

KENYA MEDICAL RESEARCH INSTITUTE



In Search of Better Health

EVIDENCE BRIEF

Anopheles stephensi in Kenya: potentially substantial threat to malaria transmission in urban and rural areas

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Key messages:

Anopheles stephensi is a malaria vector that thrives in both urban and rural settings. Following its detection in Kenya, there is a likelihood of malaria transmission occurring in urban and peri-urban set-ups in the country. The new mosquito poses a serious threat and could reverse the gains made in the fight against malaria.

Studies carried out across all counties in Kenya, in December 2022 show that the new malaria causing mosquito *Anopheles stephensi* is present in Laisamis and Saku sub-counties in Marsabit County in northern Kenya. Laboratory assays were conducted to confirm the identity of the vector.

The Division of National Malaria Program, donors and partners have joined forces to respond to the threat of *Anopheles stephensi*. Intensified surveillance in all counties in Kenya is promoted to determine the current scale of distribution. The behaviour and transmission dynamics of *Anopheles stephensi* is also under investigation.

Introduction Background:

Malaria is a leading public health problem in Kenya. The disease is endemic in different parts of the country and almost 70% of the entire population is at risk. The disease accounts for 13% – 15% of hospital outpatient visits. Malaria affects individuals of all ages and is a major cause of morbidity and mortality among pregnant women and children under five years of age. The disease is transmitted through the infectious bite of the *Anopheles* female mosquito. In Kenya, malaria is spread by two major mosquitoes namely *Anopheles gambiae* and *Anopheles funestus*.

Anopheles stephensi is a malaria causing mosquito that was originally known to occur and spread malaria in Southeast Asia, the Middle East and Arabian Peninsula. The mosquito species has been expanding its geographic range over the last decade, with detections reported in Dhibouti (2012), Ethiopia and Sudan (2016), Somalia (2019) and Nigeria (2020).

How is *Anopheles stephensi* different from the known malaria mosquitoes in Kenya?

The *Anopheles stephensi* mosquito exhibits different behaviour from the known malaria mosquitoes in Kenya. The new mosquito thrives in urban settings, unlike known malaria vectors that are mainly found in rural areas.

Anopheles stephensi mainly breeds in containers such as jerry cans, tyres, open tanks, sewers, cisterns, overhead tanks and underground tanks. The known malaria mosquitoes in Kenya breed in rural areas in habitats such as water pools, rice paddies, streams, surface run-offs, streams, sprints, tyre tracks and hoof prints.

The new mosquito is invasive and can spread very fast to new areas with or without the known malaria mosquitoes. *Anopheles stephensi* is adaptive and can adapt to different climatic and environmental conditions.

Methodology

The Ministry of Health through the Division of National Malaria Programme (DNMP) and the Kenya Medical Research Institute (KEMRI) carried out routine mosquito surveillance in December 2022 in different counties across Kenya. Immature mosquitoes were sampled from breeding habitats in different surveillance sites. A sample of *Anopheles* mosquitoes were analyzed in the KEMRI laboratories to determine the species using the *Anopheles stephensi* protocol.

Key findings

Across the twelve counties surveyed, the new mosquito was found in Marsabit County. The detection was done in four different surveillance sites in Marsabit County. A total of 55 *Anopheles* larvae were collected and 11 died during transit. Of the 11 larvae, seven were identified as *Anopheles stephensi*. Forty-four larvae were reared to adults then killed in a containment facility at KEMRI, four of which were shipped to the CDC for confirmatory testing. Forty newly emerged adults were tested and nine identified as *Anopheles stephensi*

Implications

Malaria in Kenya, and Africa at large is known to occur in rural areas. Rainfall, temperature and availability of unpolluted mosquito breeding habitats in rural areas favour the breeding of malaria mosquitoes. However, *Anopheles stephensi* is unique as it thrives in man-made containers and breeding habitats in polluted settings. The establishment of *Anopheles stephensi* in urban and peri-urban areas may pose a serious threat for malaria transmission in areas that have been *Anopheles* and malaria free. Over the last few decades, there has been a reduction in the burden of malaria across Kenya. This new mosquito species poses a significant public health threat and could reverse the gains made in the fight against malaria.

Recommendations

A coordinated response to the threat of the new mosquito is critical. Malaria prevention and control efforts can be broadly divided into two categories: community and national and county levels.

Community Level

- Source reduction; Proper disposal/removal of unused containers and tires, drainage of any stagnant water
- Covering of all water containers to avoid mosquito breeding
- Use of larvicides to treat stagnant water bodies
- Conduct community education on management of mosquito breeding habitats
- Utilise the available malaria control tools such as mosquito nets
- Use personal protective measures such as repellants, wearing long sleeved clothing to prevent mosquito bites

National and County Level

- Capacity building of county and National personnel for increased surveillance
- Monitoring of trends in malaria to capture any changes in the trend
- Develop and distribute educational materials on the management and control of mosquitoes
- Prioritize distribution of mosquito nets in affected areas
- Conduct routine entomological surveillance to determine the extent of vector distribution and mosquito infectivity rates

Reference

Takken W, Lindsay S: **Increased Threat of Urban Malaria from Anopheles stephensi Mosquitoes, Africa.** *Emerg Infect Dis* 2019, **25**:1431-1433.

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