Editorial

Open Access

https://doi.org/10.48130/biocontam-0025-0002

Outbreak of chikungunya fever in Guangdong: transmission and control of arboviruses

Guang-Guo Ying[1*] and Yi Luo[2]

Received: 30 July 2025

Accepted: 4 August 2025

Published online: 11 August 2025

Keywords: Chikungunya fever, Arbovirus

For the past few weeks of July 2025, a significant chikungunya fever epidemic in southern China has been drawing widespread public concern. The confirmed cases in Foshan City, Guangdong Province, have surpassed 4,000, with more than 3,600 cases in Shunde District. The initial spread of the outbreak was first observed in this region, and it rapidly escalated into a widespread public health concern. Not only have these incidents been documented in Guangzhou, Shenzhen, Yangjiang, and Zhanjiang within the province of Guangdong, but similar cases have also emerged in Macao and Hong Kong.

The chikungunya virus is mainly spread when infected individuals are bitten by mosquitoes of the Aedes genus, which is the primary vector responsible for its transmission. Most infections typically present with relatively mild symptoms, often involving a sudden onset of fever and joint pain. Although the disease itself is not spread directly between humans, its transmission depends entirely on mosquitoes acting as vectors, which means that implementing effective mosquito control strategies is essential to prevent outbreaks. China recorded its first imported case of chikungunya in 2008. Since then, small-scale outbreaks caused by imported cases occurred in 2010 and 2019. However, none escalated to the magnitude of this year's outbreak.

The current outbreak is largely driven by the high global prevalence of the virus and favorable climatic conditions. On July 22, 2025, the World Health Organization (WHO) released a critical warning that chikungunya virus has now been detected in 119 nations and regions around the world. Upon entering a region, the virus can establish local transmission and generate small-scale outbreaks because of the presence of Aedes mosquitoes, which serve as its main vector.

In response to this outbreak, the Guangdong Provincial Health Department has issued a formal appeal to residents across the province to join a comprehensive campaign aimed at eliminating stagnant water and control mosquito breeding. The campaign aims to curb the spread of arboviral diseases transmitted by Aedes mosquitoes, such as chikungunya and dengue fever.

Arboviruses, which are known to cause diseases in both humans and animals, spread primarily through the bites of infected vectors, and they are commonly classified under the families of flaviviridae, alphaviridae, or bunyaviridae. Common examples of viral infections transmitted by arboviruses encompass diseases such as dengue fever, chikungunya, yellow fever, West Nile virus, and Zika virus. In tropical and subtropical climates, arboviral diseases have emerged as critical public health challenges due to their high prevalence and potential for rapid spread. According to recent data, approximately 100 million people contract dengue fever annually, underscoring the global health impact of this mosquito-borne disease. The widespread dissemination of these pathogens is driven by a complex interplay of elements, such as climate change, human movement patterns, rapid urban expansion, and the movement of animals across borders. Climate change can increase the likelihood of extreme weather phenomena, including heavy rainfall, and prolonged droughts. This phenomenon has been linked to the spread of arboviruses in endemic regions and is now observed in previously unaffected areas, indicating a broader environmental impact.

Over the past five decades, the Earth's average surface temperature has risen by approximately 0.2 °C every ten years. It is anticipated that the Earth's land surface temperature will increase by as much as 4.5 °C over the next century. As the Earth's climate continues to warm at an alarming rate, a growing number of arbovirus species are expanding their geographic ranges beyond their traditional habitats, potentially resulting in a surge in infectious disease cases and fatalities across all regions. As a result, a multifaceted strategy must be adopted that includes enhancing the efficiency of epidemiological monitoring systems, optimizing vector control initiatives, strengthening governance frameworks at all levels, and fostering community engagement to effectively address and mitigate emerging infectious disease threats.

