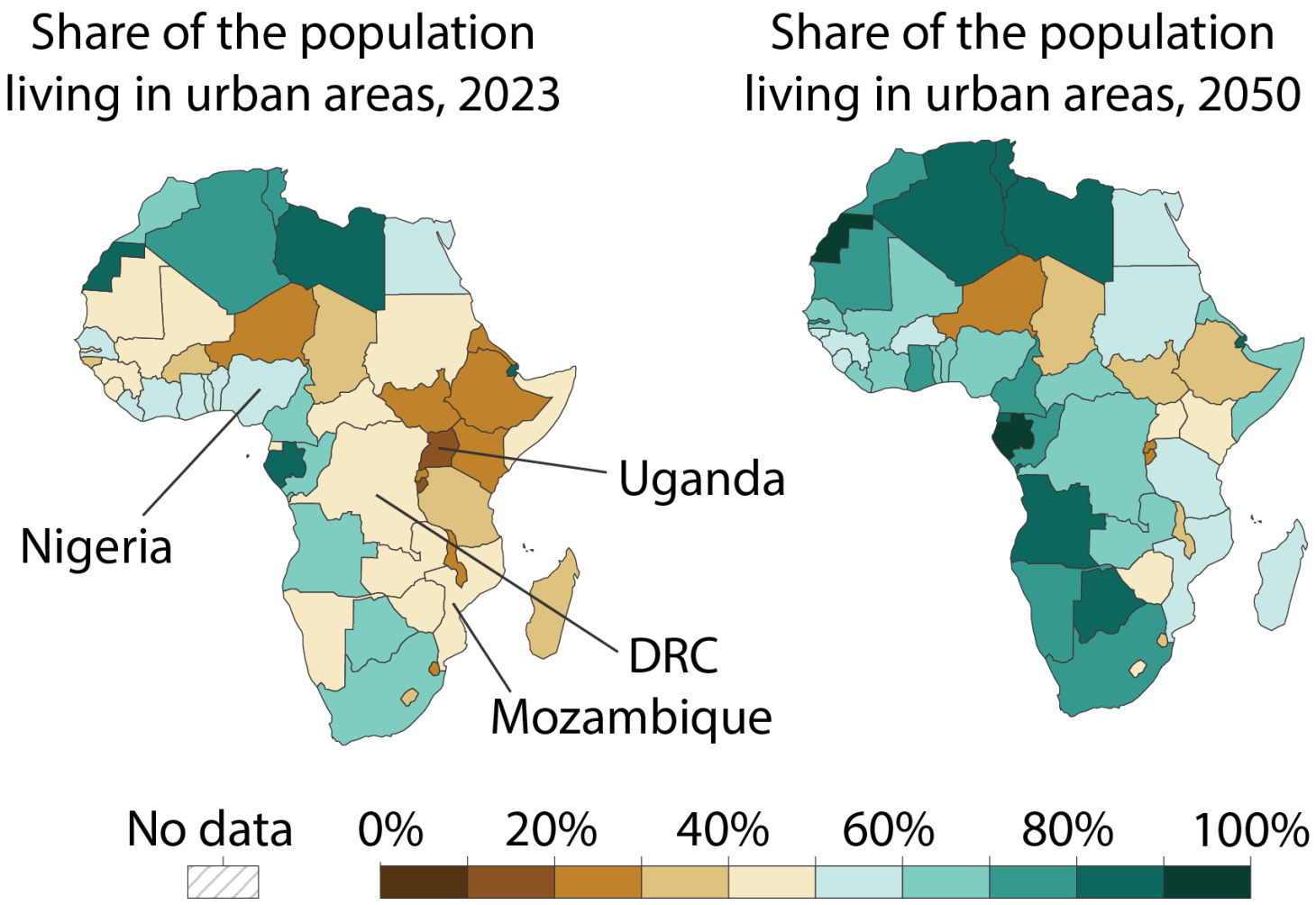
# A mixed method framework for deprioritization of ITNs, codesigned with stakeholders and applied to Ilorin, Kwara

Ifeoma Ozodiegwu
Assistant Professor,
Department of Health Informatics and Data Science
February 19, 2024

