Stratification and sub-national tailoring for ITNs: Results of applying the methods in Ghana

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Outline

- Malaria Burden
- Malaria Vector Control in Ghana
- Stratification
- Results of Stratification
- Way forward/Conclusion

Malaria Burden (1/3)

- In 2022, there were an estimated 249 million cases of malaria worldwide with 608 000 deaths

- The WHO African Region carries a disproportionately high share of the global malaria burden accounting for 94% of all malaria cases and 95% death (WHO 2022)

- Children aged under 5 years accounted for 76% of malaria deaths in African region (WHO 2023)

Malaria Burden (2/3)

- Ghana is a malaria endemic country (one of the 11 HBHI countries)
  - Entire population of 30.8 million (2021 census data) is at risk of malaria
  - Under-five mortality rate: 52/1,000 live births (2017 MHS)
  - Parasite Prevalence – 8.6% (GDHS 2022)
  - 0.4 % of in-patients deaths

- Three ecological zones with varied malaria transmission pattern

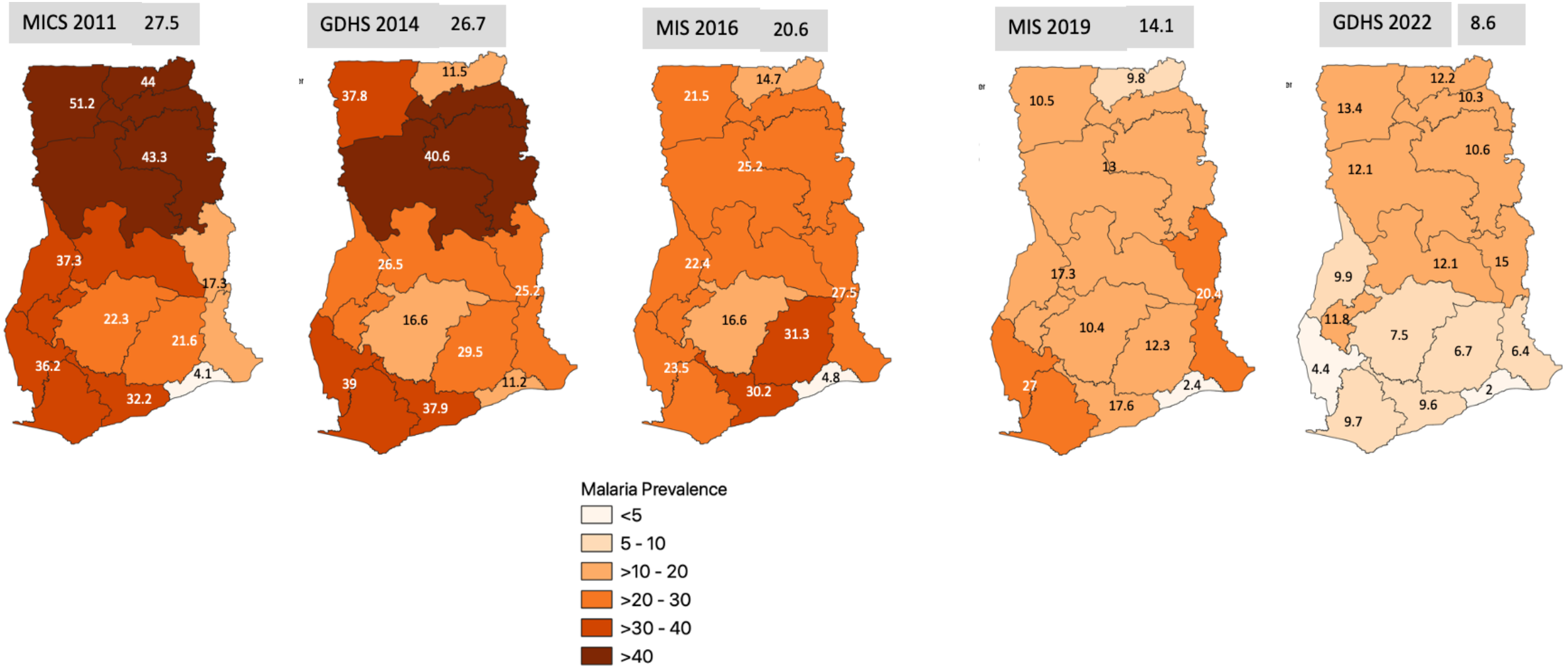
Malaria Burden (2/3)

- Economic cost
  - Highest disease expenditure- NHIS
  - GDP reduction by 0.25 - 6%

- Major vector species:
  An. gambiae, An. funestus, An. arabiensis & An stephensi

- Major Plasmodium species: *Plasmodium falciparum* - 96.3%; *P. malariae* – 1.6%; *P. ovale* – 1.0%

