# Supporting Global Malaria Eradication Efforts

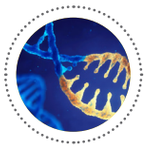
**OUR MALARIA RESEARCH PROGRAM** aims to support global malaria eradication efforts by developing and deploying innovative tools for improved malaria treatment, prevention and surveillance. In our molecular parasitology and immunology laboratories in Baltimore and at field research sites across Africa and Asia, we lead we lead epidemiological studies and clinical trials of malaria drugs and vaccines and investigate antimalarial drug resistance, molecular and genomic epidemiology, immunoepidemiology, pathogenesis, malaria in pregnancy, and interactions between malaria, and co-infections including HIV and schistosomiasis.

Recognizing that malaria eradication can only be accomplished by building upon successful local and regional elimination efforts, we work in collaboration with researchers across the globe to train young scientists and clinical investigators and build research capacity in malaria-endemic countries.

Center for Vaccine Development and Global Health

**MALARIA RESEARCH**

## Research Highlights

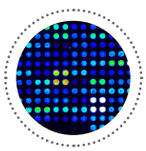


### Emergence and Spread of Drug Resistant Malaria

Applying our extensive experience in the molecular basis of antimalarial drug resistance, our researchers have been using genomic approaches to understand how parasites develop drug resistance and markers to monitor the emergence and spread of drug-resistant malaria.

### Developing and Testing Malaria Vaccines

We are evaluating the most promising vaccines in our laboratories and clinics in Baltimore and in malaria-endemic regions throughout the world. Our researchers are developing strategies to overcome the complexity and diversity of the malaria parasite.



### Studying Immune Responses to Malaria

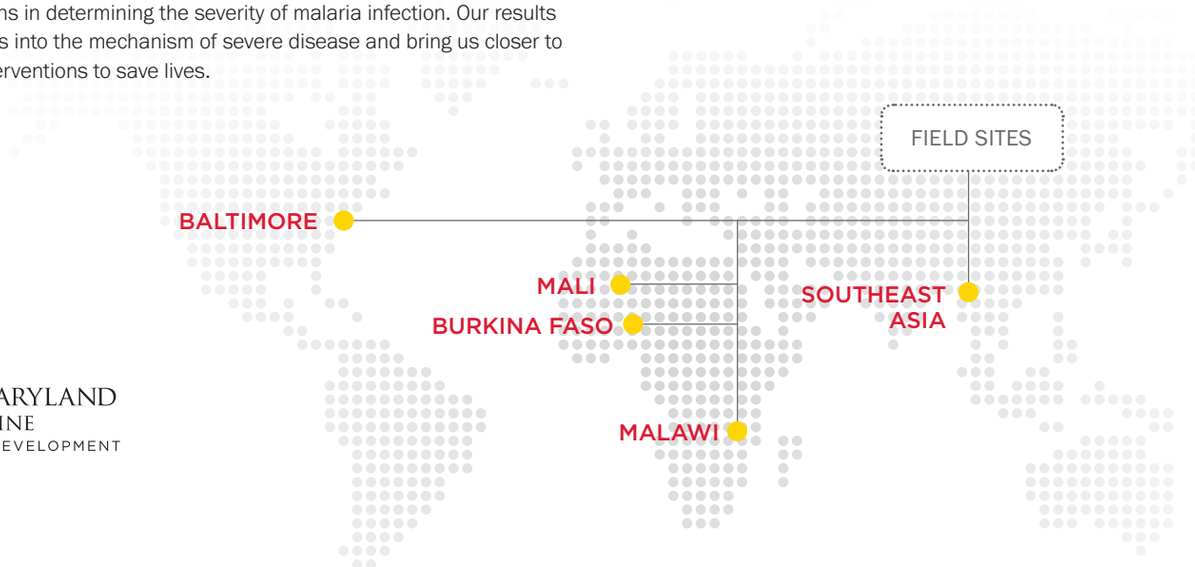
Using protein and peptide microarrays, our researchers are studying immune responses to malaria. Our research combines novel genomic approaches with powerful new microarray technology to assess the role of parasite surface antigens in determining the severity of malaria infection. Our results provide insights into the mechanism of severe disease and bring us closer to developing interventions to save lives.

