

Use of strategic information to drive impact

Stratification and intervention mixes



WHO Malaria Technical Support to Nigeria
NMEP

Global **Malaria** Programme



**World Health
Organization**

National strategic plan development and implementation



National Strategic Plans

Strategy

Objectives

Who? population at risk
Why? transmission determinants
What? interventions
When? seasonality, age
Where? place
How? delivery

40% reduction in prevalence
50% reduction in incidence
60% reduction in mortality

1. Impact evaluation
2. Stratification & Intervention mixes

3. Impact predictions

How much does it cost?

Funds Needed

4. NSP Costing

How much is available?

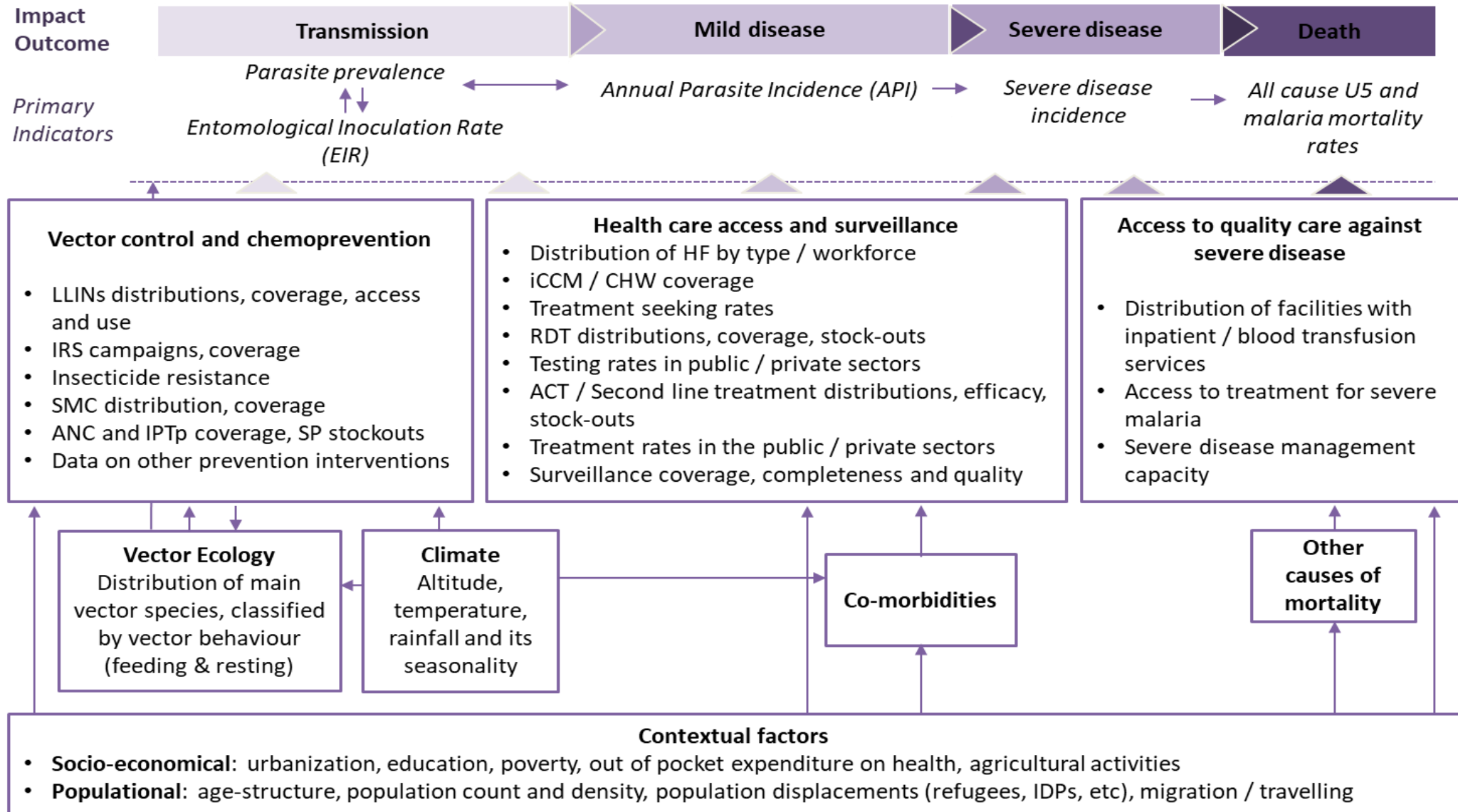
Funds available

How can I achieve the maximum level of impact with the resources available?

5. Prioritization

DATA

Stratification – a multifactorial visualization approach to inform decisions





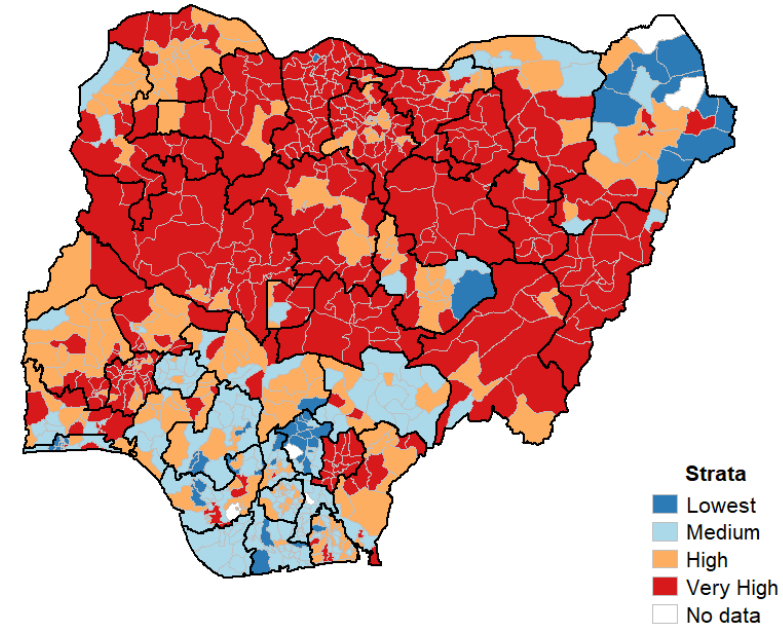
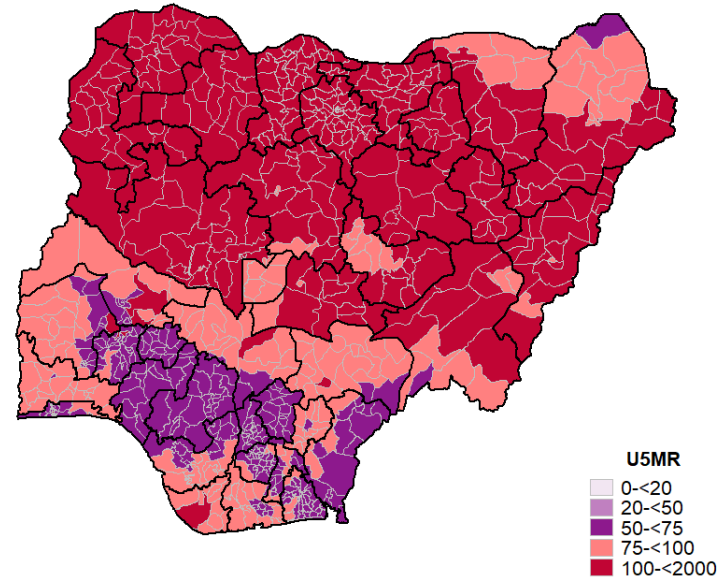
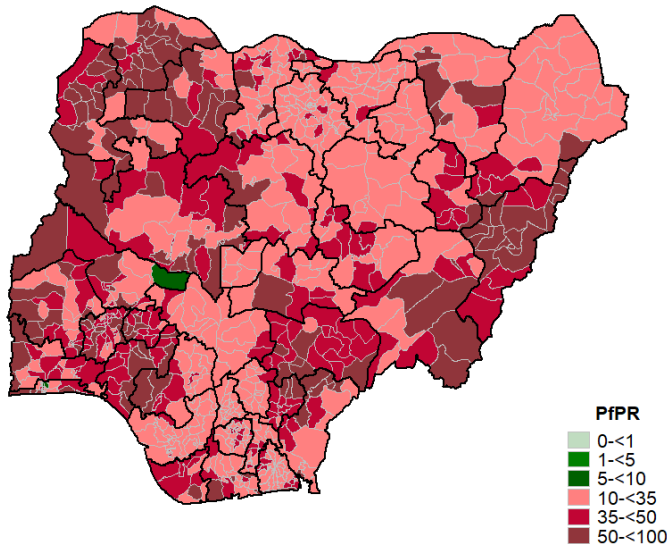
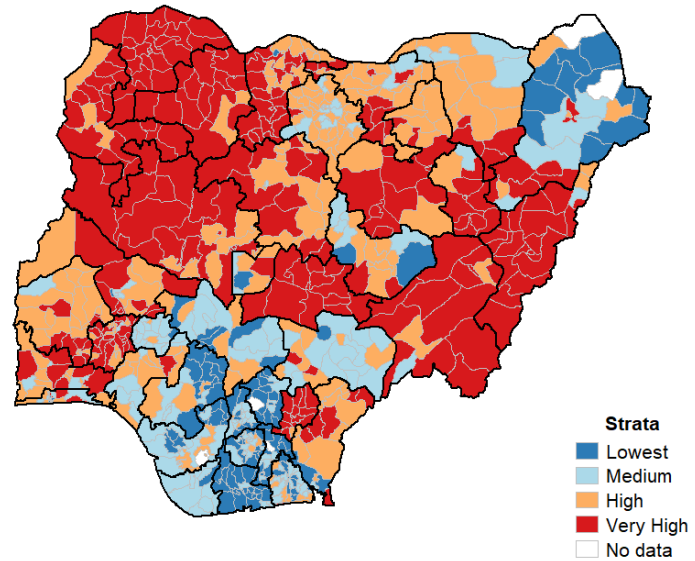
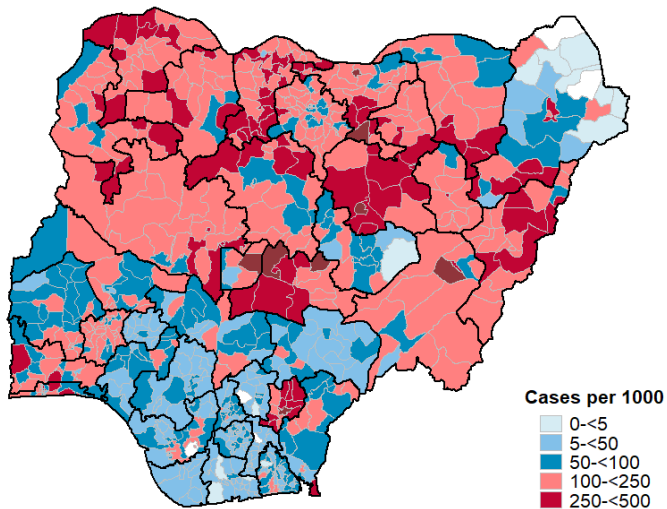
Epidemiological stratification