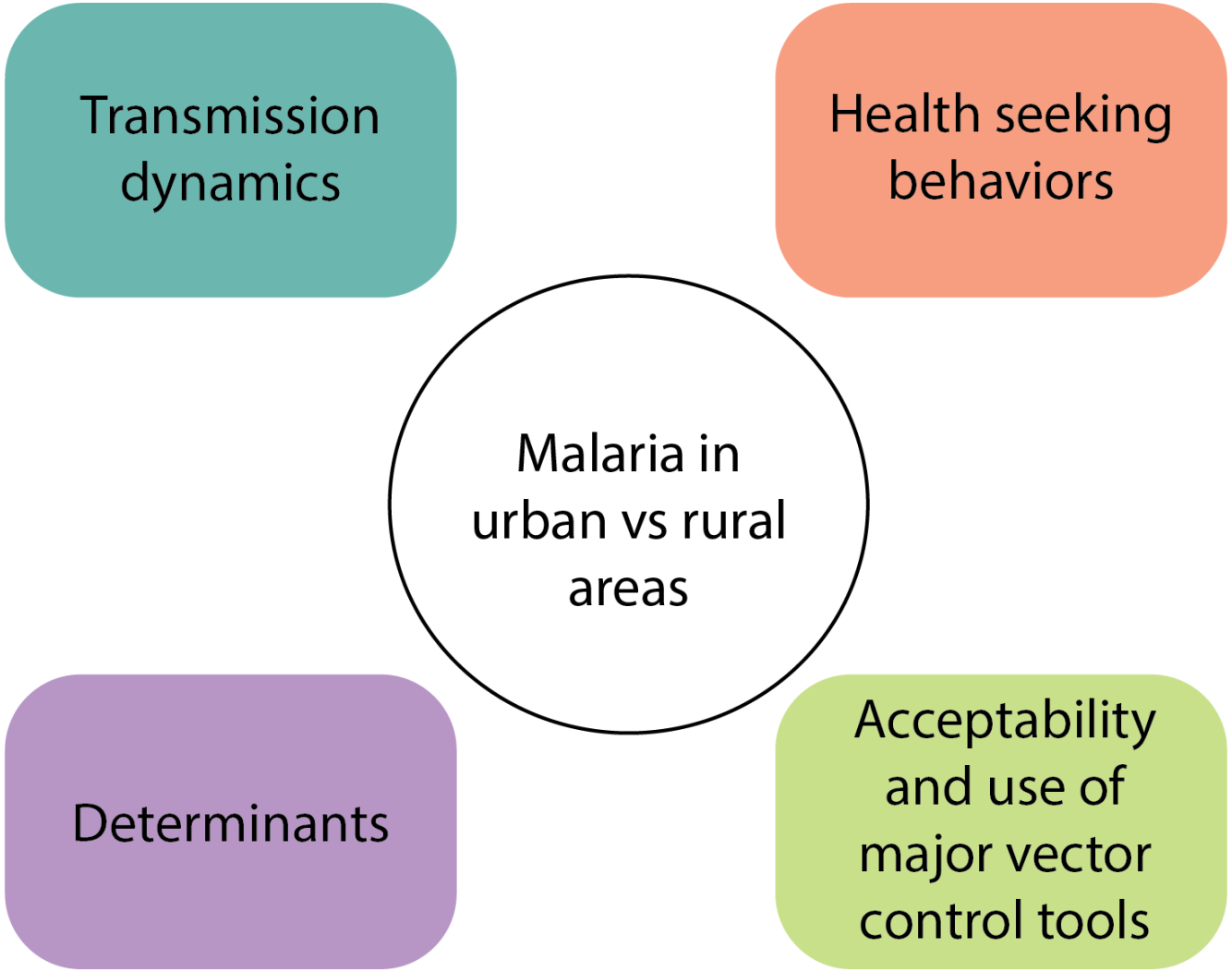


LOYOLA
UNIVERSITY CHICAGO
*Preparing people to lead extraordinary lives*

# Malaria endemic countries are rapidly urbanizing, requiring a focus on malaria in urban areas



# Current malaria control approaches are based on data from rural areas but context in urban areas differs



# These differences have implications for the malaria response in urban areas

## Differences in the context of malaria in urban vs rural areas

### Disease distribution

Transmission is mostly focal in urban areas, concentrating in peri-urban and informal settlements while in rural areas, it is typically generalized

### Infection source

Infections in urban areas are often linked to travel to and from rural areas with high transmission while most infections in rural areas are locally acquired

### Housing types

Many housing types reduce indoor biting in urban areas, except in poor quality housing in low-income areas

### Acquatic habitats

More diverse and related to human activity in urban areas while in rural areas they are often large and related to natural ecology

## Implications for urban malaria

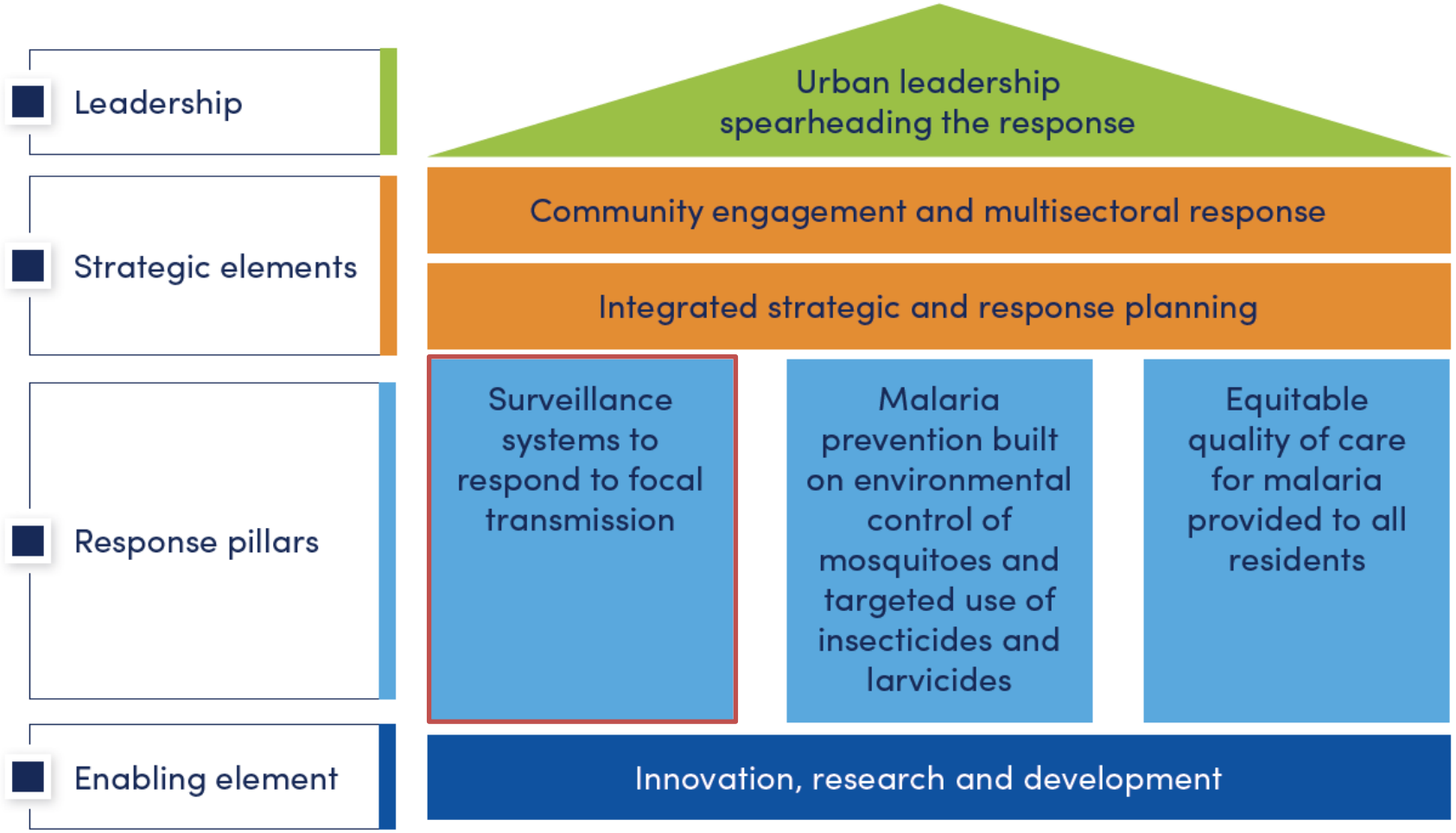
A more targeted approach to surveillance and intervention delivery is needed

Seasonality of travel may affect seasonality of infections

Bednets may have minimal impact in areas with high quality housing

Newer vectors such as *Anopheles Stephensi*, adapted to urban habitats may become predominant

