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# Kenya needs cohesive policies and better strategies in its war against malaria in arid and semi arid areas

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### Abstract

Malaria is the greatest killer parasitic diseases in the world today. Kenya falls amongst the 15 high-burden countries in sub-Saharan Africa. Due to this, the Kenyan government and its development partners launched the President's Malaria Initiative (PMI) to reduce malaria related mortality by 50%. This was to be achieved through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). Though the contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions especially in the high burden regions of the county, malaria outbreaks are frequently reported in the arid and semi-arid land (ASAL) of Kenya like Baringo and West Pokot Counties. In this Opinion, I try to address some of the reasons that could be the cause of these frequent malaria outbreaks in the ASAL regions and what could be done to reduce them.

**Keywords:** *Anopheles* spp, arid and semi-arid regions, malaria, surveillance, prevention

### 1. Introduction

In the past 15 years, Kenya where 70% of the population is believed to be at risk of Malaria has made great strides in the prevention and control of Malaria. Countrywide, malaria prevalence dropped from 11% to 8% between 2010 and 2015 [1]. During the same period, Malaria which is pervasive along the Lake Victoria region dropped from high rates of 38% to 27%. A 29% drop in overall child mortality due to Malaria between 2008 and 2014 has also been witnessed [1].

These have been achieved by a broad range of prevention efforts tailored to meet the widely divergent needs of local populations. Insecticide-treated bednets have been the primary preventive tool whereas indoor residual spraying (IRS) with insecticides is targeted towards selected areas with high prevalence and transmission around Lake Victoria. By April 2017, Kenya had distributed 16 million Long Lasting Insecticidal Nets (LLINs) in 36 counties through mass campaigns and routine maternal and child welfare clinics. The LLINs and the IRS have been accompanied by the diagnosis-based treatment policy and supply of preventive medicine [1]. Currently 87% of public health facilities have diagnostic capacity. There has also been health promotion messages broadcast nationally, even to low transmission areas, so residents can learn how to limit their exposure and, if they do fall sick, recognize the symptoms and get diagnosed and treated. It's evident that these measures have greatly impacted to the low transmission rates being witnessed [1].

Still, progress has not been uniform. There is need to sustain high coverage of malaria control measures to the seasonal malaria transmission zones. As recent as February 2018 and October 2017, Kenya has witnessed outbreaks of Malaria in its arid Counties of Baringo, West Pokot and Marsabit. Tens of Malaria cases were confirmed in Baringo in February 2018 with 20 of them described as serious [2] whereas at least 400 people were hospitalised in West Pokot and Baringo counties during a malaria outbreak in October 2017 that killed more than 10 people [3]. Another, 1, 300 people were admitted with malaria a week after the disease claimed 17 people in Marsabit County in the same month. Majority of the patients were children under the age of 5 [4].

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Sadly, it is that age that gets ravaged by Malaria so badly that in every 2 minutes somewhere in the world, a child is lost to this killer disease [4].

## 2. Previous research findings in Baringo and their implications on Malaria control

Malaria accounts for 11.8 % of the outpatient cases recorded in Baringo [5] This is higher than the nationwide malaria prevalence of 8% [1]. The County falls under the seasonal malaria transmission zone together with other counties including; Turkana, Kajiado, Mandera, Wajir, Garissa, Marsabit, Samburu, Isiolo, Meru, Tharaka Nithi, Embu, Kitui and Tana river [6]. Seasonal malaria experienced in these counties is associated with periodic amplification of morbidity in the wet season prompted by limited immunity in inhabitants

It has been reported that increased number of malaria cases in Baringo occurs against the backdrop of sub-optimal performance in health facilities due to structural problems/weaknesses such as lack of malaria drugs, understaffing, inadequate medical equipment and sparsely distributed health facilities (the average distance patients travel to health facilities is 15 kilometres) [5]. Insecurity in the region also aggravates the problems as medical staff like nurses are reported to flee the few medical facilities due to the persistent insecurity [2] This leaves communities to identify and manage the disease largely on their own even during outbreaks.

On the other hand, entomological research has observed that the *Anopheles arabiensis* mosquito that readily feeds on not only humans but livestock too is one of the main malaria vectors in Baringo. Livestock keeping is the main economic activity in Baringo, this coupled with previous findings that breeding of the *An. arabiensis* is largely sustained by man-made larval habitats like pan dams, marshes and adjoining drainage canals used for irrigation, is evidence enough that Malaria outbreaks are likely to occur. During the dry season, the vector is sustained by these man made habitats that are less dependent on rainfall. The habitats then act as vector inocula to the natural larval habitats like rivers during the rainy season [7].

Research also reports that entry and/or exit of malaria mosquitoes into houses largely depend on house type. There is a strong preference for grass-thatched houses, making house modification to limit mosquito flight into houses a plausible control strategy. This finding reinforces the common belief that poverty is a major driver of malaria transmission in Africa. Most communities in the continent's rural and resource constrained areas are largely unable to afford decent housing with adequate screening measures to block mosquito entry into houses [7].