Incidence

Prevalence

All-cause under-five mortality

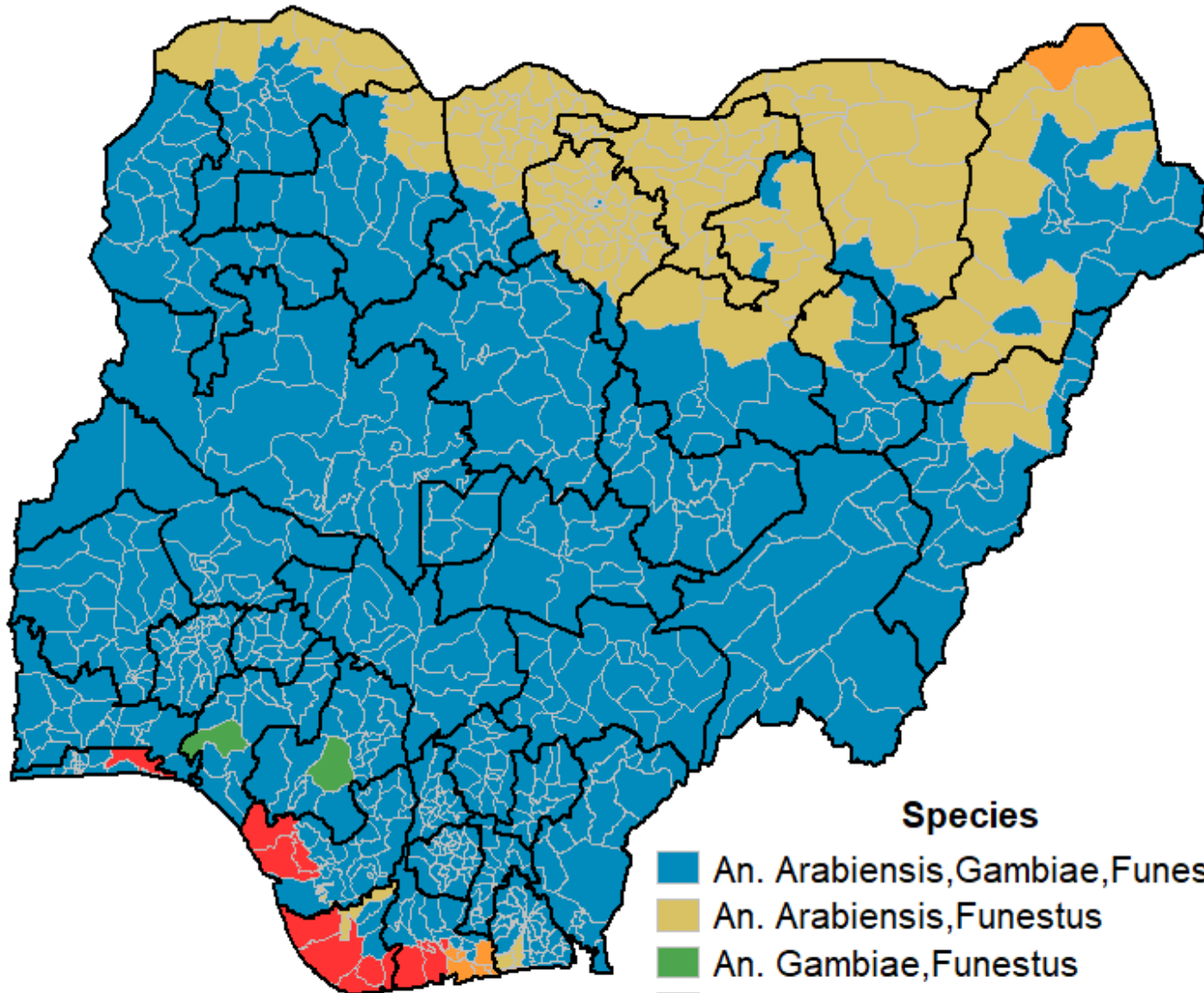
Combination of indicators





Entomological stratification

Entomology and pyrethroid resistance








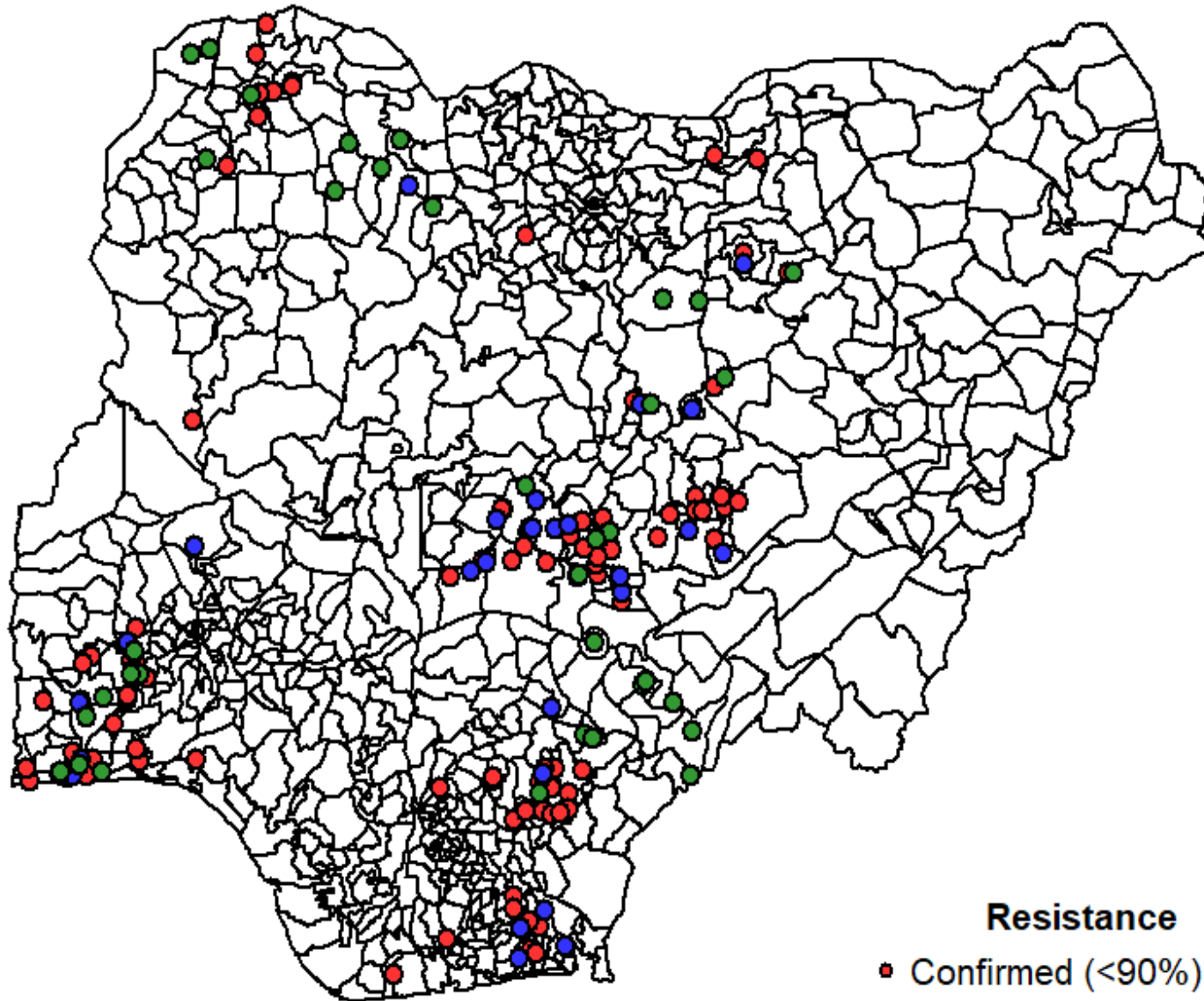
An. Arabiensis

An. Gambiae

An. Funestus

Species

-  An. Arabiensis, Gambiae, Funestus
-  An. Arabiensis, Funestus
-  An. Gambiae, Funestus
-  An. Arabiensis
-  An. Gambiae



Resistance

- Confirmed (<90%)
- Possible (90-97%)
- Susceptible (98-100%)