## THE NEXT GENERATION OF RESEARCH

Training is a central part of our mission in the Malaria Research Program.

There are three federally supported malaria research training programs for international and U.S. medical students and research fellows that have been in place for decades.

Our trainees work in our laboratories in Africa and Baltimore on a range of projects, including understanding malaria transmission and developing novel strategies to interrupt it, the impact of maternal infection on infant immunity, and using genomics to design better malaria vaccines.

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# An Interdisciplinary Approach to Fighting Malaria

MALARIA RESEARCH PROGRAM UNITS

### Genomic Epidemiology

Under the leadership of Shannon Takala-Harrison, PhD., our researchers apply methods from molecular epidemiology, evolutionary biology, and population genomics to understand the evolution of the malaria parasite in response to the human immune system and interventions such as drugs and vaccines.

Ongoing projects include investigating the impact of parasite genetic diversity on the efficacy of subunit and whole-organism malaria vaccines, genome-wide research into the mechanisms of antimalarial drug resistance and identifying molecular markers to track and contain resistant parasites.

### International Clinical Trials

Under the leadership of Matthew Laurens, MD, MPH, our projects include a clinical study of a novel whole organism malaria vaccine, a trial of non-attenuated malaria parasites given under prophylaxis as a vaccination strategy, evaluation of malaria prophylaxis in persons living with HIV, studies of malaria risk and burden in vulnerable groups, and a study of genetic determinants of severe malaria.

### Malaria Vaccine and Challenge Studies

Led by Kirsten Lyke, MD, our researchers conduct and participate in field, clinical, and immunological studies of *Plasmodium falciparum*, schistosomiasis co-infections and other tropical diseases such as dengue virus, Ebola virus, and Zika virus. We evaluate many of the most promising vaccine candidates and platforms. We are uniquely positioned to evaluate vaccine efficacy through well-established controlled human malaria challenges in our unit.

### Immunoepidemiology and Pathogenesis

Unit Co-Directors, Andrea Berry, MD, and Mark Travassos, MD, MSc, are leading research on the humoral immune response to malaria infection and vaccination as well as the pathogenesis of clinical malaria syndromes. Ongoing projects include identifying immune responses to key epitopes of diverse malaria antigens, designing surveillance tools in malaria elimination settings, and studying the role of variant surface antigens in the pathogenesis of cerebral malaria.

## A Collaborative Approach

COLLABORATION WITH INTERNATIONAL ACADEMIC AND RESEARCH INSTITUTIONS

With decades of conducting malaria research in West Africa, we have established a long-standing and productive history of collaboration with the Malaria Research and Training Center of the University of Sciences, Technique, and Technologies of Bamako in Mali. We also work closely with the National Center for Malaria Research and Training in Burkina Faso.

In Malawi, we have had an on-going partnership for over 20 years with the Malawi College of Medicine and its research affiliates, Blantyre Malaria Project and Malaria Alert Center, in the conduct of numerous epidemiological studies and clinical trials. We develop and support field sites for clinical studies and have worked with our colleagues to establish a molecular laboratory within the College of Medicine to allow us to conduct our analyses in country.

## Malaria Research Leadership

MIRIAM K. LAUFER, MD, MPH
DIRECTOR OF THE MALARIA RESEARCH PROGRAM

Dr. Laufer is a Pediatric Infectious Diseases specialist with over 15 years of experience in conducting epidemiological and translational research with a focus of translating scientific discovery into clinically relevant strategies to improve the health of people living in malaria-endemic countries. She leads a team of dynamic and innovative researchers who work toward accelerating malaria elimination throughout the world. Undergraduate scholars, PhD students, post-doctoral fellows, and pediatric infectious disease fellows—mentored by Dr. Laufer and faculty members— work in the malaria research laboratory to answer pressing public health questions.


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