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World Health Organization

Preventing the Transmission of Malaria

Republic of Ghana

## I. Background

For thousands of years, malaria has posed an immense threat to economic success, political growth, and human life. Transmitted through the Anopheles mosquito after biting humans, the malaria protozoa, different species of Plasmodium, cause flu-like illness, high fevers, and often death. It is estimated to cost Africa, where 90% of all cases occur, \$12 billion per year. Many regions experience significant loss in productivity, accompanied by economic loss. Beginning with artemisinins and quinine, originating in wormwood and Cinchona trees, respectively, antimalarial medications have been used to prevent and treat malaria around the world. However, 216 million people still contracted malaria in 2016. Newer techniques including insecticide-treated bed nets (ITNs) and indoor residual spraying (IRS) focus on vector control, by targeting the mosquitoes instead of the protozoa. However, even with many techniques, malaria still poses a huge risk to public health, especially in sub-Saharan Africa.

## II. International Involvement

The World Health Organization Global Malaria Programme (GMP) coordinates a majority of malaria control efforts. National malaria control programs (NMCPs), uniquely designed for each country, are developed and funded in part by the WHO. Other groups, such as the President's Malaria Initiative, a U.S.-led campaign specifically targeting Africa, follow WHO guidelines, such as the Global Technical Strategy for Malaria 2016-2030. All of these programs develop and fund a variety of campaigns, including vector control, treatment, preventative medication, surveillance, diagnosis, and research. Other NGOs work with the U.N. to support malaria control and treatment efforts. For example, Nothing But Nets assists the purchase and delivery of long-lasting ITNs (LLINs), one of the most promising techniques of malaria prevention and vector control. The Roll Back Malaria program interfaces with nations, businesses, and NGOs to coordinate malaria responses worldwide. These U.N.-related programs help lessen malaria's toll, but the worldwide situation is still dire.

## III. Country Policy and Solutions

The Republic of Ghana has been decimated by malaria. In the first half of 2016 alone, 4.9 million Ghanaian citizens contracted malaria. Ghana has committed to the Roll Back Malaria

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Initiative and its own NMCP. Ghana's chief vector control methods include indoor residual spraying (IRS) and insecticide-treated bed nets (ITNs). It is Ghana's goal to have 80% of the population sleeping under ITNs, and by 2011, after free distribution campaigns, 60% of children were using them. The short-term basis for malaria control lies long-lasting ITNs (LLINs), which don't need to be recoated for up to three years. In order to increase usage of LLINs, free distribution campaigns should be used, as were effective in Ghana's Hang-Up campaign. By partnering with the NGO Nothing But Nets, minimal new infrastructure will be required. Increased funding, access, and U.N. assistance will ensure that the organization can significantly increase its performance. An increasing problem in the use of ITNs is insecticide resistance, specifically to pyrethroids, the only WHO-approved insecticide for this use. Ghana believes that the process of testing and approval by the WHO must be expedited to ensure that newer insecticides can be used in ITNs. Such chemicals include piperonyl butoxide, which has been combined with pyrethroids as part of a Ugandan pilot program. These insecticides must be incorporated into current Nothing But Nets programs. Education initiatives must supplement these programs in order to ensure proper and continued usage. In addition, the reduction of taxes on such products during payed distribution periods will decrease prices, driving proliferation.

However, traditional vector control techniques can only be used in the short-term, as mosquitoes will become resistant to a new line of insecticides. Drastically increased funding and expedited yet safe approval processes for gene drive and Crispr-Cas9 technology will be the final malaria control solution. Unlike other malaria-related Crispr technology, which sterilize mosquitoes, attempting to eradicate all mosquitoes, removing the FREP 1 gene from *Anopheles* mosquitoes, prevents the Plasmodium protozoa, which causes malaria, from surviving. This causes transmission to humans to be impossible, destroying ecosystems. Using newly-created gene drives to ensure that this trait is passed to the vast majority of offspring, powerful control of malaria vectors is possible, without the extinction of a species.

Ghana seeks to establish a new surveillance network using existing surveillance sources and directing the creation of new systems. This is necessary to collect accurate information on the effectiveness of control, treatment, and prevention programs. Currently, Ghana's data is not completely accessible or reliable and an international body dedicated to determine morbidity and mortality by region is necessary to effectively and economically prevent the transmission of malaria. Education of populations to report all suspected cases and the widespread usage of rapid diagnostic tests (RDTs) to accurately diagnose patients must be employed. A child dies of malaria every two minutes, and the international community must take comprehensive action to prevent future suffering.

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