Sites not sufficiently representative

Mostly bioassay data

Results vary of short distance and time making interpretation difficult

Not linked to carefully collected epidemiological data

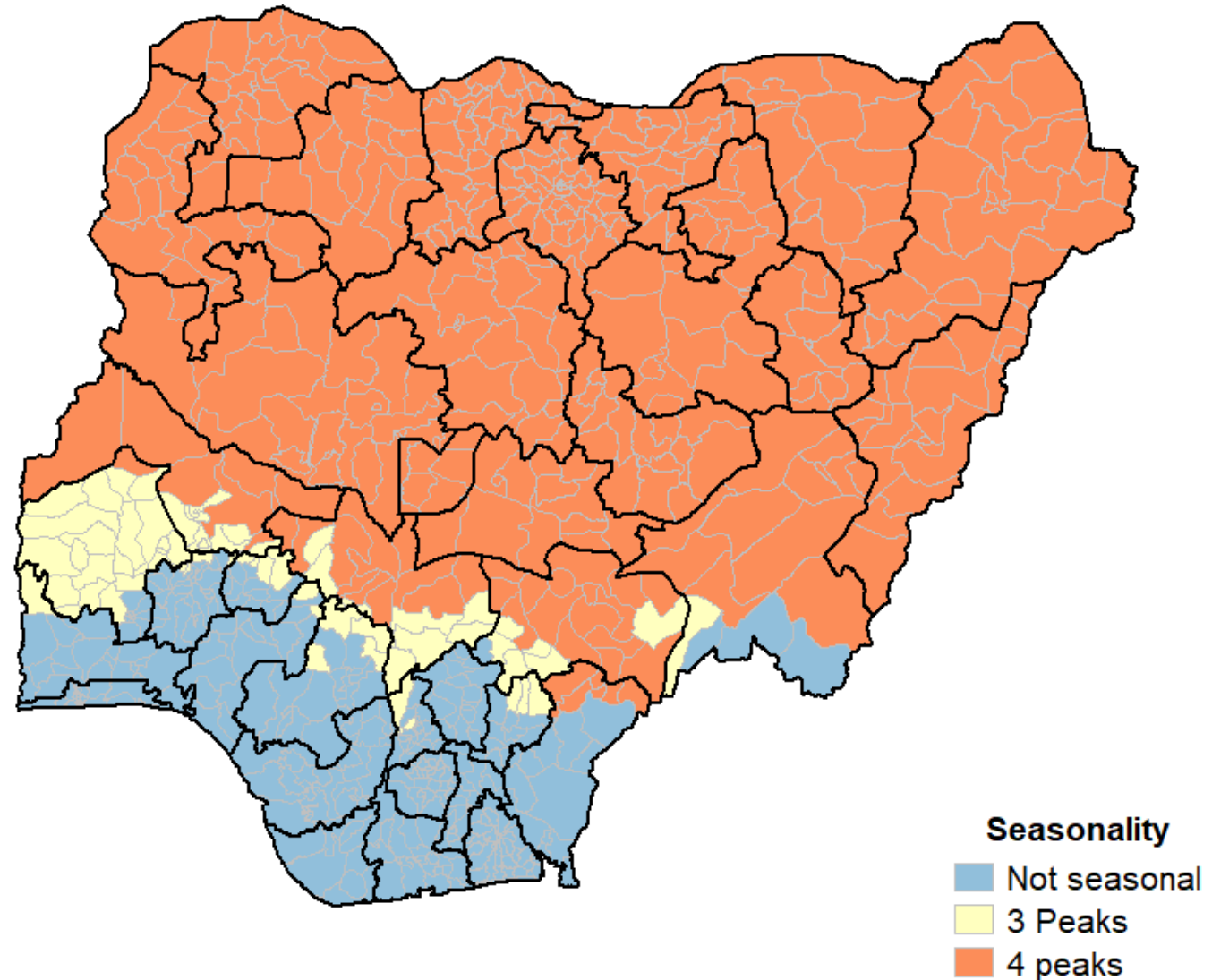


Ecological stratification



- **Altitude and topography**
- **Rainfall distribution (amount and seasonality)**
- **Temperature (min, max, night, day)**
- **Humidity (moisture levels, vegetation)**
- **Waterbodies (potential breeding sites)**
- **Land cover and land use (urbanization, irrigation, infrastructure development etc)**
- **Connectivity (virtual and physical)**

Rainfall seasonality for targeting SMC



Urban areas with >1 million population in 2018



City	Cases	Percent of HFs reporting over 80% of
Aba	14,062	14%
Abuja	91,691	10%
Benin City	19,523	18%
Enugu	10,735	4%
Ibadan	110,149	31%
Ife	56,820	29%
Ilorin	24,427	24%
Ikorodu	282,139	30%
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Kaduna	116,880	18%
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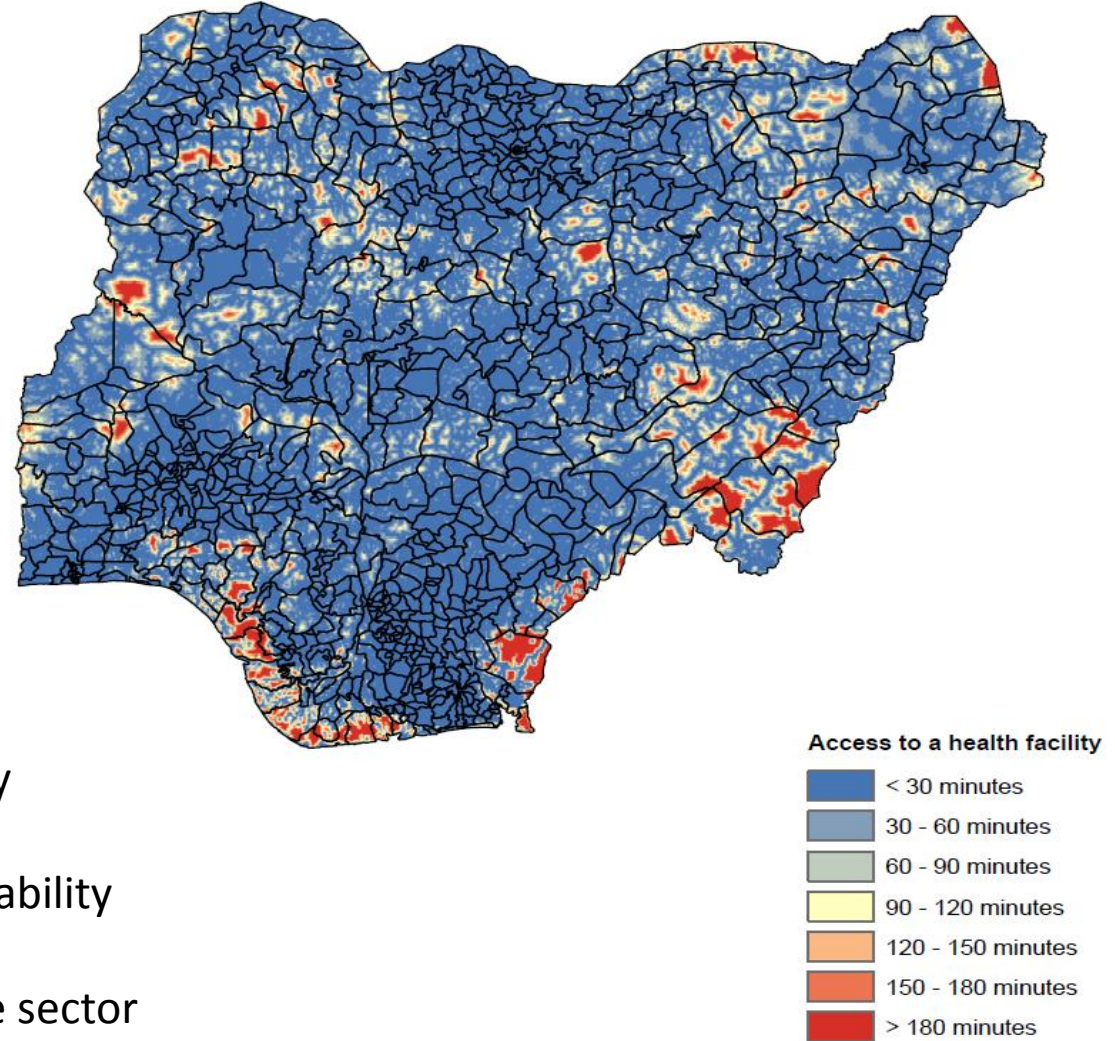
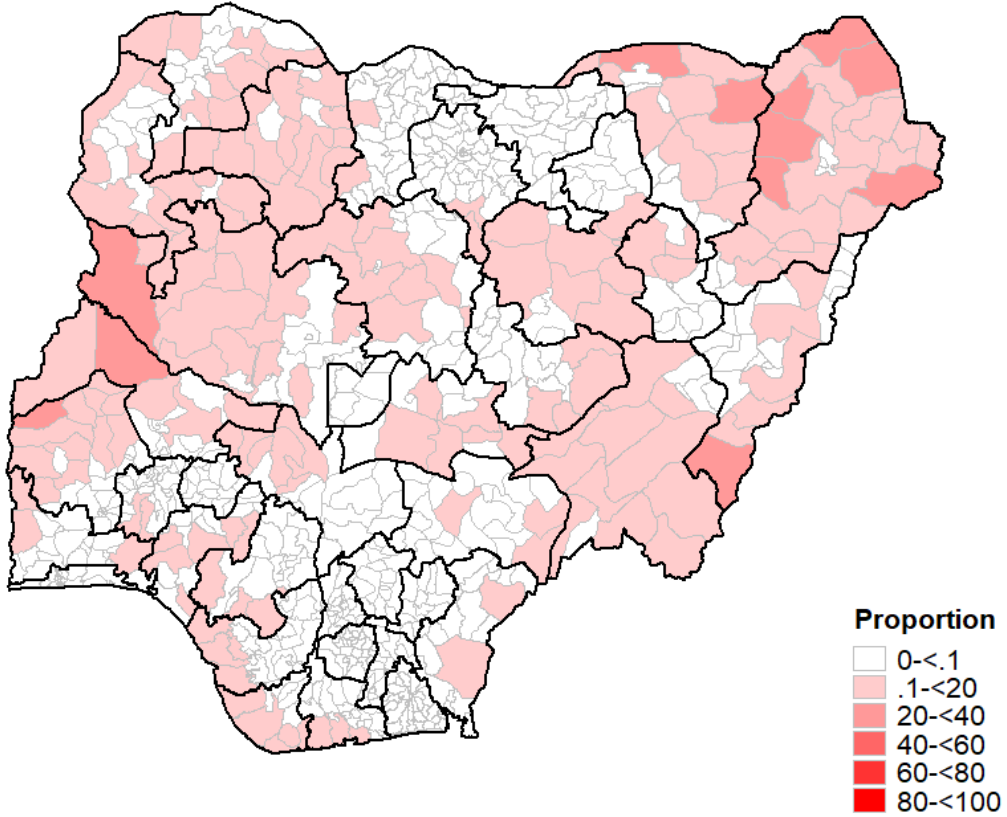
Lagos



Population = approx. 20 million



Health system stratification



Quality

Affordability

Private sector



Intervention targeting



Intervention type

Targeting criteria

Case management – formal health services	All districts, no need for stratification. However, analysis of accessibility will help inform scale of iCCM interventions
Indoor residual spraying	<ul style="list-style-type: none"> • Areas with the highest prevalence, incidence and under-five mortality rates
Pyrethroid-only nets	<ul style="list-style-type: none"> • Areas without IRS • Districts with $>1\%$ PfPR₂₋₁₀ in 2000 • Exclude districts with IRS • Microstratification required in districts covering cities with $>500k$ people
Pyrethroid-PBO nets	<ul style="list-style-type: none"> • If IRS not implemented • WHO recommends areas with intermediate pyrethroid resistance with MFO involvement. If countries do not have data on MFO, then in areas of intermediate resistance they can aim for those with the highest combined risks of prevalence, incidence and mortality
Seasonal malaria chemoprevention (SMC)	<ul style="list-style-type: none"> • Areas where PfPR₂₋₁₀ $>5\%$ in 2018 • Districts where $>60\%$ of rainfall occurs within 4 consecutive months.



Intervention type

Targeting criteria

Intermittent preventive treatment during pregnancy (IPTp)

All districts. No need for stratification. However, analysis of ANC and IPTp coverage will help inform efficient delivery of services

Intermittent preventive treatment in infants (IPTi)

- Districts NOT targeted by SMC with >10 PfPR₂₋₁₀ in 2018

Note: if scale up is in phases, areas with high burden but also with reasonably high access to health facilities (i.e. high EPI usage) can be considered in Phase 1 to maximize coverage, as well areas that report high rates of severe malaria admissions.

