



Climate Influences on Infectious Diseases in Nigeria, West Africa

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Meningitis and cholera have remains a major health burden in Nigeria, especially in the heavily populated north-west Nigeria – which is identified as one of the “hotspots” of climate change. The strong sensitivity that both diseases exhibit to climate is raising concern that future anthropogenic climate change may exacerbate the occurrence of these diseases in the region. This study aimed to model statistically the relationship between climatic conditions and the selected climate-sensitive infectious diseases, and also estimates the potential impact of future climate change on these diseases in northwest Nigeria. This was achieved by developing and validating suites of empirical statistical models capable explaining and predicting both diseases with one month lead. Also, models that are specifically designed for climate change studies were applied to estimate the future impact of climate change by forcing them with simulations from an ensemble of statistically downscaled Atmosphere-ocean Global Climate Models (AOGCMs) from the most state-of-the-art Coupled Model Intercomparison Experiments 5 (CMIP5) for three different scenarios (RCP 2.6, 6.0, and 8.5) in the early (2020-2035) and late (2060-2075) 21st century. Results from developed models indicate the significant roles of both meteorological and socioeconomic factors on incidence of diseases. Evaluation of models developed with 1-month lagged explanatory variables suggest the potential to predict both diseases cases up to a month to aid decision makes. Projection results suggest that future temperature increases due to climate change has the potential to significantly increase diseases cases in all scenarios and time slices, most especially in the months of February through May, and April through June for meningitis and cholera respectively. It is noteworthy that the projections result represents only the climatological potential for increased cases due to climate change, assuming prevention strategies will remain similar in the future.