A Turning Point for Chikungunya in Brazil: Vaccination Strategies Informed by Mathematical Modelling

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The licensing of the first chikungunya virus (CHIKV) vaccine in Brazil marks a pivotal moment in the global fight against this expanding arbovirus. Over the past two decades, CHIKV has emerged as one of the most consequential mosquito-borne viruses in Brazil.It is transmitted by *Aedes aegypti* and *Aedes albopictus* and is responsible for recurrent yearly epidemics of febrile illness with potential for long-lasting arthralgia in exposed individuals [1]. Globally, it is estimated to cause tens of millions of symptomatic infections each year, with substantial socioeconomic impact through lost productivity and pressure on health systems [1]. Since its introduction in 2014, Brazil has reported more cases than any other country in the world [2]. Until recently, prevention relied on vector control and case management. The approval of IXCHIQ in April 2025 therefore represents a historic milestone—but its optimal use remains an urgent open question. Although the FDA in the USA has temporarily suspended Ixchiq's license, this decision does not directly affect Brazil's regulatory pathway, which is independently overseen by ANVISA, though such international regulatory actions are generally taken into account in national discussions. In this issue of *The Lancet Infectious Diseases*, Cortes-Azuero and colleagues [3] provide important evidence to guide vaccination strategies. By integrating surveillance data, serological surveys, and mortality records, they reconstruct the epidemiology of chikungunya in Brazil between 2014 and 2024 and evaluate potential vaccine rollout approaches. Their analysis highlights both the magnitude of the epidemic burden and the opportunities for vaccination to reduce morbidity and mortality.

The authors estimate that over 40 million Brazilians (18,3% of the population) have been infected since 2014, with historical risk concentrated in the Northeast and Southeast [3]. Yet only about 1% of infections were detected by surveillance, underscoring the limitations of syndromic reporting in light of other circulating arboviruses with similar clinical outcomes and modes of transmission. Patterns of disease risk varied by age and sex: women were more likely to develop symptoms, while mortality was highest among infants and older adults. These findings are consistent with prior evidence that host factors shape chikungunya exposure and outcomes [4,5], but represent the most comprehensive quantification to date at the national scale.

Using this reconstructed landscape, Cortes-Azuero et al. modeled vaccine impact for 2025–2029 [3]. They found that vaccinating 40% of the population aged over 12 years—about 73 million people—with a vaccine assumed to be 70% effective against infection and 95% effective against disease could avert millions of infections, more than a million symptomatic cases, and hundreds of deaths. Targeting older adults (>50 years) would prevent more deaths per dose, while prioritizing high-burden states would maximize efficiency. These results illustrate the trade-offs between broad coverage, targeted efficiency, and logistical feasibility—critical considerations for policymakers in Brazil and elsewhere. Endemic transmission of CHIKV is now established in parts of the Americas, Africa, and Asia, with sporadic short-term outbreaks in Europe [6]. Climate change, urbanization, and global connectivity are expected to accelerate the spread of *Aedes* vectors [7], raising the risk of large epidemics in previously unaffected

regions. The modelling framework presented by Cortes-Azuero and colleagues offers a blueprint for other countries to evaluate vaccine impact across diverse epidemiological contexts.

The study also underscores the importance of ongoing data collection and post-licensure evaluation. Both IXCHIQ and VIMKUNYA were approved through accelerated regulatory pathways based on immunological correlates of protection rather than traditional efficacy trials [8]. Phase IV studies will be essential to refine estimates of effectiveness, durability, and safety, particularly in older adults where concerns about adverse events have arisen. Robust monitoring is critical to ensure that vaccination delivers its promised benefits. Importantly, vaccination is not a silver bullet. Despite widespread circulation, most of Brazil remains susceptible, highlighting the need to integrate vaccination with syndromic and genomic surveillance, diagnostics, and sustained vector control. Moreover, the chronic sequelae of chikungunya—including persistent arthralgia and neurological complications—remain under-recognized and under-measured, yet they contribute substantially to long-term burden [5]. Addressing these gaps will be key to fully capturing the benefits of future vaccination campaigns.

References

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