Results from surveys - Malaria parasite prevalence

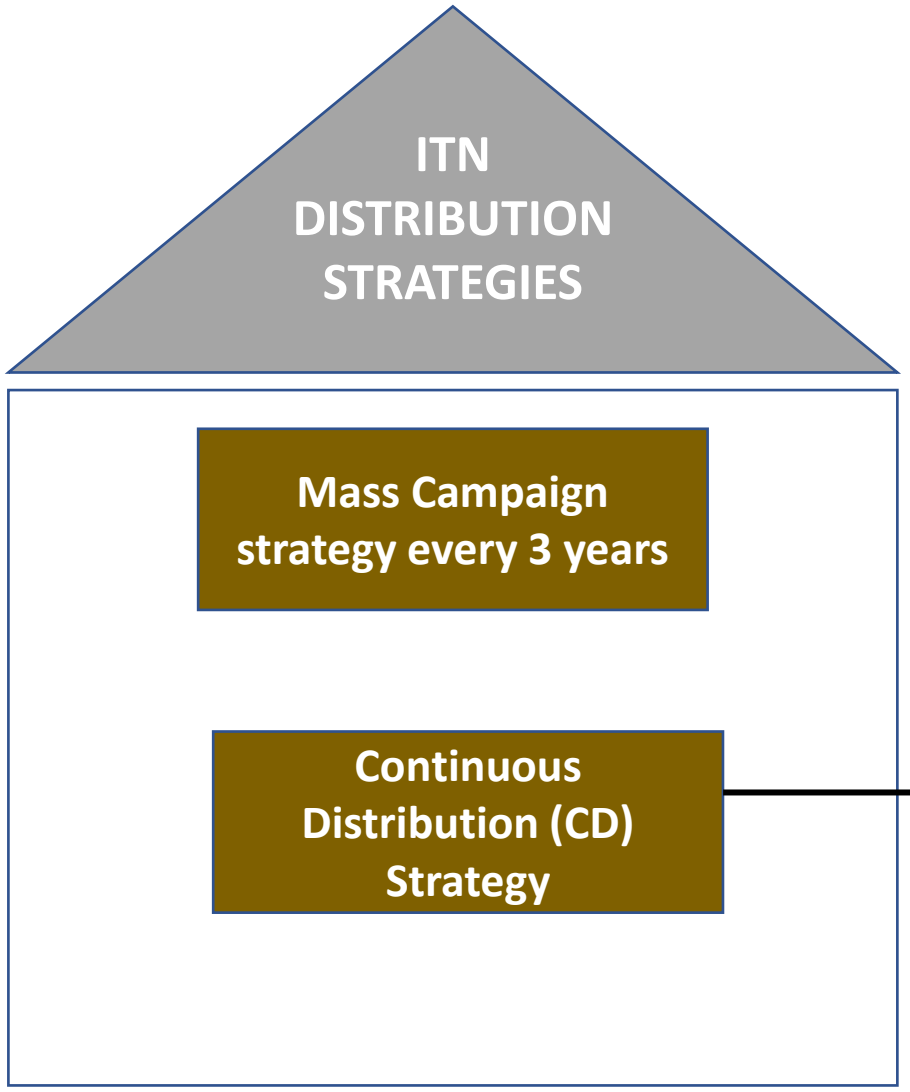


Percentage of children age 6-59 months who tested positive for malaria by microscopy by region, 2011-2022; Source: GDHS/MIS

Malaria Vector Control Interventions in Ghana

ITN Distribution	Indoor Residual Spraying (IRS)	Targeted Larval Source Management (LSM)	Entomological Surveillance

ITN Distribution



Health Facility (all year round every year)

School Based (Every year except mass campaign year)

HIV/AIDS Clinics

- Existing patients (all patients on ART)
- Every new patient
- New nets every three years

TB Clinics

- Everyone currently on treatment (started treatment from November/December 2022
- First TB patients

Stratification exercise (1/6)

- Strategic information is used for decision making of Vector Control interventions in Ghana

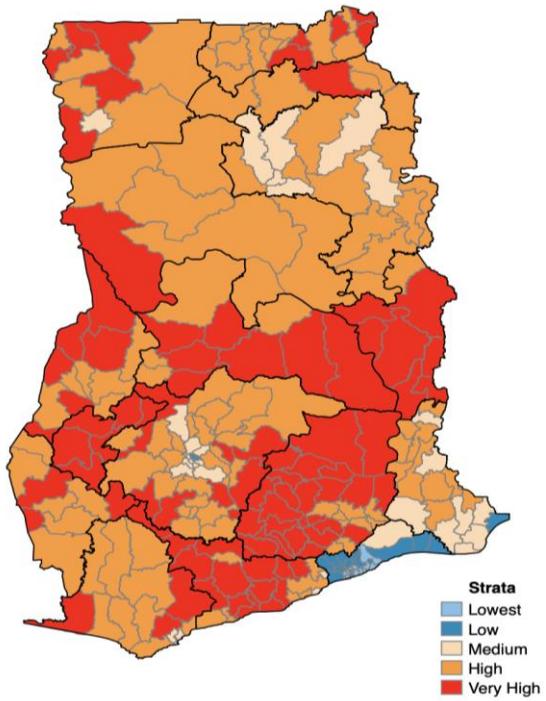
- This involves implementation of appropriate, entomological context-specific interventions, to maximize impact.

