MALARIA CONSORTIUM
PROJECT BRIEF

Monitoring and evaluating insecticide-treated net campaigns in Nigeria

Assessing the impact of net campaigns in Ondo and Anambra states

Background

Mass distribution of insecticide-treated nets (ITNs), deployed alongside other proven malaria control interventions, is an effective vector control measure that has contributed substantially to the reduction of malaria incidence in many African countries.[1]

However, widespread resistance of mosquito vectors against pyrethroid insecticides — which are typically used to treat nets — remains a major challenge in malaria endemic countries, including Nigeria.[2] While ITNs remain an important tool in the fight against malaria, their effectiveness will be sub-optimal over time as the intensity of insecticide resistance increases. Studies conducted in Tanzania and Uganda reported that, compared with standard ITNs that are treated with pyrethroids only,[3,4] those containing pyrethroids and the efficacy-enhancing synergist piperonyl butoxide (PBO) showed improved malaria transmission control in areas with pyrethroid resistance.

The National Malaria Elimination Programme has recommended the use of PBO ITNs in a number of states, among which are Ondo and Anambra. Due to a gap in funding, however, Ondo and Anambra have not received nets in a mass campaign since 2017 and 2014, respectively.

Country
Nigeria

Donor
Open Philanthropy, based on GiveWell's recommendation

Length of project
Ondo: August 2021 – December 2024
Anambra: December 2021 – March 2025

Partners
Anambra State Malaria Elimination Programme
GiveWell
National Malaria Elimination Programme
Ondo State Malaria Elimination Programme

Project outline and objectives

In Ondo, Malaria Consortium is collaborating with the National Malaria Elimination Programme and the State Malaria Elimination Programme to implement a universal coverage ITN replacement campaign. In December 2021, we distributed nearly three million DuraNet Plus© nets containing alpha-cypermethrin and PBO. A similar campaign is planned in 2022 in Anambra, where more than 3.8 million nets have been received for distribution. Open Philanthropy and additional philanthropic giving provided the funding for both campaigns based on GiveWell's recommendation.

The monitoring and evaluation project aims to study the epidemiological and entomological impacts and outcomes of the ITN campaigns compared to baseline, and use the findings to improve vector-control decisions based on a deeper understanding of the intervention's cost-effectiveness. While the research objectives and activities are generally similar in both Ondo and Anambra, there are some differences in scope, as indicated below.

The key objectives are to:

- track changes in malaria incidence rates in children 6–59 months over three years in Ondo
- monitor net durability over the study period in both states
- determine insecticide resistance levels in selected sites in both states
- monitor changes in vector biting densities and habits over time in Ondo
- gather household data on ITN access and use rates
- guide decision-making around vector control, including on ITN types and overall cost-effectiveness of the intervention.

Activities

To achieve the project objectives, we will:

- carry out malaria incidence studies using data from a sample of health facilities across Ondo, compiled from outpatient registers over a total of six years (including three years of baseline period)
- conduct baseline household surveys prior to the campaigns to gather data on ITN ownership, access and use rates alongside other relevant variables from households, sampled across both states
- evaluate the campaigns after three to four months, using household surveys to study the coverage levels, use rates and other variables
- conduct annual surveys to monitor ITN durability, including attrition (i.e. when nets are discarded due to wear and tear, given away, destroyed, used for other purposes, or lost due to other reasons), physical integrity and bio-efficacy over three years. Samples of the distributed nets will be retrieved during each survey for chemical analysis and bioassays using strains of vector species with known susceptibility/resistance to pyrethroids
- conduct entomological studies — including resistance of vectors against different insecticides — at baseline and two years after the campaigns in both states, as well as studies to understand any changes in vector biting habits over time in Ondo
- collect meteorological data from existing stations to use in the interpretation of malaria incidence trends (in Ondo), as well as ITN use and durability data in both states
- implement costing studies to collect data on financial and economic costs associated with the ITN campaigns in both states.

References

1. Bhatt S, Weiss DJ, Cameron E, Bisanzio D, Mappin B, Dalrymple U, et al. The effect of malaria control on *Plasmodium falciparum* in Africa between 2000 and 2015. Nature, 2015; 526: 207–11.
2. PMI VectorLink Project. The PMI VectorLink Nigeria annual entomology report. October 2019 – September 2020. Rockville: MD: VectorLink, Abt Associates Inc.; 2021.
3. Protopopoff N, Mosha JF, Lukole E, Charlwood JD, Wright A, Mwalimu CD, et al. Effectiveness of a long-lasting piperonyl butoxide-treated insecticidal net and indoor residual spray interventions, separately and together, against malaria transmitted by pyrethroid-resistant mosquitoes: A cluster, randomised controlled, two-by-two factorial design trial. The Lancet, 2018; 391: 1577–88.
4. Staedke SG, Gonahasa S, Dorsey G, Kamya MR, Maiteki-Sebuguzi C, Lynd A, et al. Effect of long-lasting insecticidal nets with and without piperonyl butoxide on malaria indicators in Uganda (LLINEUP): A pragmatic, cluster-randomised trial embedded in a national LLIN distribution campaign. The Lancet, 2020; 395: 1292–1303.

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Cover image: Labelling a mosquito net for durability monitoring study, Ondo state

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