03 May 2022

RBM VCWG Session 3 - Work Stream 1: Enhancing the impact of core interventions

New Nets Project interim results

Updates from pilot evaluations in Rwanda & Nigeria

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New Nets Project consortium

IVCC

- Lead and coordinator
- Liaison with industry partners
- Link to vector control product development pipeline

psi
Healthy lives. Measurable results.

- Compilation of cross-country lessons learned from pilot studies, funding for process evaluations

The Alliance for Malaria Prevention

- Technical assistance

Imperial College London

- Modelling of trials design and implementation impact

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- Cost-effectiveness determination from pilot implementations

LSTM
LIVERPOOL SCHOOL OF TROPICAL MEDICINE

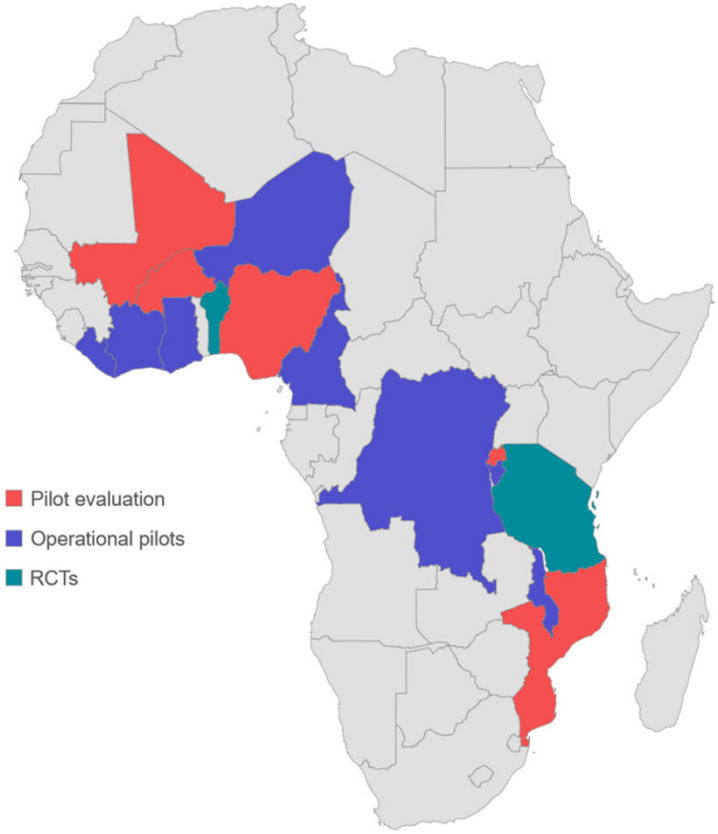
- Entomological correlates of epidemiological impact

Tulane University

- Cost effectiveness study design and data collection

LONDON SCHOOL of HYGIENE &TROPICAL MEDICINE

- Cluster-randomized trials of dual active-ingredient ITNs and entomological correlates in trials



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Interim results – interpret with caution

NNP partners are using enhanced surveillance activities to evaluate the impact of piloting different ITN types (2020–2022)

- Interceptor® G2 ITN
- Royal Guard® ITN
- PBO ITN
- Standard ITN

Epidemiology

- Malaria infection prevalence
- Malaria case incidence

Entomology

- Vector population density, behavior, infection, and resistance status

Human behavior

- ITN uptake and usage, transmission risk, social determinants of impact

Cost-effectiveness

- Product price, delivery and deployment costs, and effectiveness based on incidence rates

