



Assessing the Impact of Indoor Residual Spraying on Malaria Incidence in Ghana's Upper West Region: A Retrospective Analysis,

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Abstract

Malaria is a leading cause of morbidity and mortality in sub-Saharan Africa. Indoor residual spraying (IRS) is a core vector control intervention, but its sustained impact within specific ecological contexts, such as the Upper West Region of Ghana, requires further evaluation. This study aimed to assess the impact of IRS campaigns on malaria incidence in Ghana's Upper West Region. The primary objective was to quantify the change in reported malaria cases following IRS implementation. A retrospective ecological study was conducted using archived district-level health management information system data. Malaria incidence data from periods before, during, and after IRS campaigns were analysed. A segmented time-series analysis was employed to measure changes in incidence trends. A significant reduction in malaria incidence was observed following IRS initiation. The analysis indicated an immediate decline of approximately 42% in reported cases in the first transmission season post-spraying. This was followed by sustained lower incidence levels for two subsequent years, after which a gradual rebound was noted. IRS was effective in rapidly reducing the malaria burden in the Upper West Region. The observed rebound effect indicates that the protective effect diminishes over time, underscoring the necessity for sustained, integrated control measures. IRS should be maintained as part of an integrated vector management strategy. Programme planners must ensure timely and consistent spraying rounds to sustain gains. Complementary interventions, including long-lasting insecticidal net distribution and environmental management, should be strengthened. malaria control, indoor residual spraying, vector control, disease incidence, retrospective study,

Ghana This study provides region-specific evidence on the magnitude and duration of IRS impact, informing future malaria control policy and resource allocation in northern Ghana.

Keywords: *malaria control, indoor residual spraying, sub-Saharan Africa, vector-borne diseases, retrospective analysis, disease incidence, Ghana*

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