Description of the design of a mixed-methods study to assess the burden and determinants of malaria transmission for tailoring of interventions (microstratification) in Ibadan and Kano metropolis

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Study ward selection process

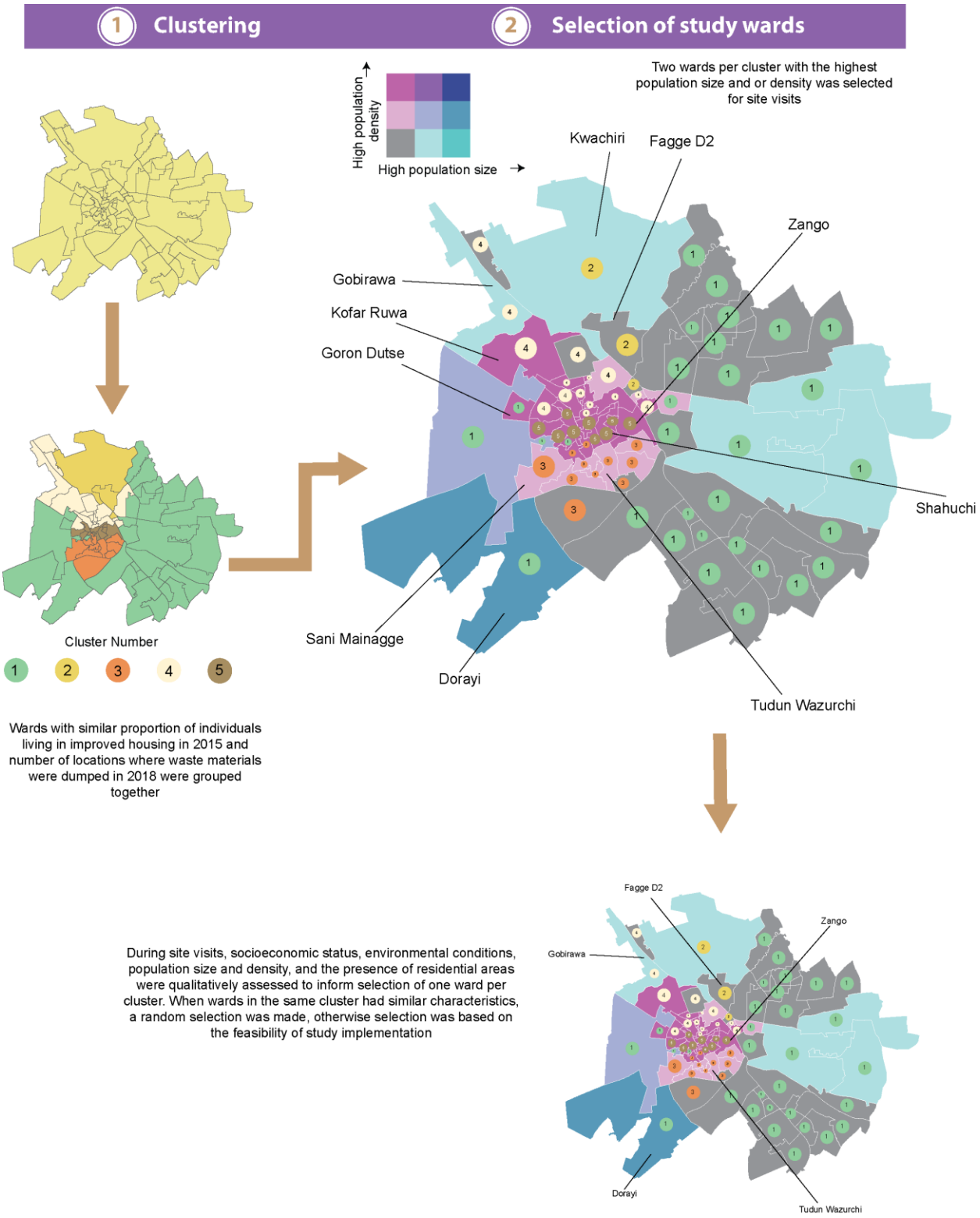

Figure 1: Overview of the site selection process for Kano

Table 1: Field observations from site visits

	Ibadan metro area		Kano metro area	
Cluster #	**Ward**	**Site impressions of residents, environmental and living conditions**		**Site impressions of environmental and living conditions**
1	Olopomewa	Roads are tarred and housing infrastructure consists of well-built, fenced and painted cement homes. An abundance of supermarkets, pharmacies and recreational areas were noted. Residents were observed to be high and middle socioeconomic class	Dorayi	Densely populated ward with modern well-built housing, tarred streets surrounded by congested and poorly accessible settlements with lower quality housing. According to locals, the ward used to have a major dumpsite and was recently redeveloped to contain modern housing. Residents of this ward were observed to be mostly of low socioeconomic status
1	Owode	Most roads are untarred, and this ward abuts multiple slums. Inhabitants are mainly in the low and middle socio-economic class and most houses are used for residential purposes. Site observers observed the ward to have medium population density	Goron Dutse	Wards is part of ancient Kano city, extends beyond the city walls and was perceived to densely populated. Housing quality is varied. Some areas had newer high-quality housing situated in neighborhoods with tarred streets. However, majority of the settlements comprised of congested low-quality housing, which had street access
2	Challenge	Roads are untarred and gutters are overgrown with plants. Housing infrastructure is a mix of ageing old-style housing architecture with modern and newly built cement housing. Inhabitants were perceived to be middle-income	Fagge D2	Densely populated ward with medium to poor quality housing quality. Streets are tarred and have good vehicular access that links most neighborhoods. The socioeconomic status of individuals residing in this ward were perceived to vary from low to medium.
2	Basorun	Roads are roughly tarred and housing is a mix of aged housing together with new housing styles. Ward is home to a popular market where staple foods are sold. Most residential houses abuts shops. Ward was observed to have medium population density and inhabitants were perceived to be of middle income.	Kwachiri	Sparsely populated commercial hub with very few residential houses. It is home to a major mechanic village/garage in Kano and serves as a transit hub for Hajj pilgrims
2	Asanke	Roads leading to individual homes are untarred but ward has access to major tarred roads that run through the city. Ward population size and density was perceived be high. Houses were aging old-style architecture.		
3	Agugu	Densely populated ward with residents considered to be low-income. Has poor road network and existing roads are untarred and contain puddles of water. Housing infrastructures are dilapidated cement homes	Tudun Wazurchi	Many roads within this ward have poor vehicular transport accessibility. Major means of transport is on foot. Housing quality is of medium to poor quality, and it is densely populated. Most households were perceived to be in the lowest socioeconomic position.
3	Ode Aje	Roads are untarred with the exception of one road that provides access to major road networks and another road to provides access to minor road network. Housing is	Sani Mainagge	Residents were perceived to be of higher socio-economic status. Housing quality is high as depicted by the many new modern builds. Most roads are well tarred. Ward appears to be sparsely populated

		aged and dilapidated. Inhabitants are perceived to be of low income and population density was perceived to be high.		
4	Bashorun	Ward with good road network. Inhabitants were perceived to consist of mostly individuals of high socio-economic status. Neighborhood has several pharmacies, supermarkets and recreational centers like hotels.	Gobirawa	Densely populated ward with medium to poor quality housing. Streets are untarred but are wide enough to enable vehicular transport access across neighborhoods. The socioeconomic status of residents was perceived to vary from low to medium
4			Kofar Ruwa	Wards has few residential areas. It is a commercial village comprising of mechanic villagese (garages), commercial parks and building materials shops
5			Zango	Housing types range from medium to poor quality. Major roads leading to the ward are tarred. The socioeconomic status of households were perceived to vary from low to moderate.
			Shahuchi	Housing quality in this ward varied from modern builds to dilapidated structures. Ward was perceived to be densely populated. Ward is the location of a major tertiary health care center.

Pictures from site visits of potential study wards

Ibadan
Wards in Cluster One

Figure 2: Picture showing two locations in Olopomewa. Roads are tarred and neighborhoods have well-built painted housing infrastructure

Figure 3: Picture depict two locations in Owode. Roads are tarred and there is visible aging of the housing infrastructure

Wards in Cluster Two

Figure 4: Picture showing two locations in Challenge. Roads are untarred and housing types are a combination of modern and old-style gated housing

Figure 5. Picture showing two locations in Basorun. Roads are roughly tarred and housing style is a combination of aging housing and newer cement homes.

Figure 6: Picture showing two locations in Asanke. Has only major tarred roads but roads are untarred in between houses.

<u>Wards in Cluster Three</u>

Figure 7: Picture showing two locations in Agugu. Roads are untarred and has filthy gutters whichcould serve as breeding sites or mosquitoes

Figure 8: Picture showing two locations in Ode Aje. Roads are untarred, housing quality is poor, and drainages are dilapidated or non-existent.

<u>Wards in Cluster Four</u>

Figure 9: Picture showing two locations in Bashorun. Roads are tarred and neighborhood consists of well-built painted housing infrastructure

Kano

Wards in Cluster One

Figure 10: Pictures showing two locations in Dorayi. Housing infrastructure suggests Dorayi has a combination of high and low quality-housing infrastructure.

Figure 11: Pictures showing two locations in Goron Dutse. Housing infrastructure suggests that Goron Dutse is a rapidly evolving community with ongoing construction. Although houses are not plastered, as shown in the pictures, they are modern builds. Site reports suggest most areas in the community comprise of low-quality housing type

Wards in Cluster Two

Figure 12: Pictures showing two locations in Fagge D2. Housing quality is of medium quality, roads are tarred and there is vehicular access between neighborhoods.

Figure 13: Pictures showing two locations in Kwachiri. Most buildings are commercial and are used for business

Wards in Cluster Three

Figure 14: Pictures showing two locations in Tudun Wazurchi. Housing is visibly aged and is of medium quality.

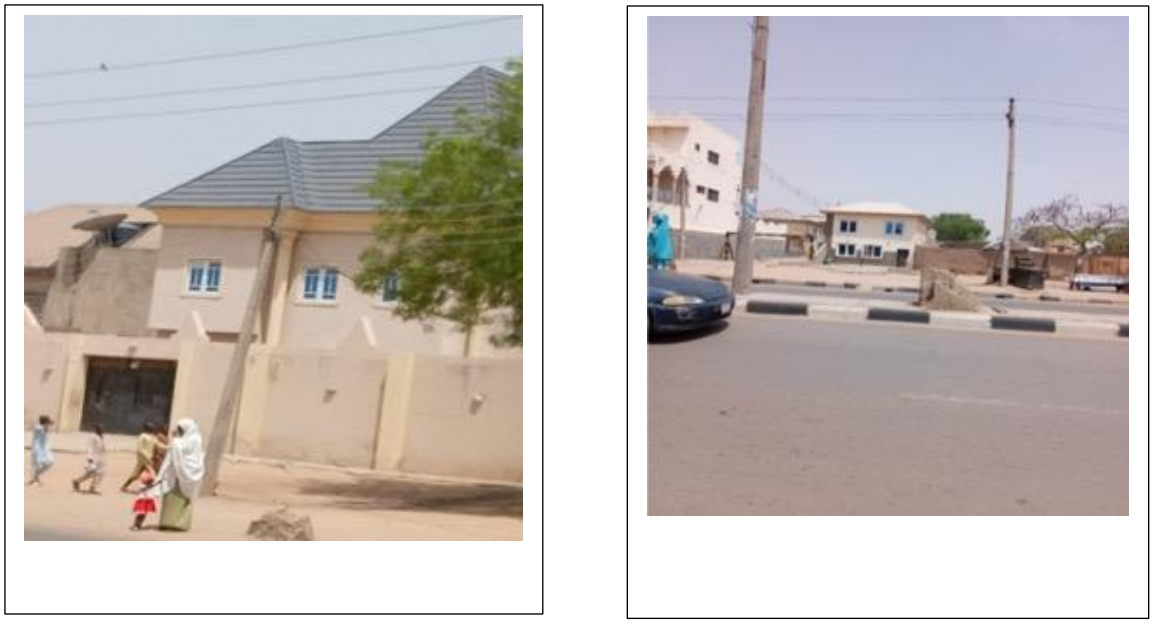

Figure 15: Pictures showing two locations in Sani Mainagge. Housing quality is high and streets are tarred.

Wards in Cluster Four

Figure 16: Pictures showing two locations in Gobirawa ward. Housing type is of medium and poor quality and roads are untarred

Figure 17: Pictures showing two locations in Kofar Ruwa depicting that the lack of residential structures in this ward

Wards in Cluster Five

Figure 18: Pictures showing two locations in Zango ward, housing quality and drainages are filled with rubbish

Figure 19: Pictures showing two locations in Shahucci. Housing quality varies from medium to poor.

Multistakeholder Dialogue Instruments

Matrix showing suggested participants to be involved in the multi-stakeholders' dialogues in each site

S/N	Category of Participant	Number	Institution/ Affiliation	Remarks
1	Town Planner/ Quantity Surveyor	1	Ministry of Lands and Housing	An experienced stakeholder (participant) to be nominated by the Commissioner/Permanent Secretary in the Ministry
2	Building Engineer/Structural Engineer/Architect	1	Ministry of Works and Transport	An experienced stakeholder (participant) to be nominated by the Commissioner/Permanent Secretary in the Ministry
3	Land Surveyor/Geographic Information System Expert	1	Surveyor General Office	An experienced stakeholder (participant) to be nominated by the Surveyor General/Permanent Secretary in the Surveyor General Office
4	Statistician/Demographer/ Population expert	1	State Bureau of Statistics/National Population Commission office at the state level	An experienced stakeholder (participant) to be nominated by the Statistician General/Director in the Agency
5	Geographer/Urban Regional Planning expert (Academic)	1	University of Ibadan/Bayero University	To be nominated by head of department or recruited through snowballing procedure
6	Estate Manager (Professional) (Residing or working within formal settlement)	1	Private Practice/Community	To be nominated by community gatekeeper(s) or recruited through snowballing procedure
7	Estate Agent (Residing or working within informal settlement)	1	Private Practice/ Community	To be nominated by community gatekeeper(s) or recruited through snowballing procedure
8	Intra-City Transport Worker (Taxicab driver)/Thrift collector residing in informal settlement/slum	1	Community	To be nominated by community gatekeeper(s) or recruited through snowballing procedure
9	Community Member (Residing in formal settlement)	1	Community	To be nominated by community gatekeeper(s)/Landlord Association or recruited through previous contact. The individual should preferably be an indigene or must have stayed within the metropolis (any of the selected communities/wards) for a least 10 years.
10	Community Member (Residing in an informal settlement/slum)	1	Community	To be nominated by community gatekeeper(s)/Landlord Association or recruited through previous contact. The individual should preferably be an indigene or must have stayed within the metropolis (any of the selected communities/wards) for a least 10 years.

NOTE: 1) As much as possible, participants especially community stakeholders should be drawn across the various selected wards/communities (Olopomewa, Challenge, Agugu, Bashorun). At least there should be one participant from each of the selected areas/communities. 2) A Stakeholder from State Malaria Elimination Programme (SMEP), State Ministry of Health will serve as a non-participant observer.

Guide for multi-stakeholder dialogue

A. Classification of settlements

1. What can you say about the housing conditions within this metropolis? (***Probe*** *- basic social services and infrastructural facilities- access roads, electricity supply, piped water/drinking water source; waste disposal/management; housing density; housing types; ownership of most housing units*)
2. What are the various types of settlements within the metropolis?
3. How would you categorise the different types of settlement within the metropolis?
4. What are the parameters that can be used to categorize different types of settlements within the metropolis?
5. (a) What is your understanding of formal settlement?
   (b) What is your understanding of informal settlement?
   (c) What is your understanding of slums?
6. What are your views about categorizing the different types of settlements within the metropolis into formal settlements, informal settlements, and slums?
7. How will you describe a typical formal settlement within the metropolis? (***Probe*** *- What are the unique features? What makes it different from other types of settlements, what type(s) of person(s) live within formal settlements. Please give us typical examples of places with within the metropolis that can appropriately described as formal settlements*)
8. How will you describe a typical informal settlement within the metropolis? (***Probe*** *- What are the unique features? What makes it different from other types of settlements, what type(s) of person(s) live within informal settlements. Please give us typical examples of places with within the metropolis that can appropriately described as informal settlements*)
9. How will you describe a typical slum within the metropolis? (***Probe*** *- What are the unique features? What makes it different from other types of settlements, what category of persons(s) live within slums. Please give us typical examples of places with within the metropolis that can appropriately described as formal settlements*).

B. Validating the clustering model outputs

What are the views of various stakeholders about the various selected study locations/wards in the metropolis (in terms of description and typologies of settlements)? **NOTE**: *Ask each of the stakeholders/participants how best the study ward can be described and the various settlement types within the community.*

Sample for to be used in each study ward (Olopomewa, Challenge, Agugu, Bashorun in Ibadan; Dorayi, Fagge D2, Tundun Wazurchi, Gobirawa and Zango in Kano)

S/N	Category of Participant	General description	Formal settlements (areas within the community/ward)	Informal settlements (areas within the community/ward)	Slums (areas within the community/ward)
1	Town Planner/Quantity Surveyor				
2	Building Engineer/ Structural Engineer/Architect				
3	Land Surveyor/Geographic Information System Expert				
4	Statistician/Demographer/ Population expert				
5	Geographer/Urban Regional Planning expert (Academic)				
6	Estate Manager (Professional)				
7	Estate Agent				
8	Intra-City Transport Worker (Taxi cab driver)/Thrift collector				
9	Community Member (Residing in formal settlement)				
10	Community Member (Residing in an informal settlement/slum)				
11	Overall consensus among participants				

C. Instructions for Participatory Community Mapping

1. Each multi-stakeholder dialogue participant who is very familiar with or resides in each of the selected communities will be required to help sketch the community map with detailed identification of various types of settlements
2. Each Multi-stakeholders' dialogue participant will be given the opportunity to present and explain his/her community map.
3. For each community map being sketched by each participant, contributions will be welcomed from all the multi-stakeholders' dialogue participants.
4. Possibly if available, properly validated map of each selected community that may be gotten from relevant organization (National Population Commission, World Health Organization or State Bureau of Statistics) will be given to participants to assist them or provide them with some clues so as to make the process of drawing their own maps easier and well validated.
5. Professionals in the multi-stakeholders' group like town planner, surveyor and geographer will provide useful guidance and suggestions concerning the mapping process.

Sample informed consent form for the multistakeholder dialogue

Introduction

My name is ……and other team members are…… we are convening this multi-stakeholder dialogue as part of the formative aspect and qualitative components of our study on "field assessment of the burden and determinants of malaria to inform tailoring of interventions (microstratification) in Ibadan and Kano Metropolis" which is being implemented through the collaborative efforts of the University of Ibadan and Nigeria National Malaria Elimination Programme, Abuja, Nigeria.

We would like to request for your opinion on various issues relating to settlement types and communities within the urban areas of this metropolis to enable us understand malaria transmission in urban areas. You have been specially invited for this multi stakeholders' dialogue and we thank you for honouring our invitation.

Purpose

The main goal of the multi-stakeholders' dialogue, which involves different categories of stakeholders/experts, is to facilitate brainstorming and identifying criteria for categorising various settlement types and selecting appropriate communities that can appropriately represent formal and informal settlements and slums within the selected wards being considered for the study in Ibadan metropolis. Furthermore, the multi-stakeholders' dialogue will complement and/or validate the information about the selected wards and settlements obtained through quantitative analysis and site visits.

The information we will be collecting through the multi-stakeholders' dialogue will help to develop appropriate operational definitions and categorizations for settlement types suitable for the social milieu of the study sites which can be relied upon for guiding for different components of the study we are planning to conduct. Our study findings will potentially contribute to malaria control efforts in Nigeria.

Procedure

As part of this study, you will be placed in a group of 10 individuals who represent various stakeholders and experts for the purpose of brainstorming and having cross-fertilization of ideas on pertinent issues. The multi-stakeholders' dialogue which will last for 90 - 120 minutes will entail asking you some open-ended questions which will be discussed in form of a group discussion. We will be asking you to share your opinions on settlements typologies and the various communities being considered for the study. During this dialogue, your views will be respected and will not be used against you in any way. The multi-stakeholders' dialogue will be taped, so please speak up and speak clearly. We ask for your consent to record the multi-stakeholders' dialogue so that we will not miss out anything from the information you will be providing to us through this dialogue. Please do share your views without mentioning people's names. We want the multi-stakeholders' dialogue to be anonymous and to be confidential as possible. You can choose whether to participate in the multi-stakeholders' dialogue, and you may stop at any time during the dialogue. There is no right or wrong view, so feel free to express yourself. Out of respect, please refrain from interrupting others. However, feel free to be honest even when your responses counter those of other dialogue participants. Remember your participation in this dialogue is voluntary. Your decision not to be involved or drop out at any point will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

Should you choose to participate in the study you will be asked to respect the privacy of other participants of the multi-stakeholders' dialogue by not disclosing any content discussed during the study. The information you share will be kept confidential. Identifying information will be removed from the transcript and report of the dialogue. The tape-recording of the dialogue will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research. Although we will ask all participants in the multi-stakeholders' dialogue to maintain confidentiality, we cannot guarantee that they will do so.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
IMARAT, College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following two boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Focus Group Discussions and Key Informant interview Instruments

Focus group discussion informed consent form

Who to interview: Groups (8 – 12 persons) of community members that are homogenous- These include:

1. Male adults
2. Female adults
3. Mothers of under-five children

Introduction

My name is ……and my colleagues are…… We work with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. You have been specially invited for this focus group discussion and we thank you for honouring our invitation.

