Modeling seasonal Leptospirosis cases in Western province of Sri Lanka

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Leptospirosis is a zoonotic infectious disease in the world. It is growing as a major public health threat in Sri Lanka. The records in Sri Lanka show that, over 2400 cases were reported only in first six months in 2016. Further, it reveals that, nearly 30% of total cases were reported from Western province. Therefore the objective of this study is to model leptospirosis cases in Western province of Sri Lanka using time series analysis.

Standard tests were carried out to develop autoregressive integrated moving average (ARIMA) models. Augmented Dickey- Fuller, Kruskal- Wallis tests were used in addition to autocorrelation and partial autocorrelation functions to test stationary of the data. Anderson- Darling test, Lagrange's Multiplier test, Durbin-Watson statistic and White's general test were employed to verify the diagnostic checking for tentatively fitted models. To select the best model, coefficient of determination, Akaike information criterion and Schwartz's Bayesian criterion were applied. Mean absolute percentage error was used to measure the accuracy of forecasting.

The results show that, Western province (28.92%) is the mostly affected part of the island by leptospirosis. Moreover, Gampaha (11.13%), Kalutara (9.63%) and Colombo (8.16%) districts in Western province are ranked among first 6 districts of Sri Lanka based on number of cases recorded. The accuracy of the fitted seasonal ARIMA$(1, 0, 0)(0, 1, 1)_{12}$ model is over 91%. Therefore, it can be used to forecast future leptospirosis cases in Western province. Hence, the expected cases for last six months in 2016 are 707.

 Key words: *Leptospirosis, Seasonal ARIMA, Western province*

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