



# Evaluating the Impact of Indoor Residual Spraying on Malaria Incidence in Ghana's Upper West Region: A Research Protocol

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## Abstract

Malaria is a leading cause of morbidity and mortality in Ghana, with the Upper West Region experiencing a disproportionately high burden. Indoor residual spraying (IRS) is a core intervention within the national malaria control strategy. However, robust, localised evidence on its effectiveness within this specific region is required to guide future programme implementation and resource allocation. This protocol describes a study to evaluate the impact of IRS campaigns on malaria incidence in the Upper West Region. The primary objective is to measure the reduction in confirmed malaria cases following IRS implementation. Secondary objectives are to assess community knowledge and acceptance of IRS, and to identify operational challenges affecting spray coverage. A mixed-methods, quasi-experimental design will be employed. Quantitative data on confirmed malaria incidence will be collected from health facility records in intervention districts and comparable control districts over multiple transmission seasons. This will be supplemented by household surveys and key informant interviews to gather qualitative data on community perceptions and programme delivery. As this is a study protocol, no empirical findings are available. The anticipated outcome is a measurable reduction in malaria incidence in sprayed areas relative to control areas. The analysis will quantify this reduction and explore qualitative themes related to programme acceptability and implementation barriers. The study will conclude on the demonstrated effectiveness of IRS in reducing malaria incidence within the Upper West Region, thereby providing an evidence base for public health decision-making. Findings will inform recommendations for the Ghana Health Service on optimising IRS campaign timing, coverage, and community engagement strategies. Results may also support policy discussions on sustaining and scaling IRS in high-burden regions. Malaria control, Indoor Residual Spraying, Ghana, Incidence, Evaluation protocol, Public health intervention This protocol contributes a structured framework for generating

context-specific evidence on malaria control. It emphasises the integration of quantitative impact assessment with qualitative insights into community reception and operational realities.

**Keywords:** *Malaria control, Indoor residual spraying, Disease incidence, Sub-Saharan Africa, Vector-borne diseases, Epidemiological monitoring, Anopheles*

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