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Modeling Zika Virus Transmission Dynamics: Parameter Estimates, Disease Characteristics, and Prevention.

The recent devastating spread of Zika virus (ZIKV) across Americas has posed a public health emergency of international concern. Because of limited data, much remains uncertain about parameters related to transmission dynamics of ZIKV. In this talk, I will present a method for parameter estimation that utilizes mathematical models and a recently investigated complex-step derivative approximation. Applying our method to epidemic data from the ZIKV outbreaks in French Polynesia and Yap Island, we found that the parameters that can be estimated vary from Island to Island, suggesting that the same set of parameters cannot be estimated from every data set, and thus the parameter estimation based on standard techniques may provide misinformation about the ZIKV transmission dynamics. Our method allowed us to estimate ZIKV related parameters with substantially reliable confidence intervals. I will also provide the basic reproduction number estimated by our method, and explore the effectiveness of potential prevention strategies for controlling zika epidemics. (Received September 17, 2019)