WHO initiative to stop the spread of *Anopheles stephensi* in Africa

Anopheles stephensi at a glance

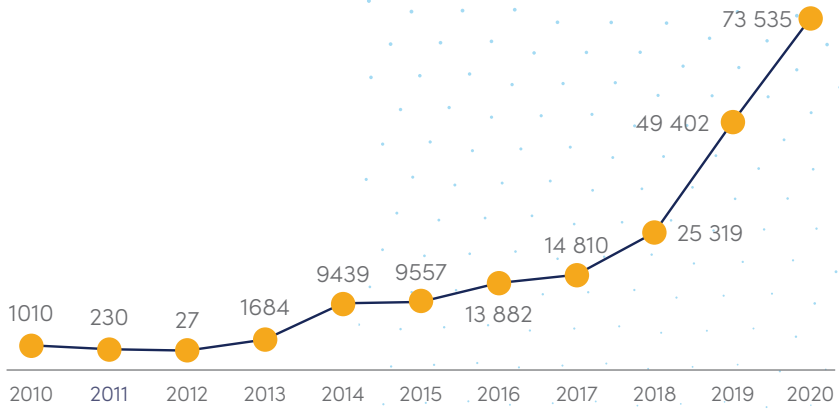
Anopheles stephensi is a mosquito species that is capable of transmitting both *Plasmodium falciparum* and *P. vivax* malaria parasites. It was originally native to South Asia and parts of the Arabian Peninsula but has been expanding its range over the last decade, with detections reported in Djibouti (2012), Ethiopia and Sudan (2016), Somalia (2019) and Nigeria (2020). Although *An. stephensi* has likely spread to other African countries, it has yet to be detected as systematic, large-scale surveillance of the vector is still in its infancy.

Anopheles stephensi has the capacity to thrive in urban environments, setting it apart from the other main mosquito vectors of malaria that primarily breed in rural areas. Where *An. stephensi* has been reported in Africa, it has been found to be resistant to many of the insecticides used in public health, posing an added challenge to its control.

The invasion of *An. stephensi* in sub-Saharan Africa – where the burden of malaria is highest and over 40% of the population lives in urban environments – is particularly worrying. Since 2012, *An. stephensi* is thought to have contributed to a resurgence of malaria in Djibouti City and at least one outbreak of the disease in Ethiopia. While the overall contribution of *An. stephensi* to malaria transmission in the region is unclear, the rapid growth of many African cities, coupled with the invasion and spread of this highly efficient and adaptable malaria vector, could undermine the gains made in reducing the burden of the disease.

World Health Organization

Number of reported malaria cases in Djibouti, 2010–2020

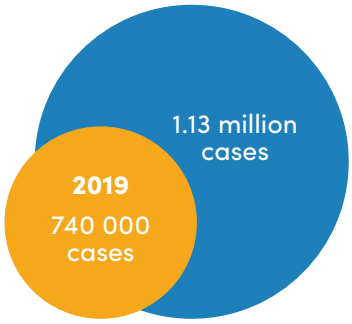


In a 2019 vector alert, the World Health Organization (WHO) identified the spread of *An. stephensi* as a significant threat to malaria control and elimination – particularly in Africa. This new WHO initiative, launched in September 2022, aims to stop the further spread of *An. stephensi* in the region and to determine whether it can be eliminated from areas that have already been invaded.

Modelling the potential impact of *Anopheles stephensi*

Recent mathematical modelling studies have attempted to show how and where *An. stephensi* might be spreading, and the potential implications for malaria transmission and control in Africa. One study projected that *An. stephensi* could put an additional 126 million people in Africa at risk of malaria if the mosquito vector were to spread unchecked. Another study estimated that the number of malaria cases in Ethiopia could increase by 50% if *An. stephensi* were to spread to all receptive areas. However, these models are based on assumptions that have not been fully validated in the African context, and any results should be interpreted with caution.

Projected increase in malaria cases in Ethiopia if *An. stephensi* were to spread to all receptive areas



Malaria hits hardest in the African Region

In 2020, the vast majority of all malaria cases (95%) and deaths (96%) were found in the WHO African Region. Young African children bear the brunt of the disease: an estimated 80% of all malaria deaths in the region are among children under the age of 5.

Many African countries with moderate to high malaria transmission saw a significant reduction in their malaria burden between 2000 and 2015. However, the rate of progress has levelled off in recent years, and disruptions to malaria services during the COVID-19 pandemic have further jeopardized malaria control efforts in the region.