- This focuses on ensuring systems are in place to obtain the requisite data set to enable decision on the available tools, appropriate for a particular district
    - Stratification exercise
    - Epidemiology data on disease burden
    - Entomology and Insecticide resistance data

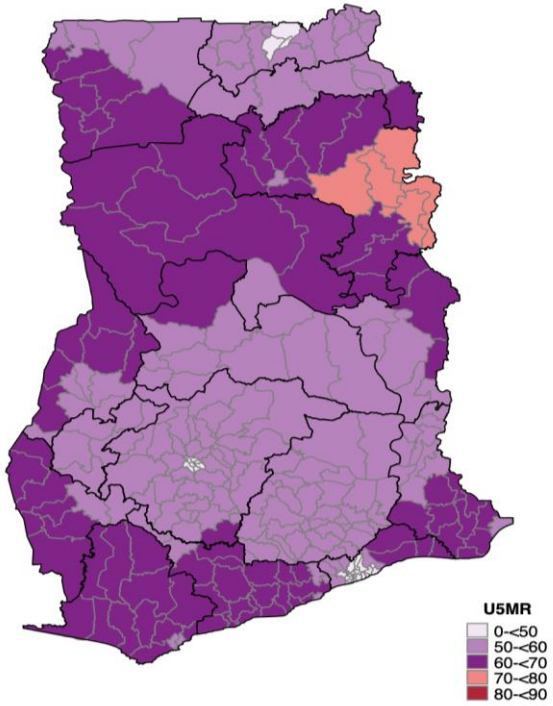
- Choosing the appropriate intervention amidst limited options
    - Where to put which tool is based on intensity of disease
    - Not to put two main interventions in place

Stratification exercise (2/6)

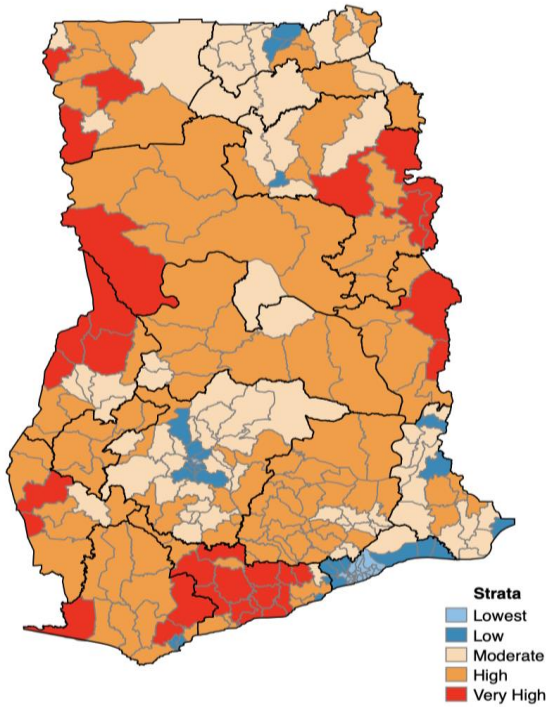
First level stratification
Prevalence + Adj Inc, 2022



Under-five All-cause Mortality Rate, 2017

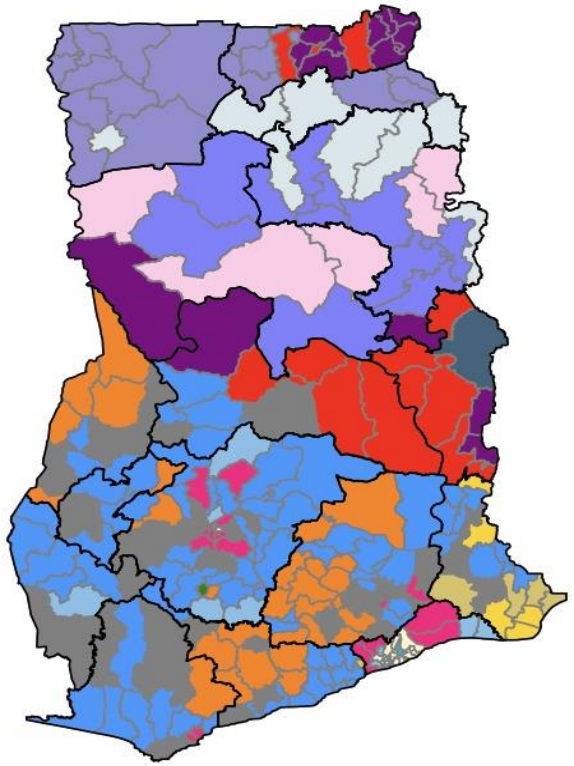


Final stratification
Prevalence + Adj Inc + U5MR, 2022



Stratification exercise (3/6)

