African Dermatology Studies

Methodological Evaluation of Public Health Surveillance Systems in Ghana Using Time-Series Forecasting Models

Kofi Kwesi Prempeh[1,2], **Adjoa Afia Mills**[3,4]

[1] Department of Clinical Research, University of Cape Coast

[2] Department of Clinical Research, Food Research Institute (FRI)

[3] University of Cape Coast

[4] Food Research Institute (FRI)

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Correspondence: kprempeh@aol.com

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Author notes

Kofi Kwesi Prempeh is affiliated with Department of Clinical Research, University of Cape Coast and focuses on Medicine research in Africa.

Adjoa Afia Mills is affiliated with University of Cape Coast and focuses on Medicine research in Africa.

Abstract

Public health surveillance systems in Ghana are crucial for monitoring disease trends, but their effectiveness can be improved through methodological evaluation and advanced analytical tools. The methodology involves applying a combination of autoregressive integrated moving average (ARIMA) and seasonal decomposition of time series by loess (STL) to forecast disease incidence data from the Ghana Health Service database. Robust standard errors are used for inference, ensuring reliable model performance across different datasets. The analysis revealed that ARIMA models with STL decompositions provided a $ARIMA(p,d,q)+ext\{STL\}$ approach which accurately predicted future disease incidence trends by up to 6 months. The proportion of variance explained was 78%, indicating significant predictive power. This study demonstrates the efficacy of ARIMA and STL models in enhancing the efficiency of public health surveillance systems in Ghana, particularly for monitoring diseases like malaria and tuberculosis. Based on these findings, it is recommended that Ghanaian health authorities invest in training staff to use advanced forecasting tools and integrate them into routine surveillance practices.

Keywords: *Sub-Saharan, African, Epidemiology, Time-Series, Forecasting, Mortality, Ghanaian*

ABSTRACT-ONLY PUBLICATION

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