# The response to malaria in urban areas needs to be locally led and requires data at the smallest admin unit to identify and prioritize those at risk




**Data needs**

- Epidemiologic (prevalence, incidence and mortality)
- Entomologic (Indoor and outdoor biting rates, vector species, aquatic habitats)
- Interventions
- Mobility and demographics
- Climatic and other environmental data
- Socioeconomic determinants

# …and should ideally follow the process for subnational tailoring of interventions to determine the appropriate interventions for urban communities

- WHO recommended approaches and interventions to prevent malaria in urban areas
  - Environmental management
  - Chemical and microbial control
  - Chemoprevention
  - Vaccine
  - Behavioral change

# Many countries lack essential data for prioritization and want to optimize bednet distribution in urban areas.

My team co-created a mixed method framework together with Nigeria's NMEP to optimize bednet distribution in cities through deprioritization of the least vulnerable communities

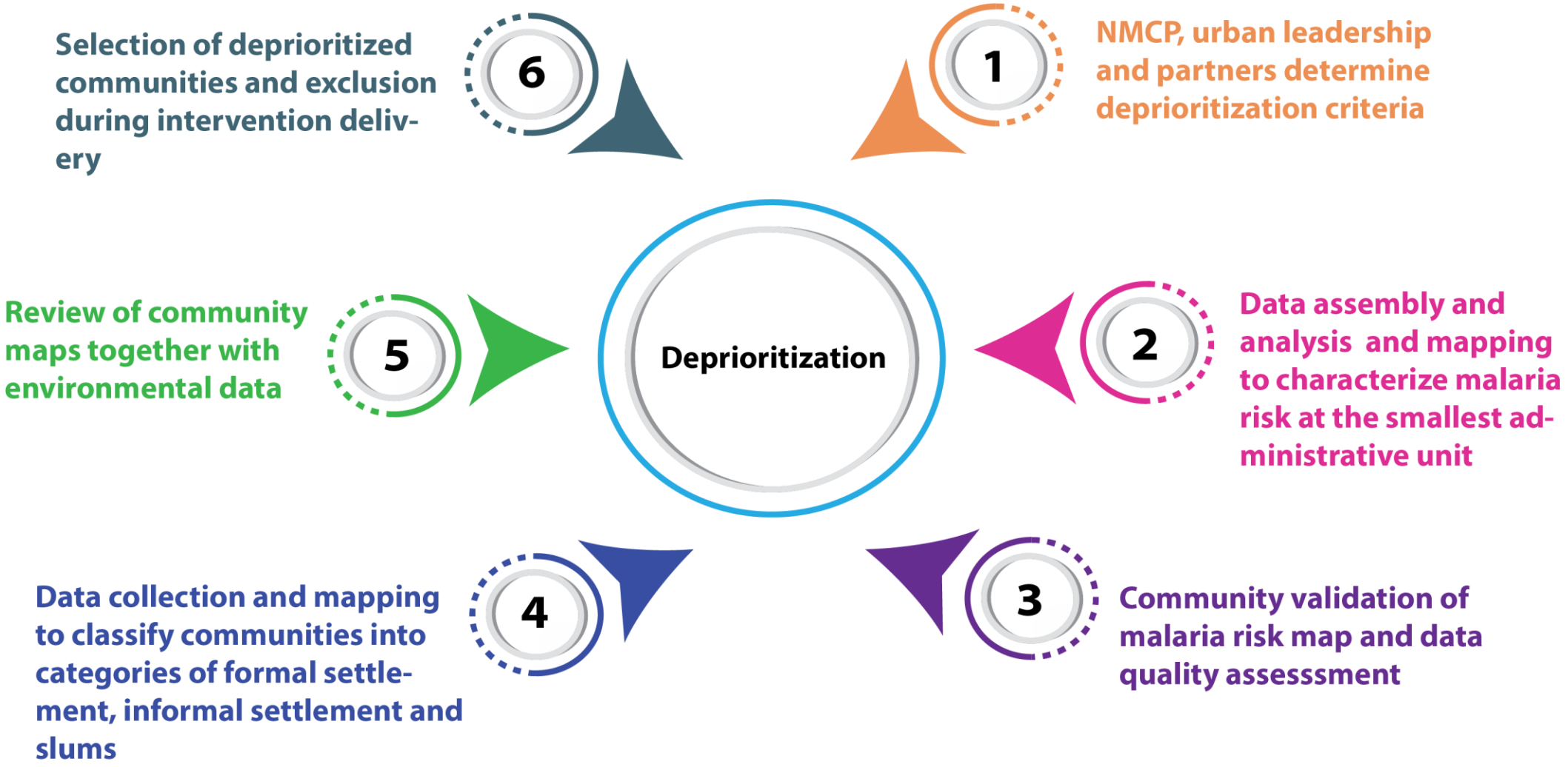
# The what and why of deprioritization

- The focus is identifying communities with characteristics that are reduce their risk of malaria transmission

- Easier to distinguish the least vulnerable from vulnerable communities based on observable environmental characteristics.

