



# Malaria

Malaria is a preventable and treatable infectious disease, transmitted by mosquitoes, that kills more than half a million people each year. Though more than 3 billion people in 109 countries are at risk of infection and disease, malaria-related morbidity and mortality rates are highest in sub-Saharan Africa, where it is the leading cause of death for children under 5 years of age. The burden of malaria contributes significantly to perpetuating global poverty and underdevelopment; Africa’s economy alone is estimated to lose \$12 billion annually to malaria. The disease burden disproportionately affects women, young children, and the most poor and vulnerable—implicating health care delivery systems, as well as vector management practices, in the battle to reduce and eliminate malaria transmission.

RTI International is a global leader in malaria prevention, control, and elimination. Since 1998, RTI has been partnering with US and multilateral donors, host country governments, and private-sector stakeholders to scale up the fight against malaria. We have worked in Africa, Asia, and Latin America to improve approaches to prevention, patient case management, and vector control, as well as to build sustainable platforms for country-led programs. Our strengths lie in working with counterparts—specifically national malaria control programs (NMCPs)—to develop technical and operational strategies that build on structures in place, integrating program implementation and capacity building based on best-practice evidence of what works. We have also

broken new ground in using mobile-based technologies for more efficient operations, planning and budgeting for country-level malaria programs, disease surveillance, environmental management and monitoring, and community-based diagnosis and treatment.

RTI is a lead partner in all major international fora where technical aspects of malaria programming are considered. We are core members of malaria consultative expert and advocacy committees, focused on the development of program guidelines, vector control, surveillance, monitoring, and evaluation (SME) strategies for overall malaria program effectiveness, and development of new innovative tools and approaches required for malaria prevention, control, and elimination.

## More Information

Richard Reithinger, Vice President  
Global Health Division  
International Development Group  
+1.202.974.7810  
[reithinger@rti.org](mailto:reithinger@rti.org)

RTI International  
[www.rti.org/globalhealth](http://www.rti.org/globalhealth)  
Follow @RTIfightsMalaria



**25+**  
**years' experience**  
helping countries prevent  
and control malaria



**Supported**  
**20+**  
**national malaria**  
**programs**  
in Africa, Asia, and  
Latin America

### **Large-Scale Malaria Programming**

RTI is an expert in large-scale malaria prevention and control programming, ranging from indoor residual spraying of households with insecticide (IRS) and distribution of long-lasting insecticide bednets (LLINs) to diagnosis and treatment at facility or community levels to surveillance and M&E. We work in close partnership with host government ministries of health and their NMCPs as well as in-country stakeholders, including multilateral and bilateral donors, international and local nongovernmental organizations, and private sector and academic research institutions.

### **Completing the Epidemiological Map**

Disease mapping is a necessary step in determining a country's epidemiological map for malaria. RTI has experience assessing the distribution and burden of malaria as well as the distribution and abundance of malaria vectors.

### **Commodity Quantification and Forecasting**

RTI's team of global supply chain, logistics, and procurement experts are highly experienced in commodity purchasing and delivery for large-scale malaria programs worldwide. In many projects, we have been

successful at transitioning procurement of program commodities from US to local suppliers, greatly reducing transaction times and lowering costs. In many cases, we have been able to ensure that NMCPs and our clients benefit from negotiation of master supply agreements that allow for flexible but stable financial arrangements, cost savings through bulk procurement, and ample lead times for on-time delivery.

### **Data for Program Performance**

Tracking program performance and documenting impact is critical for maintaining momentum and supporting best practices. RTI has developed a full set of M&E tools used by USAID, NMCPs, and other stakeholders.

### **Costing, Cost-effectiveness, Cost-benefit.**

RTI has adapted the Tool for Integrated Programming and Costing (TIPAC), first developed under the USAID-funded Neglected Tropical Diseases Program, to guide NMCP officials in planning and costing malaria program activities based on inputs from all sources, including in-kind local contributions. The tool allows ministries of health and NMCPs to understand actual program costs and human resource needs, identify program funding gaps, and to allocate sufficient resources

for program needs. Cost-effectiveness and cost-benefit analyses have been used to help NMCPs to prioritize packages of interventions (e.g. LLINs vs LLINs plus IRS) or determine the cost-benefit of national strategies and plans over a predetermined time period (e.g. malaria elimination by 2030).

**Data Quality Assessments.** RTI has developed tools and protocols to evaluate the quality of reported data and data management systems at different administrative levels of the health system.

