

## **A New Approach to Malaria Prevention: Investigating Monoclonal Antibodies to Protect Vulnerable Children in Africa**

Malaria remains one of the deadliest threats to children under five in sub-Saharan Africa. The HEKIMA Project, led by the University of Bergen (UiB) and funded by the Research Council of Norway, is part of Norway's contribution to achieving Sustainable Development Goal 3 (SDG 3), which focuses on ensuring healthy lives and promoting well-being for all at all ages. The project brings together international and local partners to explore the use of monoclonal antibodies (Mabs) as a potential solution to protect these vulnerable children from malaria infections.

Building on an ongoing National Institutes of Health (NIH)/Centers for Disease Control and Prevention (CDC)-funded efficacy trial of monoclonal antibodies for post-discharge malaria chemoprevention (PDMC) in Kenya, the HEKIMA project seeks to expand this promising intervention by adding research towards the potential implementation across malaria-endemic African countries. The Kenyan trial, which evaluates the safety and effectiveness of Mabs in preventing malaria in children recovering from severe anemia, serves as the foundation for HEKIMA's efforts to determine the feasibility, cost-effectiveness, and acceptability of Mabs across three countries: Kenya, Uganda, and Malawi.

The HEKIMA project exemplifies meaningful, equitable collaboration within a long-established partnership. UiB serves as the project owner, coordinating efforts across a diverse consortium of international and local partners. The Kenya Medical Research Institute (KEMRI) is a globally renowned research institution, leading the monoclonal antibody research in Kenya. KEMRI will leverage its extensive expertise in malaria research in this project. Likewise, the Training and Research Unit of Excellence (TRUE) in Malawi has experience conducting clinical trials, feasibility studies, and economic evaluations on malaria prevention. Partners in Uganda contribute additional expertise in health systems analysis and policy engagement. HEKIMA aims to foster capacity building and ensures that the research directly benefits the regions where the research activities are rooted. This partnership reflects a commitment to shared decision-making and sustainable outcomes within a consortium that delivers cutting-edge, equitable global health research.

For children recovering from severe anemia—a common consequence of malaria—the months following hospital discharge are critical. These children are at heightened risk of severe illness or death if they contract malaria again. The currently WHO-recommended PDMC strategy requires families to administer three pills once a day for three consecutive days each month over a three-month period, a regimen that can be challenging to maintain

consistently. Poor adherence reduces the antimalarial efficacy, and beyond the three months' protective period, the still-recovering children are left vulnerable to re-infections.

Monoclonal antibodies offer a groundbreaking alternative to these challenges. A single injection provides immediate protection lasting throughout the malaria transmission season, eliminating the need for daily adherence. This is particularly advantageous for children from poorer households, whose families often face logistical and financial barriers to maintaining long-term treatment schedules. Moreover, early results from the NIH/CDC-funded trial in Kenya indicate that Mabs are well-tolerated, with fewer side effects compared to traditional malaria treatments. Additionally, Mabs reduce the risk of drug resistance, a growing concern in malaria-endemic regions. These attributes make monoclonal antibodies a highly promising intervention for malaria prevention.

The HEKIMA project's research spans four interconnected areas, designed to provide a comprehensive understanding of how monoclonal antibodies can be implemented effectively. In economic evaluations, researchers assess the costs and benefits of Mabs compared to pill-based PDMC regimens. These analyses include healthcare system costs, household expenses, and long-term economic impacts across the three target countries. Community acceptability studies involve interviews, surveys, and focus groups to understand caregivers' perceptions of Mabs, including an experimental study to determine their willingness to adopt and pay for the treatment. These findings will guide pricing strategies and engagement approaches that ensure accessibility and equity.

The involvement of local communities is central to HEKIMA's methods. Caregivers, families, and community leaders are engaged throughout the research to ensure their perspectives shape the development and implementation of monoclonal antibody treatments. By embedding user feedback into economic evaluations, feasibility studies, and policy development, the project prioritizes practical and community-focused solutions.

Scaling up monoclonal antibody treatments also requires robust healthcare infrastructure. The HEKIMA project evaluates the readiness of healthcare systems in each country, identifying barriers such as logistical challenges, supply chain limitations, and training gaps. These insights inform tailored solutions to strengthen system capacity and facilitate smooth delivery of Mabs. Additionally, policy engagement is a central focus of the project. HEKIMA will work closely with ministries of health and international organizations, like the WHO, to ensure that relevant findings contribute to actionable recommendations. By engaging policymakers early, the project aims to accelerate decisions on integrating Mabs into national malaria prevention strategies.

Preliminary findings are already highlighting the potential of monoclonal antibodies to transform malaria prevention. Their simplicity, safety, and extended protective period make them an attractive alternative to pill-based regimens. Early cost-effectiveness modeling suggests that, despite higher upfront costs, Mabs could lead to significant savings by reducing hospital readmissions and the burden of severe malaria. Community acceptability studies have shown strong interest among caregivers, who value the convenience and reliability of a single-dose treatment. By leveraging data from the NIH/CDC-funded efficacy trial in Kenya, the HEKIMA project ensures its findings are grounded in rigorous evidence on the efficacy of Mabs. These insights will inform the potential development of national and regional strategies for scaling up monoclonal antibody treatments, ensuring they meet the needs of the communities they are designed to serve.

The HEKIMA Project emphasizes equitable partnerships and sustainable outcomes. By prioritizing local expertise and fostering collaboration across countries, the project ensures that its solutions are practical, appropriate, and rooted in the realities of malaria-affected regions. KEMRI, TRUE, and other local partners play leading roles in every aspect of the research, from trial implementation to policy engagement. This approach not only enhances the quality of the research but also builds local capacity for future malaria prevention efforts and research.

Supported by the Research Council of Norway, the HEKIMA project is taking a bold step toward reducing the devastating impact of malaria on children under five. By addressing the limitations of current PDMC methods, monoclonal antibodies could annually save thousands of lives and improve many more, easing the burden on families and healthcare systems alike.