



Authors' response to the letter to the editor entitled: Co-circulation of dengue, chikungunya, and Zika viruses and cross-protection

To the editor:

Dengue, zika, and chikungunya outbreaks in Central and South America countries have presented significant challenges related to their prevention and control. From the virologic point of view, the possibility has been raised that the co-circulation of the three viruses could generate cross-protection between the three alphaviruses.

In order to discuss this hypothesis it must be taken into account that Zika, dengue (DENV) and chikungunya viruses are closely related flaviviruses, with identical urban transmission and some immune interactions (1). Also, it is known that secondary DENV infections may be more severe than primary infections due to the antibody-dependent immune response (i.e., heterotypic sub-neutralizing antibodies that increase virus entry into poorly susceptible cells) (2,3).

In addition, the recent introduction of Zika and chikungunya viruses in the Americas and the large-scale exposure of a uniformly unexposed population could affect subsequent transmission of dengue virus. This hypothesis has not been tested, largely because insufficient epidemiological data are available for the affected sites. However, in Salvador, Brazil, after the zika outbreak there was a significant decrease in the frequency of dengue cases (4). A similar situation was observed in Colombia, where the decrease in dengue cases following the zika and chikungunya outbreaks went from 334.1 cases per 100 000 people in 2015 to 90.7 cases per 100 000 in 2017 and 173.1 cases per 100 000 in 2018 (5). Although temporary associations do not prove causation, the strength and consistency of the observations suggest that infections with Zika virus and chikungunya virus could induce cross-protective immunity against dengue. Prospective studies are needed to fully assess the risk of dengue infection after exposure to Zika and chikungunya viruses and to determine whether the supposed cross-protection is long-lasting. Although observations support this hypothesis, the potential direct implications of this hypothesis for epidemiological

surveillance, immunological research on pathogenesis and vaccine development require additional studies.

Conflict of interests. None declared by the authors.

Declaration. The opinions expressed in this manuscript are the responsibility of the authors and do not necessarily reflect the criteria or policy of the RPSP / PAJPH and/or PAHO.

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