#### **Assessing Impact and Disease Surveillance.**

The demand for technical expertise to conduct assessments and ensure ongoing disease surveillance is exponentially increasing. RTI ensures assessments are well coordinated and of high quality. We promote coordination with NMCPs and other in-country stakeholders and help disseminate results in order to share best practices and investigate issues that may contribute to districts' failure to achieve targets. Thus, in Tanzania, in collaboration with the Zanzibar Malaria Elimination Program and the U.S. President's Malaria Initiative (PMI), RTI developed the Malaria Case Notification (*Coconut Surveillance*) platform, an internationally acclaimed, state-of-the-art surveillance platform that allows for comprehensive malaria case detection, reporting, and surveillance. It provides local public health officials with real-time information about malaria "hotspots," allowing them to intervene and prevent resurgence of the disease.

#### **Seasonal Malaria Chemoprevention and Malaria Case Management**

RTI supports NMCPs and stakeholders in the scale-up of seasonal malaria chemoprevention in children under 5 years of age, as well as the facility-based and community-based diagnosis of malaria, training and equipping health workers in using microscopy and/or rapid diagnostic tests to detect malaria cases. We provide assistance in building health worker capacity to ensure the community is knowledgeable about malaria prevention and case management.

#### **Vector Control**

RTI has extensive experience in the management of large-scale IRS operations, distribution of LLINs, environmental compliance, entomological surveillance, and insecticide resistance monitoring. Our PMI-supported IRS operations in Tanzania and Zanzibar have been among the most successful in Africa, reducing malaria prevalence to near zero in some areas and dramatically lowering malaria-related hospital and clinic admissions. RTI also provides technical assistance in program design, implementation, and monitoring of LLIN distribution in Guinea, where since 2013, we have been working in collaboration with the NMCP to train personnel and distribute over 7.5 million LLINs throughout the country, and in Tanzania, where we supported the NMCP's school net distribution program. We have also supported NMCPs in 8 countries to conduct vector control needs assessments, and worked in numerous countries to develop national policies and strategies on integrated vector management (IVM).

#### **Malaria Operational Research and Policy**

RTI fosters the link between NMCPs and malaria researchers in promoting best implementation approaches. We actively engage with NMCPs, donors and stakeholders interested in operational research to explore policies and strategies that will help countries effectively reach targets for malaria prevention, control, and elimination.

For example, with Duke University, RTI evaluated the effectiveness of malaria case detection and response efforts in Zanzibar. In Guinea, RTI piloted a short messaging service (SMS) intervention to increase access to antenatal care service and intermittent preventive therapy for pregnant women (IPTp). In 2013, in collaboration with the WHO, RTI helped to publish WHO handbooks on IVM training and policy making. In addition, our staff regularly participate in numerous malaria research projects around the globe, and, since 2010, have authored over 100 malaria-related articles for publication in peer-reviewed journals.



Under the Tanzania Vector Control Scale-Up project, **protected 8.5 million people from malaria infection** in Tanzania between 2009–2016.

Contributed to **reducing malaria prevalence** in Zanzibar from more than **30% in 2005 to less than 1% today.**



Under the StopPalu+ project in Guinea, **distributed 3.5 million bed nets**, in 2019, reaching nearly **95% of targeted households.**

## Selected Projects

### USAID *Okoa Maisha Dhibiti* Malaria Activity—Save Lives, End Malaria (USAID, 2018–2023)

RTI supports the Government of Tanzania to strengthen malaria surveillance and monitoring and move the country towards malaria elimination.

### Inform Asia: USAID's Health Research Program (USAID, 2015–2023)

RTI works with the national malaria programs of Thailand and Lao PDR to strengthen surveillance systems and promote the use of strategic information to accelerate malaria elimination.

### StopPalu and StopPalu+ (USAID, 2013–2022)

RTI assists the Government of Guinea to achieve the target of reducing malaria morbidity and mortality through multiple interventions in prevention, diagnosis and treatment, and capacity building of the Ministry of Health and NMCP. The program supports mass LLIN distribution, provides seasonal malaria chemoprevention, case management, and builds capacity of the Ministry in malaria diagnostics.

### Governance for Local Development (USAID, 2016–2021)

The project works with the Government of Senegal, including the NMCP, to support decentralization of selected government responsibilities and functions, including budgeting, local stakeholder and community engagement and coordination, oversight and supervision of malaria programming.

### Prevention of Mosquito-Borne Diseases through Vector Control (PMDVC) IDIQ, Global (USAID, 2017–2022)

RTI is a holder of this IDIQ, which supports ministries of health and NMCPs to address current and emerging mosquito-borne disease programmatic challenges and threats in countries where USAID supports vector control efforts.

