



# Covid-19 in Africa

The Uplifting Africa Program

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*Robert Kapininga, a nurse assistant, gives baby Lusitana the first dose of the world's first malaria vaccine. Photo Credit: WHO/ M. Nieuwenhof*

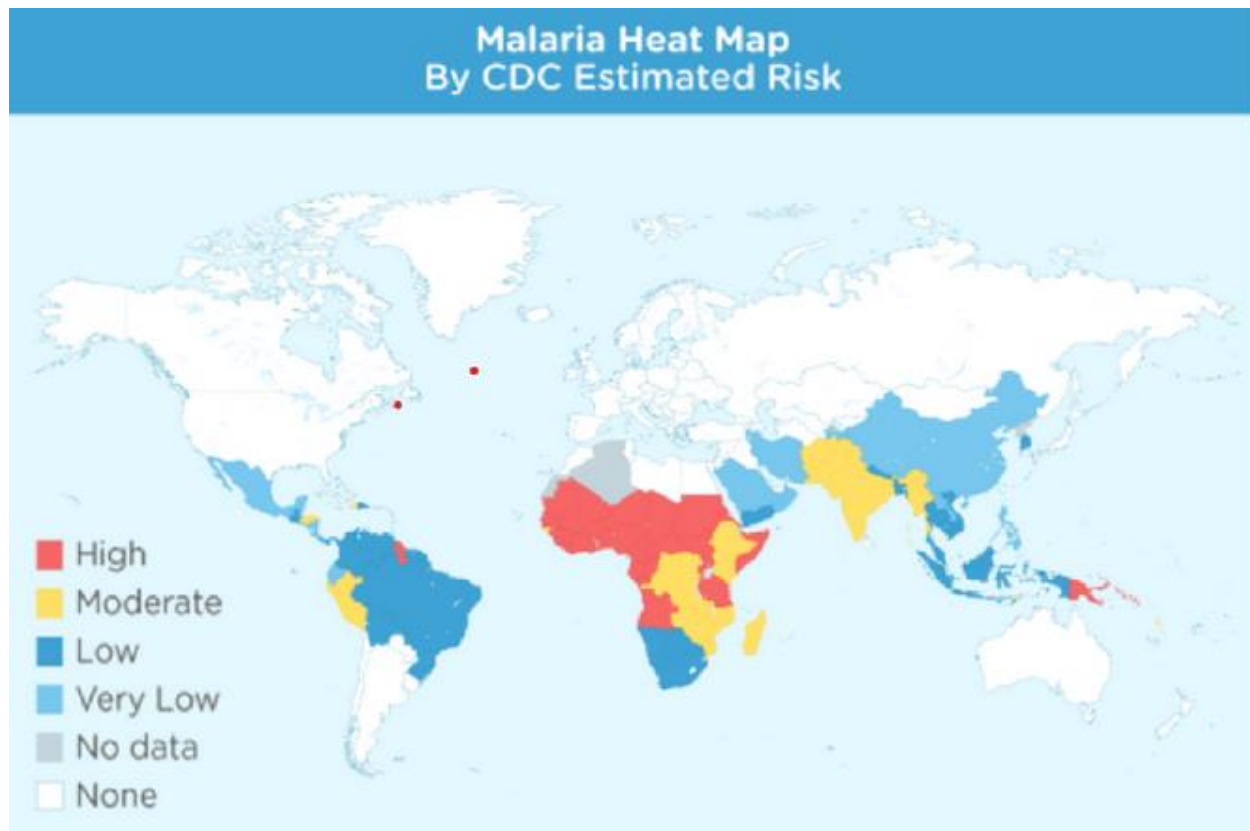
**Daniel Emblidge**

**The Uplifting Africa Program**

**Humanitarian Division**

<https://www.upliftingafrica.org>

# Ending Malaria in Africa



Malaria mortality rates in regions of the world. Image Credit: CDC

The Covid-19 pandemic has put vaccine campaigns for a number of diseases such as tuberculosis, measles, and polio to a halt – reversing decades of progress. However, one promising prospect is in the fight against malaria. Despite malaria being preventable and curable it affects 200 million people a year, claiming over 400,000 lives – most of them children. According to the World Health Organization (WHO) a child dies every minute from malaria. Scientist recently hailed a new malaria vaccine that the WHO approved and recommended in October 2021. The RST,S vaccine is recommended for children – the most vulnerable population to malaria – in regions with moderate to high *Plasmodium falciparum* transmissions. *Plasmodium falciparum* is one of four human malaria parasites carried by the female *Anopheles gambiae* mosquito in Africa and is the most dangerous - accounting for over 90% of malaria

cases. An infection occurs when an infected female mosquito bites a human injecting the parasite from its saliva into a human's blood stream.