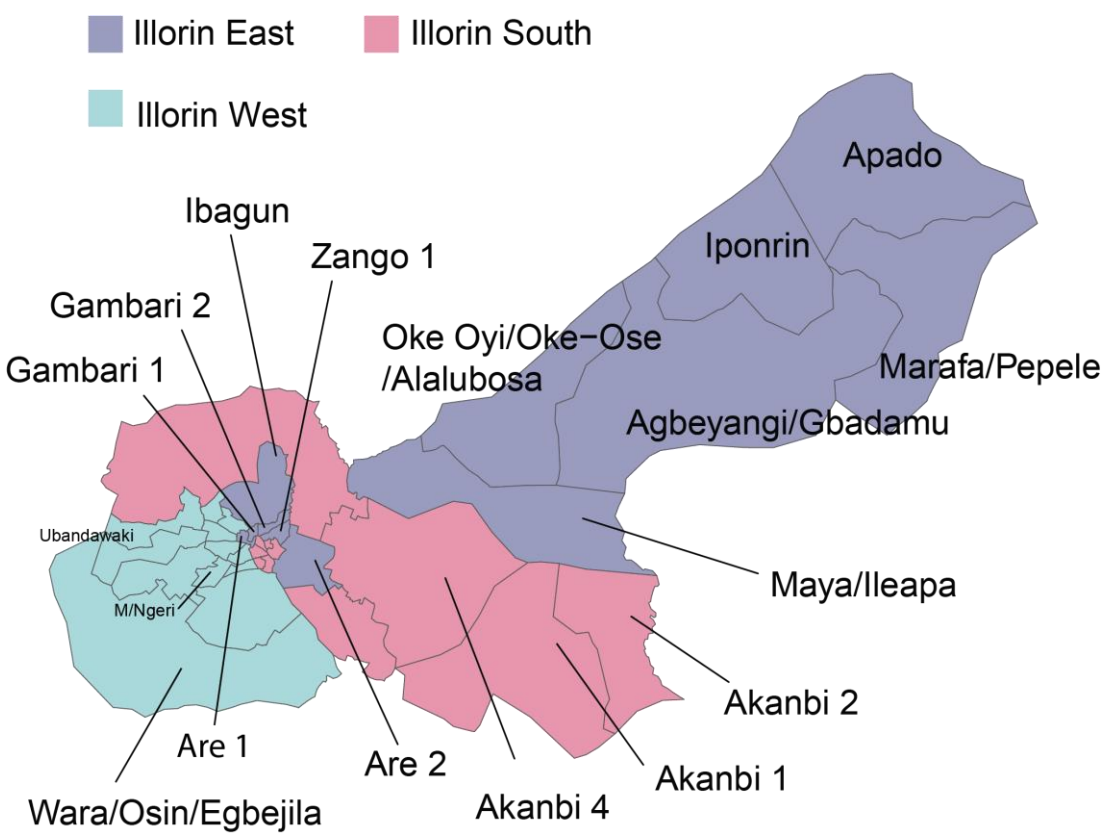
- Prioritization is more challenging as it requires precisely ranking communities with similar levels of vulnerability. As such, data on burden and determinants are needs to be available.

# Approach for deprioritization



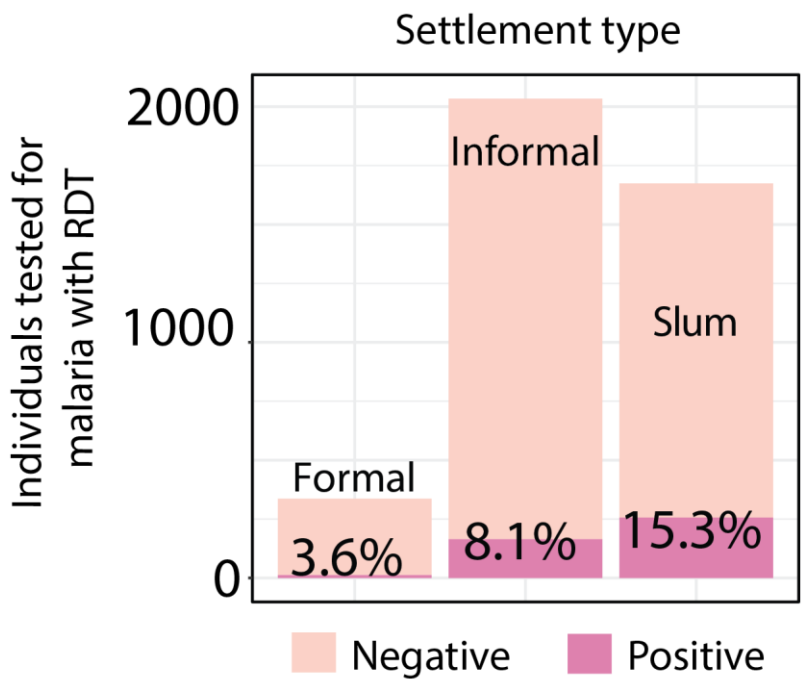
# Illorin bednet campaign deprioritization trial case study

- Kwara state reported a 6% malaria prevalence rate among children under the age of 5 years in the 2021 MIS
- Due to funding constraints in the Global Fund grant cycle 7, the NMEP wanted to deprioritize low-risk urban communities during the 2023 ITN mass campaign
- No baseline survey had been conducted in Ilorin urban communities to understand malaria risk
- Our team was recruited to support the NMEP to develop an approach to identify low-risk areas for deprioritization within a 2-week timeline

