

Cross-Reactivity Between Zika and Dengue Virus: A Cross-Sectional Analysis in Rio Grande do Norte, Brazil



Nilson N. Mendes Neto, MD, Extension Center, University of California, Davis, Davis, CA; Family Medicine, HUOL, Natal - RN, Brazil, Jessika Maia, MD, HUOL, Natal - RN, Brazil, Marcelo Rodrigues Zacarkim, MD, MS, Harvard Medical School, Boston, MA, Igor Thiago Queiroz, MD, PhD, Universidade Potiguar, natal, Brazil, A. Desiree Labeaud, MD, MS, Pediatric Infectious Diseases, Stanford University, Stanford, CA and David Aronoff, MD, FIDSA, Medicine, Vanderbilt University School of Medicine, Division of Infectious Diseases, Nashville, TN

Background:

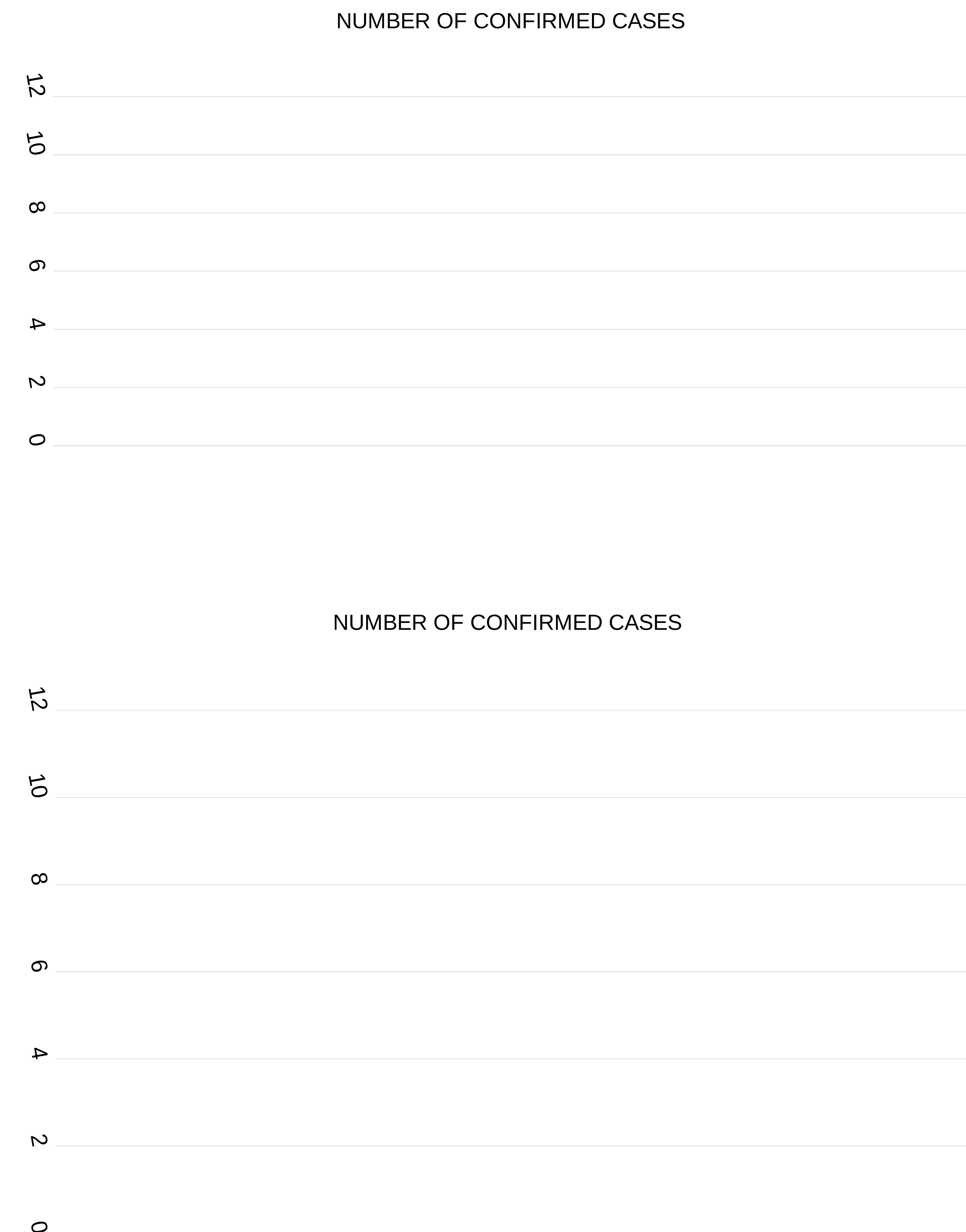
- Preexisting DENV antibodies may have a cross-reactivity against ZIKV.
- A recent primate study suggested that prior DENV infection does not adversely impact subsequent ZIKV disease and might be protective.
- We aimed to evaluate the relation between a Dengue Fever (DF) outbreak in 2016 and the prevalence of ZIKV infection in Rio Grande do Norte (RN).
- RN is a Brazilian northeast state endemic for arboviruses.
- RN population: 3.409 million.

