

**SPATIAL AND TEMPORAL PATTERNS OF COMMUNICABLE
DISEASES IN SRI LANKA**

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Communicable diseases caused by bacteria, viruses, and parasites present major global health challenges. Understanding their transmission patterns is key to effective prevention and control. In Sri Lanka, limited research has been conducted to investigate the spatial and temporal patterns. The present study considered eight communicable diseases, including dengue fever, dysentery, encephalitis, enteric fever, leptospirosis, typhus fever, viral hepatitis, and food poisoning. Weekly data were collected from the Sri Lanka Epidemiology Unit website from 2007 to 2023. The current study found strong positive correlations among enteric fever, dysentery, and viral hepatitis. After 2015, dengue cases increased significantly, modelled by ARIMA(1,1,0)(0,0,1)[52], with a peak in 2017. Encephalitis cases rose from 2017 to 2023, best forecasted by ARIMA(1,1,1). Enteric fever declined after 2020, with ARIMA(1,1,2)(1,0,0)[52] indicating stability. Models were selected using AIC and BIC with residual diagnostics confirming forecast accuracy. Model validation showed predicted values within confidence intervals. Time series analysis also modelled typhus fever, viral hepatitis, food poisoning, and dysentery. Disease patterns shifted before and after COVID-19, potentially due to immunity changes caused by the pandemic. Dynamic time warping identified six clusters for dengue and four for leptospirosis, with K-medoid clustering showing better separation, supported by higher mean silhouette scores. Other diseases had less defined clusters, indicated by negative silhouette scores for both K-medoids and hierarchical clustering. This underscores challenges in accurate grouping due to small case numbers and the need for adaptive public health strategies. By identifying these patterns, the study informs targeted public health interventions, such as optimizing resource allocation, improving disease surveillance, and tailoring prevention strategies to specific regional and temporal trends in Sri Lanka.

Keywords: ARIMA, Communicable diseases, Epidemiology, Public health