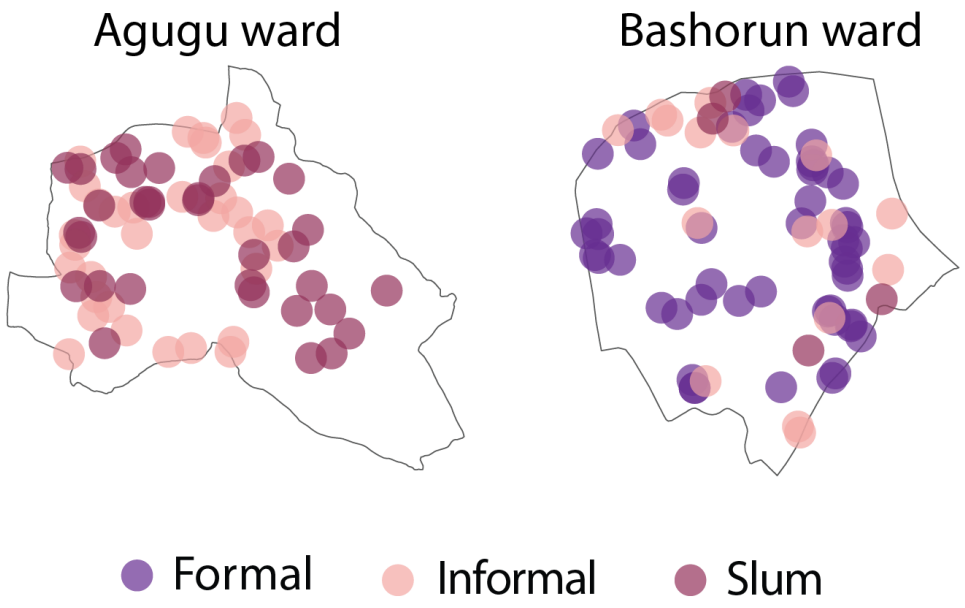



Three “urban” LGAs comprising of 35 wards were selected for the trial

# What we learned from our ongoing studies to understand malaria transmission in Nigerian cities



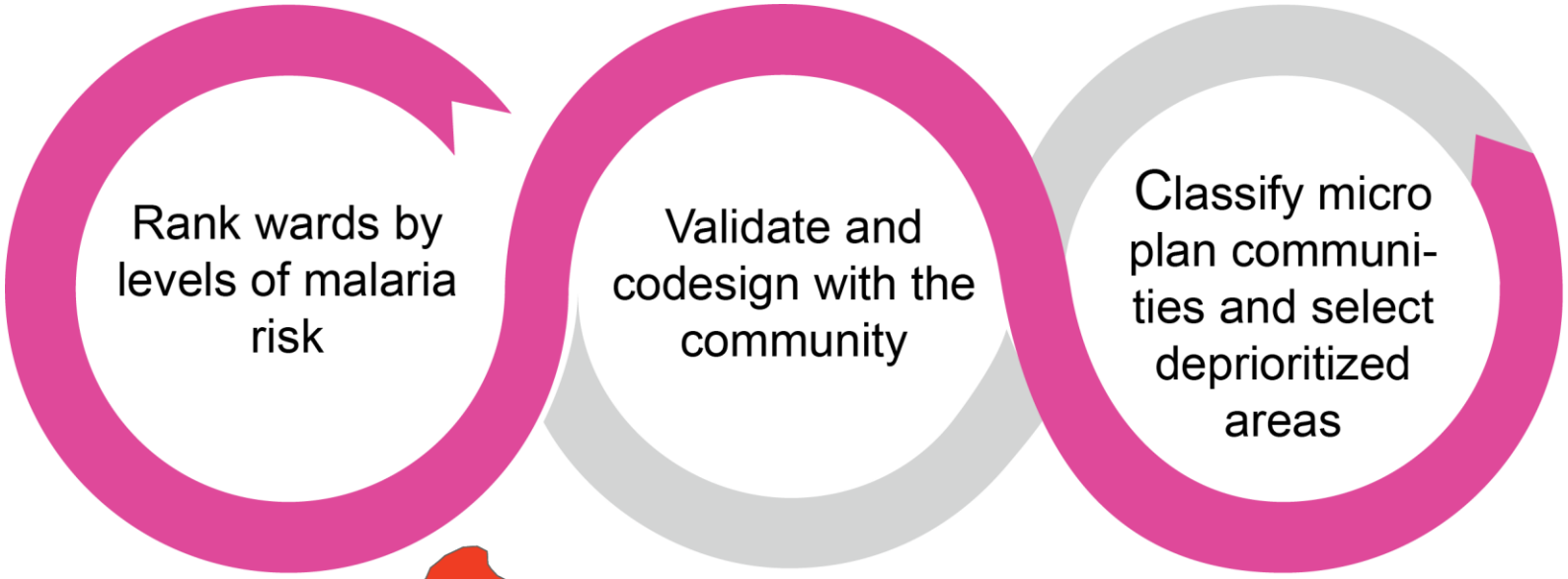

Early findings from our ongoing field study in Ibadan metropolis suggested the existence of ward-level differences in living conditions.

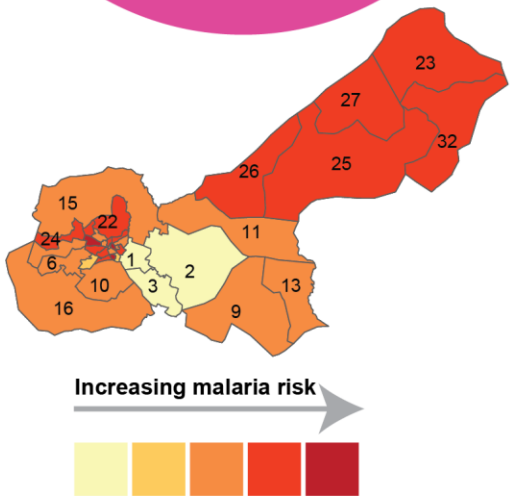


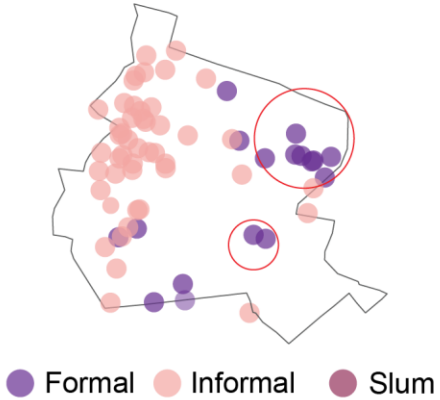

Working with communities to capture the characteristics of different settlement types allowed us to identify low-risk areas

We took a similar approach to identify communities with characteristics that may reduce of malaria transmission in Illorin