Durability monitoring

- Survivorship, attrition, physical integrity, and insecticidal content

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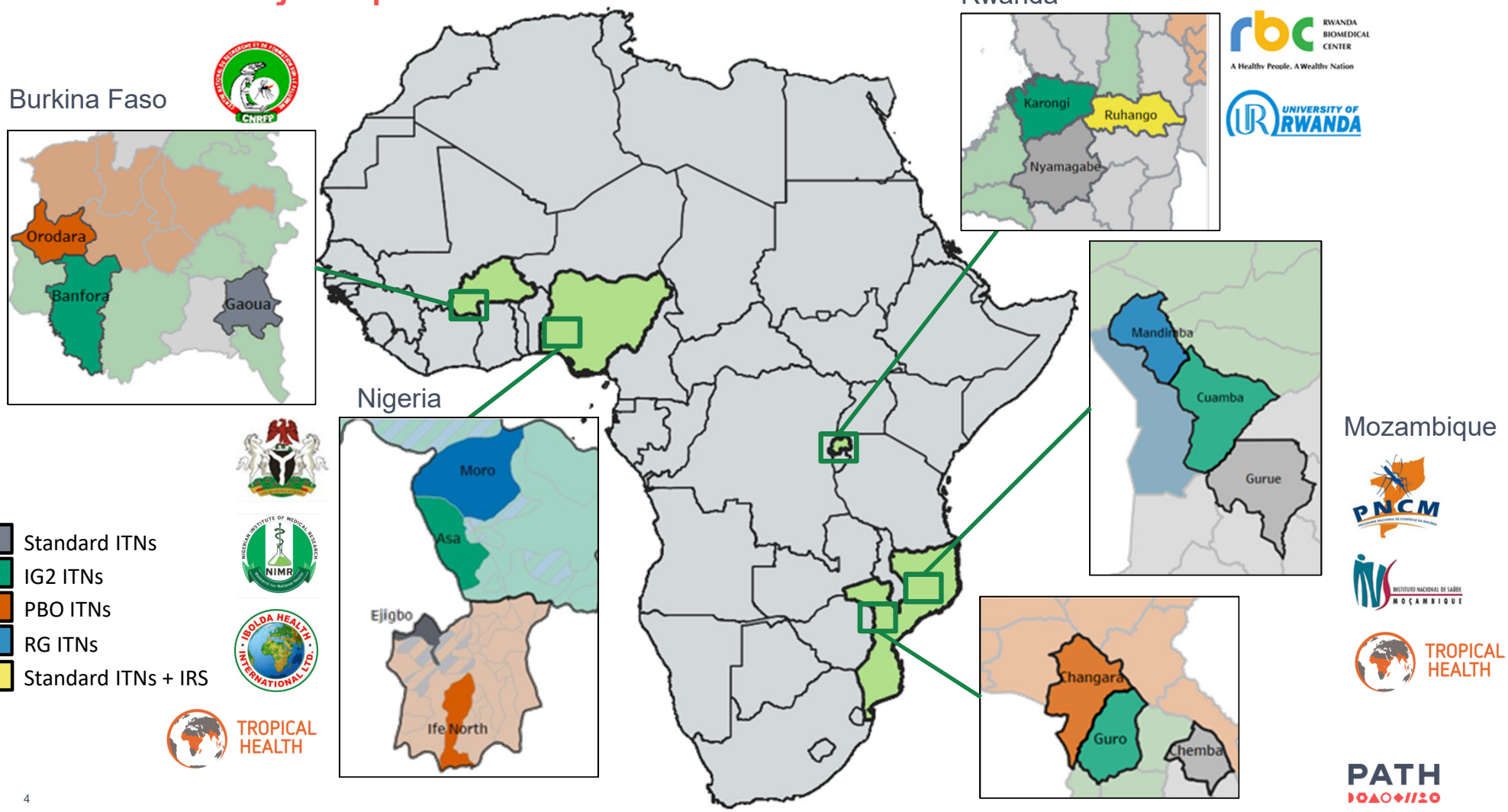
Interim results – interpret with caution