Incidence → Prevalence → Mortality



Intervention Mix for NMESP, 2024-2028

- CM+IPTp+IRS+SMC
- CM+IPTp+LLINs+MDA
- CM+IPTp+LLIN+SMC
- CM+IPTp+LLINs+LSM+MDA
- CM+IPTp+LLINs+LSM+SMC
- CM+IPTp+PDMC+IRS+SMC
- CM+IPTp+PDMC+IRS+LSM+SMC+MV
- CM+IPTp+PDMC+LLINs+SMC+MV
- CM+IPTp+PDMC+LLINs+LSM+SMC+MV
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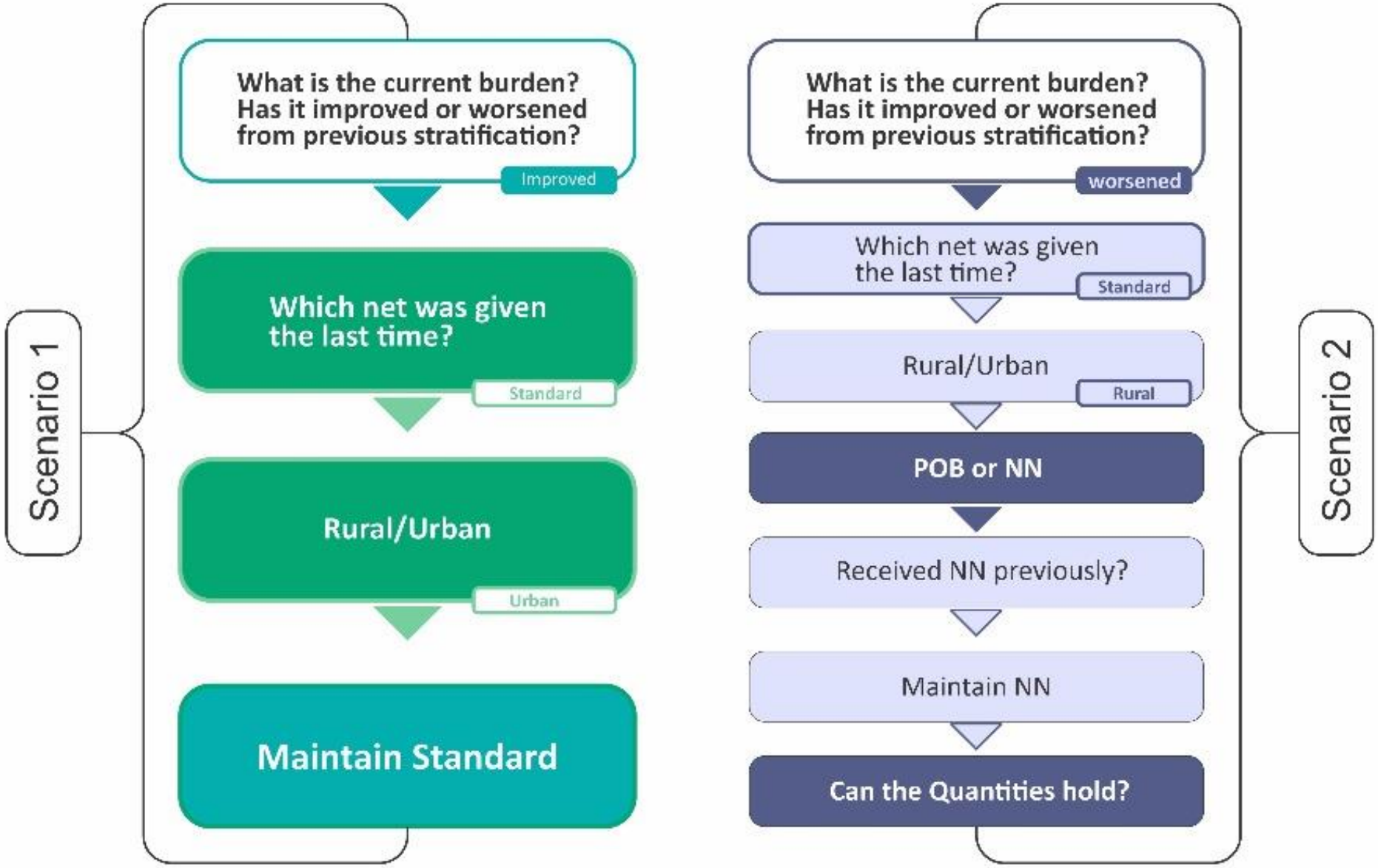
- CM+IPTp+LLINs+LSM+MV
- CM+IPTp+PDMC+IRS+MV+IPTSc
- CM+IPTp+PDMC+IRS+LSM+MV+IPTSc
- CM+IPTp+PDMC+LLINs+MV+IPTSc
- CM+IPTp+PDMC+LLINs+LSM+MV+IPTSc