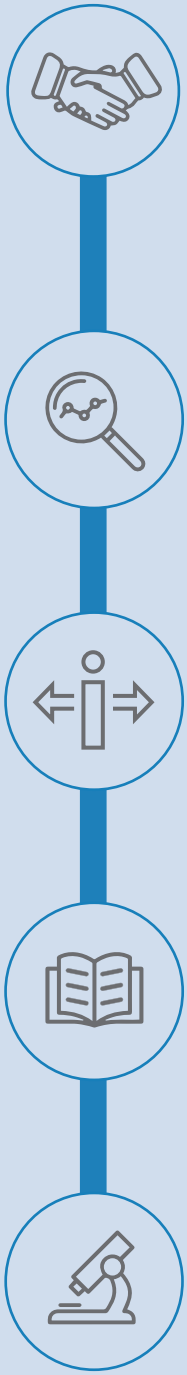
In 2020 the WHO African Region reported

228 million
NEW MALARIA CASES

602 000
MALARIA-RELATED DEATHS

NEW WHO INITIATIVE

To support an effective response to *An. stephensi* on the African continent, WHO is launching this initiative aimed at:



Increasing COLLABORATION

National malaria control programmes, researchers, funders, and other actors conducting surveillance, research and control of *An. stephensi* must collaborate effectively to ensure that knowledge is shared, resources are used optimally, and key activities are prioritized. As *An. stephensi* has the potential to spread quickly, cross-border collaboration is essential, and countries should work together to ensure an effective regional approach.

Strengthening SURVEILLANCE

Entomological surveillance can determine the extent of the spread of *An. stephensi* and its role in transmission; it is essential to target specific control measures and assess their impact. Human malaria case surveillance should be used to investigate the potential impact of the vector's presence on malaria, particularly in urban areas. Such surveillance might provide an indication of the presence of *An. stephensi* in areas where it has not yet been detected.

Improving INFORMATION EXCHANGE

Information on the presence of *An. stephensi*, as well as on successes and failures in attempts to control the vector, needs to be documented and shared widely and rapidly – at both national and international levels – to determine best practices and inform the response across invaded areas.

Developing GUIDANCE

National malaria control programmes need evidence-based guidance on the appropriate ways to conduct surveillance, implement control measures, develop by-laws, and devote resources to their response to *An. stephensi*. WHO provided an initial set of recommendations in its 2019 vector alert. This guidance will be reviewed and, where appropriate, updated based on best practices and other evidence identified as part of the regional initiative.

Prioritizing RESEARCH

It will be important to evaluate the impact of vector control interventions, and particularly new tools, against *An. stephensi.* Conducting research focused on *An. stephensi* will enable programmes to find better ways of responding to this invasive vector and of integrating control efforts with those targeted at other mosquito vectors.

Strategies against invasive vectors

Generally, in responding to invasive species, three main strategies can be considered:

Control

Accepting that the species has invaded certain areas, and controlling it to mitigate a potential increase in the malaria burden where it is present.

Containment

Allowing the species to remain in a certain area but conducting surveillance and intensive control, particularly at the fringes, to prevent further spread.

Elimination

Eliminating the species from the invaded area by building on efforts made under strategies 1 and 2.

While the feasibility of these strategies is not yet known when it comes to *An. stephensi* in Africa, it is essential that action be taken to build an evidence base to assess their validity while responding to the task at hand of halting the spread of this invasive vector across Africa.

Building and maintaining an integrated response

National responses to *An. stephensi* should be part of a comprehensive response to malaria vectors, guided by the WHO *Global technical strategy for malaria 2016–2030.* Where feasible, integration with efforts to control other vector-borne diseases should be explored, as for example in the area of breeding site surveillance in urban and in peri-urban areas. The WHO *Global Vector Control Response 2017–2030* provides a framework for investigating and implementing such integration across vector-borne diseases.

Its four pillars of action are:

1. Strengthening inter- and intra-sectoral action and collaboration
2. Engaging and mobilizing communities
3. Enhancing vector surveillance and monitoring the evaluation of interventions
4. Scaling up and integrating tools and approaches

Tracking the spread of *Anopheles stephensi*

The WHO Malaria Threats Map features a dedicated section on invasive vectors, including *An. stephensi*. All confirmed reports of the presence of *An. stephensi* should be reported to WHO to enable an open sharing of data and an up-to-date understanding of the vector's distribution and spread. This knowledge will ultimately provide a basis to assess the effectiveness of any efforts to control or eliminate *An. stephensi*.

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World Health Organization