New Nets Project pilot evaluations



Interim results – interpret with caution

Rwanda

Dr. Aimable Mbituyumuremyi

Manager – Malaria, NTDs, and Other Parasitic Diseases Control Division:
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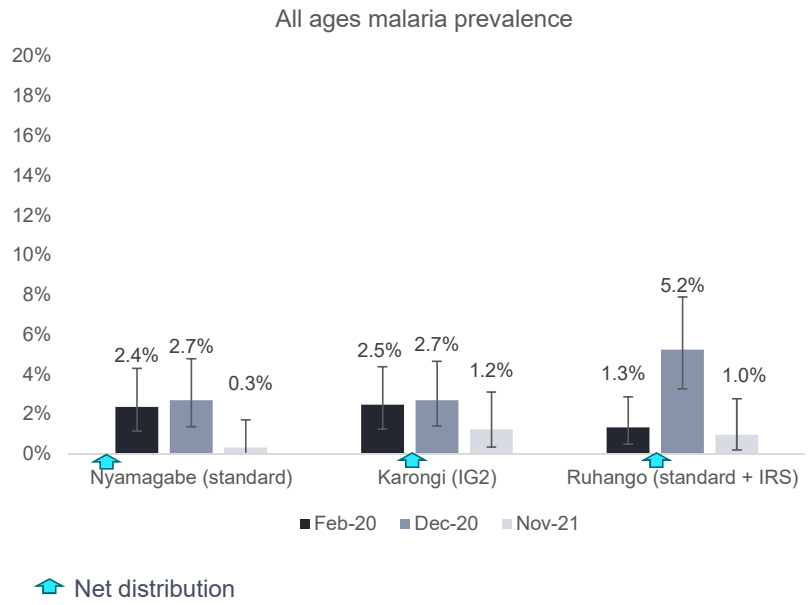
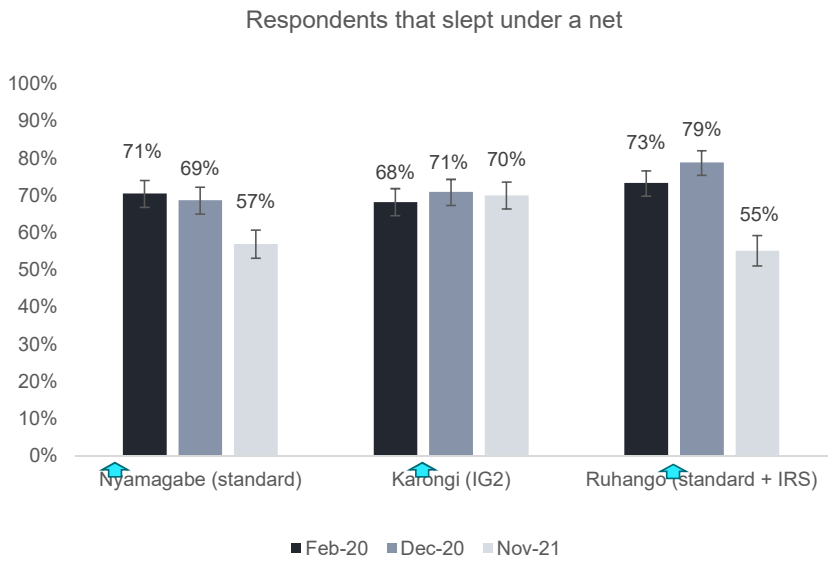
Co-PI – New Nets Project pilot evaluation

