University of Basel

The Resistant Mosquito: Staying Ahead of the Game in the Fight against Malaria

Case study by Chadwick Sikaala

The benefits of community engagement

An integrated programme for malaria control was conducted in Southern Malawi over a five-year period. The impact of integrated vector control (IVC) on the entomological inoculation rate (EIR) was studied. EIR is a proxy for the intensity of malaria parasite transmission.

During the baseline year, an EIR of approximately 50% was observed, which fell to virtually zero in the dry season (September-January). When the rainy season started again, malaria returned, roughly with the same pattern as a year before.

At this point, the entire population of about 50,000 people were provided with insecticide-treated nets (ITNs). Net distribution took approximately two months. At the end of this distribution, house improvements were introduced. People closed all holes and entrances in their houses, either with netting or by putting bricks in holes. At the end of this operation, which took a year, most houses were more or less mosquito proof.

Finally, a novel approach to larval source management (LSM) was also undertaken. Local community members were trained to identify and treat mosquito breeding sites by applying Bti (an insecticidal toxin produced by the bacteria *Bacillus thuringiensis israelensis*). All of this work was done through community engagement. It was the local population themselves who conducted the housing improvements and LSM.

One year after these interventions, the EIR had become virtually zero. A further year on, no measurable transmission was observed. This is just one example where you can see that with a focus on integration of tools and local community engagement, malaria can be controlled to such an extent that it is no longer considered to be a major health problem.

It is worth noting that control strategies for other vector-borne diseases and vectors, such as *Aedes* mosquitoes and the viruses they can vector, also rely largely on insecticides. At the moment, there are very few alternative strategies that are not insecticide-based, other than house improvement. So there is a strong focus on IVC.

Another example is a programme of LSM with Bti conducted in Rwanda. In the control area, mosquito pupae could still be found in the field following ten spray rounds with a larvicide over the course of ten days. When the community were engaged and trained to apply Bti themselves, pupae numbers decreased dramatically. Under expert supervision, pupae eventually disappeared altogether. This showed the positive impact of integrated approaches and community engagement when conducted as part of an IVC programme.