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Methodological Evaluation of Municipal Water Systems in Rwanda: A Multilevel Regression Analysis for Clinical Outcomes Assessment

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Abstract

Rwanda's municipal water systems are crucial for public health but require methodological evaluation to assess their effectiveness in improving clinical outcomes. A multilevel logistic regression model will be used to analyse the relationship between municipal water system quality and various health indicators at both individual (patient) and community levels. The analysis revealed a significant positive association ($OR = 1.5, CI: [1.2, 1.9]) between improved municipal water systems and reduced incidence of diarrheal diseases in children under five years old. This study underscores the importance of robust municipal water infrastructure for public health outcomes in Rwanda. Investment in upgrading water treatment facilities is recommended to further enhance clinical benefits.

Keywords: *African Geography, Multilevel Modelling, Water Supply Systems, Regression Analysis, Public Health Impact, Epidemiology, Geospatial Data Analysis*

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