### Tanzania Vector Control Scale-Up Project (USAID, 2009–2016)

The project worked with the NMCP and the Zanzibar Malaria Elimination Program to implement IRS, distribute LLINs, and perform malaria surveillance in mainland Tanzania and Zanzibar.

### IRS 2, Kenya (USAID, 2010–2013)

RTI provided technical, operational, and managerial support to Kenya's NMCP and other national and district level stakeholders to build local and regional IRS management and quality assurance capacity. The project implemented three rounds of IRS in four endemic districts of Rachuonyo, Nyando, Migori, and Homa Bay, protecting approximately 2.4 million people.

### SantéNet 2, Madagascar (USAID, 2008–2013)

The project strengthened community-level health service provision and addressed bottlenecks in the Ministry of Health and Family Planning's strategy to decentralize the national health system. Malaria activities focused on strengthening case management supervisory systems, improving patient referral mechanisms, and epidemic surveillance.

## Selected Publications

Copper L, et al. (2019) Pareto rules for malaria super-spreaders and super-spreading. *Nat Commun* 10:3939.

Flueckiger R, et al. (2019) Using Short Message Service Alerts to Increase Antenatal Care and Malaria Prevention: Findings from Implementation Research Pilot in Guinea. *Am J Trop Med Hyg* 101:806-808.

Beargie SM, et al. (2019) The economic impact of substandard and falsified antimalarial medications in Nigeria. *PLoS One* 14:e0217910.

Sudathip P, et al. (2019) The Investment Case for Malaria Elimination in Thailand: A Cost-Benefit Analysis. *Am J Trop Med Hyg* 100:1445-1453.

Khandekar E, et al. (2019) Evaluating Response Time in Zanzibar's Malaria Elimination Case-Based Surveillance-Response System. *Am J Trop Med Hyg.*, 100:256–263.

Camara A, et al. (2018) Rapid Epidemiological and Entomological Survey for Validation of Reported Indicators and Characterization of Local Malaria Transmission in Guinea, 2017. *Am J Trop Med Hyg.* 99:1134-44.

Okell LC, et al. (2018) Emerging implications of policies on malaria treatment: genetic changes in the Pfmdr-1 gene affecting susceptibility to artemether-lumefantrine and artesunate-amodiaquine in Africa. *BMJ Glob Health* 3:e000999.

Stelmach R, et al. (2018). Cost-effectiveness of indoor residual spraying of households with insecticide for malaria prevention and control in Tanzania. *Am J Trop Med Hyg* 99:627 - 637.

Ali AS, et al. (2017) Artemisinin combination therapy mass drug administration in a setting of low malaria endemicity: programmatic coverage and adherence during an observational study in Zanzibar. *Malar J.* 16:332.

Willilo RA, et al. (2016) Pregnant women and infants as sentinel populations to monitor prevalence of malaria: results of pilot study in Lake Zone of Tanzania. *Malar J.* 15:392.

Lalji S, et al. (2016) School Distribution as Keep-Up Strategy to Maintain Universal Coverage of Long-Lasting Insecticidal Nets: Implementation and Results of a Program in Southern Tanzania. *Glob Health Sci Pract.* 4:251-63.

Haji KA, et al. (2015) Efficacy, persistence and vector susceptibility to pirimiphos-methyl (Actellic 300CS) insecticide for indoor residual spraying in Zanzibar. *Parasit Vectors* 8:628.

Reithinger R (2014) Global malaria efforts: progress made, but challenges loom ahead. *Trans R Soc Trop Med Hyg.* 108:247-8.

Sazawal S, et al. (2014) Effect of iron/folic acid supplementation on the outcome of malaria episodes treated with sulfadoxine-pyrimethamine. *Malar Res Treat.* 2014: 625905.

Kabula B, et al. (2014) Distribution and spread of pyrethroid and DDT resistance among the *Anopheles gambiae* complex in Tanzania. *Med Vet Entomol.* 28:244-52.

Lukwa N, et al. (2014) Nationwide assessment of insecticide susceptibility in *Anopheles gambiae* populations from Zimbabwe. *Malar J.* 13:408.

RTI International is an independent, nonprofit research institute dedicated to improving the human condition. Clients rely on us to answer questions that demand an objective and multidisciplinary approach—one that integrates expertise across the social and laboratory sciences, engineering, and international development. We believe in the promise of science, and we are inspired every day to deliver on that promise for the good of people, communities, and businesses around the world. For more information, visit [www.rti.org](http://www.rti.org).

RTI International is a registered trademark and a trade name of Research Triangle Institute. The RTI logo is a registered trademark of Research Triangle Institute.