# Estimating the potential effectiveness of wide-scale implementation of intermittent preventive therapy in infants (IPTi) in Southern Nigeria

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## **Need for IPTi in Nigeria**

- Nigeria accounts for 23% of malaria deaths globally.
- The infant mortality rate (all causes is 67 deaths per 1000 lifebirths)
- 378 local government areas (LGAs) in the southern part of Nigeria have been identified as eligible for IPTi by the WHO and Nigerian National Malaria Elimination Program (Fig 1).
- However, the impact of IPTi is highly uncertain and will depend on the effective coverage per area, transmis sion, bed net and treatment coverage.

# **Input layers**

- Infant population: assumed to be ~20% of children under the age of five years.
- Infant malaria burden: obtained from a dynamic malaria transmission model calibrated per LGA in Nigeria, that accounts for differences in transmission intensity and intervention impact (Ozodiegwu et al in prep).
- Infant malaria mortality: calculated based on case management and pre dicted severe cases.
- **IPTi coverage:** approximated using pentavalent vaccine coverage from 2018 DHS survey (Fig 1).
- **IPTi efficacy:** estimates from a sys tematic review of clinical trials for sul fadoxine-pyrimethamine (Esu et al 2019) (Table 1).



# Methods

- management and ITNs.







Fig 2: Model predicted malaria outcomes in infants for Southern Nigeria prior and after IPTi effectiveness adjustment

#### Table 1: PE's of IPTi (Esu et al 2019)

Outcome	Rate ratio	95%CI
Prevalence	0.66	(0.56 - 0.79)
Clinical cases	0.79	(0.74 - 0.85)
All-cause mortality	0.93	(0.74 - 1.15)

• We used effect sizes from clinical trials and model predicted malaria outcomes in infants to estimate the IPTi effectiveness per LGA. • IPTi was deployed in addition to case

Fig 1: Average pentavalent vaccination coverage in IPTi eligibale areas. Data source: DHS 2018.



## **Estimated IPTi effectiveness**

- The relative impact of IPTi among infants reflected the efficacy estimates with 24%, 15% and 5% reduction in inci dence, prevalence, and mortality respectively (Flg 4).
- In total IPTi was estimated to avert 321'253 (95%Cl 229'467-397'742) malaria episodes per year among infants and 132 (95%CI -284-493) deaths.







Fig 4: Estimated annual effect of additional IPTi per malaria outcome in Southern Nigeria

References: Esu, E.B., Oringanje, C., Meremikwu, M.M., 2019. Intermittent preventive treatment for malaria in infants. Cochrane Database of Systematic Reviews.

National Population Commission (NPC) [Nigeria] and ICF. 2019. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF.



### Discussion

- The estimated impact of IPTi was heterogeneous among the LGAs.
- While relative reductions mirror IPTi coverage, the total number of cases and deaths averted depend on additional factors, such as transmission and intervention coverage as well as population size.
- The presented method provides a accessible approach for approximating the impact of IPTi across large geograpical areas that can be attached to outputs from mathematical models, increasingly used in high malaria burden countries.
- The approach relies on the quality and applicability of the clinical trials to the specific setting.
- Most of he IPTi trials where conducted ten or more years ago and newer clinical trials as well as implementation studies are needed.

## Conclusions

• The results suggest that while relative reductions in cases are low, the total number of cases averted can be considerable and supports the implementation of IPTi given the protective efficacy as seen in clinical trials and high coverage.

• To obtain more up to date predictions more recent data would be beneficial.

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