



Policy Brief

A Cost-Effectiveness Analysis of Long Lasting Insecticidal Nets and Indoor Residual Spraying Programs in Jigawa state, Nigeria

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1. Introduction

Recent statistics show that Nigeria ranks among the top five countries in terms of malaria incidence and deaths in the world. Reports indicate that 100 percent of the population is at risk of contracting malaria. At present, there are about 4,295,686 confirmed cases of malaria in Nigeria. In 2009, the number of deaths attributed to malaria was estimated at 7,522. In the same year, 658,732 out of 1,115,966 hospital admissions were attributed to malaria, out of the 7,296 reported malaria deaths in children 4, 126 of these deaths were in children under the age of five. This trend together with its possible economic and fiscal impact, has made it imperative for the Nigerian government to fund malaria interventions. Recently, Nigeria, with some financial support from donors, implemented the Indoor Residual Spraying (IRS) and the Long Lasting Insecticidal Nets (LLINs) programs.

This brief summarizes the findings of a cost effectiveness analysis conducted on long-lasting insecticide treated nets and indoor residual spraying interventions implemented in Jigawa State under the National Malaria Control Programme (NMCP).

“These nets provide both personal protection and community protection by reducing the vector population...”

2. Background of Selected Interventions

Indoor Residual Spraying is an intervention targeted at endophilic mosquitoes (mosquito species that rest indoors), and can last between 3 to 6 months, depending on the insecticide and the seasonality of transmission in the area. IRS is widely used in areas of seasonal transmission, including epidemic-prone areas, and increasingly in more malaria-endemic areas.

The Long Lasting Insecticidal Nets are factory-treated mosquito nets made with netting material that has insecticide incorporated within or bound around the fibres. These nets provide both personal protection and community protection by reducing the vector population when implemented at very high coverage.

“...the cost effectiveness ratios (CERs) for the IRS intervention per MI, MM and DALYwhich is more expensive compared to LLIN.”

3. Methodology

Cost effectiveness analysis involves three (3) main steps: First is the evaluation of the cost data for each of the interventions. Second, is the measurement of effectiveness of the interventions relative to its effect on Malaria Incidence, Malaria Mortality and Disability Adjusted Life Years, and third is computation of the cost effectiveness ratio of individual interventions.

The cost effectiveness ratio for each intervention is calculated by dividing the cost by the effectiveness. For this study, cost is taken at the household level. Data used for this analysis were sourced from the World Health Organization, National Malaria Control Programme, and National Bureau of Statistics.

4. Results

Cost Analysis

Indoor Residual Spraying

The insecticides used in the IRS programme include; Lambdacyhalothrin, Bifenthrin and Deltamethrin. Other ingredients for the programme are compression spray pumps, repair kits, and protective clothing, spray men, team leaders, supervisors, and drivers. The data available from NMCP were classified under labor cost, which covers the number of persons involved in the intervention, the number of days engaged and the unit cost, material cost covering the cost of insecticides, equipment and supplies. The cost of equipment is the actual procurement cost incurred by NMCP and its partners. The last component of the cost of the intervention falls under overhead costs. Under this category, cost incurred for trainings, baseline survey and transportation during the implementation period are recognized. The cost analysis reveals an estimated cost of NGN 1,771 to spray one household in each state.

Long Lasting Insecticidal Nets

The LLINs cost data used in this analysis is the total amount spent on the intervention in Jigawa state. The data sourced from NMCP contain expenditure details for each state. Therefore, there was no need to either apply or assume a cost estimate for Jigawa state.

The cost is disaggregated into procurement cost, covering management cost, monitoring and supervision, storage, community mobilization activities and training materials costs; Personnel cost covering logistics, demand creation, and monitoring and supervision. Other cost components include transportation and workshop and training.

The analysis of the data provided by the NMCP shows that it costs around NGN 147 to provide one treated net to a household in Jigawa state.

“... LLIN indicated that the use of the intervention will achieve CERs which are significantly lower than the CERs of IRS across all three (3) effectiveness measures.”

