

## **Prediction model of leptospirosis occurrence for Seremban (Malaysia) using meteorological data**

### **ABSTRACT**

Leptospirosis is one of the waterborne diseases that is widespread in Asia Pacific regions, especially in developed countries. Over the past few years, the clinical data have shown Seremban experienced a significant number of leptospirosis patients. To minimize the impact of this disease, this study has set one objective which is to develop one prediction model to predict the leptospirosis diseases confirmed-cases by using Back-Propagation Neural Network (BPNN). A growing number of studies has shown the climate can be a predictor in outbreak incidence. Likewise, climate variables such as rainfall, temperature, and relative humidity affect in many ways especially for the transmission of vector and pathogens. Thus, these 3 parameters will be the main input for this model. Technically, this study will focus on the accuracy and the sensitivity of the model by finding the relationship between the meteorological data and clinical data. The clinical data was provided from the Ministry of Health Negeri Sembilan, while the meteorological data was provided from the Drainage and Irrigation Department and the Malaysian Meteorological Department. This study acknowledges that the amount of rainfall was correlated with the leptospirosis cases in all regions of Seremban states such as Mantin, Seremban, Perentian, and Sikamat. In this study, preliminary exploration was performed by finding the best time for the meteorological data to correlate with clinical data (1 until 5-month lag). The model achieved 70% accuracy in prediction by combining the sum of rainfall, relative humidity, and temperature with 3-month lag as an input of the BPNN model. In conclusion, the authors believe this achievement of the model is an early stage for the prediction model. This model can achieve more than 70% accuracy by adapting some exploratory data analysis for every single variable or predictor.

**Keyword:** Leptospirosis prediction; Artificial Neural Network; Meteorological data; Prediction model