### **Treatment and Prevention**

Until now, malaria's prevention and treatment included Vector control and preventative chemotherapies. Vector control methods include insecticide-treated nets (ITNs) and indoor residual spraying (IRS) with insecticides. While preventative chemotherapies entail chemoprophylaxis, intermittent preventive treatment (IPT) of infants and pregnant women, seasonal malaria chemoprevention, and mass drug administration (MDA). All chemotherapies involve the distribution of anti-malarial drugs. MDA is particularly interesting because it is administered to every member of a population or defined geographical area. Vector control and preventative chemotherapies have saved an incalculable number of lives, although vector control limitations end at the front door and preventative chemotherapies are undermined by an increase resistance to the insecticides and anti-malarial drugs and paucity of anti-malarial alternatives.

### **Today's Promising Vaccine**

The RST,S vaccine is considered moderately effective, with a 30% reduction in severe cases of malaria after completion of a four-dose regiment for children under five years old. Some scientists are concerned about the vaccines moderate effectiveness despite being-in-the-making for 30 years. Though, computer modeling systems project that a four-dose vaccine rollout to all children in countries with a high incidence of malaria would reduce the death toll by 23,000. Moreover, according to Dr. Alassane Dicko, malaria researcher at University of Bamako concluded a study that found vaccination in concert with seasonal malaria chemoprevention could decrease malaria hospitalization and deaths by 73%. That is a significant number as it represents hundreds of thousands of lives. In the face of the Covid-19 pandemic, the backslide in preventable and curable disease campaigns, and the growing resistance to insecticides and anti-malarial drugs, the vaccine is a positive reminder that a brighter future is on the horizon.

## Looking to the Future

Thanks to the advancements in the science of genetically modified organisms vector control, chemoprevention and even vaccines may not be necessary by the end of the decade. Two genetic manipulations and a behavior discovery are making swift progress towards malaria prevention and eradication. The first is the discovery of a microbe called *Microsporidia MB* which is found in *Anopheles* mosquitos. Mosquitos carrying this microbe do not harbor any malaria parasites – not every *Anopheles gambiae* carries the malaria parasite. Additionally, scientists found that *Microsporidia MB* is easily past to offspring and doesn't affect survival rate. hypothetically, if scientists could harness and introduce this malaria transmission-blocking microbe into large populations of mosquitoes throughout Africa then malaria could no longer pose a threat to humans after a couple of brief mosquito generations.

Secondly, scientists funded by the Bill and Melinda Gates foundation, used a gene mutation technique called CRISPR to make precise changes to the *Anopheles gambiae*. The specific gene they targeted was the “doublesex” gene which resulted in a mutated mouth making them unable to penetrate the human skin to release the parasite and perverts their reproductive organs rendering them infertile. Keep in mind that this operation only targets the females of a specific sub-species of mosquito, the *Anopheles gambiae*, which would either die out and be replaced by a competing species of mosquito or adapt to feed from new hosts. The gene modification is combined with a gene drive described by Dr. Tony Nolan, one of the researchers who conducted this study, as “a selfish type of genetic element that spreads itself in the mosquito population.” This allowed the team of researchers to distinguish their genetically modified mosquitos from natural mosquitos.

Finally, scientists are working on another form of vector control called “attract and kill.” Field studies discovered that pregnant mother *Anopheles gambiae* are attracted to the odor of cedrol - a sesquiterpene alcohol. After the mosquito feeds, it searches for stagnant water to lay its eggs. If scientists can capture infected and pregnant mosquitos using cedrol and kill them before they lay their eggs then the number of malaria cases will drop proportionately.

Microbes, genetic manipulation, and using odors to stop malaria are a step in the right direction toward the eradication of this endemic will aid in uplifting Africa.

### ***Sources:***

<https://targetmalaria.org/results-from-months-of-monitoring-following-the-first-release-of-non-gene-drive-genetically-modified-mosquitoes-in-africa/>

<https://www.who.int/news-room/fact-sheets/detail/malaria>

<https://www.npr.org/sections/goatsandsoda/2021/07/28/1020932493/how-an-altered-strand-of-dna-can-cause-malaria-spreading-mosquitoes-to-self-dest>

<https://www.nature.com/articles/d41586-021-02755-5#:~:text=08%20October%202021-,%20Scientists%20hail%20historic%20malaria%20vaccine%20approval%20%E2%80%94%20but%20point%20to%20challenges,%20will%20be%20crucial%20to%20success.>

<https://www.nature.com/articles/d41586-021-01022-x>

<http://www.africairs.net/indoor-residual-spraying/>

[https://www.cdc.gov/malaria/malaria\\_worldwide/reduction/mda\\_mft.html](https://www.cdc.gov/malaria/malaria_worldwide/reduction/mda_mft.html)

<http://www.icipe.org/news/%E2%80%98attract-and-kill%E2%80%99-trapping-malaria-mosquito-mums-they-lay-eggs>

<http://www.icipe.org/news/icipe-scientists-discover-malaria-transmission-blocking-microbe-mosquitoes>