Purpose

The purpose of this focus group discussion is to investigate the following

1. How community members manage suspected malaria infections
2. Where community members seek care for malaria
3. Factors that influence care seeking for malaria in a hospital,
4. How health seeking behaviour and source of care differ by socioeconomic group
5. Local names for malaria medications
6. Whether showing of pictures or physical packaging of malaria medications can improve participants' recall and answers about usage of malaria medication
7. Factors that influence decisions about what malaria medicine to use
8. Common methods that people use to protect themselves from themselves from malaria
9. Understand facilitators and barriers to participating in a community-based disease reporting programme for malaria

The information learned in this focus group will be used to guide the development of other components of the study that we are planning to conduct.

Procedure

As part of this study, you will be placed in a group of 8 – 12 individuals. The focus group discussion which will last for 45 – 90 minutes will entail asking you some open-ended questions. In addition to the discussion questions, we will be asking for some of your socio-demographic information. During this discussion, your views will be respected and will not be used against you in any way. This discussion will be taped, so please speak up and speak clearly. We ask for your consent to record the discussion so that we will not miss out anything from the information you will be providing to us through the discussion. Please do share your views without mentioning people's names. We want the discussion to be anonymous and to be confidential as possible. You can choose whether to participate in the focus group discussion, and you may stop at any time during the study. There is no right or wrong view, so feel free to express yourself. Out of respect, please refrain from interrupting others. However, feel free to be honest even when your responses counter those of other group members. Remember your participation in this discussion is voluntary. Your decision not to be involved or drop out at any point will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

Should you choose to participate in the study you will be asked to respect the privacy of other focus group discussion members by not disclosing any content discussed during the study. The information you share will be kept confidential. Identifying information will be removed from the transcripts. The transcripts and other electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research. Although we will ask all participants in your focus group to maintain confidentiality, we cannot guarantee that they will do so.

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IMARAT, College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following two boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Focus group discussion guide

S/N	Main questions	Follow up questions or hints
	Introduction and general questions	
1	a) What can you say about the living conditions of community members?	• Settlements or housing conditions in the community ○ (**Probe for**, if not mentioned, presence of formal settlements, informal settlements, slums) ○ (Probe for their opinions about features of formal settlements, informal settlements, slums) • Financial condition or status of community members ○ (**Probe for**, opinions about categorization of community members based on economic or financial status) • Health facilities in the communities ○ **Probe for**, availability of the health facilities in the communities ○ **Probe for**, types of health facilities most preferred by community members (private hospital, primary health facilities, secondary health facilities, tertiary health facilities) ○ **Probe for**, characteristics of preferred health facilities ○
	b)Where does the community members generally prefer to go for health care?	**Probe** for the following (if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). Probe for names of the preferred facilities • Patent medicine stores • Traditional healing home • Drug peddlers)
	c) In this community if someone is pregnant, where would they typically go for antenatal care?	**Probe** for the following (if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). Probe for names of the preferred facilities • Traditional Birth Attendants • Traditional doctors • Faith-based maternity homes • Nowhere/prefer to give birth at home • Opinions on why some pregnant women prefer not to attend antenatal care in the hospitals
	d) What are the common diseases in this community	• Which diseases are most common among under-five children? • Which diseases are most common among adult population? • Which diseases are the most severe diseases? • Which diseases are associated with mosquito bites in the community?
	Basic understanding of malaria	
2	Now let us discuss specifically on some basic issues relating to malaria. a) How common is malaria in this community?	What categories of persons are most affected by malaria? Probe for: ○ Under-five children ○ Adolescents ○ Adults ○ Aged people ○ Pregnant women

		○ People with sickle cell anemia etc.
	b) How do community members usually get to know that they have malaria?	**Probe** for the following (if not mentioned): ○ Through observation of signs and symptoms that are suggestive of malaria ○ Clinical examination ○ Lab examination
	c) In your opinion, what are the signs and symptoms of malaria	_____
	d) Please share with us what you think is the cause of malaria?	**Probe** for the following: ○ Mosquito bite ○ Exposure to hot sunshine ○ Poor hygiene ○ Hunger ○ Spiritual reasons etc.
	Practices relating to management of malaria in the community	
3	a) How do adult members in community manage suspected malaria infections?	**Probe** for the following (if not mentioned): ○ Home-based care ○ Self-medication ○ Use of herbs ○ Use of drugs or medicines with prescription
	b) Tell us about how suspected malaria infections in under-five children are being managed in the community	**Probe** for the following (if not mentioned): ○ Home-based care ○ Self-medication ○ Use of herbs ○ Use of drugs or medicines with prescription
	c) Tell us about how suspected malaria infections in adolescents are being managed in the community	**Probe for the following (if not mentioned):** ○ Home-based care ○ Self-medication ○ Use of herbs ○ Use of drugs or medicines with prescription
	d) If you think someone in your community has malaria, what kind of treatment should they follow?	**Probe** for the following (if not mentioned): ○ Home-based care ○ Self-medication ○ Use of herbs ○ Use of drugs or medicines with prescription
	e) Kindly share your experience of how you managed your last or most recent malaria episode	**Probe for**, • The malaria medication(s) used the last time participants had malaria infection
	Malaria related health-seeking behaviours of community members	

4	Where do community members seek care for malaria?	**Probe** for the following (if not mentioned) o Traditional healing homes o Patient Medicine Vendors stores o Drug hawkers/peddlers o Pharmacy stores o Herbal drug stores/kiosks o Hospitals (Private hospital, government hospital) **Probe for** where community members seek care for malaria the most and reasons **Probe for** where participants treated their own last malaria episodes
5	What can you say about what influences community members to seek malaria treatment in a hospital?	**Probe** for the following • Money for paying bills for treatment • Money for transportation to hospital • Distance of hospital • Access to hospital • Availability of hospital • Availability of medications • Waiting time in the hospital/health facility • Attitude of health workers • Preference for traditional medicine • Preference for a particular type of hospital (Private hospital, primary health centre, secondary health care facility) • Cultural norms and beliefs about seeking care in hospital • Cultural norms and beliefs malaria • Perceived seriousness of malaria • Perceived threat of malaria • Frequency of malaria episode
6	What can you say about what influences community members to seek malaria treatment in a particular hospital/health facility?	Probe for the following • Attitude of the health workers • Reputation of the provider • Previous experience with provider • Gender of the provider • Distance to the health facility • Quality of services • Ambience of health facility • Waiting times • Availability of medication • Cost of services
7	Let us briefly discuss how health seeking behaviour and source of care differ by socioeconomic group?	**Probe** for –where each of the following categories of people usually seek malaria care? ‘ • Rich people in the community • Poor people in the community • People with formal education • People without formal education (**For each of the categories, probe for the common source of malaria treatment e.g** - government institutions, private clinics, pharmacy, chemists, drug peddlers/hawkers, traditional healing homes, herbal drug stores/kiosks)
	Malaria medications being used and their local names	

8	a) What can you say about the malaria medications that community members use?	**Probe** for • Please tell us about malaria medications that are commonly used among adult population in the community • Tell us about the malaria medications that are commonly used among children in the community • What are your views about the cost of the malaria medications
	b) What are the local names for the malaria medications that community members use?	
	Showing of pictures or physical packaging of malaria medications to improve recall and answers about usage of malaria medication	
9	a) What are your opinions about the showing of pictures or physical packaging of malaria medications with the intention of improving recall and answers about usage of malaria medication?	**Probe** for • Why they think showing of pictures or physical packaging of malaria medications can possibly improve recall and answers about usage of malaria medication?
	b) In your opinion what other ways or means do you think can help community members to improve recall and answer about usage of malaria medications?	
	Factors influencing use of malaria medications and treating malaria at a hospital	
10	a) Please share with us the things that do influence community members decisions about choice of malaria medications	**Probe** for • **Individual factors that influence the decisions about what malaria medicine to use – e.g.,** Age, sex (male or female), marital status, economic status, being pregnant, medical history, perceived seriousness of malaria, perceived threat of malaria, preference for particular drug • **Drug related factors that influence the decisions about what malaria medicine to use –** e.g. Availability of drug in hospital or drug stores, number of days expected to use drugs, number of capsules/dosages, taste of drug, side effects of drugs, drug resistance, proliferation of fake malaria medicines, giving of genuine malaria medications • **Social-cultural factors that influence the decisions about what malaria medicine to use –**e.g support from partners, support family members, support from friends/peers, media influence and drug adverts, cultural norms, and values • **Health system related factors that influence the decisions about what malaria medicine to use-**e.g availability of drugs in hospital/pharmacy, prescription of drug, advice from health workers • **Policy related factors e.g**–governments and regulatory bodies recommendation relating to antimalarial drugs that should be first line of treatment • **Disease pattern related factors e.g**–uncomplicated vs severe malaria

		• **Economic related factors -** e.g – cost of buying malaria medications, affordability of preferred malaria medications
	a) What are the foremost things or situations that do influence your own decisions about the use of malaria medications?	**Probe for:** • Cost of treatment in private hospitals • Cost of treatment in primary health facilities • Cost of treatment in secondary health facilities • Cost of treatment in patent medicine store • Cost of treatment using traditional/herbal medicines
	b) What can you say about the cost of treating malaria in the hospital?	• How affordable do you think the cost of treating malaria is for community members in the health facility?
	Common methods that community members use to protect themselves from malaria	
11	a) Please tell us about the common methods that people use to protect themselves from malaria	**Probe** for (if not mentioned): • Use of insecticide sprays • Use of insecticides treated bed nets • Use of mosquito replants • Use of coils • Use of window and door screens • Wearing of long-sleeved clothing and long pants • Malaria prophylaxis
	b) Which method is most commonly used by people to protect themselves from malaria?	**Probe** for • Reasons for being the most commonly used
	c) Which methods do community members usually use to protect under-five children from malaria?	
	Participation in community-based malaria programme	
12	a) We are planning to put in place a free community-based programme whereby community members will be asked to consistently report malaria cases or symptoms. Our goal is to understand the transmission of malaria in the community to inform where interventions go. What is your opinion about how community members will perceive the programme?	
	b) If we want community members to be reporting malaria cases or symptoms consistently what would be the preferred way or means for this?	**Probe** for (if not mentioned): • Face-to-face with a project volunteer • Through community representative • Through SMS • Through WhatsApp • Through mobile application • Through hotline Through community meeting etc.
	c) Supposed we ask community members to be reporting malaria cases or symptoms via text message as part of our community-based malaria programme, what is your opinion about it?	**Probe** for: • How easy it will be for community members to participate • How willing community members will be • The barriers that may be associated with it • What can encourage community members to be reporting consistently malaria cases or symptoms via text message • Participants' willingness to participate to be involved

	d) What is your opinion about asking community members to be reporting malaria cases or symptoms via a mobile application as part of our community-based malaria programme?	**Probe** for: • How easy it will be for community members to participate • How willing community members will be • The barriers that may be associated with it • What can encourage community members to be reporting consistently malaria cases or symptoms via a mobile application • Participants' willingness to participate to be involved
	e) What can facilitate the participation of community members in the programme?	
	Conclusion and other relevant information	
13	a) Please tell us about on-going or existing community-based malaria interventions in this community	
	b) What suggestions do you have about how malaria can be controlled in this community?	
	c) What other suggestions do you have that can help us with the community-based malaria programme that we are planning?	

Socio-demographic information

Ward and LGA…… Name of Community/Area……

Age in years (at last birthday) …… Sex……

Highest level of Education…… Primary Occupation……

Type of community/settlement …….

Key informant interview consent form for formal health sector providers

Who to interview: Formal Healthcare Sector Providers - These include:

1. Heads of Primary Health Care (PHC) Centres/facilities
2. PHC coordinators /Medical officer of Health at LGA level
3. Roll-back malaria focal persons at LGA level
4. Pharmacists and doctors working in private and public health facilities
5. Malaria programme officers at State level

Introduction

My name is ……and my colleagues are…… We work with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. You have been specially invited for this key informant interview and we thank you for honouring our invitation.

Purpose

The purpose of this key informant interview is to investigate the following

1. How community members manage suspected malaria infections
2. Where community members seek care for malaria
3. Factors that influence care seeking for malaria in a hospital,
4. How health seeking behaviour and source of care differ by socioeconomic group
5. Local names for malaria medications
6. Whether showing of pictures or physical packaging of malaria medications can improve participants' recall and answers about usage of malaria medication
7. Factors that influence decisions about what malaria medicine to use
8. Common methods that people use to protect themselves from themselves from malaria
9. Understand facilitators and barriers to participating in a community-based disease reporting programme for malaria

The information learned in this key informant interview will be used to guide the development of other components of the study that we are planning to conduct.

Procedure

The key informant interview, which will last for 40 – 60 minutes, will entail asking you some open-ended questions. In addition to the interview questions, we will be asking for some of your socio-demographic information. During this interview, your views will be respected and will not be used against you in any way. This interview will be taped, so please speak up and speak clearly. We ask for your consent to record the interview so that we will not miss out anything from the information you will be providing to us through the interview. Please do share your views without mentioning people's names. We want the interview to be anonymous and to be confidential as possible. You can choose whether to participate in the interview, and you may stop at any time during the study. There is no right or wrong view, so feel free to express yourself. Please note that your participation in this interview is voluntary. Your decision not to be involved or drop out at any point will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the transcripts. The transcripts and other electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
Director, Institute for Advanced Medical Research and Training (IAMRAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Key informant interview guide for formal health sector providers

S/N	**Main questions**	**Follow up questions or hints**
	Introduction and general questions	
1	a) Please tell us about the health facilities that are available in this community	**Probe for:** • Primary health centres • Secondary health facilities • tertiary health facilities • Private hospitals
	b)Where does the community members generally prefer to go for health care?	**Probe**-(if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). o Probe for, opinion about the types of health facilities most preferred by community members • Patent medicine stores • Traditional healing home • Drug peddlers)
	c) In this community if someone is pregnant, where would they typically go for antenatal care?	**Probe** for the following (if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). Probe for names of the preferred facilities • Traditional Birth Attendants • Traditional doctors • Faith-based maternity homes • Nowhere/prefer to give birth at home • Opinions on why some pregnant women prefer not to attend antenatal care in the hospitals
	d) What are the common diseases in this community	• Which diseases are most common among under-five children? • Which diseases are most common among adult population? • Which diseases are the most severe diseases?
	Basic understanding of malaria	
2	Now let us discuss specifically on some basic issues relating to malaria. a)How common is malaria in this community?	What categories of persons are most affected by malaria? Probe for: o Under-five children o Aged people o Pregnant women o People with sickle cell anemia etc.
	b) How do community members usually get to know that they have malaria?	**Probe** for the following (if not mentioned): o Through observation of signs and symptoms that are suggestive of malaria o Clinical examination o Lab examination
	c) In your opinion, what are the signs and symptoms of malaria	

	Practices relating to management of malaria in the community	
3	a) How do adult members in community manage suspected malaria infections?	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	b) Tell us about how suspected malaria infections of under-five children are being managed in the community?	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	c) Tell us about how suspected malaria infections in adolescents are being managed in the community	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	d) Kindly describe to us how malaria infection is being managed in the health facility	
	Malaria related health-seeking behaviours of community members	
4	Where do community members seek care for malaria?	**Probe** for the following (if not mentioned) o Traditional healing homes o Patient Medicine Vendors stores o Drug hawkers/peddlers o Pharmacy stores o Herbal drug stores/kiosks o Hospitals (Private hospital, government hospital) **Probe for** where community members seek care for malaria the most and reasons
5	What do you think usually influence community members to seek malaria in a hospital?	**Probe** for the following • Money for paying bills for treatment • Money for transportation to hospital • Distance of hospital • Access to hospital • Availability of hospital • Availability of medications • Waiting time in the hospital/health facility • Attitude of health workers • Preference for traditional medicine • Preference for a particular type of hospital (Private hospital, primary health centre, secondary health care facility) • Cultural norms and beliefs about seeking care in hospital • Cultural norms and beliefs malaria • Perceived seriousness of malaria • Perceived threat of malaria • Frequency of malaria episode

6	Let us briefly discuss how health seeking behaviour and source of care differ by socioeconomic group?	**Probe** for –where each of the following categories of people usually seek malaria care? ‘ • Rich people in the community • Poor people in the community • People with formal education • People without formal education (**For each of the categories, probe for the common source of malaria treatment e.g.** - government institutions, private clinics, pharmacy, chemists, drug peddlers/hawkers, traditional healing homes, herbal drug stores/kiosks)
	Malaria medications being used and their local names	
7	a)What can you say about the malaria medications that community members use?	• Please tell us about malaria medications that are commonly used among adult population in the community. o **Probe for**, the local names for the malaria medications being used by adults in the community • Tell us about the malaria medications that are commonly used among children in the community. o **Probe for**, the local names for the malaria medications being used by children in the community • What are your views about the cost of the malaria medications? • How affordable do you think the cost of malaria medications is for community members?
	b)Please think about it if you were sick, which malaria medications would you take	**Probe for**, • The local names for the malaria medications • The malaria medication(s) used the last time participant had malaria infection
	Showing of pictures or physical packaging of malaria medications to improve recall and answers about usage of malaria medication	
8	a)What are your opinions about the showing of pictures or physical packaging of malaria medications with the intention of improving recall and answers about usage of malaria medication?	**Probe** for: • Why showing of pictures or physical packaging of malaria medications can possibly improve recall and answers about usage of malaria medication?
	b) In your opinion what other ways or means do you think can help community members to improve recall and answer about usage of malaria medications?	
	Factors influencing use of malaria medications and treating malaria at a hospital	
9	a)Please share with us the things that you think do influence community members decisions about choice of malaria medications	**Probe** for • **Individual factors that influence the decisions about what malaria medicine to use – e.g.,** Age, sex (male or female), marital status, economic status, being pregnant, medical history, perceived seriousness of malaria, perceived threat of malaria, preference for particular drug type

		• **Drug related factors that influence the decisions about what malaria medicine to use –** e.g., Availability of drug in hospital or drug stores, number of days expected to use drugs, number of capsules/dosages, taste of drug, side effects of drugs, drug resistance, proliferation of fake malaria medicines, recognizing genuine malaria medications • **Social-cultural factors that influence the decisions about what malaria medicine to use –** e.g. support from partners, support family members, support from friends/peers, media influence and drug adverts, cultural norms, and values • **Health system related factors that influence the decisions about what malaria medicine to use-** e.g., availability of drugs in hospital/pharmacy, prescription of drug, advice from health workers • **Policy related factors e.g.–**governments and regulatory bodies recommendation relating to antimalarial drugs that should be first line of treatment • **Disease pattern related factors e.g.–** uncomplicated vs severe malaria • **Economic related factors** e.g. – cost of buying malaria medications, affordability of preferred malaria medications
	c) What is your view about the cost of treating malaria in the hospital/health facility?	• How affordable do you think the cost of treating malaria is for community members in the health facility or hospitals?
	Common methods that community members use to protect themselves from malaria	
10	a) Please tell us about the common methods that people use to protect themselves from malaria in this community	**Probe** for (if not mentioned): • Use of insecticide sprays • Use of insecticides treated bed nets • Use of mosquito replants • Use of coils • Use of window and door screens • Wearing of long-sleeved clothing and long pants • Malaria prophylaxis
	b) Which method is most commonly used by people to protect themselves from malaria?	**Probe** for • Reasons for being the most commonly used
	c) Which methods do community members usually use to protect under-five children from malaria?	
	Participation in community-based malaria programme	
11	a) We are planning to put in place a free community-based programme whereby community members will be asked to consistently malaria cases or symptoms. Our goal is to understand the transmission of malaria in the community to inform where interventions go. What is your opinion	

	about how community members will perceive the programme.	
	b) If we want community members to be reporting malaria cases or symptoms consistently what do you think would be the preferred way or means for this?	**Probe** for (if not mentioned): • Face-to-face with a project volunteer • Through community representative • Through SMS • Through WhatsApp • Through mobile application • Through hotline Through community meeting etc.
	c) Supposed we ask community members to be reporting malaria cases or symptoms via text message as part of our community-based malaria programme, what is your opinion about it?	**Probe** for: • How easy do you think it will be for community members to participate? • How willing do you think community members will be? • What barriers do you think may be associated with it? • What do you think we can encourage community members to be reporting consistently malaria cases or symptoms via text message?
	d) What is your opinion about asking community members to be reporting malaria cases or symptoms via a mobile application as part of our community-based malaria programme?	**Probe** for: • How easy do you think it will be for community members to participate? • How willing do you think community members will be? • What barriers do you think may be associated with it? • What do you think we can encourage community members to be reporting consistently malaria cases or symptoms via a mobile application?
	e) What can facilitate the participation of community members in the programme?	
	Conclusion and other relevant information	
12	a) Please tell us about on-going or existing community-based malaria interventions in this community	
	b) What suggestions do you have about how malaria can be controlled in this community?	
	c) What other suggestions do you have that can help us with the community-based malaria programme that we are planning?	

Socio-demographic information

Ward and LGA …… Sex: ……

Age in years (at last birthday) …… Highest level of Education……

Designation …… Position ……

Number of years spent in present position ……
Number of years spent in health facility…….
Type of settlement ……..
Name of Community/Area…….

