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**Modelling the first outbreak of Zika virus in continental USA**

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Since 2015, Zika virus (ZIKV) has had an unprecedented spread throughout Latin and Central America. This emerging infectious disease has been causing considerable public health concern because of severe neurological complications, especially in newborns after congenital infections. In July 2016, the first outbreak in continental USA was identified in the Wynwood neighbourhood of Miami-Dade County, Florida. Health authorities identified 21 locally transmitted symptomatic cases, with onset of illness ranging from June 26 to August 5. Effective vector control treatments were implemented the first week of August, i.e. two weeks after outbreak detection.

In this work, we investigated ZIKV transmission dynamics in the Wynwood neighbourhood using a stochastic individual-based model calibrated to observed data on mosquito abundance and symptomatic human infections.

We found that, although ZIKV transmission was detected only in late July, the first importation might have occurred between March and mid-April. This long delay can be justified by the combination of the low infection prevalence in humans during the first months of virus circulation and the low ZIKV symptomaticity and reporting rates. The estimated highest value for  $R_0$  was 2.73 (95%CI: 1.65-4.17) and the attack rate was 14% (95%CI: 5.6-27.4%). We also provided some estimates on the efficacy of vector control treatments, which resulted crucial to help preventing many more infections. However, model outputs indicated that even if effective interventions were immediately deployed on the day of first detection of local transmission, the attack rate would have not decreased considerably. Finally, model simulations suggest a likely extinction of transmission during winter even in absence of interventions; however, we suggest that undetected infections might have occurred even after authorities declared the end of the outbreak on September 19.

Results from this study can help to prepare future outbreak-related interventions in areas where competent mosquitoes for ZIKV transmission are already established.

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