Cost Effectiveness Ratio

Based on the results of the analysis, the cost effectiveness ratio (CER) for the IRS intervention based on MI, MM and DALY are NGN 63,801, NGN 1,011,553 and NGN 27,676, respectively, which is more expensive compared to LLIN. These figures were derived by dividing the IRS cost per household NGN 1,771 by the impact of the intervention on the health effects (See Table 1).

Results of the cost effectiveness analysis on the LLINs indicated that the use of the intervention will achieve a CER of NGN 3,542 per MI, NGN 56,154 per MM, and NGN 1,536 per DALY, which are significantly lower than the CERs of IRS across all three (3) effectiveness measures (See Table 1).

Table 1: Cost-Effectiveness Ratio by Effectiveness measures and Interventions in Jigawa State, Nigeria

	IRS		LLIN	
	Health Effect	CER	Health Effect	CER
Reduction in Malaria Incidence	0.028	63,801	0.042	3,542
Reduction in Malaria mortality	0.002	1,011,553	0.003	56,154
Reduction in DALY	0.064	27,676	0.096	1,536

Source: Own estimates

Sensitivity Analysis

This study considered two types of sensitivity analyses, one way and multi-way. The one-way sensitivity analysis examined a 10, 30 and 50 percent decrease in the cost of IRS total material cost (largest cost item) under the best case scenario and a 10, 30 and 50 percent increase in LLINs total personnel cost under the worst case scenario. The results of the one-way sensitivity analysis show that LLINs remains the cost-effective intervention.

For the multi-way analysis, all the cost components except total material cost for IRS and total personnel cost for LLINs, were simultaneously varied. Similarly, the analysis applied a 10, 30 and 50 percent changes to both interventions. Again, the LLINs is preferred to the IRS.

5. Conclusion and Policy Recommendations

The results cost analysis of show that LLINs is less expensive to provide to households in Jigawa state than IRS. The results of program CEA show that LLINs has lower cost-effectiveness ratio compared to IRS, implying that LLINs is more cost effective than IRS.

This study makes several important policy recommendations.

- There is a need to reallocate resources from IRS intervention which is more expensive and less cost-effective, to LLINs that is more effective and sustainable.
- There is the need to broaden the distribution of LLINs to other states of the Federation especially the riverine states such as Delta, and Bayelsa where the incidence of malaria is unusually high. Invariably, if the incidence of malaria is dramatically reduced, as targeted by the MDGs, this will have some positive effect on malaria mortality rate and DALY.
- It is imperative to increase LLIN distribution to cover more households and not only households with pregnant women and children under the age 5. By moving resources away from IRS, the Federal Government should be able to increase the coverage of LLINs. For example, if 50 % of the allocation to IRS is channeled to providing more LLINs, coverage will multiply by at least six-folds, thereby increasing the total number of households from 31,748 to 222,236.
- There is a need to keep proper record of financial and non-financial resources utilized by each intervention for future reference. This way, it will be easier to assess more precisely the effectiveness of malaria intervention. This extends to encouraging the culture of monitoring and evaluation so that progress can be towards achieving program objectives.

About CSEA

The Centre for the Study of the Economies of Africa (CSEA) is an independent non-profit organization established by Dr. Ngozi Okonjo-Iweala. CSEA aims to strengthen the evidence-based policy space through high quality and timely research.

Further Reading

This policy brief is a summary of a research conducted by CSEA. For the full report and other reports published by CSEA, please visit www.cseaafrica.org.

- Guyatt, H., J. Kinnear, M. Burini and R. Snow (2002), "A Comparative Cost Analysis of Insecticide-Treated Nets and Indoor Residual Spraying in Highland Kenya", *Health Policy and Planning*, Vol. 17, pp. 144-153.
- Uneze, E.F. and Nwadike, G.C. (2011), "A Cost Effectiveness Analysis of Indoor Residual Spraying and Long Lasting Insecticidal Nets in Jigawa state, Nigeria", *a research report* prepared for the Global Development Network (GDN) under the Strengthening Institutions to Improve Public Expenditure Accountability Project.
- Foreign Exchange
1 USD = 155.77 NGN (Naira)
1 GBP = 250.90 NGN

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