Stratification exercise (4/6)

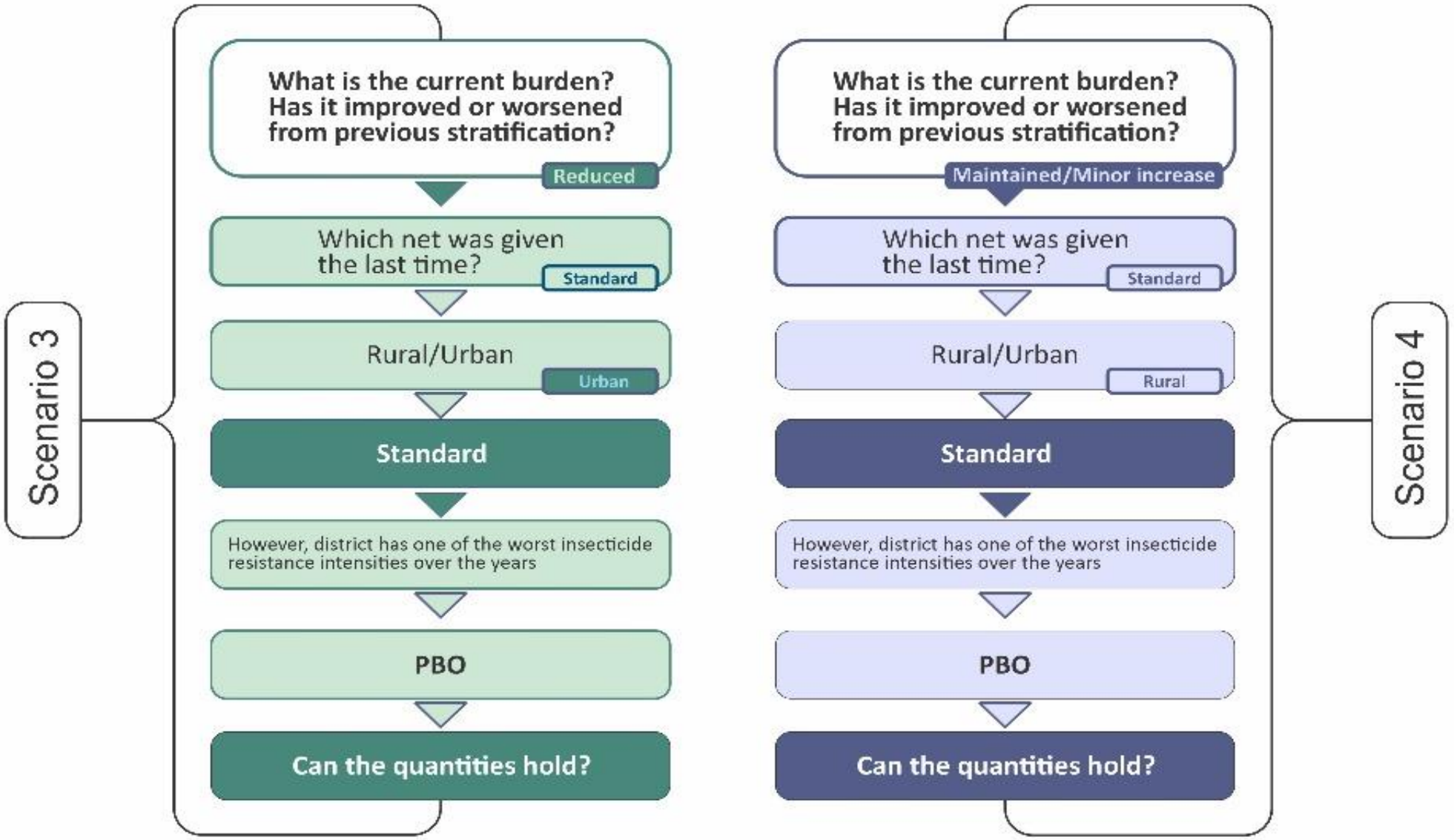
- The following considerations are made for subnational tailoring of the types of ITNs:
  - Burden of disease per district
    - Stratification exercise
    - Surveys
      - Ghana Demographic Health Survey (GDHS)
      - Malaria Indicator Cluster Survey (MICS)
  - Change in burden between previous and current stratification
  - Rural/urban
  - Type of ITN received in previous exercise
  - Quantities available to the country/cost

ITNs Available		
Standard Pyrethroid	Pyrethroid PBO	'New Nets'