Key informant interview consent form for informal health care workers

Who to interview: Informal Healthcare Providers- These include:

1. Patient Medicine Vendors
2. Drug peddlers/hawkers
3. Herbal drug sellers
4. Traditional doctors

Introduction

My name is ……and my colleagues are…… We work with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. You have been specially invited for this key informant interview and we thank you for honouring our invitation.

Purpose

The purpose of this key informant interview is to investigate the following

1. How community members manage suspected malaria infections
2. Where community members seek care for malaria
3. Factors that influence care seeking for malaria in a hospital,
4. How health seeking behaviour and source of care differ by socioeconomic group
5. Local names for malaria medications
6. How showing of pictures or physical packaging of malaria medications can improve participants' recall and answers about usage of malaria medication
7. Factors that influence decisions about what malaria medicine to use
8. Common methods that people use to protect themselves from themselves from malaria
9. Understand facilitators and barriers to participating in a community-based disease reporting programme for malaria

The information learned in this key informant interview will be used to guide the development of other components of the study that we are planning to conduct.

Procedure

The key informant interview, which will last for 40 – 60 minutes, will entail asking you some open-ended questions. In addition to the interview questions, we will be asking for some of your socio-demographic information. During this interview, your views will be respected and will not be used against you in any way. This interview will be taped, so please speak up and speak clearly. We ask for your consent to record the interview so that we will not miss out anything from the information you will be providing to us through the interview. Please do share your views without mentioning people's names. We want the interview to be anonymous and to be confidential as possible. You can choose whether to participate in the interview, and you may stop at any time during the study. There is no right or wrong view, so feel free to express yourself. Please note that your participation in this interview is voluntary. Your decision not to be involved or drop out at any point will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the transcripts. The transcripts and other electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
Director, Institute for Advanced Medical Research and Training (IMARAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Key informant interview guide for informal health care workers

S/N	**Main questions**	**Follow up questions or hints**
	Introduction and general questions	

1	a)What can you say about the living conditions of community members?	• Financial condition or status of community members
		  ○ (**Probe for**, opinions about categorization of community members based on economic or financial status)
		• Health facilities available in the communities
		  ○ **Probe for**, types of health facilities (private hospital, primary health facilities, secondary health facilities, tertiary health facilities)
		  ○ **Probe for**, the most preferred by community members (private hospital, primary health facilities, secondary health facilities, tertiary health facilities)

	b)Where does the community members generally prefer to go for health care?	**Probe**-(if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). • Patent medicine stores • Traditional healing home • Drug peddlers etc.
	c) In this community if someone is pregnant, where would they typically go for antenatal care?	**Probe** for the following (if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). • Traditional Birth Attendants • Traditional doctors • Faith-based maternity homes • Nowhere/prefer to give birth at home ○ Opinions on why some pregnant women prefer not to attend antenatal care in the hospitals
	d) What are the common diseases in this community	• Which diseases are most common among under-five children? • Which diseases are most common among adult population? • Which diseases are the most severe diseases?
	Basic understanding of malaria	
2	Now let us discuss specifically on some basic issues relating to malaria. a)How common is malaria in this community?	What categories of persons are most affected by malaria? Probe for: ○ Under-five children ○ Aged people ○ Pregnant women ○ People with sickle cell anemia etc.
	b) How do community members usually get to know that they have malaria?	**Probe** for the following (if not mentioned): ○ Through observation of signs and symptoms that are suggestive of malaria ○ Clinical examination ○ Lab examination
	c) In your opinion, what are the signs and symptoms of malaria	

	Practices relating to management of malaria in the community	
3	a) How do adult members in community manage suspected malaria infections?	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	b) Tell us about how suspected malaria infections of under-five children are being managed in the community?	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	c) Tell us about how suspected malaria infections in adolescents are being managed in the community	**Probe for the following (if not mentioned):** o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	(For herbal drug sellers and traditional doctors) d) Kindly describe to us how malaria infection should be managed or treated using herbal malaria drugs?	**Probe for:** • Malaria infections involving adults • Malaria infections involving under-five children • Malaria infection involving pregnant women • Complicated malaria infections • Individuals having frequent malaria episodes
	(For Patient Medicine Vendors and Drug peddlers/hawkers involved in selling over-the-counter malaria medicines) d ii) Kindly describe to us how malaria infection should be managed or treated using malaria medicines (orthodox medicine)?	**Probe for:** • Malaria infections involving adults • Malaria infections involving under-five children • Malaria infection involving pregnant women • Complicated malaria infections • Individuals having frequent malaria episodes
	Malaria related health-seeking behaviours of community members	
4	Where do community members seek care for malaria?	**Probe** for the following (if not mentioned) o Traditional healing homes o Patient Medicine Vendors stores o Drug hawkers/peddlers o Pharmacy stores o Herbal drug stores/kiosks o Hospitals (Private hospital, government hospital) **Probe for** where community members seek care for malaria the most and reasons
5	a) What do you think usually influence community members to seek malaria care in a hospital?	**Probe** for the following • Money for paying bills for treatment • Money for transportation to hospital • Distance of hospital • Access to hospital • Availability of hospital

		• Attitude of health workers • Preference for traditional medicine • Preference for a particular type of hospital (Private hospital, primary health centre, secondary health care facility) • Cultural norms and beliefs about seeking care in hospital • Cultural norms and beliefs malaria • Perceived seriousness of malaria • Perceived threat of malaria • Frequency of malaria episode
	b)What do you think usually influence community members to seek malaria treatment in Patient Medicine Vendors stores or from drug peddlers? **(For Patient Medicine Vendors and Drug peddlers/hawkers involved in selling over-the-counter malaria medicines)**	**Probe** for the following • Money for paying bills for treatment • Money for transportation to hospital • Distance of hospital • Access to hospital • Availability of hospital • Attitude of health workers • Cultural norms and beliefs about seeking care in hospital • Cultural norms and beliefs malaria • Perceived seriousness of malaria • Perceived threat of malaria • Frequency of malaria episode
	c)What do you think usually influence community members to seek malaria in a hospital? **(For herbal drug sellers and traditional doctors)**	**Probe** for the following • Money for paying bills for treatment • Money for transportation to hospital • Distance of hospital • Access to hospital • Availability of hospital • Attitude of health workers • Preference for traditional medicine • Cultural norms and beliefs about seeking care in hospital • Cultural norms and beliefs malaria • Perceived seriousness of malaria • Perceived threat of malaria • Frequency of malaria episode
6	Let us briefly discuss how health seeking behaviour and source of care differ by socioeconomic group?	**Probe** for –where each of the following categories of people usually seek malaria care? • Rich people in the community • Poor people in the community • People with formal education • People without formal education (**For each of the categories, probe for the common source of malaria treatment e.g** - government institutions, private clinics, pharmacy, chemists, drug peddlers/hawkers, traditional healing homes, herbal drug stores/kiosks
	Malaria medications being used and their local names	

7	a)What can you say about the malaria medications that community members use?	• Please tell us about malaria medications that are commonly used among adult population in the community.
		  ○ **Probe for**, the local names for the malaria medications being used by adults in the community
		• Tell us about the malaria medications that are commonly used among children in the community.
		  ○ **Probe for**, the local names for the malaria medications being used by children in the community
		• What are your views about the cost of the malaria medications (orthodox medicine)?
		• How affordable do you think the cost of malaria medications is for community members?

	b)What can you say about the use of herbal drugs for treating malaria? **(For herbal drug sellers and traditional doctors)**	• Types of herbal drugs used for treating malaria ○ **Probe for**, the local names for the herbal malaria drugs • Perceived efficacy of the herbal drugs used for treating malaria • How common the use of herbal malaria drugs is in the community • Characteristics of community women who prefer to use herbal drugs for malaria treatment • Reasons community members prefer to use herbal drugs for malaria treatment • What are your views about the cost of the herbal malaria drugs? • What determines the type of herbal malaria drugs that you give to your patients? • Under what condition should community members who use herbal malaria drugs seek healthcare in the hospital for malaria treatment?
	c)What can you say about your competency to treat and manage malaria infections?	**Probe** for the competency to manage: • Malaria infections involving adults • Malaria infections involving under-five children • Malaria infection involving pregnant women • Complicated malaria infections • Individuals having frequent malaria episodes
	Showing of pictures or physical packaging of malaria medications to improve recall and answers about usage of malaria medication	
8	a)What are your opinions about the showing of pictures or physical packaging of malaria medications with the intention of improving recall and answers about usage of malaria medication?	**Probe** for • Why showing of pictures or physical packaging of malaria medications can possibly improve recall and answers about usage of malaria medication?
	b) In your opinion what other ways or means do you think can help community members to improve recall and answer about usage of malaria medications?	
	Factors influencing use of malaria medications and treating malaria at a hospital	

9	a)Please share with us the things that you think do influence community members decisions about choice of malaria medications	**Probe** for • **Individual factors that influence the decisions about what malaria medicine to use – e.g** Age, sex (male or female), marital status, economic status, being pregnant, medical history, perceived seriousness of malaria, perceived threat of malaria, preference for particular type of malaria medications (orthodox drugs), preference for herbal malaria drugs • **Drug related factors that influence the decisions about what malaria medicine to use –** e.g Availability of drug in hospital or drug stores, number of days expected to use drugs, number of capsules/dosages, taste of drug, side effects of drugs, drug resistance, availability of herbal malaria drugs, preference for herbal malaria drugs, proliferation of fake malaria medicines, giving of genuine malaria medications • **Social-cultural factors that influence the decisions about what malaria medicine to use –** e.g support from partners, support family members, support from friends/peers, media influence and drug adverts, cultural norms, and values • **Health system related factors that influence the decisions about what malaria medicine to use-** e.g., availability of drugs in hospital/pharmacy, prescription of drug, advice from health workers • **Policy related factors e.g.** – governments and regulatory bodies recommendation relating to antimalarial drugs that should be first line of treatment • **Disease pattern related factors e.g.**–uncomplicated vs severe malaria • **Economic related factors** e.g. – cost of buying malaria medications, affordability of preferred malaria medications
	d) What is your view about the cost of treating malaria in the hospital?	• How affordable do you think the cost of treating malaria is for community members in the health facility?
	Common methods that community members use to protect themselves from malaria	
10	a) Please tell us about the common methods that people use to protect themselves from malaria in this community	**Probe** for (if not mentioned): • Use of insecticide sprays • Use of insecticides treated bed nets • Use of mosquito replants • Use of coils • Use of window and door screens • Wearing of long-sleeved clothing and long pants • Malaria prophylaxis
	b) Which method is most commonly used by people to protect themselves from malaria?	**Probe** for • Reasons for being the most commonly used
	c) Which methods do community members usually use to protect under-five children from malaria?	
	Participation in community-based malaria programme	
11	a) We are planning to put in place a free community-based programme where community members will be asked to	

	consistently malaria cases or symptoms. Our goal is to understand the transmission of malaria in the community to inform where interventions go. What is your opinion about how community members will perceive the programme	
	b) If we want community members to be reporting malaria cases or symptoms consistently what do you think would be the preferred way or means for this?	**Probe** for (if not mentioned): • Face-to-face with a project volunteer • Through community representative • Through SMS • Through WhatsApp • Through mobile application • Through hotline Through community meeting etc.
	c) Supposed we ask community members to be reporting malaria cases or symptoms via text message as part of our community-based malaria programme, what is your opinion about it?	**Probe** for: • How easy do you think it will be for community members to participate? • How willing do you think community members will be? • What barriers do you think may be associated with it? • What do you think we can encourage community members to be reporting consistently malaria cases or symptoms via text message?
	d) What is your opinion about asking community members to be reporting malaria cases or symptoms via a mobile application as part of our community-based malaria programme?	**Probe** for: • How easy do you think it will be for community members to participate? • How willing do you think community members will be? • What barriers do you think may be associated with it? • What do you think we can encourage community members to be reporting consistently malaria cases or symptoms via a mobile application?
	e) What can facilitate the participation of community members in the programme?	
	Conclusion and other relevant information	
12	a) Please tell us about on-going or existing community-based malaria interventions in this community	
	b) What suggestions do you have about how malaria can be controlled in this community?	
	c) What other suggestions do you have that can help us with the community-based malaria programme that we are planning?	

Socio-demographic information

Ward and LGA …… Sex: ……
Age in years (at last birthday) …… Highest level of Education……
Primary occupation …… Other occupation(s) ……..
Number of years spent as informal healthcare provider……
Type of settlement ……
Name of Community/Area……..

Key informant interview consent form for community leaders

Who to interview: Community leaders - These include:

1. Opinion leaders
2. Traditional leaders
3. Religious leaders
4. Women leaders

Introduction

My name is ……and my colleagues are…… We work with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. You have been specially invited to this key informant interview and we thank you for honouring our invitation.

Purpose

The purpose of this key informant interview is to investigate the following

1. How community members manage suspected malaria infections
2. Where community members seek care for malaria
3. Factors that influence care seeking for malaria in a hospital,
4. How health seeking behaviour and source of care differ by socioeconomic group
5. Local names for malaria medications
6. How showing of pictures or physical packaging of malaria medications can improve participants' recall and answers about usage of malaria medication
7. Factors that influence decisions about what malaria medicine to use
8. Common methods that people use to protect themselves from themselves from malaria
9. Understand facilitators and barriers to participating in a community-based disease reporting programme for malaria

The information learned in this key informant interview will be used to guide the development of other components of the study that we are planning to conduct.

Procedure

The key informant interview, which will last for 40 – 60 minutes, will entail asking you some open-ended questions. In addition to the interview questions, we will be asking for some of your socio-demographic information. During this interview, your views will be respected and will not be used against you in any way. This interview will be taped, so please speak up and speak clearly. We ask for your consent to record the interview so that we will not miss out anything from the information you will be providing to us through the interview. Please do share your views without mentioning people's names. We want the interview to be anonymous and to be confidential as possible. You can choose whether to participate in the interview, and you may stop at any time during the course of the study. There is no right or wrong view, so feel free to express yourself. Please note that your participation in this interview is voluntary. Your decision not to be involved or drop out at any point will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the transcripts. The transcripts and other electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
Director, Institute for Advanced Medical Research and Training (IMARAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Key informant interview guide for community leaders

S/N	**Main questions**	**Follow up questions or hints**
	Introduction and general questions	

1	a)What can you say about the living conditions of community members?	• Financial condition or status of community members
		  ○ (**Probe for**, opinions about categorization of community members based on economic or financial status)
		• Health facilities available in the communities
		  ○ **Probe for**, types of health facilities (private hospital, primary health facilities, secondary health facilities, tertiary health facilities)
		  ○ **Probe for**, the most preferred by community members (private hospital, primary health facilities, secondary health facilities, tertiary health facilities)

	b)Where does the community members generally prefer to go for health care?	**Probe**-(if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). • Patent medicine stores • Traditional healing home • Drug peddlers etc.
	c) In this community if someone is pregnant, where would they typically go for antenatal care?	**Probe** for the following (if not mentioned): • Health facilities (private hospitals, primary health facility, secondary health facilities, tertiary health facilities). • Traditional Birth Attendants • Traditional doctors • Faith-based maternity homes • Nowhere/prefer to give birth at home ○ Opinions on why some pregnant women prefer not to attend antenatal care in the hospitals
	d) What are the common diseases in this community	• Which diseases are most common among under-five children? • Which diseases are most common among adult population? • Which diseases are the most severe diseases?
	Basic understanding of malaria	
2	Now let us discuss specifically on some basic issues relating to malaria. a)How common is malaria in this community?	What categories of persons are most affected by malaria? Probe for: ○ Under-five children ○ Aged people ○ Pregnant women ○ People with sickle cell anemia etc.
	b) How do community members usually get to know that they have malaria?	**Probe** for the following (if not mentioned): ○ Through observation of signs and symptoms that are suggestive of malaria ○ Clinical examination ○ Lab examination
	c) In your opinion, what are the signs and symptoms of malaria	

	Practices relating to management of malaria in the community	
3	a) How do adult members in community manage suspected malaria infections?	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	b) Tell us about how suspected malaria infections of under-five children are being managed in the community?	**Probe** for the following (if not mentioned): o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	c) Tell us about how suspected malaria infections in adolescents are being managed in the community	**Probe for the following (if not mentioned):** o Home-based care o Self-medication o Use of herbs o Use of drugs or medicines with prescription
	c) What efforts are being put in place by the community relating to the prevention and control of malaria?	
	Malaria related health-seeking behaviours of community members	
4	a) Where do community members seek care for malaria?	**Probe** for the following (if not mentioned) o Traditional healing homes o Patient Medicine Vendors stores o Drug hawkers/peddlers o Pharmacy stores o Herbal drug stores/kiosks o Hospitals (Private hospital, government hospital) **Probe for** where community members seek care for malaria the most and reasons
5	b) What do you think usually influence community members to seek malaria in a hospital?	**Probe** for the following • Money for paying bills for treatment • Money for transportation to hospital • Distance of hospital • Access to hospital • Availability of hospital • Attitude of health workers • Preference for traditional medicine • Preference for a particular type of hospital (Private hospital, primary health centre, secondary health care facility) • Cultural norms and beliefs about seeking care in hospital • Cultural norms and beliefs malaria • Perceived seriousness of malaria • Perceived threat of malaria • Frequency of malaria episode

6	c) Let us briefly discuss how health seeking behaviour and source of care differ by socioeconomic group	**Probe** for –where each of the following categories of people usually seek malaria care? • Rich people in the community • Poor people in the community • People with formal education • People without formal education (**For each of the categories, probe for the common source of malaria treatment e.g** - government institutions, private clinics, pharmacy, chemists, drug peddlers/hawkers, traditional healing homes, herbal drug stores/kiosks)
	Malaria medications being used and their local names	
7	a) What can you say about the malaria medications that community members use?	• Please tell us about malaria medications that are commonly used among adult population in the community. o **Probe for**, the local names for the malaria medications being used by adults in the community • Tell us about the malaria medications that are commonly used among children in the community. o **Probe for**, the local names for the malaria medications being used by children in the community • What are your views about the cost of the malaria medications (orthodox medicine)? • How affordable do you think the cost of malaria medications is for community members?
	a) Please think about it If you were sick, which malaria medications would you take	**Probe for**, • The local names for the malaria medications • The malaria medication(s) used the last time participant had malaria infection
	b) What can you say about the use of herbal drugs for treating malaria by community members?	• Types of herbal drugs used for treating malaria o **Probe for**, the local names for the herbal malaria drugs • Perceived efficacy of the herbal drugs used for treating malaria • How common the use of herbal malaria drugs is in the community • Characteristics of community women who prefer to use herbal drugs for malaria treatment • Reasons community members prefer to use herbal drugs for malaria treatment • What are your views about the cost of the herbal malaria drugs? • Under what condition should community members who use herbal malaria drugs seek healthcare in the hospital for malaria treatment?
	Showing of pictures or physical packaging of malaria medications to improve recall and answers about usage of malaria medication	
8	a)What are your opinions about the showing of pictures or physical packaging of malaria medications with the intention of improving recall and answers about usage of malaria medication?	**Probe** for • Why showing of pictures or physical packaging of malaria medications can possibly improve recall and answers about usage of malaria medication?
	b) In your opinion what other ways or means do you think	

	can help community members to improve recall and answer about usage of malaria medications?	
	Factors influencing use of malaria medications and treating malaria at a hospital	
9	a) Please share with us the things that you think do influence community members decisions about choice of malaria medications	**Probe** for • **Individual factors that influence the decisions about what malaria medicine to use – e.g.,** Age, sex (male or female), marital status, economic status, being pregnant, medical history, perceived seriousness of malaria, perceived threat of malaria, preference for particular type of malaria medications (orthodox drugs), preference for herbal malaria drugs • **Drug related factors that influence the decisions about what malaria medicine to use –** e.g. Availability of drug in hospital or drug stores, number of days expected to use drugs, number of capsules/dosages, taste of drug, side effects of drugs, drug resistance, availability of herbal malaria drugs, preference for herbal malaria drugs, proliferation of fake malaria medicines, giving of genuine malaria medications • **Social-cultural factors that influence the decisions about what malaria medicine to use –** e.g. support from partners, support family members, support from friends/peers, media influence and drug adverts, cultural norms, and values • **Health system related factors that influence the decisions about what malaria medicine to use-** e.g., availability of drugs in hospital/pharmacy, prescription of drug, advice from health workers • **Policy related factors e.g.** –governments and regulatory bodies recommendation relating to antimalarial drugs that should be first line of treatment • **Disease pattern related factors e.g.** –uncomplicated vs severe malaria • **Economic related factors** e.g. – cost of buying malaria medications, affordability of preferred malaria medications
	b) What is your view about the cost of treating malaria in the hospital?	• How affordable do you think the cost of treating malaria is for community members in the health facility?
	Common methods that community members use to protect themselves from malaria	
10	a) Please tell us about the common methods that people use to protect themselves from malaria in this community	**Probe** for (if not mentioned): • Use of insecticide sprays • Use of insecticides treated bed nets • Use of mosquito replants • Use of coils • Use of window and door screens • Wearing of long-sleeved clothing and long pants • Malaria prophylaxis
	b)Which method is most commonly used by people to protect themselves from malaria?	**Probe** for • Reasons for being the most commonly used
	c) Which methods do community members usually	

	use to protect under-five children from malaria?	
	Participation in community-based malaria programme	
11	a) We are planning to put in place a free community-based programme where community members will be asked to consistently report malaria cases or symptoms. Our goal is to understand the transmission of malaria in the community to inform where interventions go. What is your opinion about how community members will perceive the programme. What is your opinion about how community members will perceive the programme?	
	b) If we want community members to be reporting malaria cases or symptoms consistently what do you think would be the preferred way or means for this?	**Probe** for (if not mentioned): • Face-to-face with a project volunteer • Through community representative • Through SMS • Through WhatsApp • Through mobile application • Through hotline Through community meeting etc.
	c) Supposed we ask community members to be reporting malaria cases or symptoms via text message as part of our community-based malaria programme, what is your opinion about it?	**Probe** for: • How easy do you think it will be for community members to participate? • How willing do you think community members will be? • What barriers do you think may be associated with it? • What do you think we can encourage community members to be reporting consistently malaria cases or symptoms via text message?
	d) What is your opinion about asking community members to be reporting malaria cases or symptoms via a mobile application as part of our community-based malaria programme?	**Probe** for: • How easy do you think it will be for community members to participate? • How willing do you think community members will be? • What barriers do you think may be associated with it? • What do you think we can encourage community members to be reporting consistently malaria cases or symptoms via a mobile application?
	e) What can facilitate the participation of community members in the programme?	
	Conclusion and other relevant information	
12	a) Please tell us about on-going or existing community-based malaria interventions in this community	

	b) What suggestions do you have about how malaria can be controlled in this community?	
	c) What other suggestions do you have that can help us with the community-based malaria programme that are planning?	

