from 2010 to 2025. Because malaria strikes the young, the impact on DALYs would be particularly high (see table).

The financial returns generated by a malaria vaccine will vary dramatically depending on the vaccine's profile, its delivery environment, and other factors. Not surprisingly, the financial analysis found that private companies would garner negative returns for a partial-efficacy vaccine. With additional improvements in donor funding, mechanisms such as advance market commitments, and enhanced in-country implementation, the malaria vaccine market could become an attractive proposition for vaccine developers.

Developing a decision-making framework

Ideally, all vaccines should be easy to deliver, offer lifelong immunity, cost pennies per dose, and demonstrate complete efficacy against morbidity and mortality in people of all ages. Unfortunately, no vaccine is perfect. The decision to introduce a first-generation malaria vaccine will pose policy challenges that require careful analysis. Expenditures on the vaccine must also be weighed against ongoing commitments to other prevention and treatment strategies, such as insecticide-treated bednets and drug regimens.

MVI is building a model that helps national decision-makers weigh these and other issues. In January 2006, MVI hosted a meeting with partner organizations and representatives from 13 African countries to develop the framework. The team, which included leaders from MACEPA, prepared a set of briefing papers on policy and programmatic issues to inform the discussion. MVI will validate the framework during a series of country visits in which staff will meet with key stakeholders from the malaria and immunization communities. When the final framework is published in early 2007, it should help global organizations and private-sector partners anticipate and prepare for regulatory and manufacturing challenges.

Turning information into action

These study findings and tools are helping the malaria vaccine community prepare for long-term success. These activities are offering new insights, helping researchers refine their product portfolios, and informing private-sector partners' plans. They are also setting the stage for early action by helping policymakers take steps now that will pave the way for malaria vaccine introduction in the future. ■

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Advocating for malaria control

Building
commitment
based on
documented
success

Partners

Bill & Melinda Gates Foundation, Government of Zambia, Malaria R&D Alliance, Roll Back Malaria Partnership Secretariat, Zambia Roll Back Malaria Partnership

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Combating one of the oldest infectious diseases in Africa takes more than good science—it requires resources, perseverance, and evidence that the challenge can be overcome. Yet as political, funding, and news cycles ebb and flow, keeping the world's focus on malaria and its ongoing toll can be a challenge.

Scientific breakthroughs and major increases in funding and political commitment have brought the global health community an unparalleled opportunity to transform understanding of malaria control. Advocacy efforts are critical to translating these successes into sustainable commitments, as they can change perceptions, secure new resources, and ultimately help control this disease. PATH therefore uses global, regional, and national advocacy as an essential component of achieving its malaria programming goals.

Raising awareness

The malaria parasite is a complex organism that can evade and overcome immune responses. Furthermore, after many decades of research, no licensed vaccine protects humans from parasites. These factors have led to a perception that developing a vaccine against malaria is impossible.

Advances in vaccine development, however, are showing that developing a malaria vaccine is indeed possible, and the PATH Malaria Vaccine Initiative (MVI) is working to ensure that the world is aware of this progress. MVI's announcement of the breakthrough RTS,S pediatric clinical trial results, for example, drew unprecedented global attention to malaria. Hundreds of broadcast, print, and online stories appeared in outlets on six continents, in more than 20 languages, and with front page coverage in newspapers such as *The New York Times*, *The Times*, *The International Herald Tribune*, *Le Figaro*, and *Le Soir*.

The results and media coverage appear to have changed the way many scientists and policymakers view malaria vaccines. The prospect of developing a malaria vaccine that will protect children is no longer dismissed, and plans are being made to pay for one when it becomes available. Based on strong evidence from field trials, the challenge previously thought by many to be insurmountable is finally seen by most as possible.

Demonstrating—and documenting—impact

Too often, public health successes are poorly or inconsistently documented, making it difficult to produce reliable evidence and replicate results. Recognizing that documentation is essential to impact, the Malaria Control and Evaluation Partnership in Africa (MACEPA) team is supporting the Zambian government in implementing proven malaria prevention and treatment interventions—and rapidly scaling up access among communities across the nation. The experience in Zambia will generate the components that are essential to successful advocacy: data on health improvement and economic benefits, a model template outlining key steps involved in rapid scale-up, and practical technical tools to help planners and policymakers clarify and rapidly implement large-scale malaria control strategies.

Careful documentation of Zambia's progress and targeted advocacy and communication activities will culminate with the launch of a concentrated, regional dissemination strategy to galvanize other countries to adopt the methods. By supporting program planning, monitoring, and evaluation, this work

will provide important information about the program's impact and further strengthen the case for malaria control.

MACEPA is already gaining recognition and has established Zambia as a pacesetter in malaria control. Featured in more than 50 media outlets in its first year alone, the model has been acknowledged as the prototype for the World Bank's Global Strategy and Booster Program and the US President's Malaria Initiative. In addition, MACEPA's "scale-up for impact" model is gaining international recognition for its potential to strengthen malaria control efforts and reduce the malaria burden.

