

THE PATH TOWARDS ELIMINATION



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AKROS
GLOBAL HEALTH

Akros + malaria

Akros has been working in malaria prevention since its inception. Our goal is to reduce malaria-related sickness and death. If we can keep more people healthy and malaria free, that means a greater overall level of economic productivity, which in turn cycles back into greater overall health.

We specialize in helping national ministries of health gather the data they need to mount the best fight they can against their malaria burden. To fight malaria most effectively, you need to have the right tools in the right places and at the right time. Using mobile-to-web reporting methods, we help national health systems know exactly where to send the next shipment of malaria medication. We help them project when a rural health clinic will run out of rapid diagnostic test kits.

Along with our partners, we ensure that our programs are always on the cutting edge of the science and technology that are leading our industry. Our team of epidemiologists, programmers, and implementation experts work directly with our clients to create maximum impact for every intervention we coordinate.



[Click here](#) to watch a video about Akros' work in malaria prevention

This packet is a short introduction to the four areas of Akros' malaria prevention program. To learn more, visit: www.akros.com/malaria-prevention



Community-level surveillance



Entomological Surveillance



Genotyping



mSpray®

Community-level surveillance

The Government of the Republic of Zambia (GRZ) has created an innovative system to reach its goal of eliminating malaria country wide by 2020. One of the components of this system centers around community-level malaria surveillance and leverages community health worker (CHW) networks in two main areas:

1. Finding, treating and reporting all malaria infections in the community
2. Reducing the burden of outpatient care and staff work load at the health facility through expanding access to malaria diagnosis and treatment by CHWs at community level.

The community-level malaria surveillance system provides a means to sensitively detect malaria infections through community health worker networks and report malaria data by mobile phone. CHW activities have expanded the health system to the community in two ways:

1. By training CHWs posted within their communities to test and treat for malaria, expanding malaria management from ~260 health facilities to a total of more than 1,800 health facilities and CHW posts.
2. By following up malaria cases diagnosed at health facility or health post: CHWs visit the household and neighbors of malaria patients to find and treat any additional malaria infections, thus reducing risk of onward transmission.



Success

Great success has already been observed through this community-level malaria surveillance approach. Implementing CHW case management of malaria through community surveillance is associated with the following success indicators:

1,500

CHWs have been trained in the proper follow-up, treatment, and reporting protocols

8.2%

reduction of outpatient attendance at overburdened clinics (as patients are instead managed by CHWs)



11

The community-level surveillance approach has been implemented in 11 districts in Zambia's Central and Southern, and Western Provinces

45.5%

increase in the number of malaria cases identified and treated

Entomological Surveillance

To create the highest impact and save the most lives, national programs must know the types and locations of mosquitoes flying around in their country. That way, they can apply the right insecticide to the right mosquitoes at the right times. For example, some mosquitoes like to rest on walls after they have fed, making indoor residual spraying an appropriate strategy.

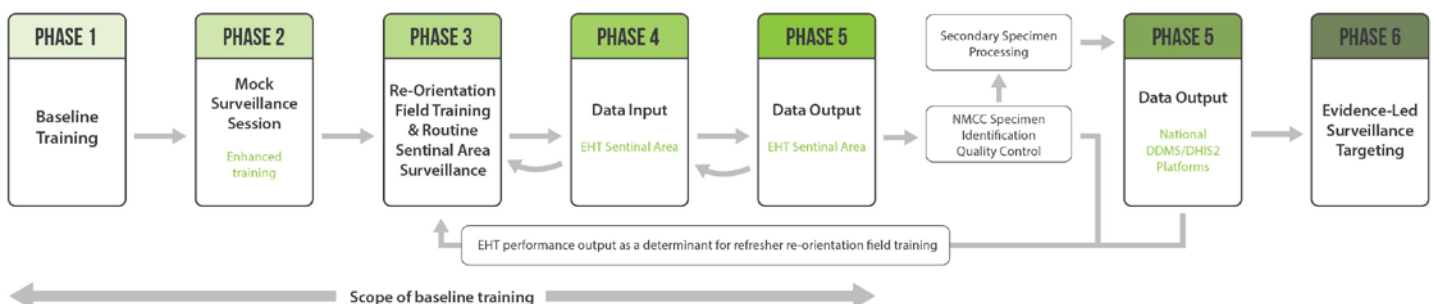
Collecting information like this is not an easy task. It is expensive and requires a wealth of technical resources often not available to the developing countries most burdened by malaria.



That's where we come in

Akros has developed the very first national-led, decentralized entomological surveillance program in Zambia. Our technicians analyzed the chief entomological outcomes required by national malaria control programs, consolidated key, routine processes in an operational protocol deployed to environmental health technicians (EHT) in over thirty (30) districts in Zambia, installed a user-friendly data capture and transmission system to speed the data from far-flung districts to a central database, and trained staff from the Ministry of Health on system maintenance, usage and data analysis.