Socio-demographic information

Ward and LGA …… Sex: ……

Age in years (at last birthday) …… Highest level of Education……

Primary occupation…… Other occupation(s)……..

Position……

Type of settlement ……..

Name of Community/Area……..

Cognitive testing consent form

Who to interview:

1. Mothers of under-five children

Introduction

My name is ……and my colleagues are…… We work with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. You have been specially invited for this cognitive pretesting and we thank you for honouring our invitation.

Purpose

The objective of this cognitive pretest is to obtain information about a wide range of questionnaire problems. The cognitive pretest will afford us the opportunity of assessing the comprehensibility of questions, identifying problems that respondents have answering the questionnaire, establishing the causes of these problems, and generating suggestions for improvement based on these findings.
The information learned in this cognitive pretesting will be used to guide the development of other components of the study that we are planning to conduct.

Procedure

During this interview which will last for 30 – 45 minutes, we will be reading out to you a few questions that researchers commonly ask parents during community surveys. Some of these questions may sound familiar to you. We would like you to think about how easy or difficult it would be for you to answer each question and provide suggestions for how it could be better asked. For each question, we would like you to imagine that you are being asked to answer this about one of your children. We encourage you to feel free to ask any question or ask for clarification during the interview. During this interview, your views will be respected and will not be used against you in any way. This interview will be taped, so please speak up and speak clearly. We employ you to allow us to record the interview so that we will not miss out anything from the information you will be providing to us through the interview. Please do share your views without mentioning people's names. We want the interview to be anonymous and to be confidential as possible. There is no right or wrong view, so feel free to express yourself. Please note that your participation in this interview is voluntary. Your decision not to be involved or drop at any point will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the transcripts. The transcripts and other electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the

research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
Director, Institute for Advanced Medical Research and Training (IMARAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Cognitive testing discussion guide

S/N	**Main questions**	**Follow up questions/Probes**
	Objective: Identify the challenges that survey participants encounter when responding to questions on malaria-related illness and treatment seeking from the Demographic and Health Survey and ascertain mitigating factors	

1	a) Has your child been ill with a fever at any time in the last two weeks?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How comfortable are you answering this question?
		• How confident are you to easily recall your child's malaria fever experience in the last two weeks?
		• How clear is this question to you?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question?
		• I will appreciate if you can tell me (by putting it in our own words) if asking whether your child had fever would capture a malaria episode. If not, what do you think we should inquire about to capture a malaria episode.

2	Did you seek advice or treatment for the illness from any source?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How comfortable are you answering this question?
		• How clear is this question to you?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question?

3	Where did you seek advice or treatment? Public sector government hospital? Private medical center? Chemist? Other? [response not required]	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• Do you understand the difference between public/government hospitals and private ones?
		• How comfortable are you answering this question?
		• How clear is this question to you?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question?

4	At the Pharmacy/Chemist/Patent Medicine Stores (PMS):
	
	Was your child examined?
	
	Did you get advice on the type of medication to buy, or did you already know which one to buy?
		• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How comfortable are you answering this question?
		• How clear is this question to you?
		• Could you let me know if there is anything confusing about this question?

	What is the name of the medication recommended or purchased? (Probe separately for each of the three questions here)	• In case you feel this question is confusing, how will you suggest that we ask this question?

5	At any time during the illness, did your child take any drugs for the illness?
	
	What drugs did your child take? Artemisinin Combination Therapy? SP/Fansidar? Chloroquine? Amodiaquine? Quinine Pills? Injection/IV? Artesunate Rectal? Other Antimalarial (specify)
		• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How comfortable are you answering this question?
		• How clear is this question to you?
		• Tell me if you are familiar with all the drugs that listed as options
		• Tell me the drugs you are unfamiliar to you
		• Tell me you if you familiar with what ACTS are
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question?
		• How would you answer this question if you tested negative for malaria?
		•

6	Here are a few photos of common medications that are commonly prescribed for malaria. Which one did your child take when they were ill?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How comfortable are you answering this question?
		• How clear is this question to you?
		• Between this question (question 6) and the previous one on medication use (question 5) which one is clearer to you?
		• Between this question (question 6) and the previous one medication (question 5), which one is easier to remember, and which question do you prefer?
		• What other ways can we ask this question to make it easy for you to remember which medication your child took?
		• Please think about it If you were sick, which medication would you take?

7	How long after the fever started did your child first take an artemisinin combination therapy? Same day? Next day? Two days after fever? Three or more days after fever? Don't know?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How comfortable are you answering this question?
		• How clear is this question to you?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question?

	Objective: Assess comfort with answering questions about financial status	

8	What is your total household income? (per month)	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

9	How many members of the household earn income?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

10	How do members of your household earn income? [salaried/hourly wage or intermittent work]	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

11	How much do you spend on personal expenses, such as food and transportation? On a weekly basis? On a monthly basis?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?

		• Who would be the most appropriate person to ask this question? • Could you let me know if there is anything confusing about this question? • In case you feel this question is confusing, how will you suggest that we ask this question • In terms of personal expenses such as food and transportation, will it easier to recall expenses in terms of weekly expenses or monthly expenses?
12	What is your primary mode of transportation?	• How clear is this question to you? • How comfortable are you answering this question? • Share your opinion whether people in your area will feel comfortable answering this question? • Who would be the most appropriate person to ask this question? • Could you let me know if there is anything confusing about this question? • In case you feel this question is confusing, how will you suggest that we ask this question
13	Are your children enrolled in school?	• How clear is this question to you? • How comfortable are you answering this question? • Share your opinion whether people in your area will feel comfortable answering this question? • Who would be the most appropriate person to ask this question? • Could you let me know if there is anything confusing about this question? • In case you feel this question is confusing, how will you suggest that we ask this question

14	How much do you spend per term on children's education?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

15	Do you receive money from family abroad? How much do you receive on a monthly basis?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?

		• In case you feel this question is confusing, how will you suggest that we ask this question

16	Do you have financial support from other sources?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

17	If you or a member of your household was sick and needed to go the hospital, would you: a) have enough funds to cover all costs, b) have enough funds for some of the costs, c) need to borrow money or find other means to pay	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

18	If a member of this household were sick and needed to go to the hospital, would you have enough money for/access to reliable transportation?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

19	How do members of your household manage health expenses when there isn't enough money?	• Please tell me if you would be able to recall this accurately
		  ○ Reasons for being able to recall accurately
		  ○ Reasons for not being able to recall accurately
		• How clear is this question to you?
		• How comfortable are you answering this question?
		• Share your opinion whether people in your area will feel comfortable answering this question?
		• Who would be the most appropriate person to ask this question?
		• Could you let me know if there is anything confusing about this question?
		• In case you feel this question is confusing, how will you suggest that we ask this question

Cross-sectional study instruments

Household survey consent form and questionnaire

BACKGROUND INFORMATION			
LOCAL GOVT. AREA……			
WARD……			
ENUMERATION AREA/CLUSTER NUMBER……			
HOUSEHOLD NUMBER …….			
NAME OF HOUSEHOLD HEAD……			
DATE: DAY…… MONTH……YEAR……			
INTERVIEWER'S NAME …….			
INTERVIEWERS PHONE NO……			
INTERVIEWER VISIT			
	1	2	3
DATE	_____	_____	_____
RESULT			
SUPERVISORS NAME	_____	FIELD EDITOR	_____

INTRODUCTION AND CONSENT

My name is ……and my colleagues are…… I am working with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas part of a collaborative project with Northwestern University, USA and National Malaria Elimination Programme. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. We thank you for honouring our presence.

Purpose

The purpose of this interview is to investigate malaria prevalence in your household and identify what factors predispose community members to malaria infection

Procedure

As part of this study, you will be asked questions about your household characteristics, individuals living within the household, socio-demographic information, knowledge of malaria, risk factors and other relevant questions, which will help us achieve our objectives. You will also be offered rapid diagnostic testing for malaria infection. The interview should last between 30- 45 minutes. Your responses will be inputted into an electronic data-capturing device. The interview is going to be anonymous and confidential as much as possible. You can choose whether to participate in the interview, and you may stop at any time during the study. Your decision not to continue to participate will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria in your community.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the electronic data. The electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

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Director, Institute for Advanced Medical Research and Training (IMARAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Do you have any questions? Yes _____1
No_____2 ☐

May I begin the interview now? Yes _____1
No_____2 ☐

HOUSEHOLD LINE LISTING

Line No	Usual Residents	Relationship to Household Head (HH)	Sex	Residence	Age	Marital Status (If Older than 18)	RDT Eligibility
	Please give me the names of the persons who usually live here	What is the relationship of (NAME) to the HH	Is (NAME) male or female? Male = 1 Female = 2	Did (NAME) sleep here last night? Yes =1 No = 2	How old was (NAME) as at last birthday?	What is (NAME) current marital status	Selected for RDT? Yes =1 No = 2
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							

Information on non-residents							
Line No	Non-residents	Relationship to HH	Sex	Residence	Age	Remarks	
	Please give me the names of all persons who don't usually live here	What is the relationship of (NAME) to the HH	Is (NAME) male or female? Male = 1 Female = 2	Did (NAME) sleep here last night? Yes = 1 No = 2	How old was (NAME) as at last birthday?		
1							
2							
3							
4							
5							

CODES:

RELATIONSHIP TO HEAD OF HOUSEHOLD

01 = HEAD
02 = WIFE OR HUSBAND
03 = SON OR DAUGHTER
04 = SON-IN-LAW OR DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHER OR SISTER
09 = BROTHER-IN-LAW/SISTER IN-LAW
10 = NIECE/NEPHEW BY BLOOD
11 = NIECE/NEPHEW BY MARRIAGE
12 = OTHER RELATIVE
13 = ADOPTED/FOSTER/ STEPCHILD
14 = NOT RELATED
15 = CO-WIFE
16 – NANNY
98 = DON'T KNOW

CRITERIA FOR RDT

(if less than or equal to 5 people in the household, test everyone, if greater than 5 people, test one person in these age groups:
0-5 years
6-10 years
11-17 years
18-30 years
30 years and above

If age category is missing, test two persons in the youngest category

SECTION 1. HOUSEHOLD RESOURCES			
Q100	What is the main source of drinking water for members of your household? (enter the number for the most commonly used)	**Improved source** i. Piped into dwelling/yard/plot ----------1 ii. Piped to neighbour ----------2 iii. Public tap/standpipe ----------3 iv. Tube well or borehole ----------4 v. Protected dug well ----------5 vi. Protected spring ----------6 vii. Rainwater ----------7 viii. Tanker truck/cart with small tank ----------8 ix. Bottled water ----------9 **Unimproved source** x. Unprotected dug well ----------10 xi. Unprotected spring ----------11 xii. Surface water (River, Pond) ----------12 xiii. Sachet water----------13 xiv. **Others (specify)**----------14	
Q101	What is the main source of water used by your household for other purposes such as cooking and handwashing?	**Improved source** i. Piped into dwelling/yard/plot ----------1 ii. Piped to neighbour ----------2 iii. Public tap/standpipe ----------3 iv. Tube well or borehole ----------4 v. Protected dug well ----------5 vi. Protected spring ----------6 vii. Rainwater ----------7 viii. Tanker truck/cart with small tank ----------8 ix. Bottled water ----------9 **Unimproved source** x. Unprotected dug well ----------10 xi. Unprotected spring ----------11 xii. Surface water (River, Pond) ----------12 xiii. Sachet water----------13 **Others (specify)**----------14	
Q102	Where is the main source of water located?	i. In own dwelling ----------1 ii. Outside own dwelling ----------2 iii. Public tap----------3 iv. Elsewhere (specify) ----------4	
Q103	On the average, how long does it take your household to get to the source of water and back?	---------- Minutes ----------Hours ----------Don't Know	
Q104	What kind of toilet facilities do members of your family usually use?	**Improved sanitation facility** i. Flush toilet ----------1 ii. Ventilated improved pit (VIP) latrine ----------2 iii. Pit latrine with slab ----------3 iv. Composting toilet ----------4 **Unimproved facility** v. Pit latrine without slab/open pit ----------5 vi. Bucket ----------6 vii. Hanging toilet/hanging latrine ----------7 viii. Open defecation (no facility/bush/field) ----------8 ix. Others (specify) ----------98	
Q105	Do you have your own toilet or you share toilet with other households?	i. Have own toilet----------1 ii. Shared toilet ----------2	
Q106	Where is the bathroom of your house located?	i. Inside the house ----------1 ii. Outside, separated from the house ----------2 iii. No bathroom at all----------3	

Q107	How many rooms are used by members of your household for sleeping?	Specify the number of rooms used: ….....	
Q108	How many members of your household sleep on the floor?	***Give number, if none write 00*** ☐☐	
Q109	What is the main source of power/energy use for cooking in your household?	i. Electricity ----------1 ii. LPG/natural gas/biogas ----------2 iii. Kerosene ----------3 iv. Coal/lignite ----------4 v. Charcoal ----------5 vi. Wood ----------6 vii. Agricultural crop/straw/shrubs/grass ----------7 viii. Others specify ----------9	
Q110	Which of the following items do you, your spouse or your family have? (Circle as appropriate)		

	Yes	No
Radio	1	2
Television	1	2
Mobile telephone	1	2
Non-mobile telephone	1	2
Desktop Computer	1	2
Laptop Computer		
Refrigerator	1	2
Table	1	2
Chair	1	2
Bed	1	2
Cupboard	1	2
Air conditioner	1	2
Electric iron	1	2
Generator	1	2
Fan	1	2

Q111	Do your household own farmland?	Yes----------1 No----------2	
Q112	Does any member of your household have livestock?	Yes ----------1 No----------2	
Q113	Type of housing	Face to face……1 One Bedroom……2 Two Bedroom Flat……3 Three Bedroom Flat……4 Duplex……5 Others(specify)……6	
Q114	Do you share your compound with other households?	Yes……1 No……2	
Q115	Are the eaves of the house or building occupied by this household open or closed? **Observe and record**	Completely Open ……1 Partially Open……2 Closed……3	
Q116	Does the part of the house or building occupied by the household have a ceiling? **Observe and record**	No, None ……1 Yes, Partial/Poorly Sealed/Worn Out……2 Yes, Complete and Sealed ……3	

Q117	Is there a farm within the compound? **Observe and record**	Yes.....1 No.....2	

SECTION 2: NEIGHBOURHOOD CHARACTERISTICS							
Q201	How would you describe the road type in your neighbourhood	Tarred.....1 Untarred.....2 Both Tarred/untarred.....3					
Q202	Would you say most houses in your neighbourhood are?	Fenced with gate.....1 Fenced, no gate.....2 Partially Fenced.....3 Partially Fenced.....4 Other(specify).....5					
Q203	If fenced, what is the nature of the fencing material	Cement Block.....1 Mud.....2 Barbed wire and cement block.....3 Others(specify).....4					
Q204	Are the houses in your neighbourhood painted?	No not painted.....1 Yes, old painting.....2 Yes, recently painted.....3 Others (specify).....4					
Q205	Are there open drainages in your neighborhood	Yes.....1 No.....2					
Q206	Are the open drainages clogged with dirt or rubbish	Yes.....1 No.....2					
Q207: Thinking about the environment where you live, how much do you agree with the following statements							
		Strongly Agree	Agree	Can't Say	Disagree	Strongly Disagree	
Q207A	There is a lot of noise in my neighbourhood.	1	2	3	4	5	
Q207B	There are sidewalks on most streets in my community.	1	2	3	4	5	
Q207C	There is a lot of unpleasant smells in my neighbourhood.	1	2	3	4	5	
Q207D	My neighbourhood has heavy human traffic.	1	2	3	4	5	
Q207E	There is a lot of trash and litter on the street in my neighbourhood.	1	2	3	4	5	
Q207F	There is vandalism in my neighbourhood.	1	2	3	4	5	
Q207G	There are too many people hanging around on the streets near my home	1	2	3	4	5	
Q207H	I have easy access to medical care in my neighbourhood.	1	2	3	4	5	

SECTION 3: INDIVIDUAL CHARACTERISTICS			
Q300	How long have you been living continuously in (CURRENT PLACE OF RESIDENCE)?	DURATION IN YEARS	

Q301	How old were you at your last birthday? PROBE TO GET ESTIMATE IF NOT SURE	AGE AT LAST BIRTHDAY (IN YEARS) ☐☐	
Q302	Sex of Respondent	Male……1 Female……2	
Q303	Have you ever attended school? (Ask all questions)	Quranic/Islamiyah school? 1. YES 2. NO ☐ Adult classes? 1. YES 2. NO ☐ Formal school? 1. YES 2. NO ☐	
Q304	What is the highest level of formal school you completed?	i. Did not complete Primary School ----------1 ii. Primary Completed----------2 iii. Secondary Completed----------3 iv. Post-secondary School Completed----------4	
Q305	If post-secondary school completed: Specify highest level completed in this category:	If completed post-secondary education, please, specify highest level completed: _____	
Q306	What is your ethnic group?	i. Igbo ----------1 ii. Yoruba ----------2 iii. Hausa ----------3 iv. Others (specify)----------4	
Q307	What is your religion?	i. Christianity ----------1 ii. Islam ----------2 iii. Traditional religion ----------3 iv. Other (specify)----------4	
Q308	What is your current marital status?	i. Never married ----------1 ii. Married ----------2 iii. Co-habiting ----------3 iv. Divorced/Separated ----------4 v. Widowed ----------5	
Q309	How would you describe the family living arrangement in your house?	i. Monogamous Family (a man and wife, with or without children) living in a separate house ----------1 ii. Polygamous Family (a man, wives, and children) living in a separate house ----------2 iii. Extended family (a family which extends across generations, i.e including grandparents, aunts, and other relatives) living in the same house ……..3 iv. A female-headed household (a woman and her children i.e. absence of a man in a household, thus, making the woman the sole economic provider for the family) .....4 Others (specify) ----------5	
Q310	Who provides the main source of income in your home?	i. Husband/Partner ……..1 ii. Both Husband and Wife(s) provide equally……..2 iii. Wife……..3 iv. Parents ……..4 v. Children……..5 Others (specify) ……..6	
Q311	Do you currently do any work to earn an income?	Yes……..1 No……..2	
Q312	What kind of work do you do?	i. Professional/Technical/Managerial----------1 ii. Clerical ----------2	

		iii. Sales and Services ----------3 iv. Skilled Manual ----------4 v. Unskilled Manual ----------5 vi. Agriculture ----------6 vii. Domestic Work----------7 viii. Others (specify):----------8	
Q313	If you are an agricultural worker, what type of agricultural produce do you work with?	i. Rice .....1 ii. Other plants.....2 iii. Poultry.....3 iv. Fish and other seafood.....4 v. Cows.....5 vi. Other livestock.....6 vii. Other produce.....7	
Q314	If you are an agricultural worker, is your work seasonal?	Yes.....1 No.....2	
Q315	If your work is seasonal, what months of the year do you work?	.....	
Q317	Where do you do your work?	State..... LGA..... Ward.....	
Q318	Do you work indoors, outdoors or both?	Indoors..... Outdoors..... Both.....	
Q319	How long do you spend indoor or outdoor at work? **Ask for times and write response in hours**	At work (Overall)..... Indoor at Work..... Outside at Work.....	
Q320	How much do you earn?	Daily..... Weekly..... Monthly.....	
Q321	Do you have children enrolled in school	Yes.....1 No.....2	
Q322	How many children are enrolled?	/_____/	
Q323	Do your children attend school in the same neighbourhood that you reside in?	Yes.....1 No.....2	
	If, your children school outside this neighbourhood, can you provide information about?	LGA..... Ward.....	