# Our process was as follows:



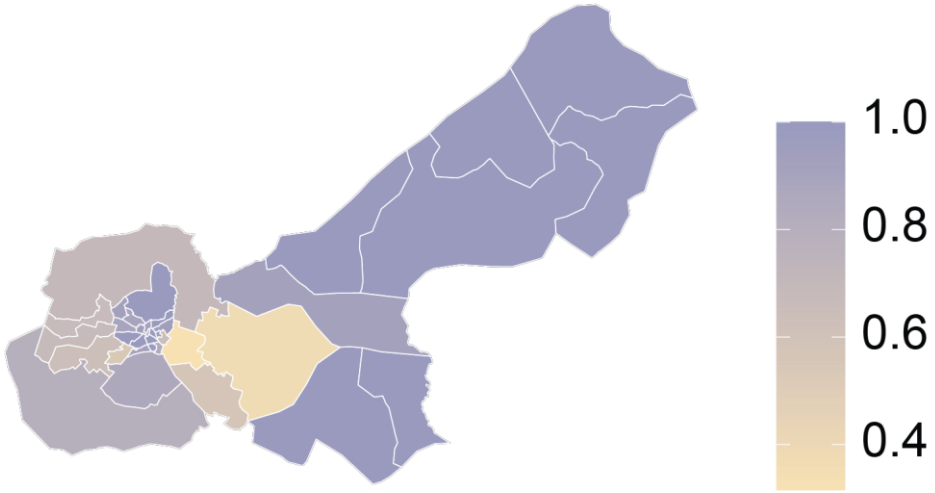



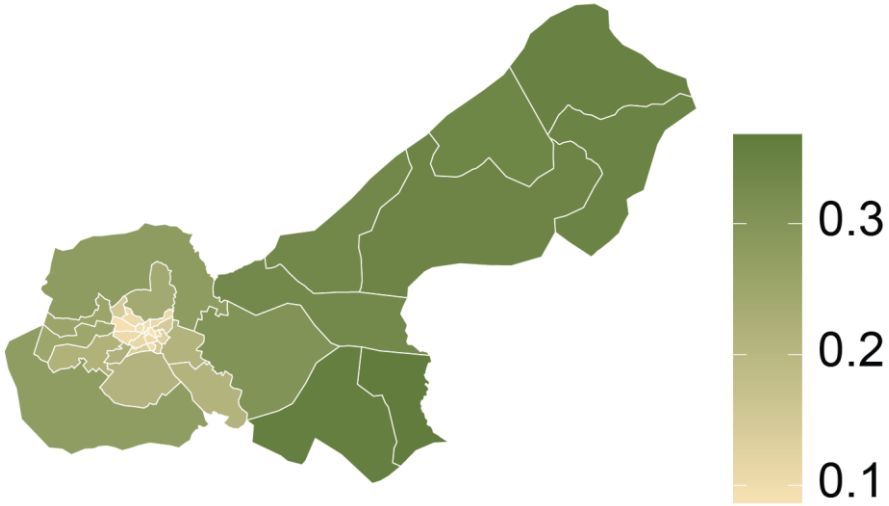
# Rank wards by levels of malaria risk

# We gathered available data on factors linked to malaria risk

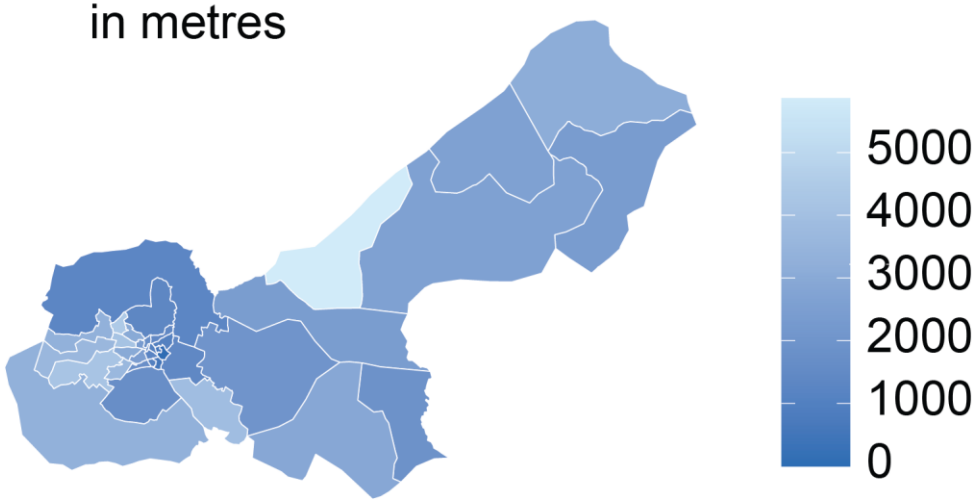
Proportion of neighborhood blocks with poor quality housing (2017 - 2018)



