**WHAT WAS KNOWN**

- Malaria is an ongoing evolutionary arms race between *Plasmodium* parasites, *Anopheles* mosquitoes, and humans.
- The parasites and mosquitoes have developed resistance to all major antimalarial drugs and insecticides, while humans can resist malaria with genes such as sickle haemoglobin.
- The scientific field was fragmented into multiple small studies that often disagreed with each other.

**WHAT WE DID**

- Establish a global data sharing network with capacity building in data analysis for researchers in malaria-endemic countries.
- Work with partners in 40 countries to collect over 100,000 samples for genetic analysis of parasite, mosquito and human populations.
- Build the largest clinical dataset on severe malaria to enable definitive genome-wide association studies of disease susceptibility.
- Develop methods for large-scale genome sequencing of parasites and mosquitoes collected in resource-poor settings.
- Bring together consortia of international experts to establish gold standards for population genomic analysis of malaria parasites and their mosquito vectors.

**WHAT THIS ADDS**

- Discovery of novel malaria resistance loci in the human genome, including a cluster of genes that encode erythrocyte surface proteins which are receptors for host cell invasion.
- Knowledge of the genetic architecture of artemisinin-resistant *P. falciparum* as it emerges across Southeast Asia, including markers of the genetic background on which new resistance mutations tend to emerge.
- A high resolution map of the genomic diversity of *An. gambiae*, the major vector of malaria in Africa, revealing new insights into the genetic processes involved in insecticide resistance and incipient speciation.
- Open access data on over 1 million *P. falciparum* polymorphisms and 50 million *An. gambiae* polymorphisms with an interactive web application to explore complex patterns of variation in different locations.
- A new generation of multi-centre studies of parasite diversity and antimalarial drug resistance in Africa, led by African scientists who have been nurtured by MalariaGEN’s capacity building programme.

**REFERENCES**