The role of human activities in increasing human-vector contact has also been cited. Herding which is a mainstay activity in Baringo and indeed, most semi-arid areas of Africa could be a major cause of malaria outbreaks. Since as already mentioned, *An. arabiensis* a major vector for malaria in Baringo feed on livestock, high livestock densities would mean high human biting rates. The situation is worsened by the fact that the largest communal grazing fields are used by hundreds of pastoralists from different villages. This would of course increase malaria transmission rates and thus outbreaks. Previous research also observed that Baringo being a semi-arid region, residents irrigate their crops late in the evening

and into the night to avoid the high temperatures during the day, this exposes them to infective mosquito bites increasing the rate of malaria transmission [7].

## 3. A few suggestions on how the outbreaks could be reduced and future perspectives

The government should provide enough diagnostic facilities and equipment. Following the general elections in 2013, the health service delivery function was formally transferred to counties in August of the same year. The Counties are responsible for three levels of care: community health services, primary care services and county referral services. It's important for the County governments of Baringo, West Pokot and Marsabit to help eliminate malaria in their Counties.

During the recent outbreaks [3, 4], lack of accessible well-staffed and well equipped hospitals was cited as the major factors that aggravated the situation. Patients had to travel long distances for treatment. According to residents and local leaders, those who died failed to get treatment in time. Malaria is a treatable disease and time is of essence, if patients are not attended to in time, they would most likely lose their lives. Unfortunately, residents in remote villages are unable to get to nearby hospitals located kilometres away. Bad roads in these areas have even worsened the situation further as patients have to walk long distances to get to the health facilities [8]. Adequate supply of antimalarial to the health facilities would also help mitigate the situation. During the last outbreak, Marsabit County was reported to lack anti-malaria medicines and was, therefore, unable to cope with an outbreak.

Furthermore, the county governments could consider deploying mobile clinics in cases of emergencies and invest on ambulances that could ferry patients from far-flung parts of the Counties. The national government on its part should provide adequate security in these areas to reassure the medical staff and development partners as this will ensure that the health facilities are effectively manned especially during outbreaks [2].

Targeted larval control will also be necessary. The highly localized and focal nature of breeding sites in these semi-desert environments provides a good opportunity for targeted larval control. The habitats are few, well-defined and easily traceable. They mainly consists of pan dams, ditches, trenches and irrigation canals which make 60% of breeding sites for the malaria vectors [9] Better environmental management that includes filling up the unnecessary ditches and trenches, draining stagnant water and applying larvicides into the irrigation canals would reduce the vector population immensely.

In addition, since *Anopheles arabiensis* that readily feeds on livestock and man is one of the main malaria vectors in Baringo, zoo prophylaxis, increasing herd sizes, could be a plausible vector control strategy. However, this may be counterproductive under the circumstances in Baringo where high livestock densities lead to converging of several herders in communal grazing lands. This has the potential of increasing vector densities and high human biting rates within these grazing lands and thus malaria transmission rates.

The shift from mud grass thatched huts to concrete houses with sealable windows would also reduce exposure to mosquito bites. House type has actually become an important micro-epidemiological factor in malaria transmission [9]. We

can only hope that the economic progress that Kenya has experienced could help the shift from mud huts to concrete houses with sealable windows to reduce exposure to mosquito bites.

Public health education and awareness targeted especially to the less educated would also be necessary as it will enable victims to seek treatment quickly and to avoid exposing themselves to mosquito bites by sleeping under insecticide treated bednets. This will also ensure that they don't become reservoirs for the mosquitoes to get inoculum to be injected into the next person<sup>[9]</sup>. Pregnant women should also be sensitized of the benefits of taking antimalarial drugs during pregnancy.

One preventive tool that has not yet been deployed in Kenya is the four dose malaria vaccine RTS, S also known as Mosquirix. The vaccine is currently under evaluation and Kenya is one of the countries for the trials<sup>[10]</sup>. This Vaccine could provide a solution for residents in these seasonal transmission zones who unlike their counterparts in the high prevalence regions like the Lake Victoria region, lack naturally acquired immunity against malaria and are thus knocked down very fast by the disease during outbreaks.

Finally, with declining resources, greater efforts are needed to better target their use. The biggest funder of the Kenyan malaria control programme – the Global Fund to Fight AIDS, Tuberculosis and Malaria – announced in December 2016 that its 2018–2020 package would contain US\$ 63 million for malaria programmes in Kenya, less than half of what it had been previously<sup>[11]</sup>. This leaves a huge gap. Kenya has made great strides in improving the quality of available data for decision making, for example, the demographic and Health Survey (DHS) data undertaken in 2014-15 designed to provide measures precise at the county level<sup>[11]</sup>. These data need to be assessed especially by the county governments, to shape implementable and effective policies that could help reduce recurrent outbreaks in the Seasonal Malaria Zones.

#### 4. Conclusions

Kenya is amongst the 15 sub Saharan African countries that accounted for 80% of malaria deaths globally in 2016. Although much effort and progress has been made to reduce and eliminate malaria in high prevalence zones around the lake victoria region, cohesive strategies are called for in seasonal transmission zones like Baringo that keep on showing spikes during the rainy seasons. This point is even emphasised by the fact that the WHO malaria annual report in 2016 showed that the progress against malaria - a key public health achievement over the past few years - has stalled.

While one of the main goals in the global strategy for malaria is to reduce illnesses and deaths by at least 40 percent by 2020, Kenya is amongst the countries that are not on track. A malaria-free Kenya is the ultimate vision of the national malaria programme. To defeat malaria, Kenya needs to invest in stronger health systems that deliver universal health coverage.

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