Estimating R_0 For Dengue Emergence In Central Argentina Using Statistical Models

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Dengue is a mosquito-borne disease and is prominent in tropical and subtropical regions of the world, but has recently been emerging in temperate areas. In Córdoba, a city in temperate central Argentina, there have been several dengue outbreaks in the last decade. Prior to 2009, dengue cases had not been reported in Córdoba. However, major outbreaks occurred in 2009, 2013, 2015, 2016, and 2020. The basic reproductive number, R_0, is one measure to determine the severity of new outbreaks. In this project, we make use of various statistical methods and apply them to estimate R_0 for dengue in Córdoba. Some of the statistical methods we utilized were Exponential Growth, White and Pagano Maximum Likelihood, EpiEstim Sequential Bayesian, and Wallinga and Tenunis Time-Dependent methods. We estimated R_0 for the four major outbreaks between 2009 and 2016. All the statistical methods produced similar R_0 predictions, which were comparable to estimates from other regions around the world. These estimates of R_0 can be useful for planning mosquito control and other mitigation strategies in the future.