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Spatio-temporal distribution of dengue fever under scenarios of climate change in the southern Taiwan

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Dengue fever has been recognized as the most important widespread vector-borne infectious disease in recent decades. Over 40% of the world's population is now at risk from dengue and about 50-100 million people are infected world wide annually. Previous studies have found that dengue fever is highly correlated with climate covariates. Thus, the potential effects of global climate change on dengue fever are crucial to epidemic concern, in particular, the transmission of the disease. This present study investigated the nonlinearity of time-delayed impact of climate on spatio-temporal variations of dengue fever in the southern Taiwan during 1998 to 2011. A distributed lag nonlinear model (DLNM) is used to assess the nonlinear lagged effects of meteorology. The statistically significant meteorological factors are considered, including weekly minimum temperature and maximum 24-hour rainfall. The relative risk and the distribution of dengue fever then predict under various climate change scenarios. The result shows that the relative risk is similar for different scenarios. In addition, the impact of rainfall on the incidence risk is higher than temperature. Moreover, the incidence risk is associated to spatially population distribution. The results can be served as practical reference for environmental regulators for the epidemic prevention under climate change scenarios.