

Fighting malaria today and tomorrow

PATH works with partners and countries to achieve a malaria-free world

Despite major progress in fighting malaria over the past decade, the disease still kills nearly 600,000 people each year—mostly children under five in sub-Saharan Africa. These deaths can be stopped. PATH is working to make a malaria-free world a reality by expanding the use of lifesaving tools and developing new strategies to create malaria-free communities; working to ensure a steady, affordable, and high-quality supply of drugs and diagnostics; and bringing together public- and private-sector partners to accelerate the development of malaria vaccines. To align this unparalleled portfolio in malaria, in 2014 PATH launched the Malaria Center of Excellence (MCOE), which aims to address existing gaps in malaria elimination, spur continued innovation to improve our ability to diagnose and treat the disease, and strengthen the enabling environment for malaria programming so that progress is leveraged and impact is magnified.

PARTNERING TO ELIMINATE MALARIA

The Malaria Control and Elimination Partnership in Africa (MACEPA), a program at PATH, is a leader in the effort to end malaria illnesses and deaths. MACEPA refines and develops tools and approaches, invests in national programs, and builds data to empower national governments to pursue malaria elimination. Since 2005, MACEPA has partnered with governments in sub-Saharan Africa to develop and implement strategies to fight the disease, including rapid, nationwide delivery of lifesaving tools such as insecticide-treated bednets, indoor residual spraying of insecticides, new diagnostics, and effective medicines. This approach, along with large-scale increases in funding and political commitment, has contributed to a 20 percent reduction in all-cause childhood deaths, saving more than 3.9 million children's lives in Africa since 2001. MACEPA is now developing strategies to eliminate local malaria transmission at national or subnational levels in Ethiopia, Kenya, Senegal, and Zambia. Our goal is to see 18 to 20 million people living in malaria-free zones by the end of 2020, with the development of adoptable and adaptable strategic approaches for malaria elimination across Africa.

As countries move into this elimination phase, new tools are needed. Our Diagnostics for Malaria Elimination Toward Eradication (DIAMETER) Team is catalyzing rapid access to the best diagnostic tools for detecting low-parasite-density infections in near-elimination settings. PATH and our partners are also advancing diagnostic tools to support treatment and elimination of *Plasmodium vivax*, or relapsing malaria, a strain commonly found in Asia and Latin America. We are accelerating the development of point-of-care tests for deficiency of an enzyme known as G6PD, a common hereditary condition that complicates treatment for *P. vivax*.

SUCCESS STORIES

Zambia leads the way

In just a few years, Zambia halved the number of children infected with malaria. Now it is piloting approaches to stop malaria transmission altogether, with the goal of creating five malaria-free zones by 2015. To reach this goal, Zambia is targeting those who are infected with the parasite but who do not have symptoms because of acquired immunity and who are thus not getting picked up by the existing health system.



PATH/Laura Newman

With the Malaria Control and Elimination Partnership in Africa (MACEPA), Zambia is implementing a mass drug administration study—treating all who live in a malaria endemic area regardless of test results before the transmission season begins. Once transmission has been reduced in an area, any subsequent positive cases are investigated to ensure that transmission remains low.

The PATH-led MalariaCare partnership is expanding the use of new and existing tools for high quality diagnosis and treatment of malaria and other febrile illnesses in Africa and the Mekong Region. Services include technical assistance, implementation support, training and capacity-building, policy development, and monitoring and evaluation. Currently working in 15 countries in sub-Saharan Africa and the Mekong region, the partnership contributes to worldwide malaria control by supporting countries in their efforts to better link quality diagnosis and treatment services and by sharing innovations and best practices.

PATH is also addressing malaria infection during pregnancy, a leading cause of maternal and newborn illness and death in East Africa. Our Malaria in Pregnancy Project reduces risk by increasing use of measures such as intermittent preventive treatment and insecticide-treated bednets.

ENSURING A STABLE SUPPLY OF MALARIA TREATMENTS

PATH is committed to promoting a stable, high-quality, and affordable supply of key antimalarial treatments. Although artemisinin-based combination therapy (ACT) is the gold standard, volatility in the supply and price of artemisinin, which is derived from the wormwood plant, has made it challenging to meet global demand.

To diversify and strengthen the supply of artemisinin, PATH formed a cross-sector partnership to develop a new pharmaceutical manufacturing process to produce commercial volumes of high-quality, nonseasonal, and affordable artemisinin to supplement the plant-based supply. Semisynthetic artemisinin was developed with a biotechnology company, Amyris Inc., and a global pharmaceutical firm, Sanofi. The University of California, Berkeley, provided the foundational technology: a process that uses genetically modified yeast to produce artemisinic acid from a simple sugar. Other groups, such as the National Research Council Canada Plant Biotechnology Institute, gave critical support by providing license rights to needed intellectual property.

The partners brought the project from small laboratory experiments to commercial production, which began in April 2013. Sanofi's current production capacity for semisynthetic artemisinin, which was prequalified by the World Health Organization in May 2013, is 50 to 60 tons per year, corresponding to approximately one-third of the global need for artemisinin, or enough for 125 million ACT treatments.

ADVANCING VACCINE DEVELOPMENT AND USE

The PATH Malaria Vaccine Initiative (MVI) has applied scientific expertise, solid project management, and rigorous decision-making to advance—or terminate—dozens of vaccine concepts. Today, MVI maintains a diverse portfolio of preclinical and clinical projects. The RTS,S vaccine candidate, under development with GSK, is undergoing regulatory review by the European Medicines Agency under the Article 58 procedure initiated in July 2014.

MVI's R&D strategy supports the goal of eradicating malaria, by focusing on two priority areas with our partners: anti-infection vaccines (AIVs) and transmission-blocking vaccines (TBVs). AIVs are meant to prevent infection in people bitten by mosquitoes that carry parasites, while TBVs aim to prevent mosquitoes from becoming infected when they feed on people who carry parasites.

MVI has helped to drive consensus within the malaria vaccine development community, playing a key role in the initial development (2006) and update (2013) of the Malaria Vaccine Technology Roadmap. Other key contributions have included support for development of needed evaluation technologies and of a decision-making framework for African countries considering vaccine adoption.

RTS,S – Where to from here?

If the vaccine candidate receives a positive opinion from the EMA's Committee for Medicinal Products for Human Use, a recommendation by the World Health Organization is anticipated in late 2015. Licensure applications to National Regulatory Authorities in sub-Saharan African countries would then follow. Together, the outcomes of the policy and regulatory process would help pave the way for the introduction of RTS,S through African national immunization programs.

FOR MORE INFORMATION

Diagnostic technologies: sites.path.org/dx/malaria/

Drug development: sites.path.org/drugdevelopment/

MACEPA: sites.path.org/macepa/

MVI: www.malariavaccine.org

MalariaCare: www.malariacare.org



PATH is the leader in global health innovation. An international nonprofit organization, we save lives and improve health, especially among women and children. We accelerate innovation across five platforms—vaccines, drugs, diagnostics, devices, and system and service innovations—that harness our entrepreneurial insight, scientific and public health expertise, and passion for health equity. By mobilizing partners around the world, we take innovation to scale, working alongside countries primarily in Africa and Asia to tackle their greatest health needs. Together, we deliver measurable results that disrupt the cycle of poor health. Learn more at www.path.org.

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