Integrated Community Case management (iCCM)

- Districts with $>5\%$ PfPR₂₋₁₀ in 2018 with low access to care

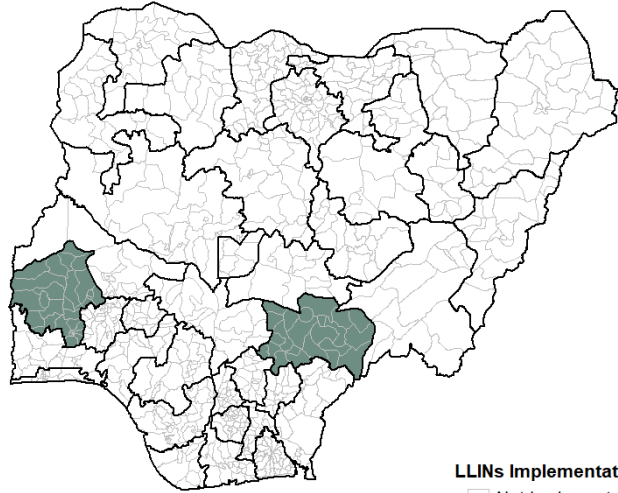
Note: if iCCM scale up nationwide is not possible, poor access (>5 km to nearest health facility) and high U5 mortality rate (>75 deaths per 1000 livebirths) can be considered for initial scale up to maximize on impact.

*Pending data on number of CHWs per LGA

Vector control targeting – past LLIN distributions

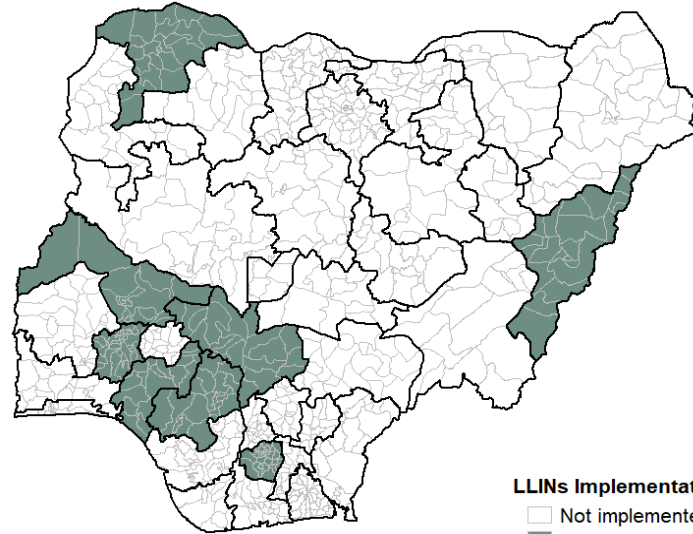


2016



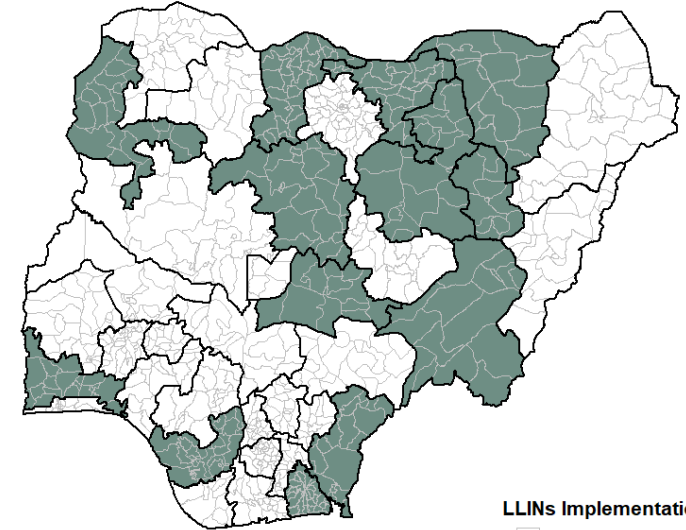
LLINs Implementation
□ Not implemented
■ Implemented

2017



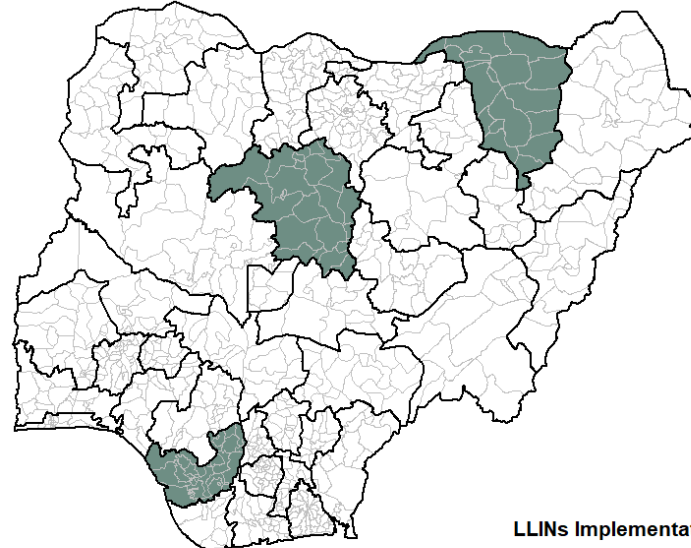
LLINs Implementation
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2018



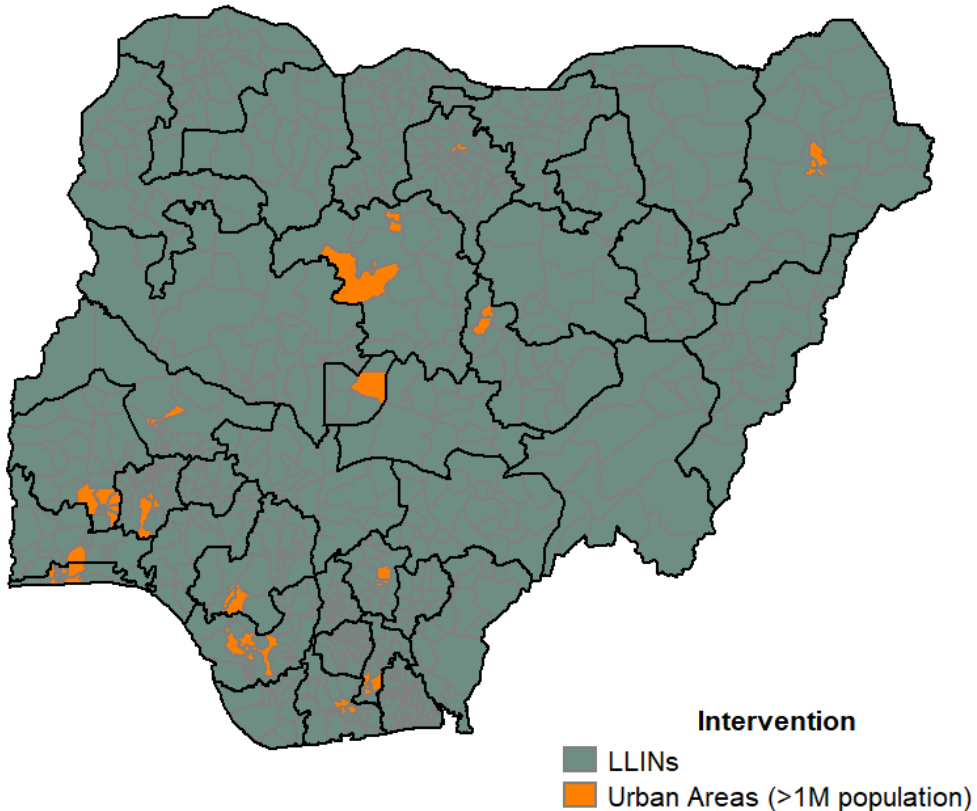
LLINs Implementation
□ Not implemented
■ Implemented