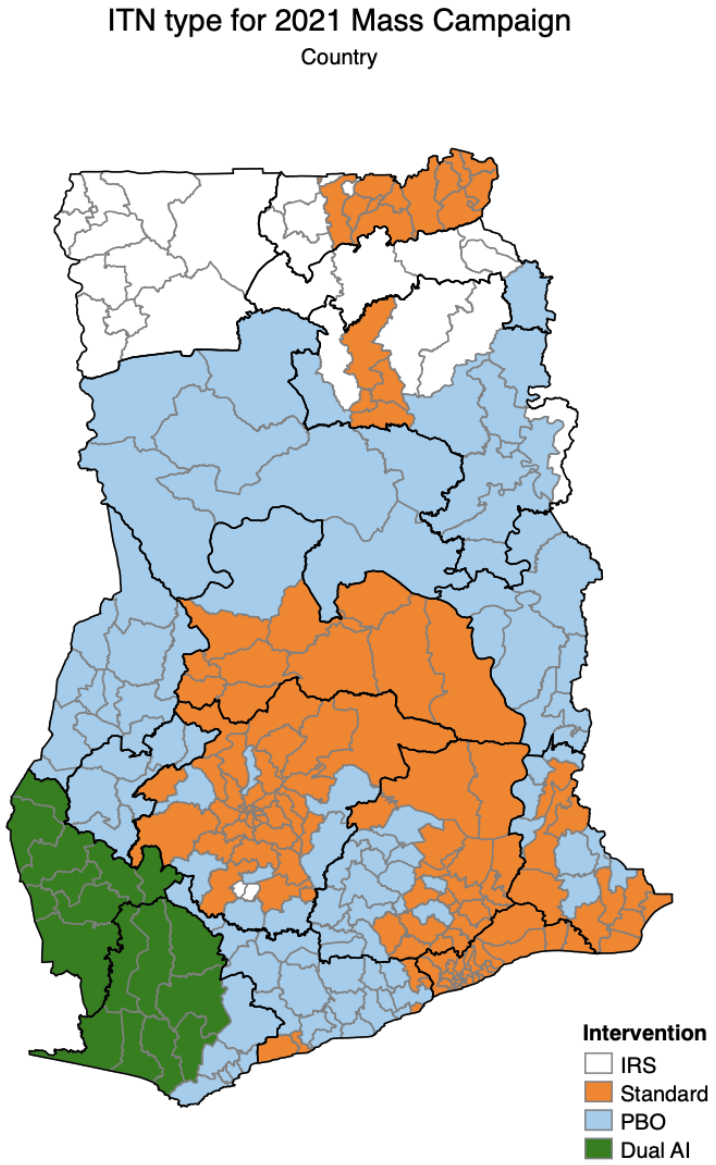
Stratification exercise (5/6)

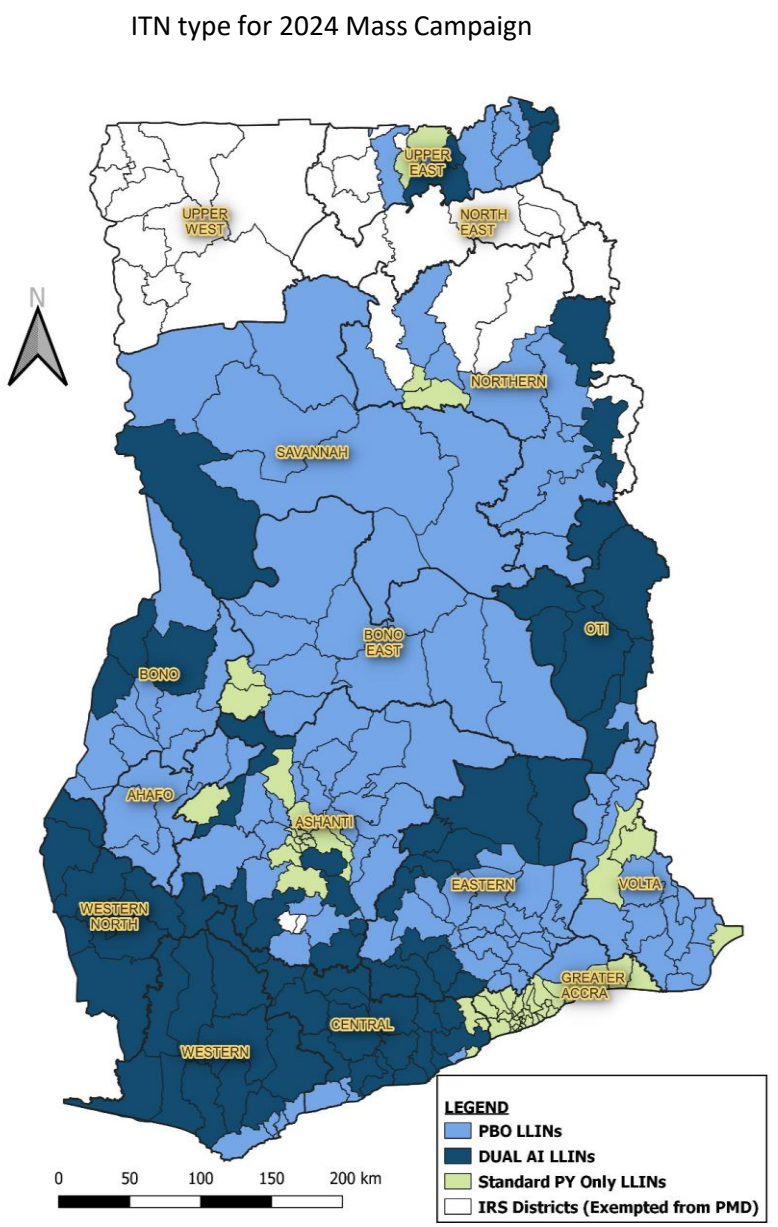


Stratification exercise (6/6)