IF RESPONDENT IS MALE, SKIP SECTION 4 AND GO TO SECTION 5

SECTION 4 : REPRODUCTION			
Q400	Have you ever given birth	Yes.....1 No.....2	
Q401	Do you have any sons or daughters to whom you have given birth to who are now living with you	Yes.....1 No.....2	
Q402	How many sons live with you?	/_____/	
Q403	How many daughters live with you?	/_____/	

	Do you have any sons or daughters to whom you have given birth who are alive but do not live with you	Yes……………………………………………………1 No……………………………………………………..2			
Q404	How many sons are alive but do not live with you	/______________________/			
Q405	How many daughters are alive but do not live with you	/_____________________/			
Q406	Have you ever given birth to a boy or girl who was born alive and later died?	Yes……………………………………………….1 No………………………………………………..2			
Q407	How many boys have died?	/___________/			
Q408	How many girls have died?	/__________/			
Q408b	Just to make sure that I am correct you have had a Total of -------births in your lifetime	/__________/			
Q409	Have you ever heard of anything that can be done to prevent pregnancy?	Yes……………………………………………………1 No…………………………………………………….2			
Q410	If yes, what was your main source of information				
Q411	Have you ever done anything to prevent pregnancy?	Yes……………………………………………………1 No……………………………………………………..2			
Q412	If yes, which of these methods have you done?		Yes	No	
		Female sterilization	1	2	
		Male sterilization	1	2	
		Pill	1	2	
		IUD	1	2	
		Injectables	1	2	
		Implants	1	2	
		Male condom	1	2	
		Female condom	1	2	
		Emergency contraception	1	2	
		Standard days method	1	2	
		Lactational amenorrhea (LAM)	1	2	
		Rhythm	1	2	
		Withdrawal	1	2	
		Other method	1	2	
Q413	Are you currently pregnant?	Yes……………………………………………………1 No……………………………………………………2			

What name was given to your most recent/previous baby	Is (NAME) a boy or girl?	Was it a single of multiple pregnancy	On what day, month and year was(NAME) born	Is (NAME) still alive	How old was (NAME) as at last birthday?	Is (NAME) living with you	Was (NAME) Selected
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2

			Year/_____/				
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2
	Boy …1 Girl… 2	Sing…..1 Mult……2	Day/__/ Month /__/ Year/_____/	Yes…1 No….2	/____/ years	Yes…1 No…..2	Yes…1 No…..2

Now I would like to ask you about your last pregnancy that resulted in a life birth			
Q415	While you were pregnant for (NAME) did you see anyone for antenatal care?	Yes……………………………………………………….1 No………………………………………………………..2	
Q416	Whom did you see?	Doctor………………………………………………….1 Nurse/Midwife………………………………………..2 Auxiliary Midwife……………………………………..3 Traditional Birth Attendant……………………….4 Community Health Worker……………………….5 Others(specify)________________________6	
Q417	Where did you receive antenatal care?	Government Hospital……………………………….1 Government Health Center……………………….2 Government Health Post…………………………..3 Other Public Sector(specify)……………………..4 Private Hospital………………………………………..5 Private Clinic……………………………………………6 Other Private Sector(specify)……………………..7 NGO Hospital…………………………………………..8 NGO Clinic……………………………………………….9 Other NGO Center(specify)……………………….10 Home……………………………………………………..11 Traditional Birth Homes…………………………….12 Others(specify)__________________________13	
Q418	How many weeks or months were you when you first received antenatal care?	Weeks_____________________ Months_____________________	
Q419	How many times did you receive antenatal care during the last pregnancy?		

Q420	During the last pregnancy, did you take SP/Fansidar to prevent malaria	Yes……1 No……2	
Q421	How many times did you take SP/Fansidar	/_____/	
Q422	Where did you get the SP/Fansidar	During Antenatal Visit……1 Another Facility Visit……2 Other Source(Specify)……3	

SECTION 5: KNOWLEDGE OF MALARIA TRANSMISSION, CAUSES AND PREVENTIVE PRACTICES					
Q500	Have you ever heard of malaria	Yes……1 No……2			
Q501			Yes	No	
	What was your source of information on malaria	Radio	1	2	
		Television	1	2	
		Newspaper	1	2	
		Friend	1	2	
		Health Care Worker	1	2	
		Religious leader	1	2	
		Colleague	1	2	
		Others (Specify)_____			
Q502			Mentioned	Not Mentioned	
	What are the common symptoms of malaria? **(DO NOT READ OUT)**	Fever	1	2	
		Chills/Shivering	1	2	
		Headache	1	2	
		Joint Pain	1	2	
		Poor Appetite	1	2	
		Vomiting	1	2	
		Convulsion	1	2	
		Cough	1	2	
		Catarrh/Nasal Congestion	1	2	
		Don't know any	3		
		Others(Specify)			
Q503					
	What are the causes of malaria you know? **(DO NOT READ OUT)**	Mosquitoes bite	1	2	
		Dirty Environment	1	2	
		Stagnant Water	1	2	
		Lakes, pits, dams around surroundings	1	2	
		Bushes around the house	1	2	
		Ill ventilated houses	1	2	
Q504	Do you think malaria can be prevented?	Yes……1 No……2			
Q505	Which was do you think malaria can be prevented?		Yes	No	
		Sleeping under insecticide treated nets	1	2	
		Cutting bush around the house	1	2	
		Spraying mosquito insecticide in homes	1	2	
		Taking malaria preventive drug	1	2	
		Door/Window Screens	1	2	
		Taking herbs	1	2	
		By praying	1	2	

SECTION 6: HISTORY OF MALARIA INFECTION; HEALTH SEEKING BEHAVIOUR FOR MOST RECENT EPISODE OF MALARIA AND ANTIMALARIAL DRUG USE PATTERN				
Q600	Has anyone been ill with a fever at any time in the last 2 weeks?		Yes.....1 No.....2	
Q601	Has anyone been ill with malaria at any time in the last 2 weeks?		Yes.....1 No.....2	
Q602	How many people in your household had fever in the last 2 weeks?		☐	
Q603	Can you list all people that have had a fever in the last 2 weeks?		NAME_____ LINE NO_____ NAME_____ LINE NO_____ NAME_____ LINE NO_____ NAME_____ LINE NO_____	
Q604	Did you seek advice or treatment for the illness for (NAME) from any source?		Yes.....1 No.....2	
Q605	Where did you first seek advice or treatment?	**PUBLIC SECTOR** Government hospital ..... 1 Government health center.....2 Government health post.....3 Mobile clinic.....4 Fieldworker/CHW.....5 Other public sector (specify).....6 **PRIVATE MEDICAL SECTOR** Private hospital/clinic.....7 Pharmacy.....8 Chemist/PMV.....9 Private doctor.....10 Mobile clinic .....11 Other private medical sector (specify) .....12 **OTHER SOURCE** Shop.....13 Traditional practitioner.....14 Market.....15 Itinerant drug seller.....16 Community-oriented resource person.....17 Other(specify).....18		
Q606	How many days after the illness began did you first seek advice or treatment for (NAME)?		_____ (00 if same day)	
Q607	At any time during the illness, did (NAME) have blood taken to diagnose malaria		Yes.....1 No.....2	
Q608	Were you told by a healthcare provider that (NAME) had malaria?		Yes.....1 No.....2	
Q609	Was (NAME) advised to take antimalarial drugs?	Yes.....1 No.....2		
Q610	What drugs did (NAME) take? Probe: Any other drugs?	Artemisinin Combination Therapy (Act).....1 SP/Fansidar.....2 Chloroquine.....3 Amodiaquine.....4 Quinine Pills.....5 Quinine Injection/IV.....6 Artesunate Rectal.....7		

		Artesunate Injection/IV.....8 Other Antimalarial.....9 .Drug of unknown type 10	
Q611	If (NAME) took antimalarial, where did you get the antimalarial drug(NAME) took?	Same facility visited as Q604.....1 Other(specify)_____2	
Q612	How long after the fever started did(NAME) first take an artemisinin combination therapy?	Same Day.....0 Next Day.....1 Two Days After Fever.....2 Three Or More Days After Fever.....3 Don't Know.....4	
Note: If more than one household member was ill (Q601 >1) , kindly repeat Q603 – Q612 for each member			

SECTION 7: VECTOR CONTROL			
Q700	Have you ever heard of a mosquito net	Yes.....1 No.....2	
Q701	Does your household own a mosquito net	Yes.....1 No.....2	
Q702	How many mosquito nets does your household have?	/_____/	
Q703	How many months ago did your household get the mosquito net?	_____ (00 if less than one month)	
Q704	Where did you get the net?	Distribution campaign.....1 ANC.....2 Immunization visit.....3 Govt. Health facility.....4 Private health facility.....5 Pharmacy.....6 Shop/market .....7 Community health worker.....8 Religious institution.....9 School.....10 Other.....11 Don't know.....12	
Q705	Did you pay for the net?	Yes.....1 No.....2 Not Sure.....3	
Q706	If you paid for the net, how much did you pay?	_____	
Q707	Is the mosquito net you have treated?	Yes.....1 No.....2 Not Sure.....3	
Q708	If yes, what was it treated with?		
Q709	Did anyone sleep inside this mosquito net last night?	Yes.....1 No.....2 Not Sure.....3	
Q710	***For each net in the household, ask the following question*** Who slept inside this mosquito net last night?	NAME.....	
Q711	Why did noone sleep inside this net?	No mosquitoes.....1 No malaria..... 2 Too hot.....3 Difficult to hang.....4 Don't like smell.....5 Feel `closed in' or constrained.....6	

		Net too old/torn……..7 Net too dirty……..8 Net not available last night (washing)……..9 Feelitn chemicals are unsafe ……..10 ITN provokes cough……..11 Users did not sleep here last night……..12 Net not needed last night……..13 No space to hang ……..14 Other (specify) ……..15 Don't know……99	
Q712	Have you ever heard of indoor residual spraying (IRS)? **If no, explain what IRS means to study participant**	Yes……1 No……..2	
Q713	If yes, what does it mean? **If not explained accurately, explain what IRS means to study participant**		
Q714	What is the importance of IRS?	Prevention of mosquito bite……..1 Prevention of other insect bite……..2 Prevention of scorpion stings……..3 Others (specify)……4	
Q715	What do you think are the disadvantages of IRS	Respiratory disorder……1 Headache……..2 Food contamination……3 Discoloration of surfaces and walls……4 Unpleasant odor……..5 Others(Specify)_____	
Q716	Have IRS ever been conducted in this household	Yes……..1 No……2	
Q717	If yes, when was the last time this was done	Month /_____/ Year/_____/	
Q718	If yes, who conducted the IRS	Government……1 Self……2 Community……3 Health Facility……4 Others(Specify) ……..5	
Q719	Do you have window/door screens?	Yes……1 No……..2	
Q720	Do you use spray insecticides?	Yes……1 No……2	
Q721	If yes, how often do you use it?		
Q722	Do you use mosquito coil?	Yes……..1 No……..2	
Q723	If yes, how often do you use it?	Daily……..1 Sometimes……..2 Rarely……..3	
Q724	What other things do you do to prevent malaria infection in your household?		
Q725	Have you heard of seasonal malaria chemoprevention (SMC)? **If no, explain what SMC means to study participant**	Yes……..1 No……..2	
Q726	If yes, what does it mean?		

	If not explained accurately, explain what SMC means to study participant		
Q727	***(Check line listing for how many children aged 3-59 months)*** Just to confirm you have /____/ children aged 3-59 months in this household?	Yes……..1 No……..2	
Q728	If yes, has any of them ever taken SMC	Yes……..1 No……..2	
Q729	If they have ever taken SMC, how long ago did they take it?	Less than 28 days ago……1 29-42 days ago……2 43 days or more……3 Can't remember……4	☐
Q730	If they have ever taken SMC, how many doses have they taken in the last four months?	.....	
Q731	If they have taken SMC, who provided the SMC?	Government……1 NGO. ……2 Community……3 Health Facility……4 Others(Specify) _____ 5	☐

SECTION 8: MOBILITY PATTERNS AND INSIDE/OUTDOOR ACTIVITIES			
Q800	How long have you been living continuously in this community? ***Ask for duration in years***	_____ (00 If less than one year)	
Q801	Just before you moved here, how would you describe where you lived?	City ……1 Town……2 Rural……3	
For each person in the household ask the following questions			
Q802	Have you travelled out of your current residence in the last 4 weeks	Yes……1 No……2	
Q803	How many times have you travelled out of your current location in the last 4 weeks?	.....	
Q804	If yes, where did you travel to?	Outside my community……1 Outside my State……2 Others(Specify)……3	
Q805a	Kindly provide the state, LGA and the ward of place visited, if known?	State …… LGA …… Ward…… _____	
Q805b	If Q805a isn't known, Can you provide the address of the place visited?	Address: _____ _____	
Q806	What was the main reason for your travel?	Business/Work-Related……1 Holiday……2 Visiting Family/Relatives……3 Visit Friends……4 Others(Specify)_____5	
Q807	How best would you describe your travel location?	Urban area - formal settlement ……1 Urban area - Informal settlement or slum……2	

		Rural area - village……..3 Rural area – farm ……..4 Others(Specify)_____5	
Q808	Did you stay overnight during your last travel?	Yes……1 No……2	
Q809	How long did you stay at this location?	.....	
Q810	Did you sleep under a mosquito net during the last night you travelled?	Yes……,……..1 No……2	
Q811	If no, what was the reason?	No mosquitoes……..1 No malaria……..2 Too hot……..3 Difficult to hang . ……..4 Don't like smell . ……5 Feel "closed in'' or constrained ……6 Net too old/torn ……..7 Net too dirty. . . . . ……..8 Net not available last night (washing)……9 Feel ITN chemicals are unsafe……..10 ITN provokes cough……..11 Net not needed last night. . . . ……..12 No space to hang ……..13 Other (specify) _____14 Don't know……..99	
Q812	Did you treat malaria during your most recent travel?	Yes……,……..1 No……2	
Q813	After you returned from your most recent trip, did you treat malaria?	Yes……,……..1 No……2	
Q814	How many days after your most recent trip did you treat malaria?	_____	
Q815	Did you do any other thing to prevent malaria during your travel?	Yes……,……..1 No……2	
Q816	If yes, what did you do?	Used Mosquito Coil……..1 Sprayed the room with insecticide ……2 Use Mosquito Repellant Cream……..3 Others(Specify)_____4	
Q817	How long do you spend outside the home daily	/_____/hours /_____/ minutes	
Q818	Do you do any chores outside your home	Yes……..1 No……2	
Q819	If yes, what kind of chores do you do?		
Q820	How long do you spend outside doing these chores	/_____/hours /_____/ minutes	
Q821	What time do you usually go to bed?	6:00pm- 7:00pm……..1 7:00pm – 8:00pm……..2 9:00pm-10:00pm……..3 10pm and above……..4	
Q822	On a daily basis, would you say	I spend same duration of time indoor/outdoor……..1 I spend more time indoor than outdoor……..2 I spend more time outdoor than indoor……..3 I cannot estimate the time I spend indoor/outdoor……..4	

		Others_____	
If there are non-residents in the household who slept in the HH the night before, ask the following questions			
Q823	How long in days has (NAME) been staying at your home	_____	
Q824	Where is (NAME) visiting from?	State_____ LGA_____ Ward _____	
Q825	Has (NAME) had malaria at any time since they arrived?	Yes……..1 No……2	
Q826	Was (NAME) diagnosed by a health professional?	Yes……,…...1 No……2	

MALARIA TESTING ALGORITHM					
	SELECTED FOR MALARIA RDT TEST	Yes……..1 No……2			
	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT.	"As part of this survey, we are asking eligible respondents to take a test to see if they have malaria. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will assist the government to develop programs to prevent malaria. We ask all eligible respondents to take part in malaria testing in this survey and give a few drops of blood from a finger or heel. One blood drop will be tested for malaria immediately, and the result will be told to you right away. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes or no. It is up to you to decide. Will you participate in the malaria test?" Yes……1 No……2			
	RDT DONE Yes……1 No…….2 ☐	OUTCOME: TESTED……..1 REFUSED……2 Other_____3	☐	RESULT: POSITIVE……..1 NEGATIVE……2 Other_____3	

Health Facility Survey Instruments

Health facility data capture form

HEALTH FACILITY INFORMATION	
This form should be completed for every health facility and linked to participant responses from the health facility surveys	
NAME OF HEALTH FACILITY	
TYPE OF HEALTH FACILITY Public . . . . . 1 Private. 2	☐
PHYSICAL ADDRESS OF HEALTH FACILITY_____ _____ _____	
WARD	
LGA	
NUMBER OF ANC ATTENDEES LAST MONTH: _____	
NUMBER OF DELIVERIES LAST MONTH: _____	
Does your facility conduct mosquito net distribution? Yes……1 No……2	☐
IPTp Available in Health Facility Yes ……..1 No……..2	☐
Involved in mass campaigns? Yes ……..1 No……..2	☐
If involved in mass campaigns, list the common campaigns involved in _____ _____ _____	

Health facility questionnaire

BACKGROUND INFORMATION			
LOCAL GOVT. AREA……..			
WARD…….			
ENUMERATION AREA/CLUSTER NUMBER……			
NAME OF HEALTH FACILITY ……..			
PHYSICAL ADDRESS OF HEALTH FACILITY……..			
DATE: DAY…… MONTH……YEAR……			
INTERVIEWER'S NAME ……			
INTERVIEWERS PHONE NO……			
INTERVIEWER VISIT			
	1	2	3
DATE	_____	_____	_____
RESULT			
SUPERVISORS NAME	_____	FIELD EDITOR	_____

INTRODUCTION AND CONSENT

My name is ……and my colleagues are…… I am working with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas part of a collaborative project with Northwestern University, USA and National Malaria Elimination Programme. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. We thank you for honouring our presence.

Purpose

The purpose of this interview is to investigate malaria prevalence among pregnant women and members of their household and identify what factors predispose them to malaria infection

Procedure

As part of this study, you will be asked questions about your household characteristics, individuals living within the household, socio-demographic information, knowledge of malaria, risk factors and other relevant questions, which will help us achieve our objectives. You will also be offered rapid diagnostic testing for malaria infection. The interview should last between 30- 45 minutes. Your responses will be inputted into an electronic data-capturing device. The interview is going to be anonymous and confidential as much as possible. You can choose whether to participate in the interview, and you may stop at any time during the study. Your decision not to continue to participate will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria in your community.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the electronic data. The electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted

folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
Director, Institute for Advanced Medical Research and Training (IMARAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Do you have any questions? Yes _____1
No_____2 ☐

May I begin the interview now? Yes _____1
No_____2 ☐

ELIGIBILITY			
Q001	Is this your first pregnancy?	Yes.....1 No.....2	
Q002	Is this your first ANC visit	Yes.....1 No.....2	
Q003	Have you been interviewed by the urban malaria study team before?	Yes.....1 No.....2	
Q004	Where do you live?	Within Ibadan metropolis.....1 Outside Ibadan Metro Area.....2 **Respondents living in Ibadan metropolis are those residing in any of the following LGAs – Ibadan North, Ibadan North West, Ibadan North East, Ibadan South West, Ibadan South West**	
	(Check, If Q001=1, Q002=1, Q003=2 and Q004 = 1, then woman is eligible for interview	Eligible.....1 Not Eligible.....2	

IF ELIGIBLE PROCEED TO INTERVIEW

SECTION 1. HOUSEHOLD RESOURCES			
Q100	What is the main source of drinking water for members of your household? (Enter the number for the most commonly used)	**Improved sources** Piped into dwelling/yard/plot ----------1 Piped to neighbour ----------2 Public tap/standpipe ----------3 Tube well or borehole ----------4 Protected dug well ----------5 Protected spring ----------6 Rainwater ----------7 Tanker truck/cart with small tank ----------8 Bottled water ----------9 **Unimproved source** Unprotected dug well ----------10 Unprotected spring ----------11 Surface water (River, Pond) ----------12 Sachet water----------13 Others (specify)----------14	
Q101	What is the main source of water used by your household for other purposes such as cooking and handwashing?	**Improved source** Piped into dwelling/yard/plot ----------1 Piped to neighbour ----------2 Public tap/standpipe ----------3 Tube well or borehole ----------4 Protected dug well ----------5 Protected spring ----------6 Rainwater ----------7 Tanker truck/cart with small tank ----------8 Bottled water ----------9 **Unimproved source** Unprotected dug well ----------10 Unprotected spring ----------11 Surface water (River, Pond) ----------12 Sachet water----------13 **Others (specify)**----------14	
Q102	Where is the main source of water located?	In own dwelling ----------1 Outside own dwelling ----------2 Public tap----------3 Elsewhere (specify) ----------4	
Q103	On the average, how long does it take your household to get to the source of water and back?	---------- Minutes ----------Hours ----------Don't Know	
Q104	What kind of toilet facilities do members of your family usually use?	**Improved sanitation facility** Flush toilet ----------1 Ventilated improved pit (VIP) latrine ----------2 Pit latrine with slab ----------3 Composting toilet ----------4 **Unimproved facility** Pit latrine without slab/open pit ----------5 Bucket ----------6 Hanging toilet/hanging latrine ----------7 Open defecation (no facility/bush/field) ----------8 Others (specify) ----------98	

Q105	Do you have your own toilet, or you share toilet with other households?	iii. Have own toilet---------- 1 iv. Shared toilet ----------2	
Q106	Where is the bathroom of your house located?	iv. Inside the house ----------1 v. Outside, separated from the house ----------2 vi. No bathroom at all----------3	
Q107	How many rooms are used by members of your household for sleeping?	Specify the number of rooms used: ……	
Q108	How many members of your household sleep on the floor?	***Give number, if none write 00*** _____	
Q109	What is the main source of power/energy use for cooking in your household?	Electricity ----------1 LPG/natural gas/biogas ----------2 Kerosene ----------3 Coal/lignite ----------4 Charcoal ----------5 Wood ----------6 Agricultural crop/straw/shrubs/grass ------7 Animal dung ----------8 Others specify ----------9	
Q110	Which of the following items do you, your spouse or your family have? (Circle as appropriate)		
Q111	Do your household own a farm land?	Yes----------1 No----------2	
Q112	Is there a farm within the compound where you reside?	Yes.....1 No.....2	
Q113	Does any member of your household have livestock?	Yes ----------1 No----------2	
Q114	Type of housing	Face to face……1 One Bedroom……2 Two Bedroom Flat……3 Three Bedroom Flat……4 Duplex……5 Other(specify)_____	

