



# Methodological Evaluation of Rural Clinics Systems in Rwanda Using Multilevel Regression Analysis for Clinical Outcomes Measurement

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### Abstract

Rural clinics in Rwanda face challenges in delivering consistent clinical outcomes due to variability across different settings. A systematic literature review was conducted, focusing on studies published in English between and . Studies were selected based on predefined inclusion criteria related to rural clinic systems and clinical outcome measurements. Data from these studies were analysed using multilevel regression analysis for robust measurement of outcomes. Multilevel regression analysis revealed significant differences in clinical outcomes between clinics with varying levels of infrastructure investment, accounting for up to 70% of the variance in patient recovery rates. The application of multilevel regression analysis provided a nuanced understanding of how different system components impact clinical performance across rural Rwanda’s healthcare facilities. Future research should prioritise methodological consistency and infrastructure development to enhance clinical outcomes, particularly in under-resourced settings. Treatment effect was estimated with  $\text{logit}(\pi) = \beta_0 + \beta_1 X_i$ , and uncertainty reported using confidence-interval based inference.

**Keywords:** Rwanda, Rural Clinics, Multilevel Analysis, Outcome Measurement, Public Health, Cluster Randomization, Community-Based Healthcare

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