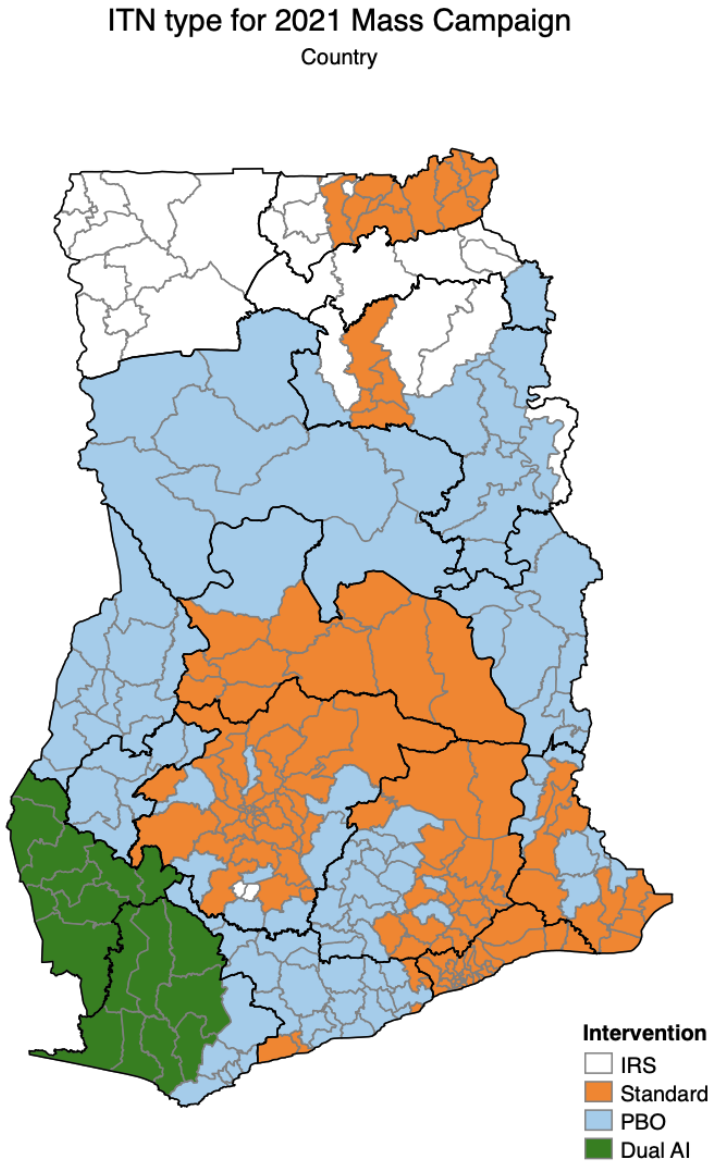


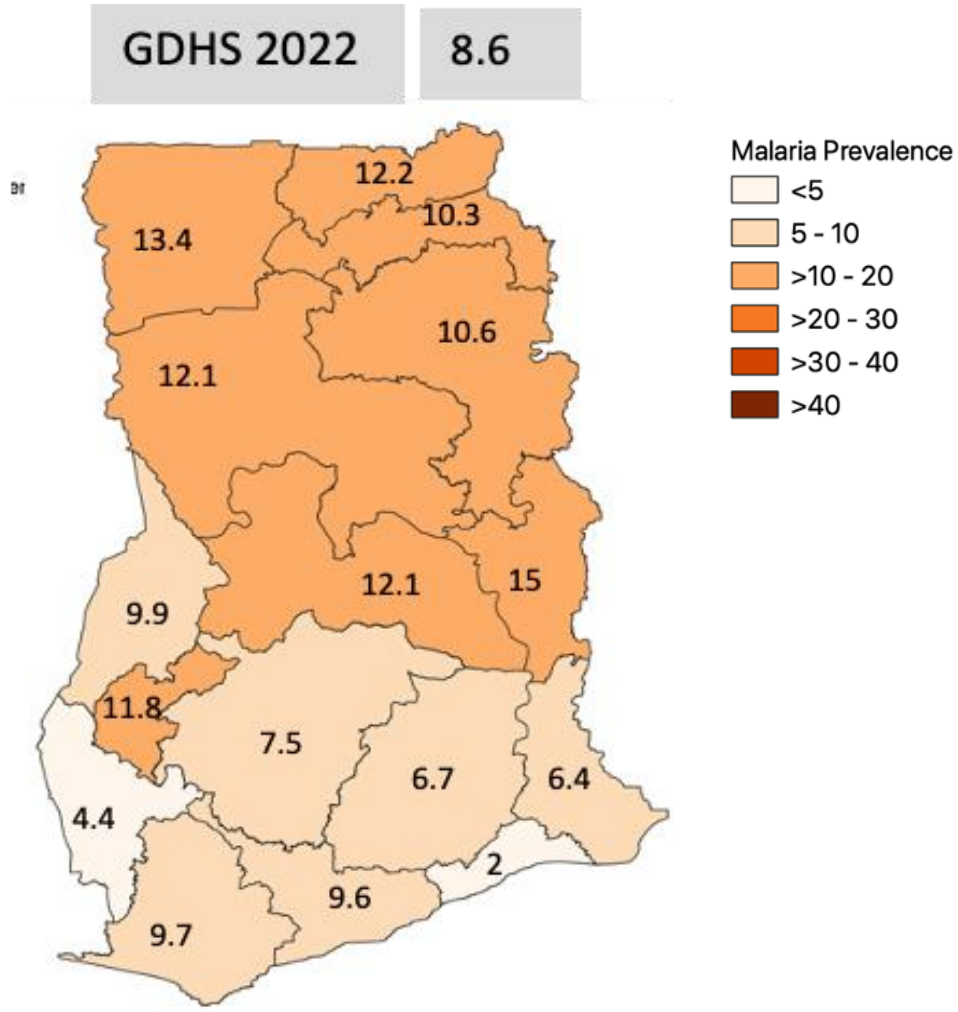
Map of Ghana showing distribution of different types of ITNs per district for mass campaign, 2021/2024





Results - 2021 ITN Mass Campaign





Percentage of children age 6-59 months who tested positive for malaria by microscopy by region, 2011-2022; Source: GDHS/MIS

Conclusion

- The country has made remarkable progress in decisions concerning the kind of ITNs
  - Active approach to resistance issues
  - Not a one size fit all approach to net placement