Malaria prevalence and ITN coverage

Cross-sectional surveys Feb 2020, Dec 2020, Nov 2021

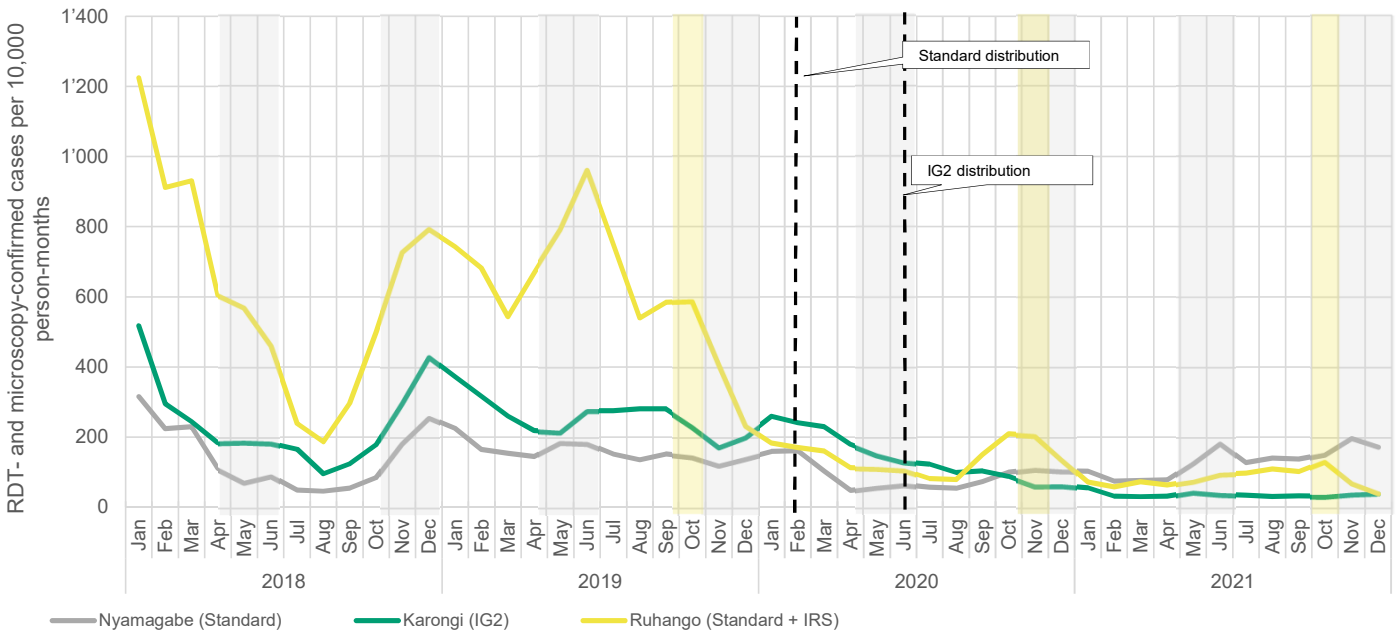




Interim results – interpret with caution

Malaria case incidence

through December 2021



13.4%

greater reduction in the IG2 district

28.7%

greater reduction in the standard + IRS district

compared to the standard district in Year 1
(April 2020 to March 2021)

Interim results – interpret with caution

Human behavior findings

In-depth interviews, focus group discussions 2020–2021

- Four rounds of data collected in 2020 and 2021
- Two additional rounds will be completed in 2022
- Coding and analyzing the data to explore:
    - Behaviors that impact malaria risk
    - Malaria prevention methods
    - Bed nets
        - Use
        - Access
        - Benefits
        - Preferences
        - Maintenance
        - Challenges and solutions

Human behavior findings

Bed net access

- **Mass campaigns are the primary method** for acquiring bed nets
- **EPI and ANC visits are also a common** method of acquiring a net
- Respondents were **split on whether they received enough bed nets**:
  - Each family is supposed to receive one bed net for each bed in the household
  - Many respondents reported receiving one or two fewer bed nets than needed
  - People are not able to collect their nets while away from home during registration or distribution, including children at boarding school
  - Other respondents report receiving enough nets, and some received an extra net for visitors.
- Many respondents were **not aware of any store or market** that sells bed nets

> ***"I** was given two bed nets, corresponding with two beds we have. But there are some homes that were given less bed nets than the number of beds they have.*
> -FGD, Nyamagabe

Human behavior findings

Bed net use

- Bed nets were cited as the most common malaria prevention method. Respondents in all 3 districts report **using nets at night throughout the year.**
- Awareness of the importance of nets for **reducing of malaria transmission** was cited as key motivating factors for use.
- Due to vulnerability to malaria, **special attention to pregnant women, the elderly, and young children was reported** when there are few nets compared to sleeping spaces.