2019



LLINs Implementation
□ Not implemented
■ Implemented

Vector control targeting – LLINs where IRS is not planned

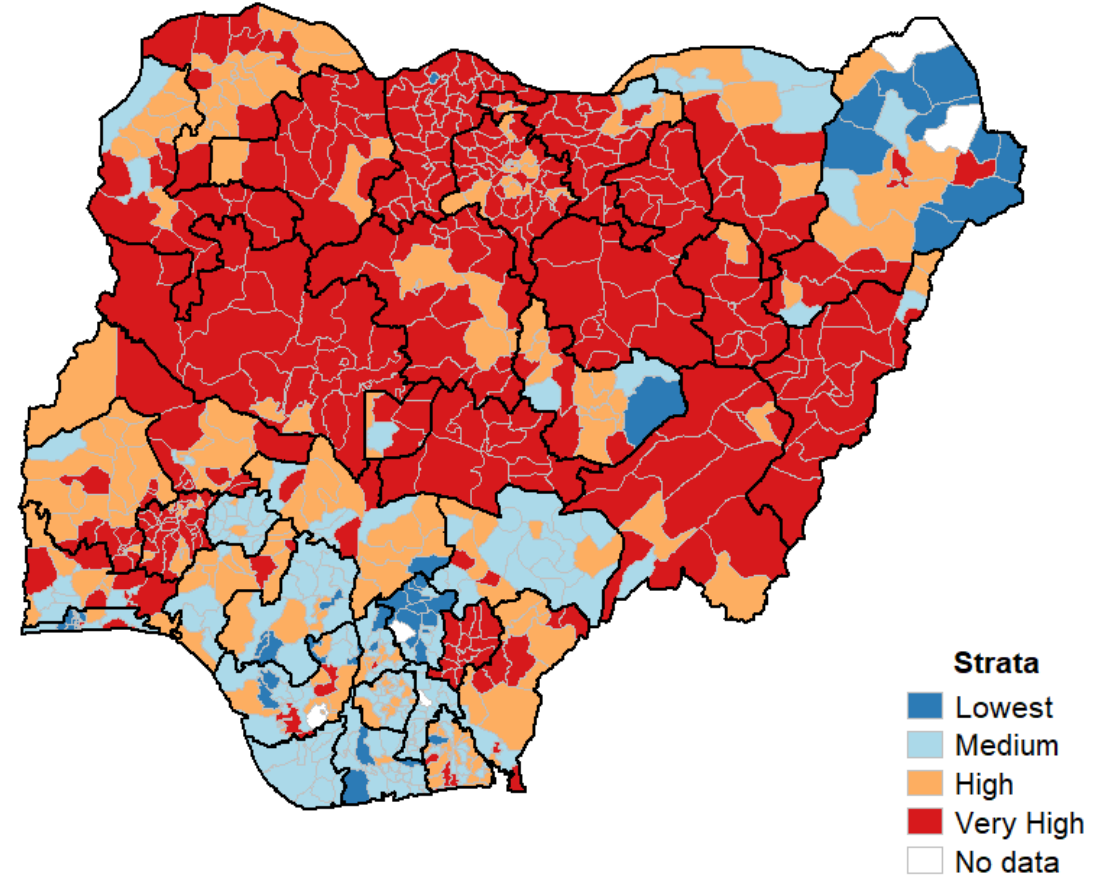
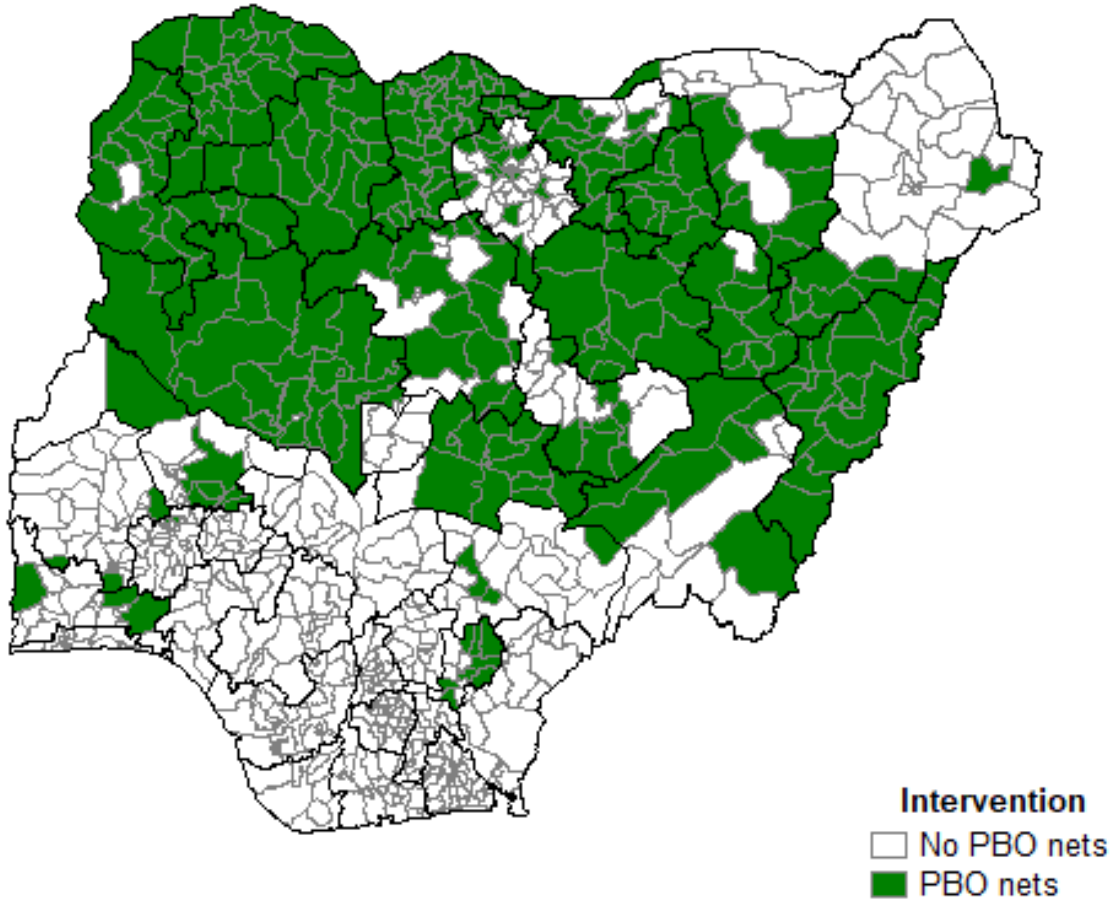


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Microstratification in urban areas using routing HF-level data and urban/peri-urban mapping

NOTE: GPS coordinates required

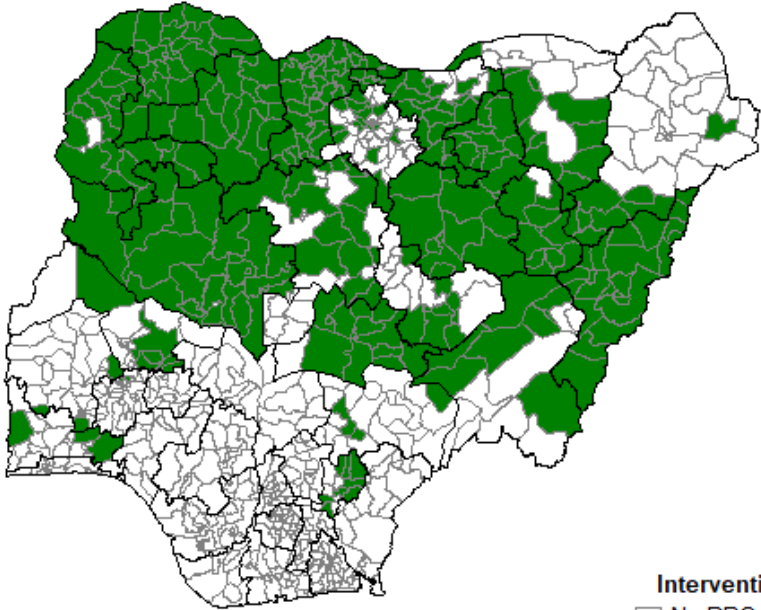
Vector control targeting – PBO LLINs



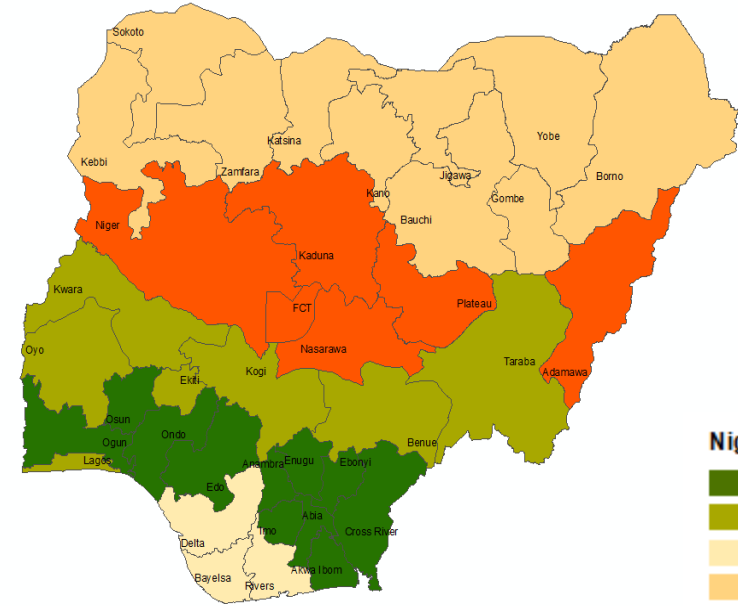
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Vector control targeting – PBO LLINs

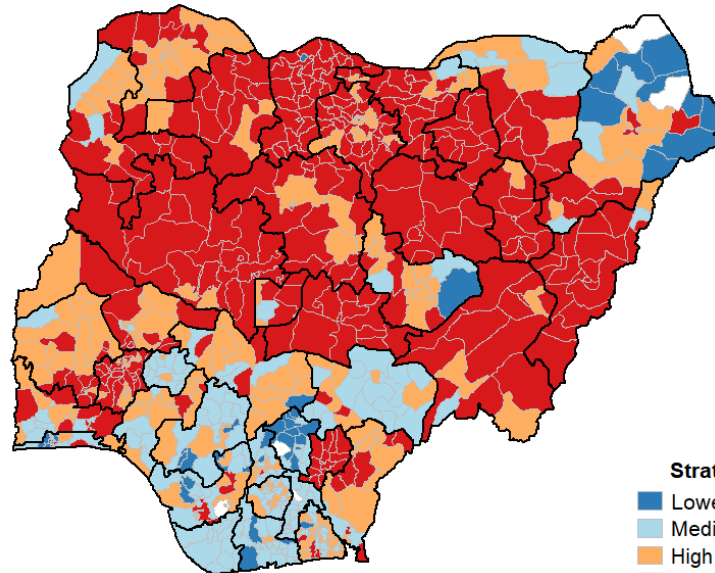


Intervention
□ No PBO nets
■ PBO nets



Nigeria Eco Zones

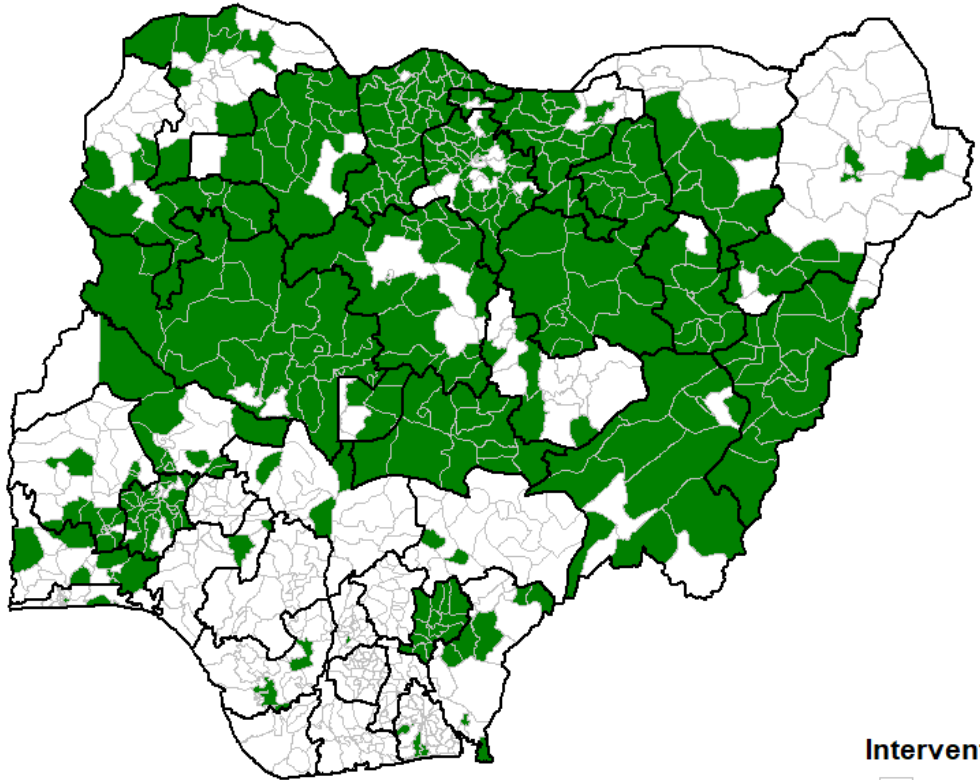
- Equatorial Forest
- Guinea Savannah
- Mangrove
- Sahel
- Sudan Savannah