In the realm of pest management strategies, vector control techniques are broadly classified into three main categories: environmental, chemical, and biological methods. Environmental

* Correspondence: Guang-Guo Ying (Guangguo.ying@m.scnu.edu.cn)

Full list of author information is available at the end of the article.

management strategies encompass the systematic removal of stagnant water sources that serve as breeding grounds for mosquitoes, the routine coverage or emptying of containers used to store rainwater or other liquids, and the establishment of well-structured waste collection and disposal systems. In the context of pest management strategies, chemical interventions typically entail the application of insecticides like pyrethroids and organophosphates in open spaces. A variety of biological approaches can be employed to combat insect pests, including the introduction of naturally predatory fish species like the mosquitofish, the deployment of microscopic crustaceans such as copepods, and the use of engineered mosquito populations designed to target disease vectors.

Although many environmental and chemical vector control techniques are already implemented on a large scale, a growing number of biological methods remain under development in specific regions, often as part of experimental trials. It is important to highlight that certain chemical and biological interventions used for pest management can inadvertently disrupt ecological balance and pose risks to human well-being. In fact, frequent application of insecticides in mosquito control programs can lead to harmful impacts on species that are not targeted, including aquatic life and pollinators like bees. Moreover, these practices can also endanger human health, particularly in vulnerable groups such as children and the elderly. The introduction of mosquitofish into local waterways can have significant implications for the survival of native aquatic species. As the world grapples with the escalating threats posed by arboviral diseases, collaborative international initiatives must be prioritized to tackle these complex challenges, which extend beyond public health concerns and encompass broader ecological and societal impacts.

Considering the substantial impact that arboviruses pose on public health, the World Health Organization (WHO) initiated the Global Arbovirus Initiative in 2022 to address this pressing global challenge. This is a cross-cutting effort involving the WHO's Health Emergencies Program, the Department of Control of Neglected Tropical Diseases, and the Immunization, Vaccines and Biologicals Department, in collaboration with a growing number of multisectoral international partners. The pillars of this initiative provide a framework for objectives and priority activities to tackle emerging and re-emerging arboviruses with epidemic and pandemic potential, focusing on risk monitoring, pandemic prevention, preparedness, detection and response, and building a coalition of partners.

On October 3, 2024, the World Health Organization (WHO) introduced the Global Strategic Preparedness, Readiness and Response Plan (SPRP) to address dengue and other Aedes-borne arboviruses. This plan aims to reduce the burden of disease, suffering, and deaths caused by Aedes-borne arboviral diseases such as chikungunya and dengue, by promoting a globally coordinated response. On the July 10, 2025, The World Health Organization released updated clinical protocols designed to assist medical professionals in managing patients with suspected or confirmed arboviral infections, including dengue and chikungunya. This is the first time the WHO has issued global guidelines covering arboviral diseases, marking a significant milestone in the field of public health.

To ensure the well-being of both human and animal populations against the threats of arbovirus diseases, a comprehensive strategy rooted in the One Health framework must be implemented, considering the interconnections between human health, animal health, and their shared environments. Future research will involve developing and comparing models for vector control methods that integrate chemical, biological, and environmental control measures, as well as evaluating different interventions.

To fully understand the transmission dynamics of pathogens across the globe, it is crucial to consider the heterogeneities in viral diversity, ecological and climatic drivers, as well as host-pathogen interactions. In recent years, the use of genomic surveillance has become an indispensable tool in the global effort to monitor and combat infectious diseases like dengue and chikungunya. Genomic data serve as a crucial foundation for unraveling the dynamics of viral evolution, especially when it comes to identifying mutations that contribute to enhanced transmission capabilities, immune escape, or altered vector competence. During outbreaks, genomic surveillance of diverse environmental samples provides near real-time data to support contact tracing, outbreak containment, and the allocation of public health resources, while further unraveling transmission networks at the molecular level.

Declarations

Competing interests

The authors declare that they have no conflict of interest.

Author details

[1]School of Environment, South China Normal University, Guangzhou 510006, China; [2]School of Environment, Nanjing University, Nanjing 210023, China