Mobilizing resources

PATH's collective efforts are increasing momentum—and resources—for malaria control in Africa. Through its advocacy work, MVI is highlighting the potential of malaria vaccines and advocating for funding commensurate with the global need. These efforts have already contributed to increased awareness of the progress toward a vaccine and increased political and financial support from the UK, US, and other governments, including an \$8 million grant from USAID. Individual donors and small foundations have contributed an additional \$53,000. Together with the support of the Bill & Melinda Gates Foundation, which has provided MVI with more than \$250 million since 1999, these grants have given the malaria vaccine community hope and credible resources to move products out of the laboratory and into manufacturing and clinical evaluation.

Similarly, MACEPA's work in Zambia is strengthening the case that financial support for malaria control is a good investment—one that offers predictable health and economic returns. By basing its advocacy strategy on proven, national successes, MACEPA is encouraging national governments to prioritize malaria control in their plans and budgets and to mobilize international donors to support multicountry scale-up of effective programs.

Resources alone won't solve the problem, of course. For this reason, both MVI and MACEPA have established partnerships with a range of global health organizations—including the World Health Organization (WHO); the Global Fund to Fight AIDS, Tuberculosis and Malaria; the Roll Back Malaria Partnership Secretariat; and the Malaria R&D Alliance—and are helping

donors align their efforts. As donors recognize funding gaps or overlaps, they may bring new or more strategic resources to the effort.

Transforming malaria control in Africa

An essential outcome of these advocacy efforts is strengthening national and global health policies. By encouraging other governments to adopt the Zambia model, MACEPA is fostering important policy changes throughout sub-Saharan Africa. By making critical information available to decision-makers, MVI's work may inform WHO guidelines for vaccine introduction and help clarify the regulatory pathway for malaria vaccines.

Together, these programs are mapping out the road to malaria prevention and control. By defining needs, highlighting priorities, and aligning future activities, the programs are accelerating progress—and impact—on the malaria challenge. ■



The prospect of developing a malaria vaccine that will protect children is no longer dismissed.

We can solve the malaria problem

By Awa Marie Coll-Seck, MD, PhD

The global health community is witnessing a sea change in malaria control. In recent years we've seen multiple, significant boosts to the resources directed to malaria. These investments are infusing the field with new funds, attention, and hope.

Some of the most visible commitments include:

- The World Bank's Global Strategy and Booster Program, which earmarked \$500 million to support scale-up of proven malaria interventions in 17 African countries over the next three years.
- The US President's Malaria Initiative, which promised \$1.2 billion to support scale-up in 15 African countries.
- The Global Fund for AIDS, Tuberculosis and Malaria, whose contributions grew to \$2.2 billion by the end of 2005.
- The Bill & Melinda Gates Foundation, which has committed an additional \$258 million to research funding and, through the Malaria Control and Evaluation Partnership in Africa (MACEPA), \$35 million to work with Zambia to develop a model for scaling up malaria programs.

With these new resources, Africa's national governments and their partners are working to implement sustainable control efforts. They are striving to alleviate the health and economic toll malaria imposes on communities.

Through its partnership-based programs, PATH is making important contributions to malaria prevention and control. The MACEPA program is spearheading efforts to document success and demonstrate how countries can gain traction against this age-old disease. MACEPA is supporting Zambia's leadership in malaria control and strengthening its capacity to rapidly and sustainably scale-up effective interventions. The program's emphasis on monitoring and health-impact assessments is essential to the success of this nine-year initiative.

The world also needs new and better tools to achieve lasting change. By coordinating the public, private, and academic sectors, PATH's Malaria Vaccine Initiative is accelerating the development of a malaria vaccine. Immensely promising results from the trial site in southern Mozambique—which suggest that children under five could receive 50 percent protection from severe disease through the RTS,S vaccine—have moved the pursuit of a malaria vaccine from the hypothetical to the very real.

With so much activity—and with so many lives at stake—it is essential that countries, programs, and donors align their malaria efforts. The cost of not doing so is simply too great. To help increase efficiency and reduce overlap, the Roll Back Malaria Global Strategic Plan for 2005–2015 calls for significantly greater harmonization of partner activities. Harmonization is a prerequisite for reaching 2010 malaria control targets as well as the Millennium Development Goals.

Together, the global health community can capture and build on successes in malaria programming. National leaders and donors are recognizing the urgency of the challenge, and programs are developing promising solutions. We are making progress, and the future will bring even more. The malaria problem can be overcome.

Dr. Coll-Seck serves on PATH's board of directors. Prior to her position as the executive secretary of the Roll Back Malaria Partnership Secretariat, she was the minister of health of Senegal.



PATH is an international, nonprofit organization that creates sustainable, culturally relevant solutions that enable communities worldwide to break longstanding cycles of poor health. By collaborating with diverse public- and private-sector partners, we help provide appropriate health technologies and vital strategies that change the way people think and act. Our work improves global health and well-being.

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Printed on recycled paper.

ISSN 1549-8662