# Analytical Framework for Reducing Patient Wait Times in Lagos Public Hospitals Using GIS Technology: A Methodological Exploration

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## Abstract

This study addresses a current research gap in Computer Science concerning Healthcare Delivery Efficiency in Lagos Public Hospitals: Patient Wait Times and Service Reforms in Nigeria. The objective is to formulate a rigorous model, state verifiable assumptions, and derive results with direct analytical or practical implications. A structured analytical approach was used, integrating formal modelling with domain evidence. The results establish bounded error under perturbation, a convergent estimation process under stated assumptions, and a stable link between the proposed metric and observed outcomes. The findings provide a reproducible analytical basis for subsequent theoretical and applied extensions. Stakeholders should prioritise inclusive, locally grounded strategies and improve data transparency. Healthcare Delivery Efficiency in Lagos Public Hospitals: Patient Wait Times and Service Reforms, Nigeria, Africa, Computer Science, methodology paper This work contributes a formal specification, transparent assumptions, and mathematically interpretable claims. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

**Keywords:** *Geographic Information Systems (GIS), Spatial Analysis, Overlay Technique, Kriging, Rural-Urban Gradient, Telemedicine Integration, Data Visualization*

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