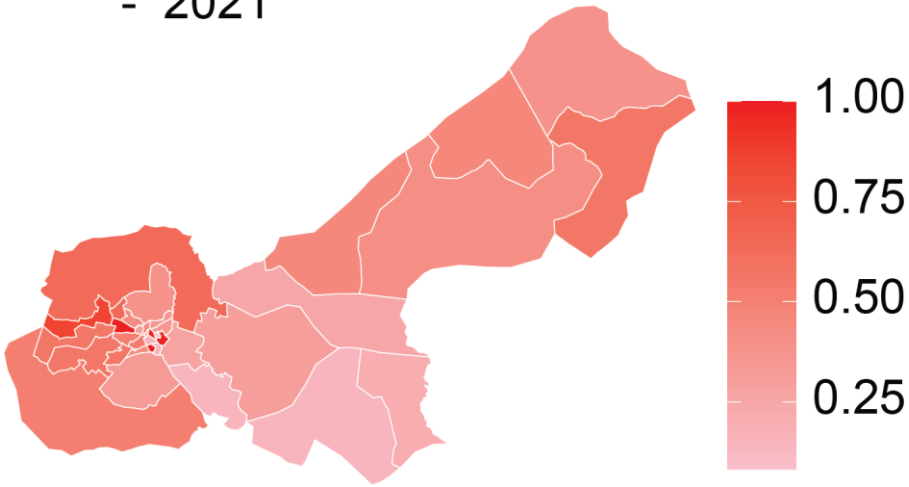

Enhanced vegetation index in 2020




Distance to water bodies in metres

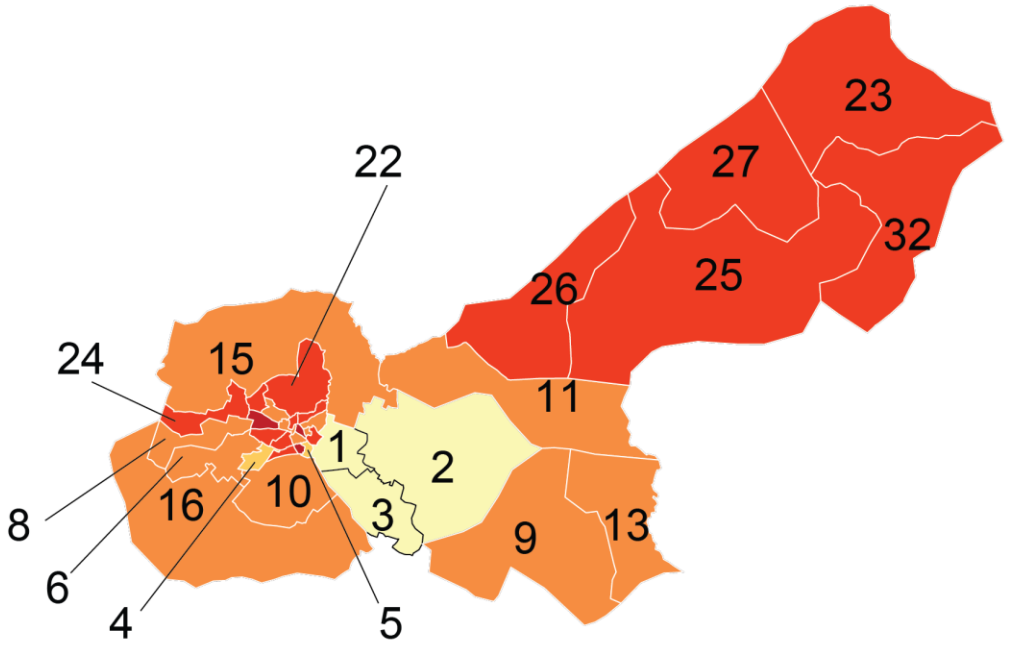



U5 test positivity rates, 2014 - 2021

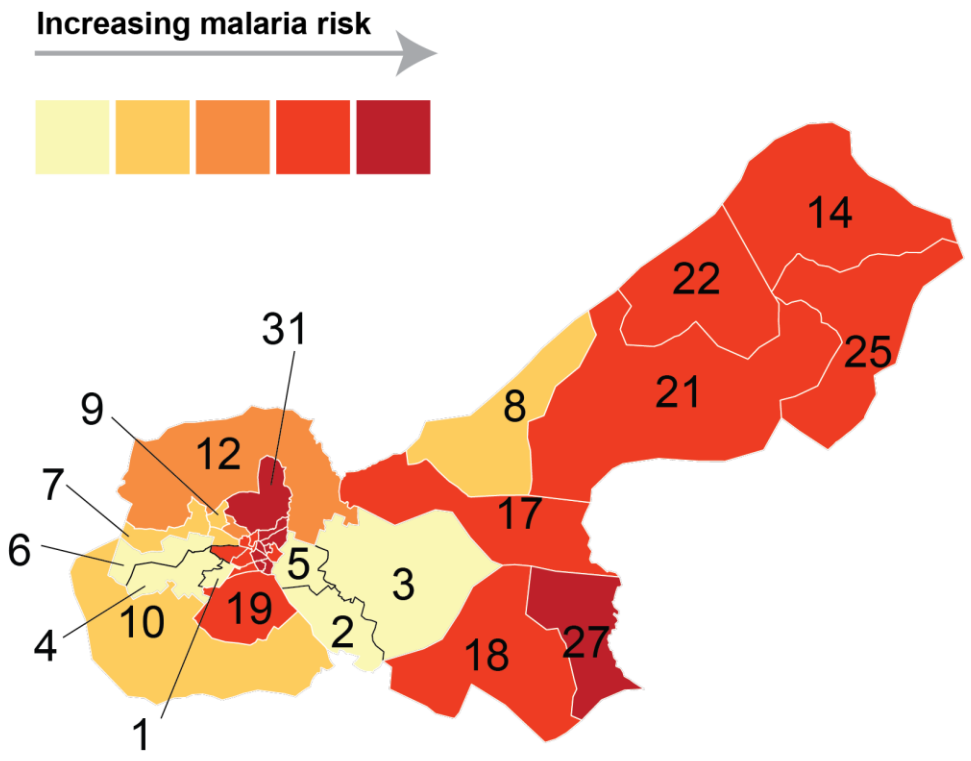


We combined these indicators to generate several maps of malaria risk

# To account for uncertainty, we created several maps




U5 test positivity rates + Proportion of neighborhood blocks with poor quality housing




Distance to water bodies + Proportion of neighborhood blocks with poor quality housing

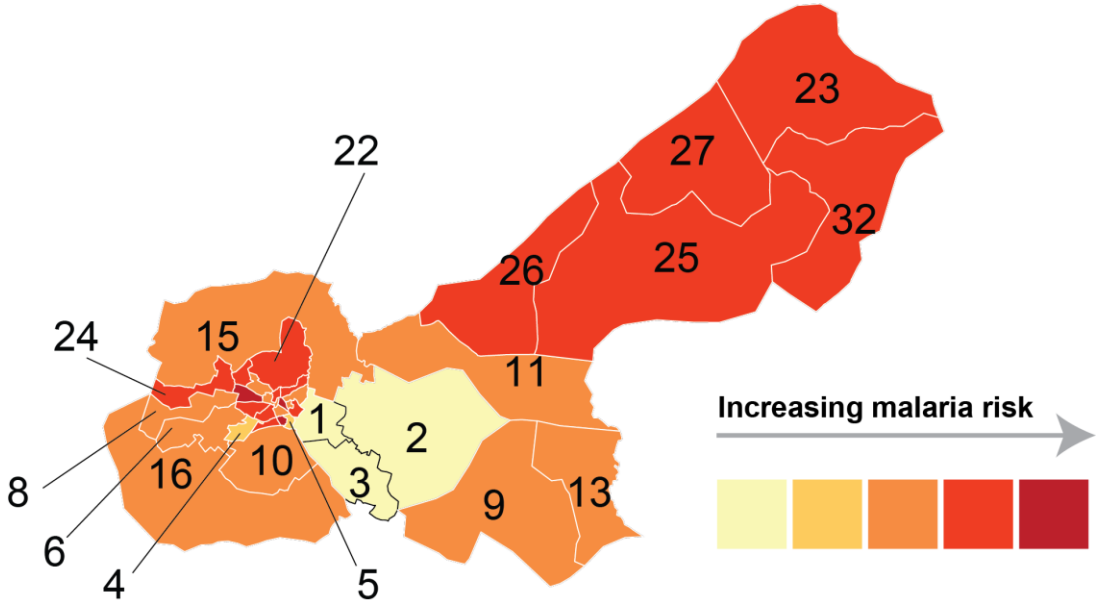
# Validate and codesign with the community

# We relied on local expertise to guide decisions and design the process

We organized a multi-stakeholder dialogue to guide the following decisions

- Determine the most appropriate data to classify wards by malaria risk levels
- Select the map that most accurately represents malaria risk
- Determine the next steps of the process
- Determine the characteristics of formal settlements, informal settlements and slums
- Create a checklist to classify communities by settlement types