	Yes	No
Radio	1	2
Television	1	2
Mobile telephone	1	2
Non-mobile telephone	1	2
Desktop Computer	1	2
Laptop Computer	1	2
Refrigerator	1	2
Table	1	2
Chair	1	2
Bed	1	2
Cupboard	1	2
Air conditioner	1	2
Electric iron	1	2
Generator	1	2
Fan	1	2

Q115	Do you share your compound with other households?	Yes……1 No……2	

SECTION 2: NEIGHBOURHOOD CHARACTERISTICS							
Q200	How would you describe the road type in your neighbourhood	Tarred……1 Untarred……2 Both Tarred/untarred……3					
Q201	Would you say most houses in your neighbourhood are?	Fenced with gate……1 Fenced, no gate……2 Partially Fenced……3 Partially Fenced……4 Other(specify)……5					
Q202	If fenced, what is the nature of the fencing material	Cement Block……1 Mud……2 Barbed wire and cement block……3 Others(specify)……4					
Q203	Are the houses in your neighbourhood painted?	No not painted……1 Yes, old painting……2 Yes, recently painted……3 Others (specify)……4					
Q204	Are there open drainages in your neighborhood	Yes……1 No……2					
Q205	Are the open drainages clogged with dirt or rubbish	Yes……1 No……2					
Q206: Thinking about the environment where you live, how much do you agree with the following statements							
		Strongly Agree	Agree	Can't Say	Disagree	Strongly Disagree	
Q206A	There is a lot of noise in my neighbourhood.	1	2	3	4	5	
Q206B	There are sidewalks on most streets in my community.	1	2	3	4	5	
Q206C	There is a lot of unpleasant smells in my neighbourhood.	1	2	3	4	5	
Q206D	My neighbourhood has heavy human traffic.	1	2	3	4	5	
Q206E	There is a lot of trash and litter on the street in my neighbourhood.	1	2	3	4	5	
Q206F	There is vandalism in my neighbourhood.	1	2	3	4	5	
Q206G	There are too many people hanging around on the streets near my home	1	2	3	4	5	
Q206H	I have easy access to medical care in my neighbourhood.	1	2	3	4	5	

SECTION 3: INDIVIDUAL CHARACTERISTICS			
Q300	How long have you been living continuously in (CURRENT PLACE OF RESIDENCE)? ***(Criteria for selection is 1 year and above)***	DURATION IN YEARS _____	
Q301	How old were you at your last birthday? PROBE TO GET ESTIMATE IF NOT SURE	AGE AT LAST BIRTHDAY (IN YEARS) _____	

Q302	Have you ever attended school? (Ask all questions)	Quranic/Islamiyah school? 1. YES 2. NO	Adult classes? 1. YES 2. NO	Formal school?]1. YES 2. NO	
Q303	What is the highest level of formal school you completed?	Did not complete Primary School----------1 Primary Completed----------2 Secondary Completed----------3 Post-secondary School Completed----------4			
Q304	If Post-secondary School completed: Specify highest level completed in this category:	If with Post-secondary Education, please, specify highest level completed: _____			
Q305	What is your ethnic group?	Igbo ----------1 Yoruba ----------2 Hausa ----------3 Others (specify)_____ 4			
Q306	What is your religion?	Christianity ----------1 Islam ----------2 Traditional religion ----------3 Other (specify) _____4			
Q307	What is your current marital status?	Never married ----------1 Married ---------- 2 Co-habiting ---------- 3 Divorced/separated ----------4 Widowed----------5			
Q308	How would you describe the family living arrangement in your house?	Monogamous Family (a man and wife, with or without children) living in a separate house ---------1 Polygamous Family (a man, wives, and children) living in a separate house ----------2 Extended family (a family which extends across generations, i.e including grandparents, aunts, and other relatives) living in the same house ….3 A female-headed household (a woman and her children i.e. absence of a man in a household, thus, making the woman the sole economic provider for the family) .....4 Others (specify) ----------			
Q309	Who provides the main source of income in your home?	Self (the woman) ……1 Husband/Partner ……2 Both Husband and Wife(s) provide equally……3 Parents ……4 Children……5 Others (specify) ……6			
Q310	Do you currently do any work to earn an income?	Yes……1 No……2			
Q311	What kind of work do you do?	Professional/Technical/Managerial----------1 Clerical ----------2 Sales and Services ----------3 Skilled Manual ----------4 Unskilled Manual ----------5 Agriculture ----------6 Domestic Work----------7 Others (specify):----------8			

Q312	If you are an agricultural worker, what type of agricultural produce do you work with?	Rice .....1 Other plants.....2 Poultry.....3 Fish and other seafood.....4 Cows.....5 Other livestock.....6 Other produce.....7		
Q313	If you are an agricultural worker, is your work seasonal?	Yes.....1 No.....2		
Q314	If your work is seasonal, what months of the year do you work?	.....		
Q315	Is there a farm within your household's compound?	Yes.....1 No.....2		
Q316	Where do you do the work?	State..... LGA..... Ward..... _____		
Q317	How long do you spend indoor or outdoor at work? **Ask for times and write response in hours**	At work (Overall)_____ Indoor at Work_____ Outside at Work_____		
Q318	How much do you earn?	Daily..... Weekly..... Monthly.....		
If currently, living with spouse/partner				
Q317	How old was your partner as at last birthday			
Q318	Has your partner ever attended school? (Ask all questions)	Quranic/Islamiyah school? 1. YES 2. NO	Adult classes? 1. YES 2. NO	Formal school? 1. YES 2. NO
Q319	What is the highest level of formal school you completed?	Did not complete Primary School ----1 Primary Completed----------2 Secondary Completed----------3 Post-secondary School Completed----4		
Q320	If post-secondary school completed: Specify highest level completed in this category:	If completed post-secondary education, please, specify highest level completed: _____		
Q320	What is your husband's/partner's ethnic group?	Igbo ----------1 Hausa----------2 Yoruba ----------3 Others (specify) ----------4		
Q320	What is your husband's/partner's religion?	Christianity ----------1 Islam ----------2 Traditional African religion ----------3 Others(specify)----------4		
Q321	What is your partners current work status?	Working ----------1 Unemployed/looking for a job ----------2 Retired ----------3 Studying ----------4 Others (specify)----------5		
Q322	If working, what kind of work does your partner do?	Professional/Technical/Managerial----------1 Clerical----------2 Sales and Services ----------3		

		Skilled Manual----------4 Unskilled Manual ----------5 Agriculture ----------6 Domestic Work----------7 Other(specify)----------8		
Q323	If your partner is an agricultural worker, is their work seasonal?	Yes.....1 No.....2		
Q324	If your partner's work is seasonal, what months of the year do they work?	.....		
Q325	Where does your partner do their work?	State..... LGA..... Ward.....		
Q326	How long does your partner spend indoor or outdoor at work?	At Work(Overall)_____ Indoor at Work_____ Outside at Work_____ Don't Know_____99		

SECTION 4: KNOWLEDGE OF MALARIA TRANSMISSION, CAUSES AND PREVENTIVE PRACTICES					
Q400	Have you ever heard of malaria	Yes.....1 No.....2			
Q401			Yes	No	
	What was your source of information on malaria	Radio	1	2	
		Television	1	2	
		Newspaper	1	2	
		Friend	1	2	
		Health Care Worker	1	2	
		Religious leader	1	2	
		Colleague	1	2	
		Others (Specify)_____			
Q402	What are the common symptoms of malaria? **(DO NOT READ OUT)**		Mentioned	Not Mentioned	
		Fever	1	2	
		Chills/Shivering	1	2	
		Headache	1	2	
		Joint Pain	1	2	
		Poor Appetite	1	2	
		Vomiting	1	2	

		Convulsion	1	2	
		Cough	1	2	
		Catarrh/Nasal Congestion	1	2	
		Don't know any	3		
		Others (Specify)			
Q403	What are the causes of malaria you know? (**DO NOT READ OUT**)				
		Mosquitoes bite	1	2	
		Dirty Environment	1	2	
		Stagnant Water	1	2	
		Lakes, pits, dams around surroundings	1	2	
		Bushes around the house	1	2	
		Ill ventilated houses	1	2	
Q404	Do you think malaria can be prevented?	Yes……1 No……2			
Q405	Which was do you think malaria can be prevented?		Yes	No	
		Sleeping under insecticide treated nets	1	2	
		Cutting bush around the house	1	2	
		Spraying mosquito insecticide in homes	1	2	
		Taking malaria preventive drug	1	2	
		Door/Window Screens	1	2	
		Taking herbs	1	2	
		By praying	1	2	

SECTION 5: MALARIA HISTORY AND TREATMENT SEEKING PRACTICES			
Q500	Have you been ill with fever at any time in the last 2 weeks?	Yes----------1 No----------2	
Q501	Have you been ill with malaria at any time in the last 2 weeks?	Yes----------1 No----------2	
Q501	Have anyone in your household been ill with fever in the last two weeks	Yes----------1 No----------2	
Q502	At any time during the illness, did anyone in your household have blood taken from them to diagnose malaria?	Yes----------1 No----------2	
Q503	Were you told by a healthcare provider that anyone in your household had malaria?	Yes----------1 No----------2	

Q504	How many people in your household were diagnosed with malaria?	.....	
Q505	Have you ever had malaria in this pregnancy	Yes----------1 No----------2	
Q506	If yes, at what gestational age was malaria diagnosed	_____	
Q507	Regarding your last episode of malaria, where did you first seek advice or treatment	**PUBLIC SECTOR** Government hospital .....1 Government health center.....2 Government health post.....3 Mobile clinic.....4 Fieldworker/CHW.....5 Other public sector(specify).....6 **PRIVATE MEDICAL SECTOR** Private hospital/ private hospital/clinic.....7 Pharmacy.....8 Chemist/PMV.....9 Private doctor.....10 Mobile clinic .....11 Fieldworker/CHW.....12 Other private .....13 Medical sector .....14 **OTHER SOURCE** Shop.....15 Traditional practitioner.....16 Market.....17 Itinerant drug seller.....18 Community-oriented resource person.....19 Other(specify).....20	
Q508	How many days after the illness began did you first seek advice or treatment?	_____ (00 if same day)	
Q509	At any time during the illness, did (NAME) have blood taken to diagnose malaria	Yes.....1 No.....2	
Q510	What was the result?	Positive.....1 Negative.....2 Indeterminate.....3	
Q511	Were you advised to take antimalarial drugs?	Yes.....1 No.....2	
Q512	Where did you get the antimalarial drug you took?	Same facility visited as Q504.....1 Other(specify)_____2	
Q513	What drugs did you take? Probe: Any other drugs?	Artemisinin Combination Therapy (Act).....1 SP/Fansidar.....2 Chloroquine.....3 Amodiaquine.....4 Quinine Pills.....5 Quinine Injection/IV.....6 Artesunate Rectal.....7 Artesunate Injection/IV.....8 Other Antimalarial.....9 Drug of unknown type 10	

Q514	How long after the fever started did you first take an antimalarial drug?	/_____/	

SECTION 6: VECTOR CONTROL			
Q600	Have you ever heard of a mosquito net	Yes.....1 No.....2	
Q601	Does your household own a mosquito net	Yes.....1 No.....2	
Q602	How many mosquito nets does your household have?	_____	
Q603	How many months ago did your household get the mosquito net?	_____ (00 if less than one month)	
Q604	Where did you get the net?	Distribution campaign.....1 ANC.....2 Immunization visit.....3 Govt. Health facility.....4 Private health facility.....5 Pharmacy.....6 Shop/market.....7 Community health worker.....8 Religious institution.....9 School.....10 Other.....11 Don't know.....12	
Q605	Did you pay for the net?	Yes.....1 No.....2 Not Sure.....3	
Q606	If you paid for the net, how much did you pay?	_____	
Q607	Is the mosquito net you have treated?	Yes.....1 No.....2 Not Sure.....3	
Q608	If yes, what was it treated with?		
Q609	Did you sleep under a mosquito net last night?	Yes.....1 No.....2 Not Sure.....3	
Q610	Did any member of your household sleep under a net last night	Yes.....1 No.....2	
Q611	How many members of your household slept under a net last night?	.....	
Q612	How many people live in your household?	.....	
Q613	If you did not sleep under a mosquito net last night, what are the reasons?	No mosquitoes.....1 No malaria.....2 Too hot.....3 Difficult to hang.....4 Don't like smell.....5 Feel "closed in'' or constrained.....6 Net too old/torn.....7 Net too dirty.....8 Net not available last night (washing).....9 Feel ITN chemicals are unsafe.....10 ITN provokes cough.....11	

		Net not needed last night……..12 No space to hang……13 Other (specify) _____14 Don't know……99	
Q614	Have you ever heard of indoor residual spraying(IRS)? **If no, explain what IRS means to study participant**	Yes……1 No……2	
Q615	If yes, what does it mean? **If not explained accurately, explain what IRS means to study participant**		
Q616	What is the importance of IRS?	Prevention of mosquito bite……1 Prevention of other insect bite……2 Prevention of scorpion stings……3 Others (specify)……4	
Q617	What do you think are the disadvantages of IRS	Respiratory disorder……1 Headache……2 Food contamination……3 Discoloration of surfaces and walls……4 Unpleasant odor……5 Others (specify)_____6	
Q618	Have IRS ever been conducted in your household	Yes……1 No……2 Not sure……3	
Q619	If yes, when was the last time this was done	Month /_____/ Year/_____/	
Q620	If yes, who conducted the IRS	Government……1 Self……2 Community……3 Health Facility……4 Others(Specify) _____5	
Q621	Do you have window/door screens?	Yes……1 No…… 2	
Q622	Do you use spray insecticides?	Yes……1 No……2	
Q623	If yes, how often do you use it?	Daily……1 Sometimes……2 Rarely……3	
Q624	Do you use mosquito coil?	Yes……1 No……2	
Q625	If yes, how often do you use it?	Daily……1 Sometimes……2 Rarely……3	
Q626	What other things do you do to prevent malaria infection in your household?		
Q627	Have you heard of seasonal malaria chemoprevention (SMC)??	Yes……1 No……2	
Q628	If yes, what does it mean? **If not explained accurately, explain what IRS means to study participant**		

Q629	Do you have children aged 3-59 months in your household?	Yes……1 No……2	
Q630	If yes, have they ever taken SMC	Yes……1 No……2	
Q631	If they have ever taken SMC, how long ago did they take it?	Less than 28 days ago……1 29-42 days ago……2 43 days or more……3 Can't remember……4	
Q632	If yes, who provided the SMC?	Government…… 1 NGO……2 Community……3 Health Facility……4 Others(Specify) _____ 5	

SECTION 7: MOBILITY PATTERNS AND INSIDE/OUTDOOR ACTIVITIES			
Q700	How long have you been living continuously in this community? ***Ask for duration in years***	_____ (00 If less than one year)	
Q701	Just before you moved here, how would you describe where you lived?	City ……1 Town……2 Rural……3	
Q702	Have you travelled out of your current location in the last 4 weeks	Yes……1 No……2	
Q703	How many times have you travelled out of your current location in the last 4 weeks?		
Ask participant to provide responses to the following questions based on their most recent travel			
Q704	If yes, for your most recent travel, where did you travel to?	Outside my community……1 Outside my State……2 Others(Specify)……3	
Q705a	Kindly provide the state, LGA and the ward of place visited, if known?	State …….. LGA ……. Ward……	
Q705b	If Q805a isn't known, can you provide the address of the place visited?	Address: _____ _____	
Q706	What was the main reason for your travel?	Business/Work-Related……1 Holiday……2 Visiting Family/Relatives……3 Visit Friends……4 Others(Specify)_____5	
Q707	How best would you describe your travel location?	Formal setting…… 1 Informal setting……2 Slum……3 Farm…… 4 Open Field……5 Others(Specify)_____6	
Q708	Did you stay overnight during your last travel?	Yes……1 No……2	
Q709	How long did you stay at this location?		

Q710	Did you sleep under a mosquito net during the last night you travelled?	Yes……,……..1 No……..2	
Q711	If no, what was the reason?	No mosquitoes……..1 No malaria……..2 Too hot……3 Difficult to hang……4 Don't like smell……..5 Feel "closed in'' or constrained……6 Net too old/torn ……7 Net too dirty……8 Net not available last night (washing)……9 Feel ITN chemicals are unsafe……..10 ITN provokes cough……11 Net not needed last night……..12 No space to hang……13 Other (specify)_____14 Don't know……..99	
Q712	Did you treat malaria during your most recent travel?	Yes……..1 No……2	
Q713	After you returned from your most recent trip, did you treat malaria?	Yes…… 1 No……2	
Q714	How many days after your most recent trip did you treat malaria?	_____	
Q715	Did you do any other thing to prevent malaria during your travel?	Yes……..1 No……2	
Q716	If yes, what did you do?	Used Mosquito Coil……..1 Sprayed the room with insecticide ……2 Use Mosquito Repellant Cream……3 Others(Specify)_____4	
Q717	How long do you spend outside the home daily	/_____/hours /_____/ minutes	
Q718	Do you do any chores outside your home	Yes……..1 No……2	
Q719	If yes, what kind of chores do you do?		
Q720	How long do you spend outside doing these chores	/_____/hours /_____/ minutes	
Q721	What time do you usually go to bed?	6:00pm- 7:00pm……1 7:00pm – 8:00pm……2 9:00pm-10:00pm……3 10pm and above……4	
Q722	On a daily basis, would you say	I spend same duration of time indoor/outdoor…….1 I spend more time indoor than outdoor……..2 I spend more time outdoor than indoor……3 I cannot estimate the time I spend indoor/outdoor……..4 Others_____	

MALARIA SCREENING				
	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT.	"As part of this survey, we are asking eligible respondents to take a test to see if they have malaria. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will assist the government to develop programs to prevent malaria. We ask all eligible respondents to take part in malaria testing in this survey and give a few drops of blood from a finger or heel. One blood drop will be tested for malaria immediately, and the result will be told to you right away. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes or no. It is up to you to decide. Will you participate in the malaria test?" Yes……1 No……2		☐
	RDT DONE Yes……1 No…….2 ☐	OUTCOME: TESTED……..1 REFUSED……2 Other_____3	RESULT: POSITIVE…….1 NEGATIVE…..2 Other_____3	☐

Longitudinal Study Instruments

Longitudinal Survey Baseline Questionnaire

BACKGROUND INFORMATION			
LOCAL GOVT. AREA……			
WARD……			
ENUMERATION AREA/CLUSTER NUMBER……			
HOUSEHOLD NUMBER……			
NAME OF HOUSEHOLD HEAD_____			
DATE: DAY…… MONTH……..YEAR……			
INTERVIEWER'S NAME ……			
INTERVIEWERS PHONE NO……			
INTERVIEWER VISIT			
	1	2	3
DATE	_____	_____	_____
RESULT			
SUPERVISORS NAME	_____	FIELD EDITOR	_____

INTRODUCTION AND CONSENT

My name is ……and my colleagues are…… I am working with the University of Ibadan. We would like your opinion on various issues to enable us understand malaria transmission in urban areas as part of a collaborative project with Northwestern University, USA and Nigeria National Malaria Elimination Programme. The information we collect will help the government to plan health services to prevent malaria infections by ensuring you receive suitable interventions. We thank you for honouring our presence.

Purpose

The purpose of this interview is to investigate malaria cases among children and identify what factors predispose them to malaria infection.

Procedure

As part of this study, you will be asked questions about your household characteristics, children living within your household, socio-demographic information, knowledge of malaria, risk factors and other relevant questions which will help us achieve our objectives. In addition, one child aged between 0-10 years will be selected in your household for rapid diagnostic testing for malaria infection. We shall visit the child once a month to further ask questions relating to malaria infection and prevention and test them using the same rapid diagnostic tests. During each visit, the interview should last between 30-45 minutes. Your responses will be inputted into an electronic data capturing device. The interview is going to be anonymous and confidential as much as possible. You can choose whether to participate in the interview, and you may stop at any time during the study. There is no right or wrong answer, so feel free to express yourself. Remember your participation in this interview is voluntary. Your decision not to continue to participate will not attract any penalty.

Benefits

Your participation in this study may not provide any personal benefit to you. However, should you decide to participate in this study, you will be doing society a great service because the findings of this study will be useful in the design of interventions and programmes for the control and prevention of malaria in your community.

Risks

There are no known or anticipated risks associated with participation in this study beyond those experienced during an average conversation. If a question, or the discussion, makes you uncomfortable, you can choose not to answer.

Confidentiality

The information you share will be kept confidential. Identifying information will be removed from the electronic data. The electronic data will be retained for a maximum of 5 years, after which they will be destroyed. Data will be stored in an encrypted folder on protected laptop. Only the research team will have access to study data. No identifying information will be used in any presentations or publications based on this research.