- Inspite of the fact that this can be logistics nightmare, the country is able to go round this with early planning and dutiful human resource

- The country looks forward to in addition to this achievement,
  - being able to actively decide on the type of net material that is procured – will result in comensurate usage coverages
  - Eventually have susceptiblity increased in areas of high resistance

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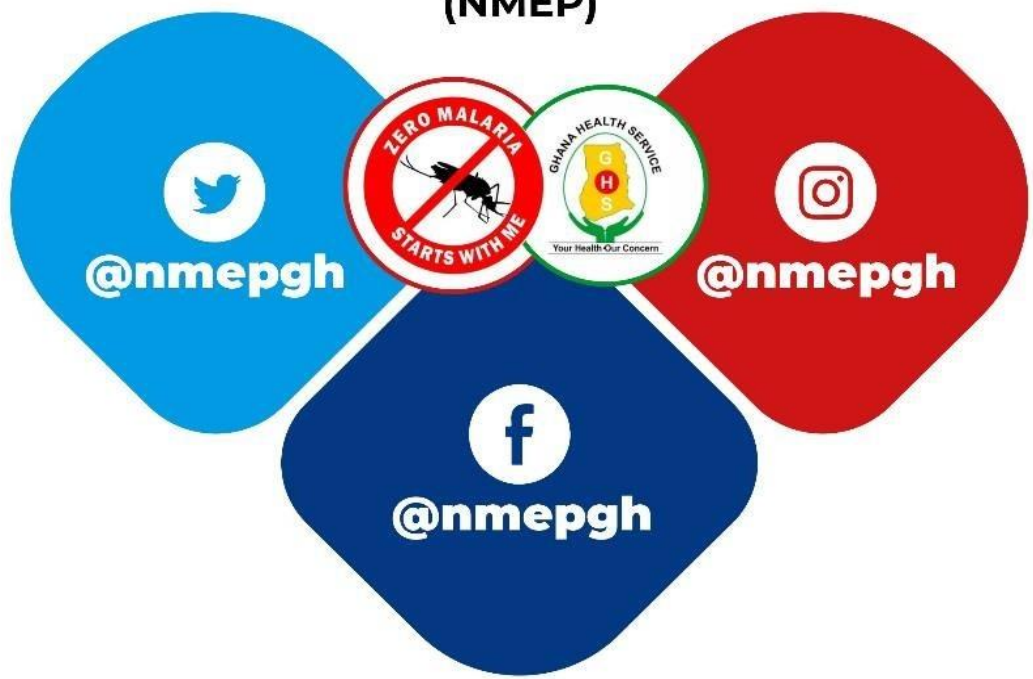
NATIONAL MALARIA ELIMINATION PROGRAMME (NMEP)



THANK YOU