**Forecasting dengue incidence in Bangladesh: A time series analysis**

# A Project Report Submitted In Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Statistics



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Dedicated

To

My Beloved parents

And

Honorable Teacher



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**Project Title: “**Forecasting dengue incidence in Bangladesh: A time series analysis**.”**

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**ABSTRACT**

Dengue is a viral infection transmitted to humans through the bite of infected mosquitoes and is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. The primary vectors that transmit the disease are Aedes aegypti mosquitoes. As of 20 November 2022, a total of 52 807 laboratory-confirmed dengue cases and 230 related deaths have been reported by the Ministry of Health & Family Welfare of Bangladesh since 1 January 2022 with a case fatality rate (CFR) of 0.44%. Dengue is endemic in Bangladesh however a surge of cases started in June 2022. Currently, all eight divisions in the country are reporting cases and deaths. This is the second-largest outbreak since 2000, with the largest having occurred in 2019. The current dengue outbreak is unusual in its scale and seasonality.

The object of this study to find an appropriate model for forecasting Dengue incidence considering the minimum biased-corrected information criterion of mean absolute percentage error (MAPE), mean absolute deviation(MAD),mean square deviation(MSD),correlation coefficient(r). Here we analyze time series plot, non-stationary test

We estimated several time series methods such as: Exponential smoothing, Kernel smoothing and different ARIMA model. According to the lowest value of AIC, BIC and highest value of adjusted R2 and also considering statistical summary of a model’s forecast accuracy: RMSE, MAE, MPE, MAPE, BIC and AIC, we select the mode ARIMA (2, 1, 2)

**Keywords:** Dengue; Time series analysis; Stationary; Non-stationary; ARIMA; SARIMA; AIC; BIC; Disease prediction; Bangladesh.