At Akros, innovation meets operations – even when it comes to killing mosquitoes and preventing malaria. The figure below illustrates the EHT Route through the integrated entomological surveillance program.



Genotyping

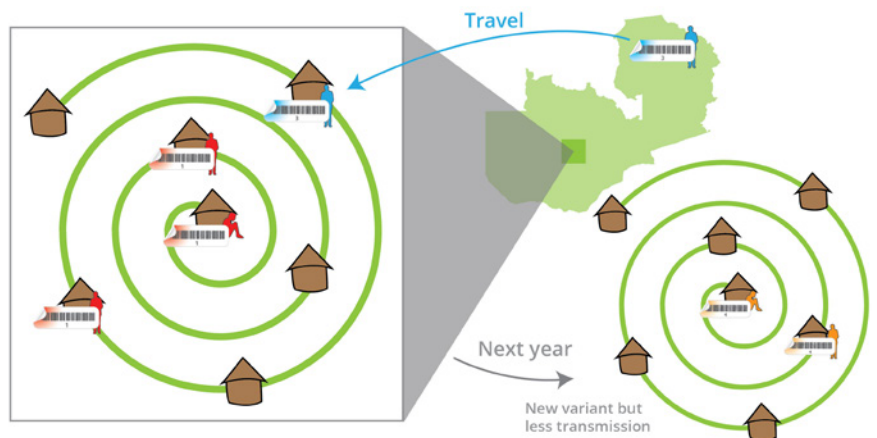
Advances in the field of genetics (the study of an organism's DNA blueprint) have revolutionized the field of biology. As popularised in many crime shows, each person's DNA is unique, meaning every hair, drop of blood and cell can be uniquely matched to you. This is often called genetic fingerprinting, though in fact there is more potential variation in DNA than fingerprints. Parasites that cause malaria also have a unique DNA sequence. However, unlike humans, there can be millions of copies of each parasite in a single infected individual. When a mosquito bites this person and takes a blood meal the male and female sexual stage parasites can recombine creating new offspring in the mosquito. If the male and female parasites that recombine have different DNA, the offspring will be unique. In areas where transmission is high this creates high genetic diversity. However, where there is very little malaria sometimes there will only be one parasite strain present, meaning the offspring will be identical to the parents. The result is that when an infected mosquito bites someone it will infect them with a parasite with exactly the same DNA as the person on which it first fed.



Spatial & Temporal Trends

Akros is employing genetic tools to both increase the sensitivity of detecting infections and to genotype individual infections. Molecular tools are being used to detect parasite infections that would be undetectable using point-of-care diagnostics. This hidden reservoir is an important driver of transmission and disease so being able to identify its location is crucial. Secondly, genotyping an infection can yield a wealth of data above and beyond the presence or absence of the parasite. In fact, it can reveal the relatedness of infections, including whether it is a local or imported infection, as well as the level of malaria transmission without having to catch a single mosquito. By understanding the genetic diversity of a parasite population in an area, insights into the temporal and spatial patterns of parasite transmission can be gained. This in turn informs intervention design and ultimately drives policy to the most appropriate response. When combined with GIS-integrated targeting and tracking of interventions, resources can be applied in the most efficient way. Defining a parasite's genotype enables relationships between different infections to be determined.

For example, in the schematic show here, individuals infected with the same parasite (red), whether they are sick (sitting down) or apparently well (standing up) were likely infected from the same local source. Similarly, where an individual was infected from outside the local area (blue), i.e., when travelling, genotyping can identify this difference. In an elimination setting this information is crucial in determining the success (no local cases) or failure of the interventions employed. Without genetic analyses we would detect less infections and



be unable to say anything further than the presence or absence of infections. Ultimately by mapping the occurrence of parasite signatures through time and space, their geographical range and persistence can be monitored.

Three parts of a greater whole

Indoor residual spraying is one of our best tools in the fight towards malaria elimination. The spraying kills mosquitos and helps keep the disease from spreading. It's not a cheap process, though. The insecticides and massive staffing required to make these campaigns effective are extremely costly, running many millions of dollars every year. In short, it's not the sort of thing you want to do inefficiently.

We need to ensure that the right insecticides are sprayed in the right amounts in the right households. That's why Akros created mSpray, a suite of tools that puts IRS campaigns into efficiency overdrive. We need to stop thinking about the aspects of IRS as separate entities and recognize that, to be effective, we must do three things really well: Enumeration, Targeting, and Spraying.



The powerful new mSpray tool

Our programmers have created a tool that integrates modern mapping technology with intelligent overlays, putting the data in the hands of everyone, helping to drive the virtuous data cycle forward. No longer do we need to send spray teams out to the far corners of the country with instructions, hoping the spraying is happening in the right places.

Now we can send them with cellular-enabled tablets with maps showing them where they are the location of the next house they need to find and spray. And thanks to GPS location tagging, we can now see each house they visited and sprayed as they file their reports, right from the field. And all of the data comes back in real-time.

