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Modeling the Climate-COVID-19 Interactions: A Comparative Analysis of Linear and Generalized Linear Frameworks

Communication Info

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Abstract

The escalating global concern over climate change has prompted intense investigation into its role in modulating infectious disease outbreaks, particularly the COVID-19 pandemic (1). This study examines the interactions between climatic variables and COVID-19 cases in Peninsular Malaysia (2020–2024) across four representative states: Selangor, Johor, Kedah, and Kelantan. A methodological comparison was conducted between Linear Models and Generalized Linear Models, specifically utilizing Poisson and Negative Binomial regressions to address data overdispersion (2). Validated by AIC, BIC, and deviance statistics, the GLM Negative Binomial model significantly outperformed the LM, providing a more robust fit for the non-normal distribution of epidemiological count data. The findings reveal that humidity and temperature are significant factors influencing COVID-19 incidence across all regions. This multi-zonal, longitudinal research offers critical insights into the environmental-health nexus, aiding policymakers in developing climate-resilient public health strategies and advancing precise pandemic surveillance.

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