Method:

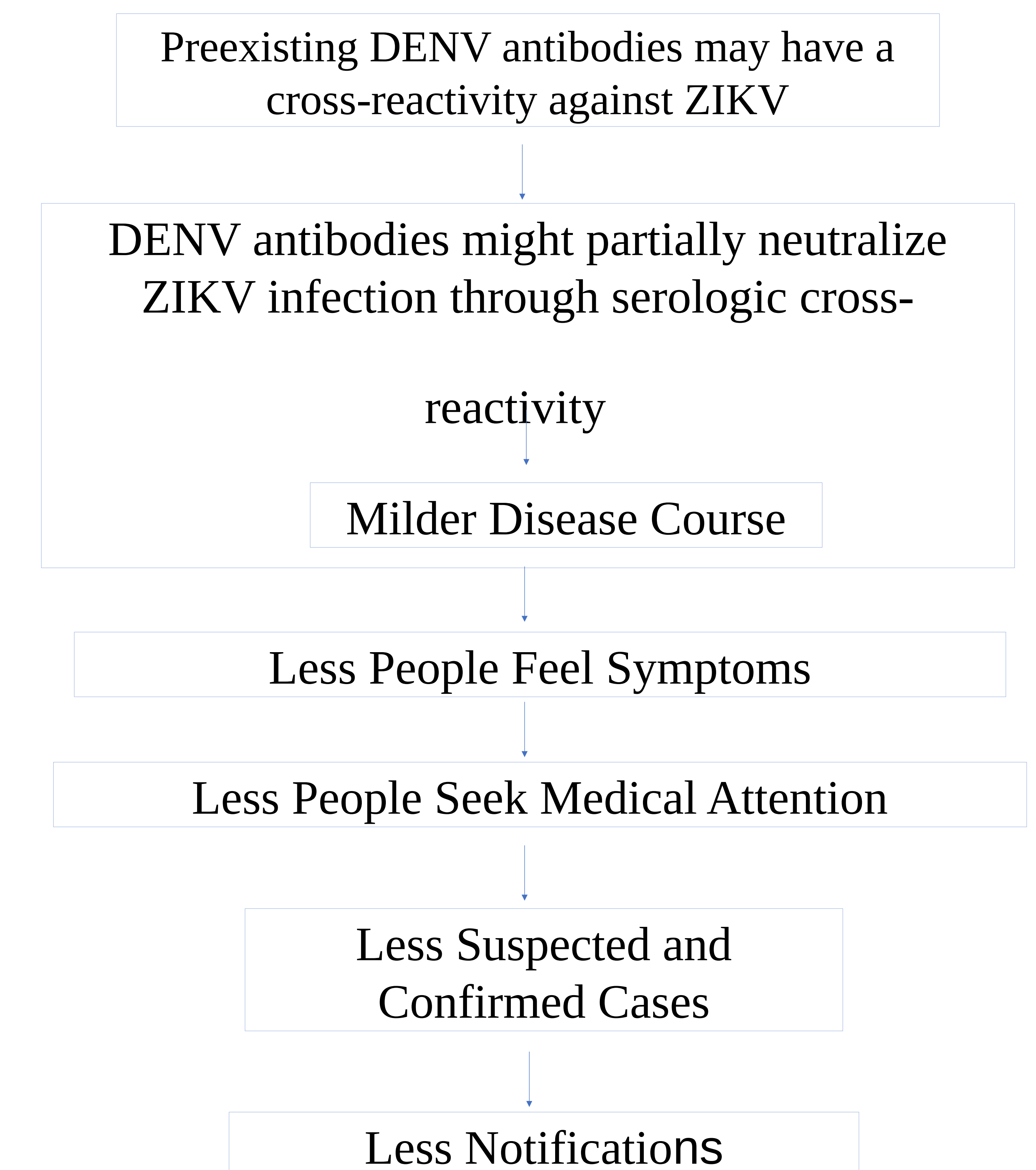
- Cross-sectional analysis.
- Data: provided by RN Department of Health from January 2015 to April 2017.
- We analyzed the epidemiological behavior of DF and Zika Virus Disease in RN (last three summers).

Result:

- From January to March in 2015, 2016 and 2017 there were 6.902, 34.642 and 1.677 DF suspected cases, respectively.
- The number of confirmed DF cases in 2015, 2016 and 2017 were 523, 7.599 and 204, respectively.
- Regarding ZIKV infection, the number of suspected cases of between January to April during 2016 and 2017 were 3,486 and 86, respectively.
- The number of confirmed ZIKV infection in 2016 and 2017 were 97 and 0, respectively.
- Adding up the total cases of ZIKV infection which occurred during 2015 and 2016, we obtain a total of 14.584 (8.743 + 5.841).
- 14 1584 represents less than 0.5% of the RN



Main Point of the Research



Conclusion:

- This epidemiological evidence support our hypothesis that the DF outbreak in 2016 has contributed to the decrease of 97.53% (86/3.486) in the prevalence of ZIKV infection (suspected cases) in 2017.
- It may be explained by preexisting DENV antibodies might partially neutralize ZIKV infection through serologic cross-reactivity.
- It supports the results found on the recent primate study.
- Our findings contradict the theory (based on in vitro experiments only) that previous immunity to DENV causes an enhancement of the immunological response in individuals exposed to ZIKV.
- Given the fact of the total suspected ZIKV cases in 2015 and 2016 represent less than 0.5% of the RN population, we cannot state that there are fewer Zika cases in 2017 because the population has been previously immunized.
- These data are highly relevant from a public health standpoint given that regions which experienced ZIKV outbreak in Brazil are endemic for DF.
- This study warrants further investigation in other ZIKV/DENV endemic regions.

Contact Information

Nilson Mendes , MD
 Email: nmendes@ucdavis.edu
 Instagram: @dr.nilsonmendes
 Twitter: @nilsonmendesmd