Contact

If you have any questions or concerns regarding this study, please contact:
Professor IkeOluwapo Ajayi
Email: ikeyajayi2003@yahoo.com, Tel: 08023268431
Director, Institute for Advanced Medical Research and Training (IMARAT),
College of Medicine, University of Ibadan

Thank you for choosing to participate in the study. Kindly show by using any of the following 2 boxes, that your participation in this study was voluntary.

I will participate	I will not participate

Do you have any questions? Yes _____No_____

May I begin the interview now? Yes _____No_____

ELIGIBILITY			
Q001	Do you have children 0 – 10 years old residing in your household?	Yes.....1 No.....2	
Q002	Do you plan to live in your current place of residence for the next one year?	Yes.....1 No.....2	
	(If Q001=1 and Q002=1, then household is eligible for interview)	Eligible.....1 Not Eligible.....2	

IF ELIGIBLE PROCEED TO INTERVIEW

HOUSEHOLD LINE LISTING						
Line No	Usual Residents	Relationship to Household Head (HH)	Sex	Residence	Age	Remarks
	Please give me the names of all persons who usually live here	What is the relationship of (NAME) to the HH	Is (NAME) male or female? Male = 1 Female = 2	Did (NAME) sleep here last night? Yes =1 No = 2	How old was (NAME) as at last birthday?	
1						
2						
3						

4						
5						
6						
7						
8						
9						
10						
Information on non-residents						
Line No	Non-residents	Relationship to HH	Sex	Residence	Age	Remarks
	Please give me the names of all persons who don't usually live here	What is the relationship of (NAME) to the HH	Is (NAME) male or female? Male = 1 Female = 2	Did (NAME) sleep here last night? Yes =1 No = 2	How old was (NAME) as at last birthday?	
1						
2						
3						
4						

CODES:

RELATIONSHIP TO HEAD OF HOUSEHOLD

01 = HEAD
02 = WIFE OR HUSBAND
03 = SON OR DAUGHTER
04 = SON-IN-LAW OR DAUGHTER-IN-LAW
05 = GRANDCHILD
06 = PARENT
07 = PARENT-IN-LAW
08 = BROTHER OR SISTER
09 = BROTHER-IN-LAW/SISTER IN-LAW
10 = NIECE/NEPHEW BY BLOOD
11 = NIECE/NEPHEW BY MARRIAGE
12 = OTHER RELATIVE
13 = ADOPTED/FOSTER/ STEPCHILD
14 = NOT RELATED
15 = CO-WIFE
16 = NANNY
98 = DON'T KNOW

SECTION 1. HOUSEHOLD RESOURCES			
Q100	What is the main source of drinking water for members of your household? (enter the number for the most commonly used)	**Improved source** Piped into dwelling/yard/plot ----------1 Piped to neighbour ----------2 Public tap/standpipe ----------3 Tube well or borehole ----------4 Protected dug well ----------5 Protected spring ----------6 Rainwater ----------7 Tanker truck/cart with small tank ----------8 Bottled water ----------9 **Unimproved source** Unprotected dug well ----------10 Unprotected spring ----------11 Surface water (River, Pond)----------12 Sachet water----------13 Others (specify)----------14	
Q101	What is the main source of water used by your household for other purposes such as cooking and handwashing?	**Improved source** Piped into dwelling/yard/plot ----------1 Piped to neighbour ----------2 Public tap/standpipe ----------3 Tube well or borehole ----------4 Protected dug well ----------5 Protected spring ----------6 Rainwater ----------7 Tanker truck/cart with small tank ----------8 Bottled water ----------9 **Unimproved source** Unprotected dug well ----------10 Unprotected spring ----------11 Surface water (River, Pond) ----------12 Sachet water----------13 Others (specify)----------14	
Q102	Where is the main source of water located?	In own dwelling ----------1 Outside own dwelling ----------2 Public tap----------3 Elsewhere (specify) ----------4	
Q103	On the average, how long does it take your household to get to the source of water and back?	---------- Minutes ----------Hours ----------Don't Know	
Q104	What kind of toilet facilities do members of your family usually use?	**Improved sanitation facility** Flush toilet ----------1 Ventilated improved pit (VIP) latrine ----------2 Pit latrine with slab ----------3 Composting toilet ----------4 **Unimproved facility** Pit latrine without slab/open pit ----------5 Bucket ----------6 Hanging toilet/hanging latrine ----------7 Open defecation (no facility/bush/field) ------8 Others (specify) ----------98	

Q105	Do you have your own toilet, or you share toilet with other households?	Have own toilet----------1 Shared toilet ----------2	
Q106	Where is the bathroom of your house located?	Inside the house ----------1 Outside, separated from the house ----------2 No bathroom at all----------3	
Q107	How many rooms are used by members of your household for sleeping?	Specify the number of rooms used: ……..	
Q108	How many members of your household sleep on the floor?	***Give number, if none write 00***	
Q109	What is the main source of power/energy use for cooking in your household?	Electricity ----------1 LPG/natural gas/biogas ----------2 Kerosene ----------3 Coal/ignite ----------4 Charcoal ----------5 Wood ----------6 Agricultural crop/straw/shrubs/grass ---------7 Others specify ----------8	
Q110	Which of the following items do you, your spouse or your family have? (Circle as appropriate)		

	Yes	No
Radio	1	2
Television	1	2
Mobile telephone	1	2
Non-mobile telephone	1	2
Desktop Computer	1	2
Laptop Computer		
Refrigerator	1	2
Table	1	2
Chair	1	2
Bed	1	2
Cupboard	1	2
Air conditioner	1	2
Electric iron	1	2
Generator	1	2
Fan	1	2

Q111	Do your household own a farmland?	Yes----------1 No----------2	
Q112	Does any member of your household have livestock?	Yes ----------1 No----------2	
Q113	Type of housing	Face to face……1 One Bedroom……2 Two Bedroom Flat……3 Three Bedroom Flat……4 Duplex……5 Others(specify)……6	
Q114	Do you share your compound with other households?	Yes……1 No……2	

Q115	Are the eaves of the house or building occupied by this household open or closed? **Observe and record**	Completely Open .....1 Partially Open.....2 Closed.....3	
Q116	Does the part of the house or building occupied by the household have a ceiling? **Observe and record**	No, None .....1 Yes, Partial/Poorly Sealed/Worn Out.....2 Yes, Complete and Sealed 3	
Q117	Is there a farm within the compound? **Observe and record**	Yes.....1 No.....2	

Longitudinal Survey Follow-up Questionnaire

BACKGROUND INFORMATION			
LOCAL GOVT. AREA……			
WARD…….			
ENUMERATION ……			
HOUSEHOLD NUMBER			
NAME OF CAREGIVER_____ _____			
NAME OF CHILD_____ _____			
DATE: DAY…….. MONTH……..YEAR……			
INTERVIEWER'S NAME ……			
INTERVIEWERS PHONE NO…….			
MONTH OF VISIT /_____/			
INTERVIEWER VISIT			
	1	2	3
DATE	_____	_____	_____
RESULT			
SUPERVISORS NAME	_____	FIELD EDITOR	_____

SECTION 1: CHILD CHARACTERISTICS			
Q100	Does (NAME) still attend school	Yes……1 No……2	
Q101	What is (NAME) level of education now?	Preschool……1 Nursery……2 Primary……3 Post Primary……4 Junior Secondary……5	
Q103	Does your household have a mosquito net	Yes……1 No……2 Had a net as at last visit……3	
Q104	How many mosquito nets does your household now have?	/_____/	
Q105	Where did you get the net?	Mass distribution campaign……1 ANC……2 Immunization visit……3 Govt. Health facility……4 Private health facility……5 Pharmacy……6 Shop/market……7 Community health worker……8 Religious institution……9 School……10 Other……11	

		Don't know……12	
Q106	Did you pay for the net?	Yes……1 No……2 Not Sure……3	
Q107	How much did you pay?	_____	
Q108	Is the mosquito net you have treated?	Yes……1 No……2 Not Sure……3	
Q109	If yes, what was it treated with?	.....	
Q110	Did (NAME) sleep under the mosquito net last night	Yes……1 No……2	
Q111	If no, why didn't (NAME) sleep under a mosquito net	No mosquitoes……1 No malaria……2 Too hot……3 Difficult to hang……4 Don't like smell……5 Feel `closed in' or constrained……6 Net too old/torn……7 Net too dirty……8 Net not available last night (washing) ……9 Feel ITN chemicals are unsafe……10 Net provokes cough……11 Users did not sleep here last night ……12 Net not needed last night……13 No space to hang ……14 Other (specify) _____15 Don't know……99	
Q112	Has (NAME) residence been sprayed in the last one months?	Yes……1 No……2	
Q113	Who conducted the spraying?	Government……1 Self……2 Community……3 Health Facility……4 Others(Specify) ……5	
Q114	What other things do you do to prevent malaria infection in your household?	Use of mosquito coil……1 Use of mosquito repellant……2 Use of window/door screens……3 Others(specify)_____4	

SECTION 2: MALARIA IN THE ENROLLED CHILD			
Now I would like to ask you about some questions about the health of your child aged 0 – 10 years **(This is the child enrolled in the study)**			
Q200	Has (NAME) been ill with a fever at any time in the last four (4) weeks?	Yes……1 No……2	
Q201	Has (NAME) been ill with malaria at any time in the last four (4) weeks?	Yes……1 No……2	

Q202	At any time during the illness, did (NAME) have blood taken from them to diagnose malaria?	Yes.....1 No.....2	
Q203	Were you told by a healthcare provider that (NAME) had malaria?	Yes.....1 No.....2	
Q204	Did you seek advice or treatment for (NAME) for the illness from any source?	Yes.....1 No.....2	
Q205	Where did you seek advice or treatment?	**PUBLIC SECTOR** Government hospital.....1 Government health centre.....2 Government health post.....3 Mobile clinic.....4 Fieldworker/CHW.....5 Other public sector (Specify) _____6 **PRIVATE MEDICAL SECTOR** Private hospital/clinic.....7 Pharmacy.....8 Chemist/PMV.....9 Private doctor.....10 Mobile clinic .....11 Other private medical sector (specify)____12 **OTHER SOURCE** Shop.....13 Traditional Practitioner.....14 Market.....15 Itinerant drug seller.....16 Community-oriented resource person.....17 Other (Specify).....18	
Q206	How many days after the illness began did you first seek advice or treatment for (NAME)	_____	
Q207	Was (NAME) advised to take antimalarial drugs?	Yes.....1 No.....2	
Q208	What drugs did (NAME) take? Probe: Any other drugs?	Artemisinin Combination Therapy (Act).....1 SP/Fansidar.....2 Chloroquine.....3 Amodiaquine.....4 Quinine Pills.....5 Quinine Injection/IV.....6 Artesunate Rectal.....7 Artesunate Injection/IV.....8 Other Antimalarial.....9 Drug of unknown type 10	
Q209	If (NAME) took antimalarials, where did you get the antimalarial drug (NAME) took?	Same facility visited as Q204.....1 Other(specify)_____2	
Q210	How long after the fever started did (NAME) first take an artemisinin combination therapy?	Same Day.....0 Next Day.....1 Two Days After Fever.....2 Three Or More Days After Fever.....3 Don't Know.....8	

Q211	***Check If NAME is 3-59 months*** Has (NAME) taken SMC since our last visit?	Yes……1 No……2	
Q212	How long ago did they take it?	Less than 7 days ago……1 7 - 14 days ago……2 15 - 28days ……3 Can't remember……4	
Q213	If they have taken SMC, who provided the SMC?	Government……1 NGO……2 Community……3 Health Facility……4 Others(Specify) _____5	

SECTION 3: MOBILITY PATTERNS AND INSIDE/OUTDOOR ACTIVITIES			
For each usual resident of the household ask the following questions			
Q300	Has (NAME) travelled out of your current location in the last 4 weeks	Yes……1 No……2	
Q301	How many times has (NAME) travelled out of your current location in the last 4 weeks?	……	
Ask participant to provide responses to the following questions based on their most recent travel			
Q302	If yes, for your most recent travel where did (NAME) travel to?	Outside the community……1 Outside the State……2 Others(Specify)……3	
Q303a	Kindly provide the state, LGA and the ward of place visited, if known?	STATE_____ LGA_____ Ward_____	
Q303b	If Q303a isn't known, can you provide the address of the place visited?	Address:_____	
Q304	What was the main reason for your travel?	Buisness/Work-Related……1 Holiday……2 Visiting Family/Relatives……3 Visit Friends……4 Others(Specify)_____5	
Q305	How best would you describe the travel location?	Urban area - formal settlement ……1 Urban area - Informal settlement or slum……2 Rural area - village……3 Rural area – farm ……4 Others(Specify)_____5	
Q306	Did (NAME) stay overnight during your last travel?	Yes……1 No……2	
Q307	How long did (NAME) stay at this location?	……	
Q308	Did (NAME) sleep under a mosquito net during the last night you travelled?	Yes……,……1 No……2	
Q309	If no, what was the reason?	No mosquitoes……1 No malaria……2	

		Too hot.....3 Difficult to hang.....4 Don't like smell.....5 Feel `closed in' or constrained.....6 Net too old/torn.....7 Net too dirty.....8 Net not available last night (washing) .....9 Feel ITN chemicals are unsafe.....10 ITN provokes cough.....11 Net not needed last night.....12 No space to hang . .....13 Other (specify) _____14 Don't know.....99	
Q310	Did (NAME) treat malaria during your most recent travel?	Yes.....1 No.....2	
Q311	After (NAME) returned from the most recent trip, did (NAME) treat malaria?	Yes.....1 No.....2	
Q312	How many days after (NAME) returned from the most recent trip did (NAME) treat for malaria	_____	
Q313	Did you do any other thing to prevent malaria during your travel?	Yes.....1 No.....2	
Q314	If yes, what did you do	Used Mosquito Coil.....1 Sprayed the room with insecticide .....2 Use Mosquito Repellant Cream.....3 Others(Specify)_____4	
Q315	How long in hours does (NAME) spend outside the home daily?	_____	
Q316	Does (NAME) do any chores outside the house now?	Yes.....1 No.....2	
Q317	If yes, what kind of chores does (NAME) do?	_____	
Q318	Approximately how long in minutes or hours does (NAME) spend outside doing these chores	_____	
Q319	What time does (NAME) usually go to bed now?	6.00pm-7.00pm. .....1 8.00pm-9.00pm. .....2 10.00pm above ..... 3 Others(specify)_____4	
Q320	On a daily basis, would you say	I spend same duration of time indoor/outdoor.....1 I spend more time indoor than outdoor.....2 I spend more time outdoor than indoor.....3 I cannot estimate the time I spend indoor/outdoor.....4 Others_____	
If there are non-residents in the household who slept in the HH the night before, ask the following questions			
Q321	How long in days has (NAME) been staying at your home	_____	
Q322	Where is (NAME) visiting from?	State_____ LGA_____ Ward _____	

Q323	Has (NAME) had malaria at any time since they arrived?	Yes……..1 No……..2	
Q324	Was (NAME) diagnosed by a health professional?	Yes……..1 No……..2	

SECTION 4: MEASUREMENTS			
Q400	Weight		
Q401	Height		
Q402	Mid Upper Arm Circumference		
	ASK CONSENT FOR MALARIA TEST FROM PARENT/OTHER ADULT.	"As part of this survey, we are asking eligible respondents to take a test to see if they have malaria. Malaria is a serious illness caused by a parasite transmitted by a mosquito bite. This survey will assist the government to develop programs to prevent malaria. We ask all eligible respondents to take part in malaria testing in this survey and give a few drops of blood from a finger or heel. One blood drop will be tested for malaria immediately, and the result will be told to you right away. All results will be kept strictly confidential and will not be shared with anyone other than members of our survey team. Do you have any questions? You can say yes or no. It is up to you to decide. Will you participate in the malaria test?" Yes……1 No……2	
Q403	Malaria RDT Done	Yes.....1 No.....2	
Q404	Result		
		Positive.....1 Negative.....2 Indeterminate.....3	

Entomological survey instruments

Community and Household Consent Form for Entomological Survey

We bring warm greetings from the management of Osun State University. This is an entomological study for the determination of indoor and outdoor biting rates of malaria in Kano and Ibadan to inform strategic plans to control malaria in your communities as part of a collaborative project with Northwestern University, USA and Nigeria National Malaria Elimination Programme.

What does being a participating community involve?
A team of Public Health Entomologists will work in the selected communities/households to collect both indoor and outdoor mosquitoes over a period of eight months. Their activities will include mounting of CDC light trap in selected rooms indoor and outdoor and between 6pm and 6am on each catching days for the collection of mosquitoes and indoor residual spraying of ten selected rooms in the community to collect indoor resting mosquitoes. The members of the community will be part of the personnel to be recruited for the study.

What are the risks?
There are no direct risks for participating in this study. However, there may be a situation of slight inconveniences in the household where the indoor and outdoor CDC light trap is carried out due to the activities of the entomologists collecting mosquitoes throughout the night.

What are the benefits?
The benefit is that your community/household would be contributing to the research in advancing efforts towards controlling malaria in urban Nigeria and the community/household may be first among the others to pilot and benefit from the control strategies emanating from the study.

Confidentiality:
Our team members are professionally trained, and all information and personal discussion volunteered to them during the study will be kept confidential.

Voluntariness:
Your participation in this study is purely voluntary. Your participation or withdrawal from the study will not have any negative effect whatsoever.

Compensation:
The community members or households selected as mosquito collectors to participate in the study will be remunerated in accordance with the budget for the study.

This study has been approved by the Federal Ministry of Health, Abuja Nigeria, and all questions should be directed to :

Prof. M. A. Adeleke,
Osun State University, Osogbo, Nigeria,
monsuruadeleke@gmail.com
Mobile: 07038257702

Statement of consent
I wish to confirm that I have read and understood the concept of the study. I therefore willingly agree to participate in the project on behalf of my household/community.

DATE: _____SIGNATURE: _____
NAME: _____
POSITION IN COMMUNITY/HOUSEHOLD: _____

Entomologist name and signature:
NAME AND SIGNATURE: _____

Sample modified CDC light trap data collection form

New Net Project: Modified CDC Light Trap

Collection & Identification Record Form

COUNTRY_____ STATE_____ LGA_____ COMMUNITY/SETTLEMENT_____

DATE OF COLLECTION _____ NAME OF DATA COLLECTOR_____

Collection time	Rainfall, Temperature(°C) and % Relative Humidity							An. gambiae s.l		An.		An.		An		An.		Hourly Anopheline total		Hourly Culicine total	
	Rain fall	Indoor wet	Indoor Dry	Indoor Tem	Outdoor wet	Outdoor Dry	Outdoor Tem	In	Out	In	out	In	Out	In	Out	In	Out	In	Out	In	Out
6-7pm																					
7-8																					
8-9																					
9-10																					
10-11																					
11-12																					
12-1am																					
1-2																					
2-3																					
3-4																					
4-5																					
5-6 am																					
Total																					

Note: Temperature and RH is to be taken at the beginning of each hourly period. Write Yes or No in the rainfall column to indicate rainfall status. Record also the wind situation of the day.