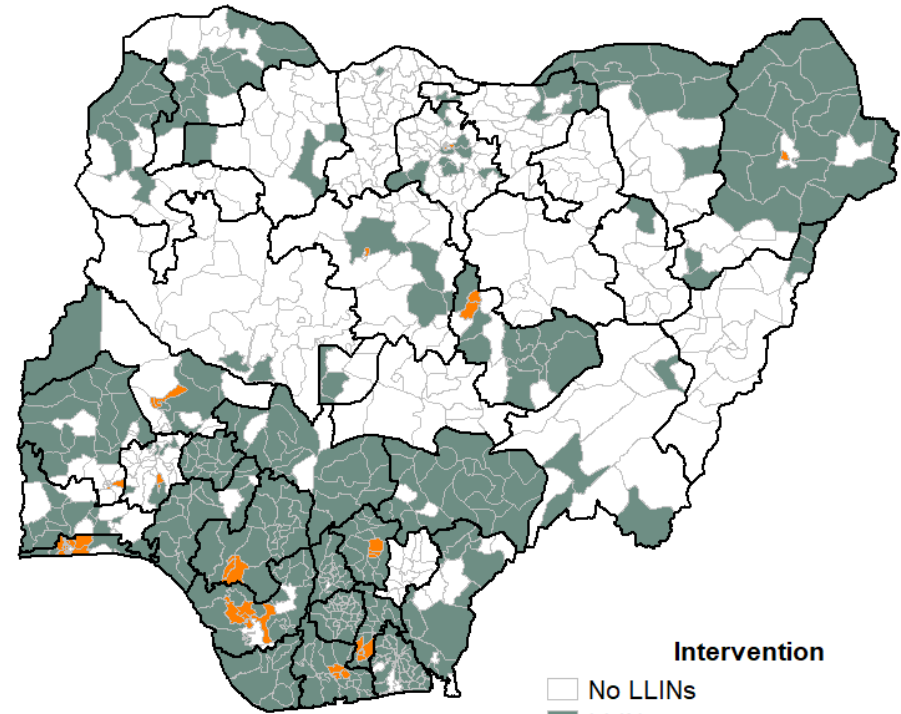
Strata

- Lowest
- Medium
- High
- Very High
- No data

Vector control targeting - IRS



Intervention
□ No IRS
■ IRS



Intervention
□ No LLINs
■ LLINs
■ Urban Areas (>1M population)

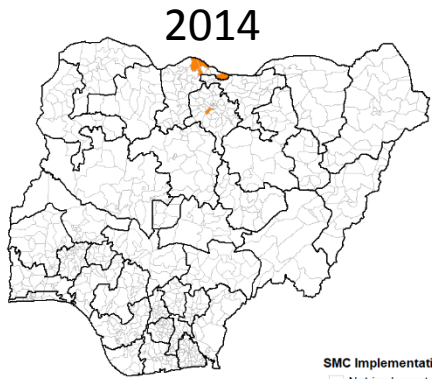
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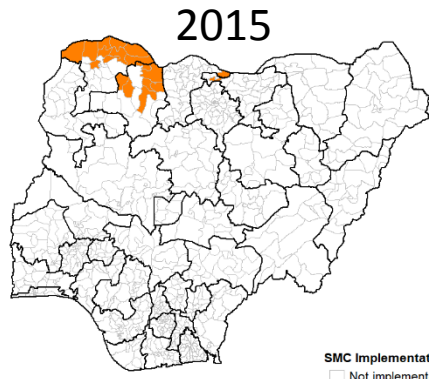


- 2,063,642 confirmed from 52,207 health facilities
- 30% of are among children under 5, 3% among pregnant women

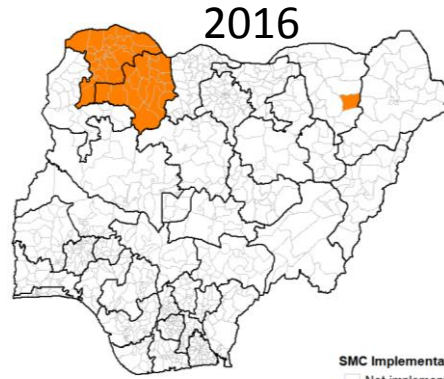
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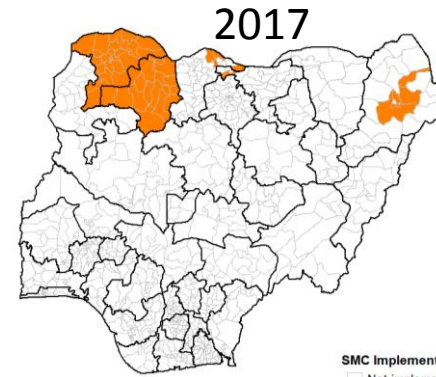
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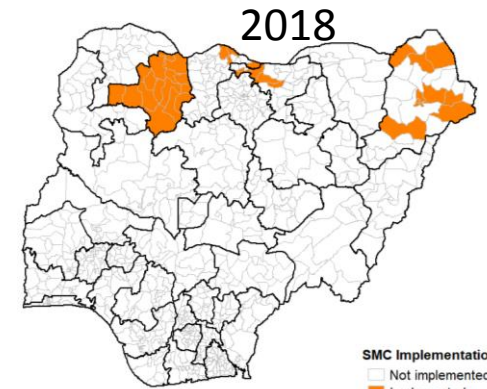
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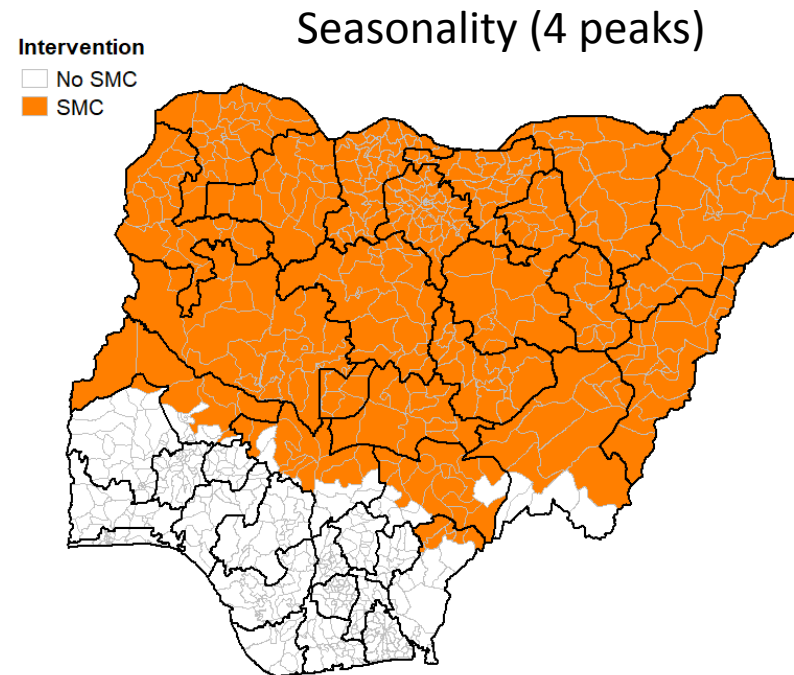
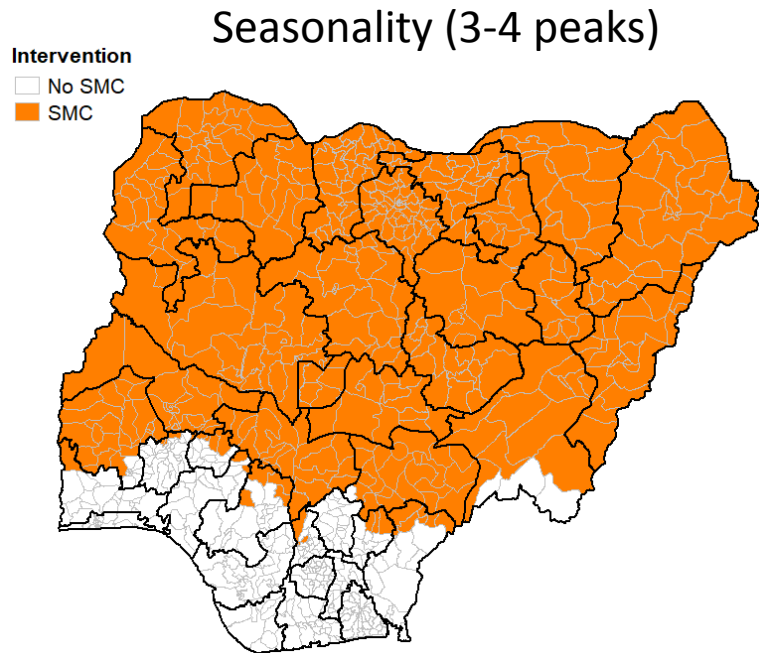
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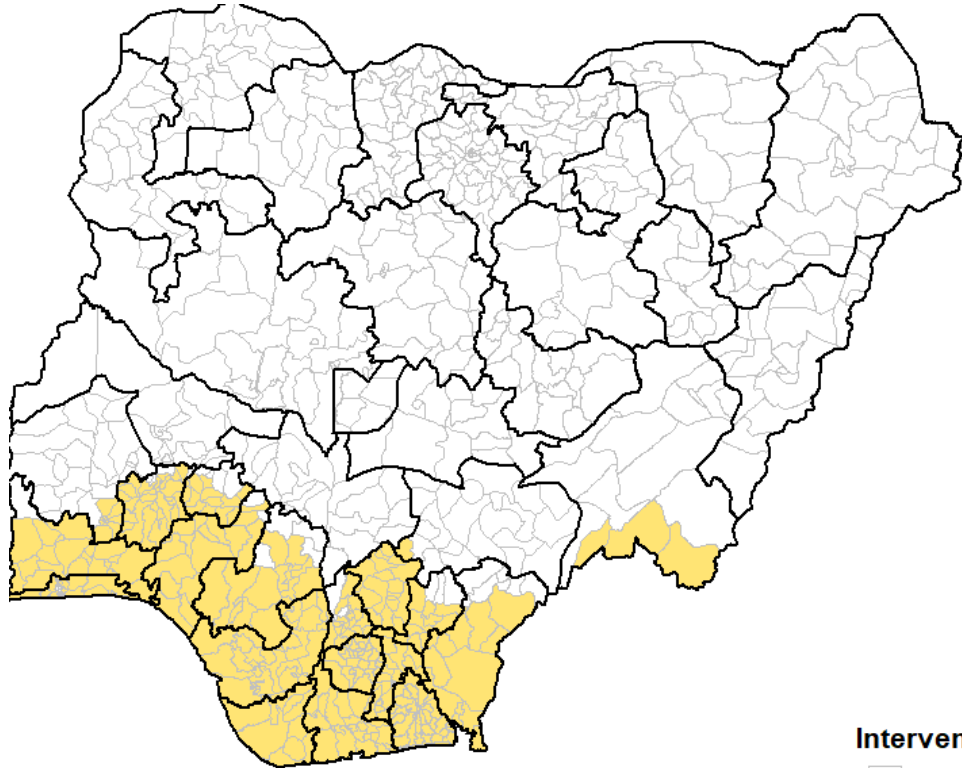
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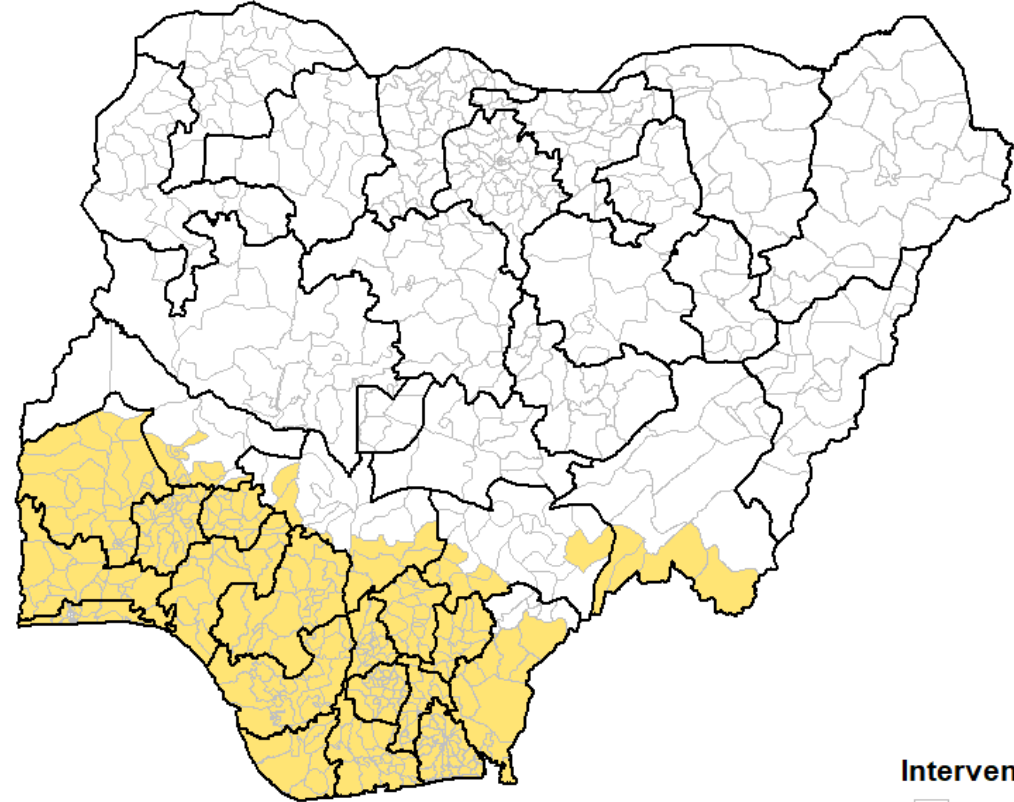


