Analysis of Impact of Geographical Environment and Socio-economic Factors on the Spatial Distribution of Kaohsiung Dengue Fever Epidemic

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Taiwan is located in subtropical and tropical regions with high temperature and high humidity in the summer. This kind of climatic condition is the hotbed for the propagation and spread of the dengue vector mosquito. Kaohsiung City has been the worst dengue fever epidemic city in Taiwan. During the study period, from January 1998 to December 2011, Taiwan CDC recorded 7071 locally dengue epidemic cases in Kaohsiung City, and the number of imported case is 118. Our research uses Quantile Regression, a spatial infection disease distribution, to analyze the correlation between dengue epidemic and geographic environmental factors and human society factors in Kaohsiung.

According to our experiment statistics, agriculture and natural forest have a positive relation to dengue fever($5.5{\sim}34.39$ and $3.91{\sim}15.52$). The epidemic will rise when the ratio for agriculture and natural forest increases. Residential ratio has a negative relation for quantile 0.1 to 0.4($-0.005{\sim}-0.78$), and a positive relation for quantile 0.5 to0.9($0.01{\sim}18.0$) . The mean income is also a significant factor in social economy field, and it has a negative relation to dengue fever($-0.01{\sim}-0.04$). Conclusion from our research is that the main factor affecting the degree of dengue fever in predilection area is the residential proportion and the ratio of agriculture and natural forest plays an important role affecting the degree of dengue fever in non predilection area. Moreover, the serious epidemic area located by regression model is the same as the actual condition in Kaohsiung. This model can be used to predict the serious epidemic area of dengue fever and provide some references for the Health Agencies