

The PATH Malaria Vaccine Initiative

Situation

Malaria is caused by a parasitic infection transmitted by mosquitoes. Approximately half of the world's population is at risk of malaria, with more than 200 million cases occurring every year. Of the estimated 429,000 deaths from malaria in 2015, nearly 90 percent occurred in Africa, and the vast majority were among children younger than five years of age. Most deaths were caused by *Plasmodium falciparum*, the malaria parasite deadliest to humans. The disease can damage the nervous system, kidneys, and liver, and severe cases can quickly lead to death. Malaria vaccines could make an important contribution to reducing the burden of disease and death among young children as well as to regional elimination efforts and eventual eradication of the disease.

While consistent use of effective insecticides, insecticide-treated nets, and malaria drugs saves lives, further reducing the impact of malaria will require additional interventions, such as vaccines. Immunization is one of the most effective and cost-effective health interventions available, and vaccines against common childhood diseases such as polio and measles already save the lives of millions of children every year. A range of new tools—including vaccines—will be needed to control, eliminate, and eventually eradicate malaria.

History of MVI

PATH's Malaria Vaccine Initiative (MVI) was founded in 1999 on the premise that although promising malaria vaccine approaches existed, they required additional support to get out of the laboratory and on a path toward clinical testing. Scientists had long demonstrated that immunization against malaria was biologically feasible—which is significant given there are no available vaccines targeting human parasitic infections. However, efforts were hampered by financial hurdles and gaps in product development expertise needed to effectively manage a portfolio of diverse vaccine approaches.

When MVI was created, several academic and governmental organizations and pharmaceutical companies had already been working on approaches to develop vaccines with the potential to have an impact on malaria. MVI catalyzed the acceleration of those efforts by providing funds as well as logistical and technical support to advance promising projects into clinical development.

Progress

Today, MVI maintains a diverse portfolio of preclinical, clinical (translational development and translational research), and advanced clinical projects. As of 2016, six MVI-supported vaccine concepts were under clinical development or regulatory review.

GSK's RTS,S is the vaccine candidate the farthest along in development in PATH's portfolio and globally. In January 2016, the World Health Organization (WHO) recommended RTS,S for large-scale pilot implementations in young children in African settings of moderate-to-high parasite transmission; the pilots are intended to generate data on impact against mortality, feasibility of implementation, and additional safety data. The WHO's recommendation followed a positive scientific opinion for RTS,S from the European Medicines Agency (EMA). The information considered by the WHO and EMA included data from 11 clinical trials of RTS,S, involving more than 19,000 trial participants, 15,459 of which were enrolled in the pivotal Phase 3 trial. The pilots are expected to begin in 2018.

MVI has realigned its research and development (R&D) strategy and further diversified its portfolio to target the malaria community's long-term goals of eliminating and eradicating malaria. Thus, in addition to approaches that build on RTS,S, which functions by blocking the ability of mosquitoes to infect humans, MVI's range of vaccine approaches includes those that seek to block malaria parasite transmission from humans to mosquitoes.

Most new projects come to MVI as preclinical feasibility studies, with only a limited number advancing to the much more expensive stage of clinical development. With dozens of feasibility studies under way at any one time, this portfolio approach is an effective way to replenish the malaria vaccine pipeline, while continually building on our knowledge base to maximize the potential for success.

In addition to its direct support for vaccine development, MVI works in a number of other areas. For instance, MVI gives high priority to the development of evaluation technologies to assess the potential efficacy of vaccine components. MVI also works to increase the flow of resources to the field, define acceptable vaccine product characteristics, ensure the availability of vaccines once licensed, and identify the information decision-makers need prior to introducing a vaccine. To accomplish all of this, MVI works closely with many partners, including universities, corporations, intergovernmental organizations, and US government agencies.

The future of malaria vaccine development is promising. Continued progress requires continued investment, in order to eradicate the parasite responsible for causing malaria. The required funding for malaria programs and malaria R&D is increasingly at risk, as government donors, in particular, wrestle with budgetary pressures, exacerbated by continued economic uncertainty and a diverse set of global health and humanitarian emergencies. More than ever, however, it is important that donors stay the course, until eradication is achieved, and encourage others to come to the table.

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.

PATH's MALARIA VACCINE INITIATIVE (MVI) accelerates malaria vaccine development and catalyzes timely access in endemic countries, toward a world free from malaria. Standing at the intersection of malaria and immunization, MVI is part of PATH's Center for Malaria Control and Elimination and PATH's Center for Vaccine Innovation and Access. Learn more at www.malariavaccine.org.