Seasonality (3-4 peaks)



Intervention
 □ No IPTi
 ■ IPTi

Seasonality (4 peaks)

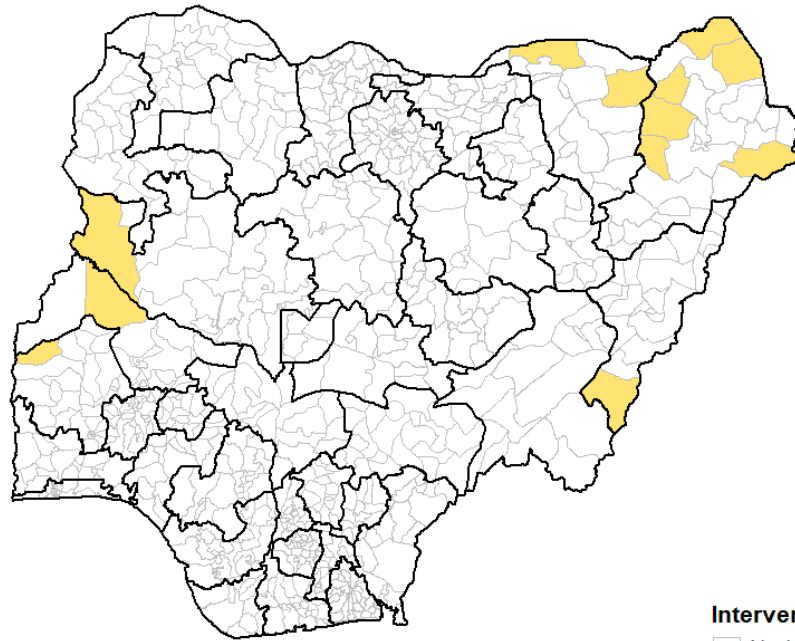


Intervention
 □ No IPTi
 ■ IPTi

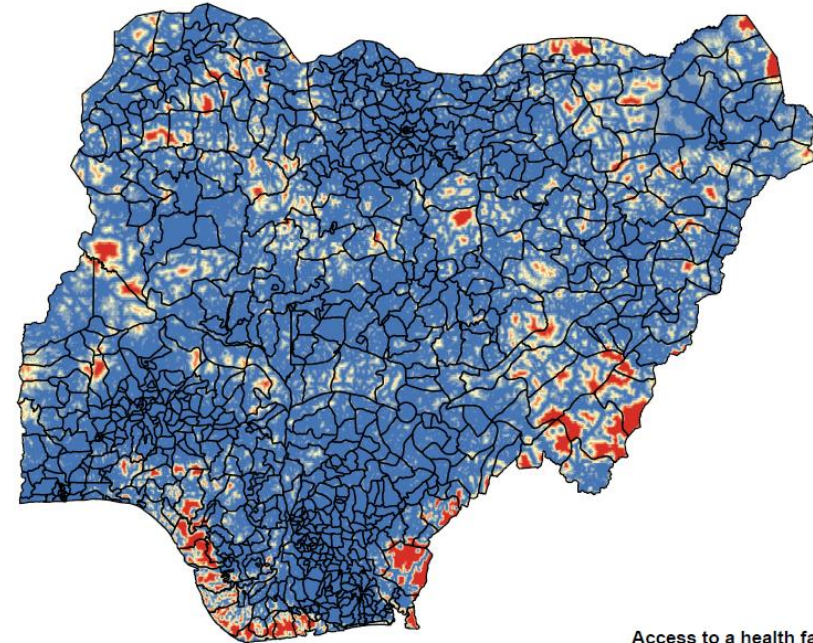
Identify areas of highest EPI coverage to further target IPTi to areas where it will have the highest impact

***NOTE:** EPI coverage commonly >100%

- PfPR>5%
- >20% of the population living outside of a 5km radius



Intervention
 □ No iCCM
 ■ iCCM



Access to a health facility

- < 30 minutes
- 30 - 60 minutes
- 60 - 90 minutes
- 90 - 120 minutes
- 120 - 150 minutes
- 150 - 180 minutes
- > 180 minutes

Pending on CHWs density data per LGA
 *NOTE: Not included in the intervention mix analysis

