PRESS RELEASE

Breakthrough in the fight against malaria

>> African-led innovation develops genetically modified mosquitoes that block malaria spread

Bagamoyo, Tanzania (December 10, 2025) – In a landmark study published in *Nature* today, scientists from the **Ifakara Health Institute (IHI)** and the **National Institute for Medical Research (NIMR)** in Tanzania, in partnership with **Imperial College London** through the **Transmission Zero** programme, have successfully developed genetically modified mosquitoes in Tanzania that block the transmission of malaria.

"This is the first time a genetically modified, gene drive-compatible mosquito strain has been developed in Africa, by African scientists, targeting malaria parasites circulating in local communities," said Dr. **Dickson Wilson Lwetoijera**, Programme Director at IHI. "We are proud to be driving innovation locally, using cutting-edge tools to address one of our continent's most pressing health challenges."

This milestone represents a powerful new model for global health research, one led and owned by African institutions. Supported by long-term collaboration and knowledge exchange with Imperial College London, Transmission Zero has trained a new generation of Tanzanian scientists in molecular biology, vector genetics, and biosafety, ensuring that scientific discovery and leadership remain firmly rooted in Africa.

"This study is not about technology alone. It's about leadership, responsibility, and partnership," said Prof. **George K. Christophides** of Imperial College London. "It shows what is possible when African institutions lead, and international collaborators support."

Malaria: A persistent threat

According to the latest World Malaria Report from the **World Health Organization (WHO)**, Tanzania is one of four countries that together account for over 50% of all malaria deaths globally, with nearly 93% of the population at risk. Traditional vector control methods, such as insecticide-treated bed nets and indoor spraying, have been highly effective, saving millions of lives, but face growing challenges due to insecticide resistance and rapid population growth.

Dr. Lwetoijera added that in line with global guidelines and policy by the WHO, CBD, and IUCN, and a supportive and responsible Tanzanian regulatory landscape, his team are setting their own agenda in the fight against malaria.

Science made in Tanzania

In 2023, Transmission Zero's leading researchers created **the first transgenic mosquito strain ever developed in Africa**, in Tanzania. Its latest research offers a new solution by genetically modifying anopheles gambiae mosquitoes (malaria carrying mosquitoes) to block the development of malaria parasites, effectively reducing their ability to transmit the disease.

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This approach allows these precise changes in the mosquitoes' ability to carry the malaria parasite to be passed down from one mosquito generation to the next.

In simple terms: the mosquitoes are still there, but they can't pass on malaria. "These findings on anopheles gambiae are the pathfinder for the technology to be extended to other equally important malaria vectors such as anopheles arabiensis and anopheles funestus, as well as vectors of arboviral diseases such as Dengue and Chikungunya," said Dr. Lwetoijera.

Conducted entirely under containment (not in the wild), the study introduced antimalarial traits - naturally occurring molecules from frogs and honeybees - into local mosquito populations. The modified mosquitoes effectively prevented Plasmodium falciparum, the primary malaria parasite in Africa, from developing, creating a significant barrier to transmission.

Built on local expertise and trust

"We build trust through conversation, transparency, and partnership with the people whose lives this research aims to improve," said Dr. Lwetoijera.

The research was conducted in **a state-of-the-art Modular Portable Laboratory** and **Containment Level 3 insectary facility (MPL/CL3)** built specifically for this research at the IHI campus, located in Bagamoyo, Tanzania. This facility, designed to meet high biosafety standards, enables local researchers to lead genetic engineering efforts and ensures that the technology is developed responsibly and transparently within Tanzania.

"We now have the infrastructure, the expertise, and the vision to advance gene drive science within Africa. By tailoring gene drive technology to local conditions, we have developed a powerful tool that could complement existing malaria control efforts and bring us closer to elimination," concluded Dr. Lwetoijera.

Next steps

While the results are promising, further research is required before field trials can begin. The next phase of Transmission Zero's research will include comprehensive risk assessments, regulatory engagement, and continued community consultation to ensure the safety, efficacy, and acceptability of any future deployment. Monitoring for resistance will also be critical to ensure the long-term effectiveness of the technology.

Dr. **Windbichler**, Reader in Genetics at Imperial College London concludes: "Our goal is to offer a novel tool that can complement existing methods in order to achieve malaria elimination in Africa, and this is a huge step forward."

"Now, we want to move at the right speed, not too fast so that everyone is on board and supportive of this new technology, but also with urgency, so that we treat malaria as the emergency that it is."

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About Transmission Zero

Transmission Zero is an international research programme working to develop innovative genetic tools to help eliminate malaria in Africa. By genetically modifying mosquitoes to block the malaria parasite from being passed to humans, the programme aims to stop malaria transmission at its source. Led by Imperial College London in partnership with the Ifakara Health Institute, the National Institute for Medical Research (Tanzania), and the Swiss Tropical and Public Health Institute (Swiss TPH), Transmission Zero is committed to advancing African-led science that is safe, equitable, and designed in close collaboration with communities. The programme is supported by the **Bill & Melinda Gates Foundation**.

About Ifakara Health Institute

IHI is a leading African research organization specializing in health innovation, testing, and validation. Its work spans biomedical and ecological sciences, intervention studies, health-systems research, and policy translation.

About NIMR

The National Institute for Medical Research (NIMR) is Tanzania's leading public health research institution, mandated to conduct, coordinate, and promote medical and biomedical research nationwide. NIMR plays a central role in generating evidence to guide health policies, advance scientific innovation, and strengthen disease control efforts across the country. *More about NIMR*

About Imperial College London

Imperial College London is a world-leading research university specializing in science, technology, engineering, medicine, and business (STEMB). Based in the UK, Imperial is globally recognized for its cutting-edge research, innovation, and strong contributions to solving major health and development challenges, including infectious diseases and global health. *More about Imperial College London*

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