

Mathematical modelling of dengue pattern in Penang, Malaysia

ABSTRACT

Dengue fever is an endemic disease in many tropical and subtropical regions. In Malaysia, it is the leading public health challenge despite the extensive intervention programs by the related authorities. Distribution of dengue cases in Malaysia varies according to states and districts where cases are more distinct in urban and suburban areas. Preparedness strategies of dengue cases could be more successful with some comprehensive and technical analysis on disease incidences. Hence, the present study analyses dengue cases using mathematical modelling in the state of Penang, one of the more urbanised state. In particular, two time series models are fitted to the dengue data from the region in order to identify the mathematical model that best describe the data. Results show that both proposed models are able to represent the cases rather well; however numerical inspection revealed that Double Exponential Smoothing method is the better choice. Subsequently, the identified model is used to make forecasting on the number of expected cases. Results show that dengue cases in Penang are expected to increase gradually.

Keyword: Dengue; Urban area; Forecasting; Double exponential smoothing method