UNIVERSITI TEKNOLOGI MARA

SPATIAL MAPPING OF TEMPORAL RISK CHARACTERISTICS: A CASE STUDY OF DENGUE CASES IN SUBANG JAYA

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I declare that this thesis entitled *Spatial mapping of temporal risk characteristics: A case study of dengue cases in Subang Jaya* is the result of my own work except as cited in the references. The thesis has not been accepted for any and is not concurrently submitted in candidature of any other degree

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ABSTRACT

SPATIAL MAPPING OF TEMPORAL RISK CHARACTERISTICS: A CASE STUDY OF DENGUE CASES IN SUBANG JAYA

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Dengue has become the most widespread vector borne viral diseases of human with the the rough estimates of between 60 and 100 million cases of dengue fever annually worldwide. In Malaysia, the number of dengue cases has shown a steadily increasing pattern from year 2000 to 2005. The total number of dengue cases in 2000 is about 7000 cases whereas in 2005, the number of cases mounting to 40000. Until now, the traditional approach in controlling dengue is through visual analysis using case incidence data. This study proposed a new set of parameter which define dengue occurrence at an area according to its time characteristics. The parameter used is frequency index, duration index and intensity index. The objectives of this study were to measure the temporally defined risk indices, to map the measured temporal risk indices and to statistically prove the relationship between each temporal risk indices. Measurement of the three temporal risk indices found that there are areas with significant high value for each of the temporal indices. This suggests that areas within Subang Jaya Municipality have different temporal characteristics for dengue occurrence. Value of frequency index is quite low which is below the half mark of 1. 1 indicates that dengue will occur every week throughout the year. Mean value of duration index is 1.66 which point out that the mean duration of an epidemic wave is about 2 weeks. 5.41 is the mean value for intensity index and its signify that during an epidemic wave, about 5 to 6 people in 1000 population will be infected by dengue fever. Mapping, which is a spatial analysis method, is utilized for the visual analysis of the three temporal indices. Mapping of the frequency index found out that the most areas with high value is found in 2008. The visual analysis of duration index shows that there is distribution pattern where areas which had history of high duration per wave will experienced it in the future. This is evident for Taman Serdang Raya in 2005 and 2007 and Taman Kinrara in 2006 and 2008. There is no significant distribution pattern for intensity index as the high value tends to stay at the same locality throughout the years. Ares with high intensity index value are Taman Subang Mas, PJS area and Kota Perdana. Spearman test is done to toest the correlation between each temporal risk indices. There are 3 types of relationship which are frequency-duration relation, frequency-intensity relation and duration-intensity relation. The correlation coefficient for all the three types of relationship is above 0.7. The value indicate that there is strong correlation between each temporal risk indices. As a recommendation, the temporal risk indices can be utilized by public health officials to characterize dengue rather than relying on the traditional case incidence data.

Keywords: Spatial risk assessment, spatial temporal clustering, geographic information system, dengue fever