Name and signature of Reviewer: _____

Sample pyrethrum spray catch and species identification record form

New Net Project: Day time Mosquito Indoor Resting Collection with Pyrethrum Spray and Species Identification Record Form

COUNTRY _____ STATE _____ LGA _____ COMMUNITY _____

MOSQUITO COLLECTION DATE _____ (DD/MM/YYYY) (Time) _____ NAME OF HEAD OF HOUSEHOLD _____

NAME OF DATA COLLECTOR _____

Type of house[a]	Number of occupants		Species (Morphologically identified)	Mosquito Identifier Code	Blood digestion stages				Vector Spp. Ovary Dissection		
	Human	Animal			Un fed	Fed	Half gravid	Gravid	Number dissected and examined	Number parous	% parous

[a]Rectangular with corrugated iron roof (a), Rectangular thatched roof (b), tukul with thatched roof(c), Tukul with iron roof (d), other specify

Comment (State if net is hanging, name of net, date of manufacture and date of expiry): -

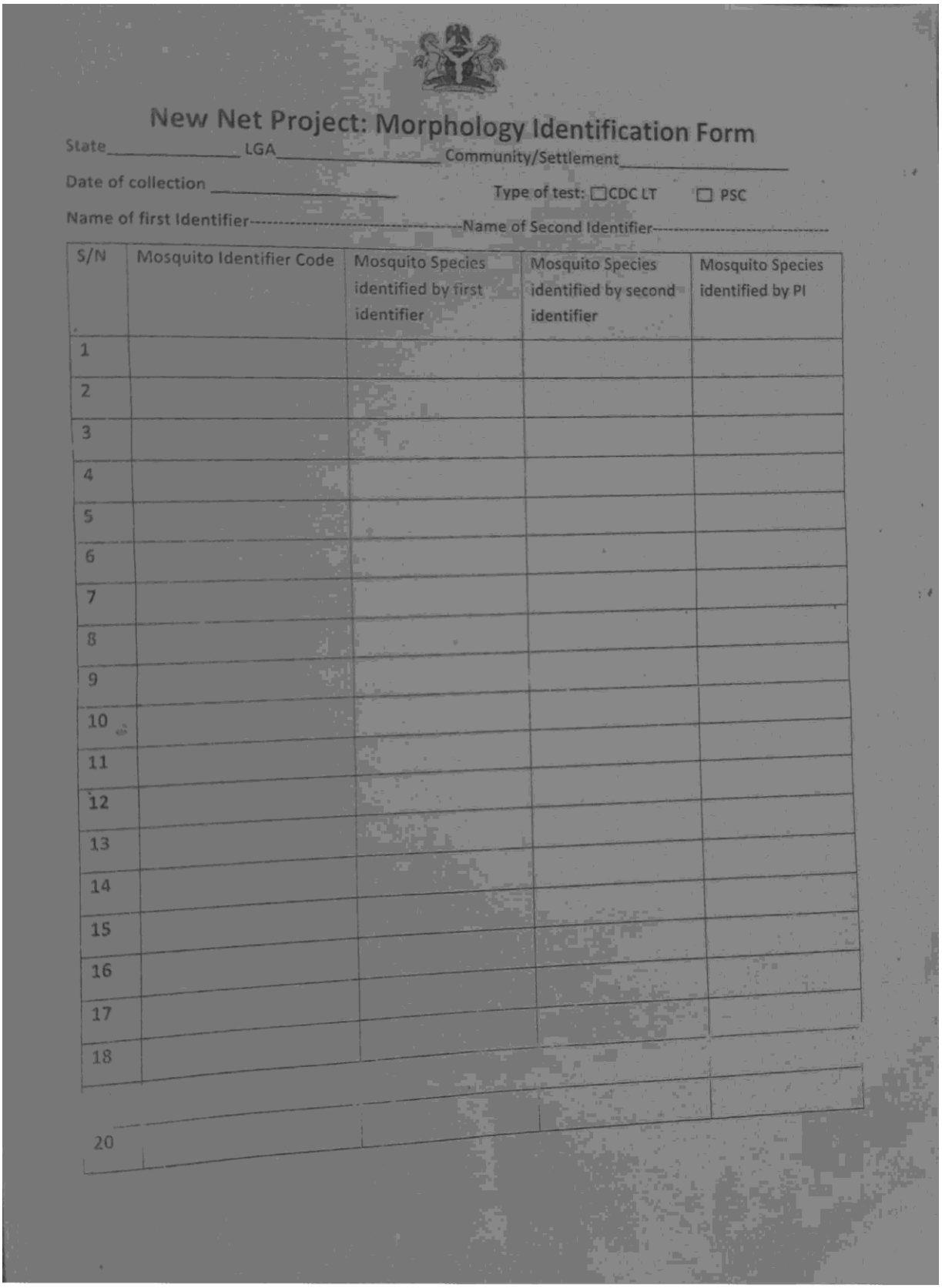
_____

_____

_____

Name and signature of Reviewer: _____

Sample morphology identification form



New Net Project: Morphology Identification Form

State_____ LGA_____ Community/Settlement_____

Date of collection _____ Type of test: ☐CDC LT ☐ PSC

Name of first Identifier----------Name of Second Identifier----------

S/N	Mosquito Identifier Code	Mosquito Species identified by first identifier	Mosquito Species identified by second identifier	Mosquito Species identified by PI
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
20				

Entomological data collection protocol

A. Species identification of Anopheles gambiae complex

DNA extraction

The DNA will be extracted using Animal DNA Preparation Kit (Jena Bioscience, Germany), following the manufacturer's guide.

- Place each mosquito sample in 1.5 ml microcentrifuge tube and homogenized in 300 µl Lysis Buffer and 2 µl of RNase A.
- Vortex vigorously for 30-60 seconds and add 8 µl of Proteinase K and mix by pipetting.
- Incubate homogenates at 60^{o}C for 20 minutes in a water bath and cool for 5 minutes.
- Add 300 µl of Binding Buffer and vortex briefly.
- Place the tube on ice for 5 minutes and centrifuge at 10,000 rpm for 5 minutes to decant the supernatant.
- Insert a spin column in a 2 ml collection tube then add 100 µl Activation Buffer into the spin column.
- Centrifuge at 10,000 rpm for 30 seconds then the flow-through is discarded.
- Pipette directly into the spin column, centrifuge for 1 minute at 10,000 rpm and the flow-through discarded.
- Wash the DNA twice with 500 µl each of DNA wash buffer follow by centrifugation at 10,000 rpm for 30 seconds and a final centrifugation of the empty column for 2 minutes at 14,500 rpm.
- Elute the DNA in 40 µl of elution buffer and then store at 4^{o}C.

Preparation of PCR Mix

The PCR mix is composed of a Master mix (dNTPs, Buffer, $MgCl_2$ etc.), the primers (both forward and reverse), Taq polymerase (an enzyme), the DNA template to be amplified and finally a PCR grade water (double distilled water or **ddH_2O**) to bring the volume to the desired volume. For the analysis, a 25 µl PCR mix is prepared as follows;

Reagents	**Volume**
PCR Master Mix	8µl
UN	0.5 µl
AR	0.5 µl
QD	0.5 µl
GA	0.5 µl
ME	0.5 µl
Taq Polymerase	0.25 µl
DNA Template	2 µl
PCR Grade Water	12.25
Total Volume	**25 µl**

Steps in PCR Amplification

S/N	**Cycle step**	**Temperature**	**Time**	**Cycles**
1.	Initial Denaturation	95°C	2 minutes	1
2.	Denaturation	95°C	30 seconds	
3.	Annealing	55°C	30 seconds	30 cycles
4.	Extension	72°C	40 seconds	
5.	Final Extension	72°C	7 minutes	1
6.	Hold	4°C	∞	--

Gel Electrophoresis - Preparation and Casting of Agarose Gel for Electrophoresis

Three percent 1.5 % agarose gel concentrations will be used for gel electrophoresis. The following procedure is required for preparation of the gel.

- The agarose will be melted in a microwave for about 2 mins until it has completely dissolved and allowed to cool sufficiently. Visualizing dye (5µl) (SYBR) will be added to ensure visualization of DNA.
- Upon cooling to about 50-45oC (not too hot to touch). The gel will be poured into a clean agarose well casting chamber in which a clean electrophoresis comb had been inserted as appropriate to create wells into which the amplicons would be loaded.

- After the gel had set, the cast will then be placed in a gel electrophoresis tank containing enough 1X TAE buffer to cover the gel and wells. The comb was then carefully removed from the gel in a way to avoid cracking of wells or gel.

Loading of Amplicons and Running of the Agarose Gel Electrophoresis
The samples will be loaded, and the gel electrophoresis run as described below:

- Molecular ladder (5µl) will be carefully dispensed into the first well of the gel or any designated well for ladder.
- 7.5µl of each amplicon (DNA) would be thereafter dispensed into corresponding wells.
- The electrophoresis tank covered with its lid and the tank cables will be appropriately connected to the electric source and set to run at 100 V for 1hour. After this, the gel is viewed to check for the bands.

Identification of Anopheles coluzzii (Anopheles gambiae M form)
It involves digestion of PCR product of *Anopheles gambiae s.s*with *Hha 1* Enzyme

Procedure
Prepare the mix in titre plate as follows:

- Incubate the mix at 37°C overnight
- Run 7µl of the digested PCR product 1.5% agarose gel containing and visualize in UV transillumination.
- 367bp and 23bp for *Anopheles colluzzii* (M form) and 257 and 110bp and 23bp for *Anopheles gambiae* S. form

Reagents	**Volume**
Buffer + BSA (1 x NE Buffer 4 and 1 x BSA)	0.6µl
1U of HhaI enzyme	0.2 µl
PCR Grade Water	1.0
PCR product	10
Total Volume	**11.8 µl**

PRIMERS
UN: GTG TGC CCC TTC CTC GAT GT
GA: CTG GTT TGG TCG GCA CGT TT
AR: AAG TGT CCT TCT CCA TCC TA
QD: CAG ACC AAG ATG GTT AGT AT
ME: TGA CCA ACC CAC TCC CTT GA

Molecular weights of the bands
Anopheles merus …… .464 base pair
Anopheles gambiae …… 390 base pair
Anopheles arabiensis……315 base pair
Anopheles quadriannulatus……153 base pair

***Anopheles Colluzzii* and An. gambiae S form**
367bp and 23bp for *Anopheles colluzzii* (M form) and 257 and 110bp and 23bp for *Anopheles gambiae* S. form

B. Molecular identification of Anopheles funestus complex

DNA extraction
Same as *Anopheles gambiae.*

Preparation of PCR Mix
Same as *Anopheles gambiae*

Reagents	**Volume**
PCR Master Mix	8µl
UV	0.6 µl
FUN	0.6 µl

VAN	0.6 µl
RIV	0.6 µl
PAR	0.6 µl
LEES	0.6 µl
Taq Polymerase	0.25 µl
DNA Template	2 µl
PCR Grade Water	11.15
Total Volume	**25 µl**

Steps in PCR Amplification

S/N	Cycle step	Temperature	Time	Cycles
1.	Initial Denaturation	95°C	2 minutes	1
2.	Denaturation	95°C	30 seconds	
3.	Annealing	47°C	30 seconds	35 cycles
4.	Extension	72°C	40 seconds	
5.	Final Extension	72°C	5 minutes	1
6.	Hold	4°C	∞	--

Gel Electrophoresis - Preparation and Casting of Agarose Gel for Electrophoresis

Three percent 2.0 % agarose gel concentrations will be used for gel electrophoresis. The following procedure is required for preparation of the gel.

1. The agarose will be melted in a microwave for about 2 mins until it has completely dissolved and allowed to cool sufficiently. Visualizing dye (5µl) (SYBR) will be added to ensure visualization of DNA.
2. Upon cooling to about 50-45oC (not too hot to touch), the gel will be poured into a clean agarose well casting chamber in which a clean electrophoresis comb had been inserted as appropriate to create wells into which the amplicons would be loaded.
3. After the gel had set, the cast will then be placed in a gel electrophoresis tank containing enough 1X TAE buffer to cover the gel and wells. The comb was then carefully removed from the gel in a way to avoid cracking of wells or gel.

Loading of Amplicons and Running of the Agarose Gel Electrophoresis

Same as *Anopheles gambiae*

C. Detection of Plasmodium falciparum in mosquitoes

PCR detection - Sample preparation

- The sporozoite is found only at salivary gland between thorax and head
- Separate the abdomen from other part of the body
- Place the thorax-head on the tube for DNA extraction

DNA extraction

The DNA will be extracted using Animal DNA Preparation Kit (Jena Bioscience, Germany), following the manufacturer's guide.

- Place each mosquito sample in 1.5 ml microcentrifuge tube and homogenized in 300 µl Lysis Buffer and 2 µl of RNase A.
- Vortex vigorously for 30-60 seconds and add 8 µl of Proteinase K and mix by pipetting.
- Incubate homogenates at 60^{o}C for 20 minutes in a water bath and cool for 5 minutes.
- Add 300 µl of Binding Buffer and vortex briefly.
- Place the tube on ice for 5 minutes and centrifuge at 10,000 rpm for 5 minutes to decant the supernatant.
- Insert a spin column in a 2 ml collection tube then add 100 µl Activation Buffer into the spin column.
- Centrifuge at 10,000 rpm for 30 seconds then the flow-through is discarded.
- Pipette directly into the spin column, centrifuge for 1 minute at 10,000 rpm and the flow-through discarded.
- Wash the DNA twice with 500 µl each of DNA wash buffer follow by centrifugation at 10,000 rpm for 30 seconds and a final centrifugation of the empty column for 2 minutes at 14,500 rpm.
- Elute the DNA in 40 µl of elution buffer and then store at 4^{o}C.

PCR reaction

Cyt b genes targeting P. falciparum is targeted (Hassan *et al*, 2009). Primers MitF2 (5'-TGAGTTATTGGGGTGCAACTG-3') and MitR2 (5'-TGTTTGCTTGGGAGCTGTAA-3').

Preparation of PCR mix

PCR mix for 25 µl PCR reaction:

Reagents	**Volume**
PCR Master Mix	8µl
MitF2	0.5 µl
MitR2	0.5µl
Taq Polymerase	0.25 µl
DNA Template	2 µl
PCR Grade Water	13.75
Total Volume	**25 µl**

Steps in PCR Amplification

S/N	**Cycle step**	**Temperature**	**Time**	**Cycles**
1.	Initial Denaturation	95°C	4 minutes	1
2.	Denaturation	95°C	40 seconds	
3.	Annealing	61°C	40 seconds	35 cycles
4.	Extension	72°C	1 minute	
5.	Final Extension	72°C	10 minutes	1
6.	Hold	4°C	∞	--

Gel electrophoresis - Preparation and Casting of Agarose Gel for Electrophoresis

Three percent 2.0 % agarose gel concentrations will be used for gel electrophoresis. The following procedure is required for preparation of the gel.

4. The agarose will be melted in a microwave for about 2 mins until it has completely dissolved and allowed to cool sufficiently. Visualizing dye (5µl) (SYBR) will be added to ensure visualization of DNA.
5. Upon cooling to about 50-45oC (not too hot to touch), the gel will be poured into a clean agarose well casting chamber in which a clean electrophoresis comb had been inserted as appropriate to create wells into which the amplicons would be loaded.
6. After the gel had set, the cast will then be placed in a gel electrophoresis tank containing enough 1X TAE buffer to cover the gel and wells. The comb was then carefully removed from the gel in a way to avoid cracking of wells or gel.

Loading of Amplicons and Running of the Agarose Gel Electrophoresis

The samples will be loaded, and the gel electrophoresis run as described below:

1. Molecular ladder (5µl) will be carefully dispensed into the first well of the gel or any designated well for ladder.
2. 7.5µl of each amplicon (DNA) would be thereafter dispensed into corresponding wells.
3. The electrophoresis tank covered with its lid and the tank cables will be appropriately connected to the electric source and set to run at 100 V for 1hour. After this, the gel is viewed to check for the bands.

Results

Amplification bands: 729 bp fragment of the Cyt b gene.

D. PCR identification of Plasmodium spp from mosquito (Protocol 2)

Procedure

Prepare master mix for one 12.5 µl PCR reactions. Add reagents in the order presented

Reagents	**X1 (µl)**
ddH2O	7.5
Pre-mix (X5) with BSA	2.5
Pfr364F	0.375

Pfr364R	0.375
Pvr47F	0.375
Pvr47R	0.375
DNA	1.0
TOTAL	**12.5**

PCR cycle conditions

- 95°C/5mins x 1 cycle
- (95°C/2mins, 56°C/30 sec, 72°C/30 sec) x 35 cycles
- 72°C/ 5mins x 1 cycle 4°C hold
- Run samples on a 2% agarose EtBr gel., load 10 µl sample.

Base pairs

- 700 or 220 bp for *P. falciparum*
- 333bp for *P. vivax*

Primer sequences for multiplex PCR of Plasmodium vivax and falciparum

Pvr47F (F, 25pmol/l)	5' CTGATTTTCCGCGTAACAATG 3'
Pvr47R (R, 25pmol/l)	5' CAAATGTAGCATAAAAATCCAAG 3'
Pfr364F (F, 25pmol/l)	5' CCGGAAATTCGGGTTTTAGAC 3'
Pfr364R (R, 25pmol/l)	5' GCTTTTGAAGTGCATGTGAATTGTGCAC 3'

(Oyedeji et al., 2007;Demas et al., 2011)

E. PCR identification of mammalian blood meals in mosquitoes by a multiplexed polymerase chain reaction

DNA extraction (deBenedictis, et al., 2003)

- Prepare extraction buffer by adding 0.1M NaCl, 0.2M sucrose, 0.1M Tris-HCl, 0.05M EDTA, pH 9.1 and 0.5% sodium dodecyl sulfate (SDS).
- Place mosquito in an autoclaved 1.5ml tube
- Homogenise mosquito sample in 100µL of extraction Buffer
- Incubate at 65°C for one hour.
- Precipitate the SDS by adding 15µL of cold 8M potassium acetate to each homogenate and incubate on ice for 45 minutes.
- Centrifuge for 10 minutes to remove cellular debris.
- Transfer supernatant into a new sterile 1.5 mL microfuge tube.
- Precipitate DNA by adding 250 µL of 100% ethanol to the transferred supernatant.
- Incubate for 5 minutes at room temperature.
- Spin for 15 minutes to pellet the DNA
- Discard the supernatant and dry
- Re-suspend dry pellets in 10 µL of 0.1 X SSC (15mM NaCl, 1.5mM sodium citrate) + 40 µL of double distilled water.

Procedure

Prepare master mix for one 12.5 µl PCR reactions. Add reagents in the order presented

Reagents	**X1 (µl)**
ddH2O	6.75
Pre-mix (X5) with BSA	2.5
Pig573F	0.375
Human741F	0.375

Goat894F	0.375
Dog368F	0.375
Cow121F	0.375
UNREV1025	0.375
Template	1.0
TOTAL	**12.5**

PCR cycle conditions

- 95^{o}C/15mins x 1 cycle
- (95^{o}C/1mins, 58^{o}C/1 min, 72^{o}C/I min) x 35 cycles
- 72^{o}C/ 5mins x 1 cycle 4^{o}C hold
- Run samples on a 2% agarose EtBr gel., load 10 µl sample.

Base pairs

- 453bp for pig
- 334bp for human
- 132bp for goat
- 680bp for Dog
- 561bp for Cow

Primer sequences for the cytochrome b-based PCR blood meal identification assay
Pig573F 5' CCTCGCAGCCGTACATCTC 3'
Human 741F 5' GGCTTACTTCTCTTCATTCTCTCCT 3'
Goat894F 5' CCTAATCTTAGTACTTGTACCCTTCCTC 3'
Dog368F 5' GGAATTGTACTATTATTCGCAACCAT 3'
Cow121F 5' CATCGGCACAAATTTAGTCG 3'
UNREV1025 5' GGTTGTCCTCCAATTCATGTTA 3'

F. Blood meal ELISA protocol

- Ensure that you have autoclaved enough tips, Eppendorf tubes and pestles
- Grind each mosquito with 100 µl of Phosphate Buffer Saline (PBS) in 1.5 ml eppendorf tube to prepare mosquito triturate
- Add 50 µl of mosquito triturate and the respective controls into wells of microtitre plate.
- (positive control: 10 µl of human serum+500 µl of PBS)
- Incubate for 1 hour
- Wash twice with 200 µl PBS – Tween 20. (To 1L of PBS, add 500 µl of Tween 20)
- Add 50 µl of prepared enzyme conjugate solution
- Affinity purified Antibody to human IgG (H+L); 1^{o} antibody 1:500
- Peroxidase-labeled affinity purified antibody to human IgG (H+L) 2^{0} antibody 1:500 i.e. add 1 µl of each to 500 µl of PBS
- Mix both primary and secondary antibody to get enzyme conjugate solution
- Incubate for 1 hour
- Wash three times with 200 µl PBS-Tween 20
- Add 100 µl of ABTS Peroxidase substrate
- Mix solution A and B together (i.e. 5ml+5ml per plate)
- Incubate for 30 minutes
- Wash three times with 200 µl PBS-Tween 20
- Add 50 µl of phosphatase substrate to each well
- Mix substrate A and B (i.e. 2.5ml+2.5ml per plate)
- Incubate for 30mins and read absorbance at 414 nm

*Preparation of Buffer - Preparation of Phosphate Buffer Saline (X1 PBS***)**

- To 800 ml of distilled water dissolve
    - 8 g of NaCl
    - 0.2 g of KCl

    - 1.44 g of Na_2HPO_4
    - 0.24 g of KH_2PO_4
- Adjust pH to 7.4 with HCl
- Adjust volume to 1 litre with distilled water

References

Demas A, Oberstaller J, DeBarry J, Lucchi NW, Srinivasamoorthy G, (2011). Applied genomics: data mining reveals species-specific malaria diagnostic targets more sensitive than 18S rRNA. J Clin Microbiol 49: 2411–2418. pmid:21525225

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Oyedeji SI, Awobode HO, Monday GC, Kendjo E, Kremsner PG, (2007) Comparison of PCR-based detection of Plasmodium falciparum infections based on single and multicopy genes. Malar J 6: 112. pmid:17705826

Entomological parameters to be collected using study data

1. *The potential breeding sites of Anopheles mosquitoes*. Habitat occupancy will be computed as the number of aquatic habitats found to harbour Anopheles vector larvae or pupae divided by the number of potential habitats for Anopheles vector egg-laying and immature stage development in an area, by category of habitat.
2. The types of the *Anopheles* found, and nature of habitats utilized by each species in each site in both seasons.
3. *Larval/pupae density (per dip/per person/per time).* Larval density is the number of immature Anopheles vectors collected per dip, per person per unit time. Usually recorded by stage (I–IV instars and pupae) and by habitat and reported by stage category (early instar, late instar, pupae) for an area.
4. *Determination of indoor and outdoor man biting rates:* The man biting rate will be calculated for each species as HBR=N/HxNi where N=Number of female Anopheles mosquitoes, H= Number of persons that slept on the bed (covered with untreated bed net as a bait) at each collection point indoors or outdoors; Ni= Number of Nights.
5. *Calculation of Human Blood Index for indoor and outdoor mosquitoes*: The human blood index represents the total number of *Anopheles* mosquitoes collected indoors or outdoors with human blood divided by the total number of *Anopheles* mosquitoes with blood.
6. *Determination of Indoor Resting Density:* The indoor resting mosquito density will be calculated as the number of female mosquitoes collected for a species divided by the number of houses where PSC was conducted in the community.
7. *Calculation of Sporozoite rate for indoor and outdoor mosquitoes*: The *P. falciparum* sporozoite rate is the number of female *Anopheles* mosquitoes collected indoors or outdoors infected with sporozoites divided by the total number of mosquitoes examined for indoor or outdoor collection.
8. In each study location, *Anopheles* habitat will be geo-referenced and a habitat distribution map for each area will be created.