



# Time-Series Forecasting Model for Yield Improvement in Tanzanian District Hospital Systems

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## Abstract

District hospitals in Tanzania are critical for healthcare delivery at a local level, yet their performance metrics such as patient yield improvement require methodological evaluation. A time-series forecasting model was employed using an ARIMA (AutoRegressive Integrated Moving Average) approach for predicting yield improvement across selected districts. Uncertainty quantification is provided with robust standard errors. The forecast model demonstrated a significant positive correlation between the number of patients seen and subsequent treatment outcomes, indicating that timely patient management can lead to improved yield by about 15% in some districts. The time-series forecasting model offers a valuable tool for assessing and enhancing district hospital performance in Tanzania, with potential applications in policy development and resource allocation. District health authorities should consider implementing the recommended forecast model as part of their ongoing quality improvement initiatives to enhance patient yield outcomes. Treatment effect was estimated with  $\text{text}\{ \text{logit} \}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** *Sub-Saharan, African, Hospital, Systems, Epidemiology, Forecasting, Modelling, Metrics*

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