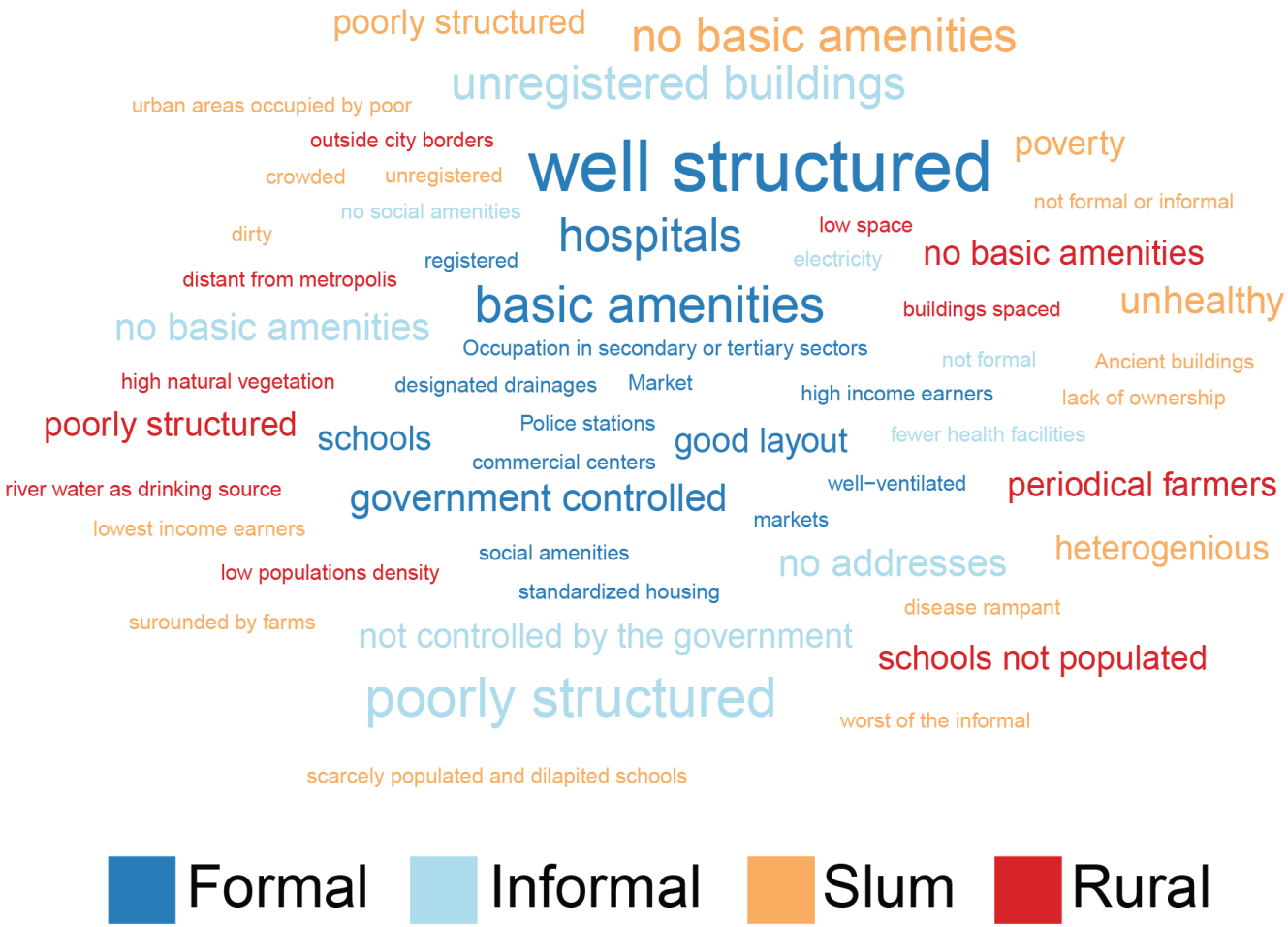
# At the end of the multi-stakeholder dialogue, participants chose the card that best represented their understanding of malaria risk.




U5 test positivity rates + Proportion of neighborhood blocks with poor quality housing

The first two highest ranked wards were selected for deprioritization. Participants noted that entire wards cannot be deprioritized given heterogeneities in living conditions even within wards

The multi-stakeholder dialogue also provided useful information to guide the classification of settlements



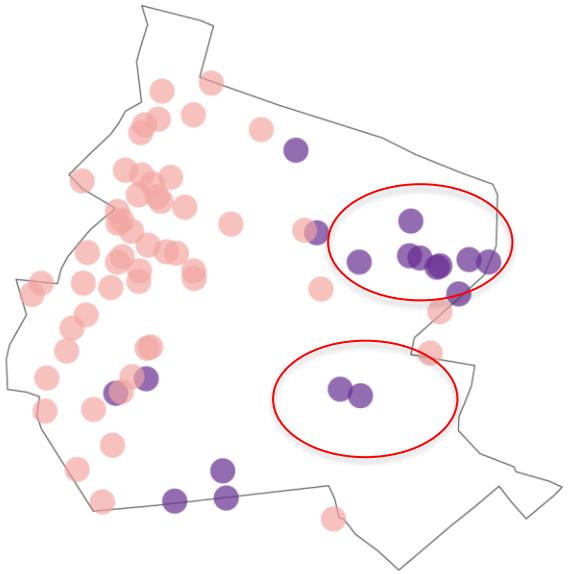

Themes from the multi-stakeholder dialogue in Ilorin on the characteristics of different types of settlements

# Classify micro plan communities and select deprioritized areas

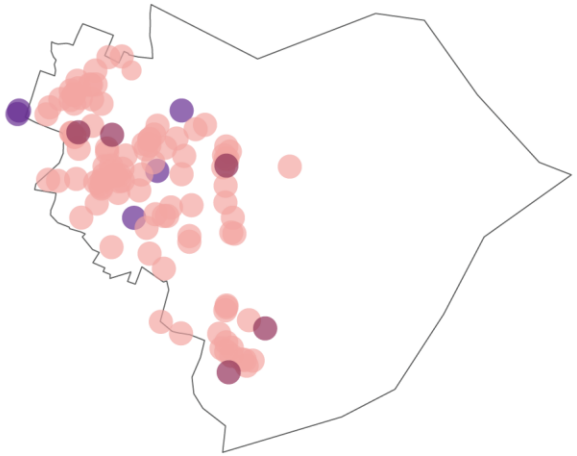
# We trained staff of the state ministry of health on settlement classification

- Prior to fieldwork, we collaborated with them to pre-test and update the settlement classification checklist.
- The state MOH team visited each microplan community in groups of two to classify settlements, collect coordinates and take photos.
- 188 communities were visited and classified

# Communities located in the red circle were deprioritized during mass campaign



The 73 communities visited in Are 2



The 115 communities visited in Akanbi 4

Formal

Informal

Slum

# Pictures from the field- Formal settlements

Formal settlement - Are 2

Formal settlement - Akanbi 4

# Pictures from the field – informal settlements

Informal settlement in Are 2

Informal settlement in Akanbi 4

# Pictures from the field – Slums and rural settlements


Slum settlement in Akanbi 4

Rural style settlements were classified as slums in Akanbi 4

# Takeaways

- National malaria control programs want to maximize resources by optimizing the delivery of interventions in urban areas to account for risk and need
- A strong surveillance system that captures data on malaria burden and determinants at granular levels is essential for a rigorous microplanning process that prioritizes those at highest risk for malaria
- Most countries lack needed data. We show how bed net distribution can be optimized in data poor environments in a manner that utilizes local knowledge and expertise and facilitates consensus among partners
- As countries urbanize, it would be imperative to understand how its impact on the magnitude and patterns of malaria transmission to facilitate progress towards elimination

# Questions

LOYOLA
UNIVERSITY CHICAGO

*Preparing people to lead extraordinary lives*