



# Time-Series Forecasting Model to Evaluate District Hospitals' Reliability in Kenya,

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## Abstract

District hospitals in Kenya have varying levels of reliability in providing healthcare services over time. A longitudinal study using a time-series forecasting model to analyse data collected from district hospitals across Kenya. The model incorporates both historical performance data and external factors affecting healthcare delivery. The analysis revealed that the reliability of district hospitals in Nairobi decreased by 5% over five years, primarily due to fluctuating resource availability. The time-series forecasting model successfully predicted these trends with a confidence interval of  $\pm 2\%$ , indicating its robustness and applicability for system performance evaluation. Health policymakers should consider implementing targeted interventions in districts experiencing declining reliability, such as improving infrastructure and increasing funding allocation. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Geographic, Sub-Saharan, Time-series, Forecasting, Evaluation, Methodology, Reliability*

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