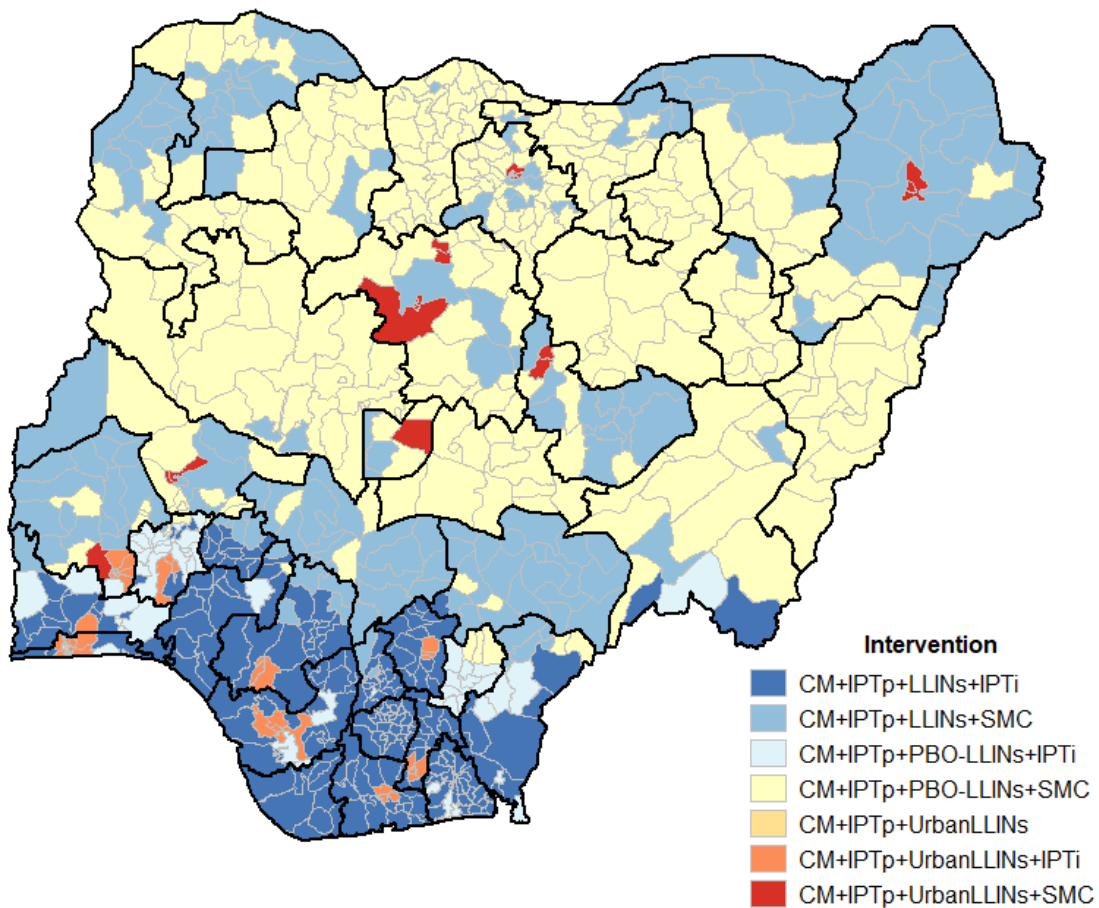


Intervention mixes

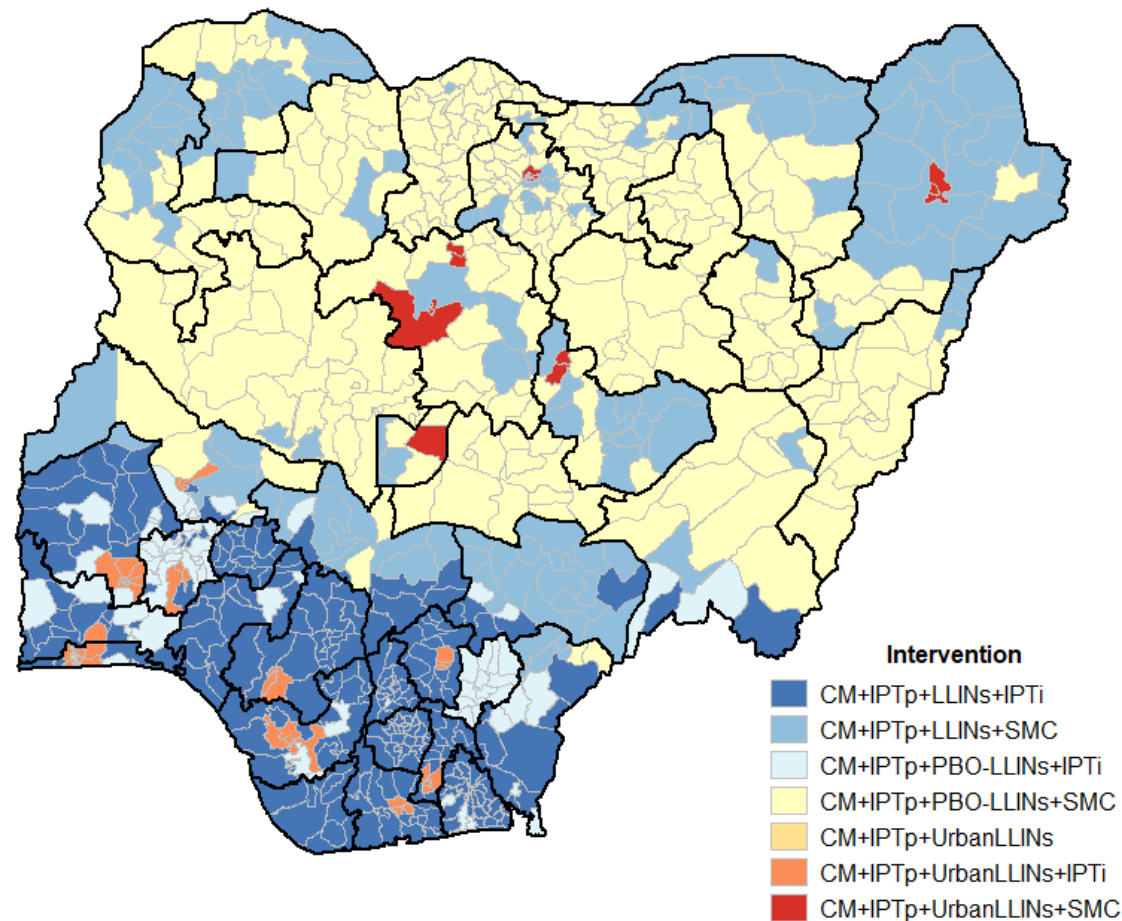
Intervention mix – excluding IRS



Seasonality (3 and 4 peaks)



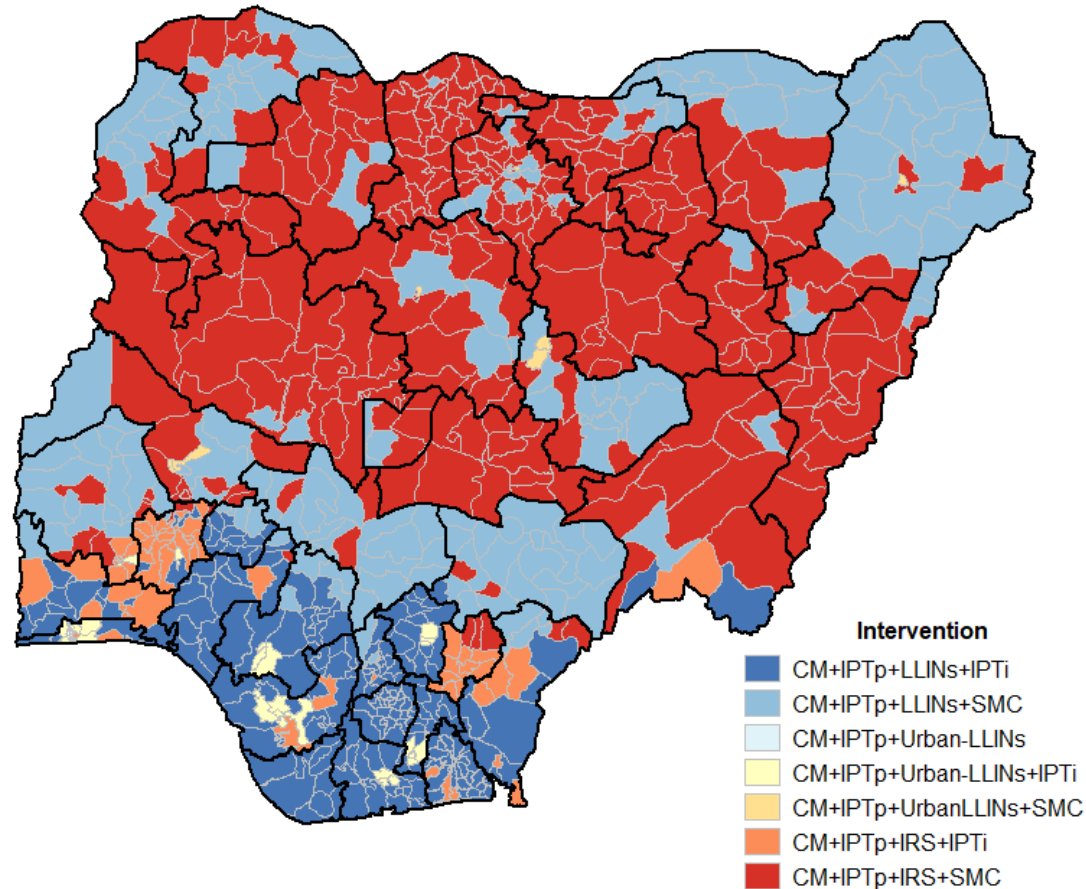
Seasonality (4 peaks)



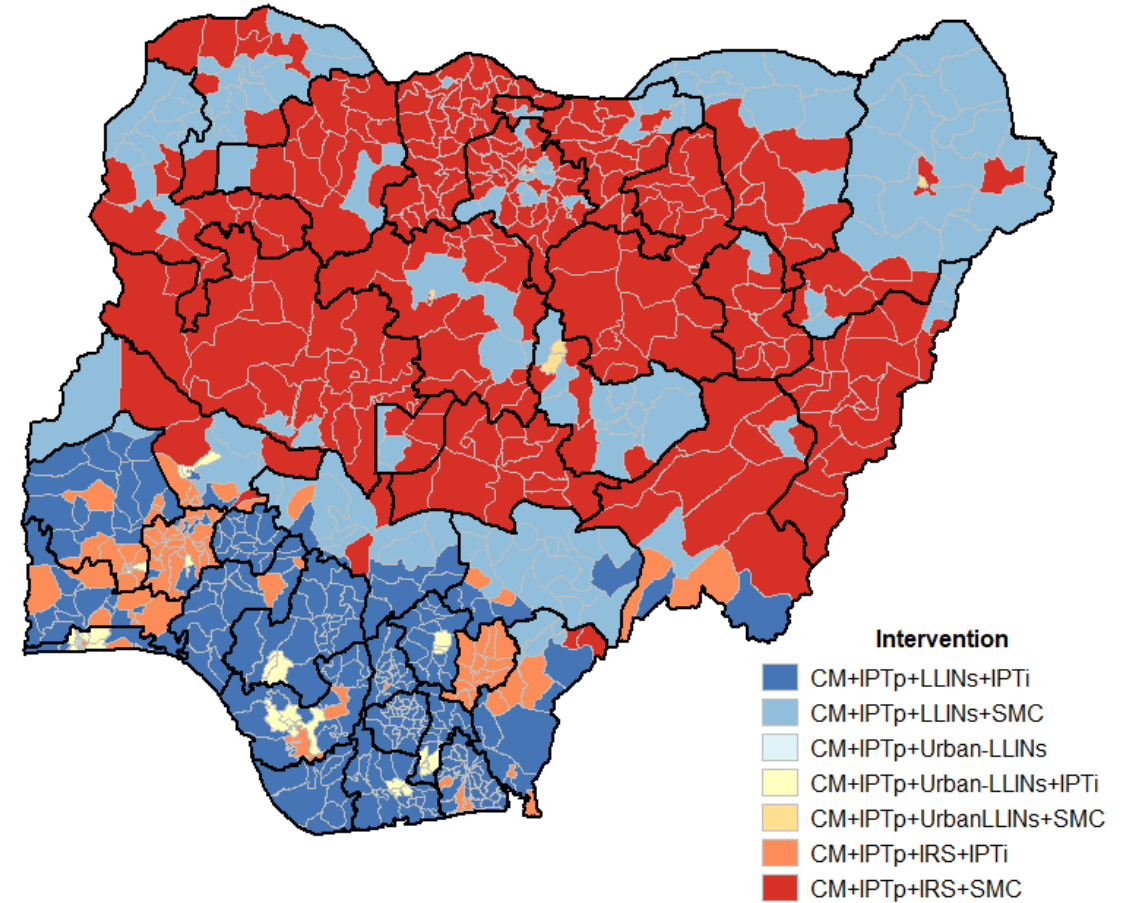
Intervention mix – including IRS



Seasonality (3 and 4 peaks)



Seasonality (4 peaks)





1. Finalize consensus of intervention mixes
2. Finalize model calibration
3. Impact assessments of the intervention mixes
4. Costing of plan
5. Prioritization