"As the education on the use of bed nets increased and malaria cases increased; we realized the importance of bed nets and started using them properly. As per now I can't dare go to sleep without a bed net."
-FGD, Nyamagabe

Human behavior findings

Bed net barriers to use

Common barriers to use in all three districts:

- Seasonal differences
    - Participants reported **higher net use in rainy/cold season compared to dry/hot season** due to increased heat and community perception that malaria is more common in the rainy season.
- Irritation from chemicals
    - **Difficulty breathing and skin rashes or irritation were commonly reported** by participants, sometimes as a challenge experienced firsthand and other times as a possible reason others may not use a bed net.
    - Almost all respondents who mention this **note that this challenge is temporary or easily remedied**, by washing or airing out a new net before using and ensuring the net doesn't touch their skin.
    - Many participants report that this **does not affect their own use** of bed nets.
- Access
    - Including **delays in distribution campaigns**, old **nets wearing out** before receiving new nets, **not receiving enough** nets per household or for visitors, nets **not being available in markets to purchase**.

Entomological landscape

	Nyamagabe (standard ITNs)	Karongi (IG2 ITNs)	Ruhango (standard ITNs + IRS)
	Year 1	**Year 1**	**Year 1**
Most abundant vector (% of likely vector species collected)	*An. funestus* s.l. (78.30%)	*An. gambiae* s.l. (89.5%)	*An. gambiae* s.l. (69.54%)
Second most abundant vector (% of likely vector species collected)	*An. gambiae* s.l. (21.28%)	*An. funestus* s.l. (7.31%)	*An. funestus* s.l. (30.46%)
Third most abundant vector (% of likely vector species collected)	*An. coustani* (0.43%)	*An. coustani* (3.19%)	–
***An. gambiae* molecular IDs**			
An. gambiae s.s.	91.3%	81.6%	80.0%
An. arabiensis	8.7%	18.4%	20.0%
HLC nightly landing rates			
Indoor:outdoor ratio (*An. gambiae s.l.)*	0.48	1.10	0.58
Indoor:outdoor ratio (*An. funestus* s.l.)	0.27	1.05	1.09
Pyrethroid-resistance profile	**LOW to MODERATE: Mitigated by PBO**		
WHO tube test mortality	97%–100%	93%–100%	86%–100%

- Mix of *An. gambiae* s.s., *An. funestus* s.l., *An. arabiensis,* and *An. coustani*
- Low to Moderate levels of pyrethroid resistance — mitigated by PBO
- Variable ratios of indoor to outdoor biting

Interim results – interpret with caution

Nigeria

Okefu Ohoji Okoko

Head Integrated Vector Management Branch, National Malaria Elimination Program,
Federal Ministry of Health

Malaria prevalence and ITN coverage

Cross-sectional surveys November 2020, 2021

OBSERVED

	Ejigbo (standard ITNs)				Asa* (IG2 ITNs)				Moro* (RG ITNs)				Ife North (PBO ITNs)			
	2020		2021*		2020		2021*		2020		2021*		2020		2021*	
Age group	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*
Total tested	424		433	428	425		425	426	421		426	428	422		425	425
Malaria prevalence (RDT+), % (95% CI)	38.4 (36.5–40.4)		25.6 (23.9–27.4)	43.7 (41.7 – 45.7)	63.1 (61.1–65.0)		15.8 (14.3–17.2)	39.9 (37.9 – 41.9)	49.9 (47.8–51.9)		21.1 (19.5–22.8)	30.4 (28.5 – 32.2)	48.3 (46.3–50.4)		40.9 (38.9–42.9)	53.2 (51.2 – 55.2)

CAUTION: Measures impact of SMC + ITNs

OBSERVED <5 IN 2020 AND 5-15 IN 2021 + MODELLED 5-15 IN 2020 AND <5 IN 2021

	Ejigbo (standard ITNs)				Asa* (IG2 ITNs)				Moro* (RG ITNs)				Ife North (PBO ITNs)			
	2020		2021*		2020		2021*		2020		2021*		2020		2021*	
Age group	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*	*<5*	*5-15*
Total tested	424		433	428	425			426	421			428	422		425	425
Malaria prevalence (RDT+), % (95% CI)	38.4 (36.5–40.4)		25.6 (23.9–27.4)	43.7 (41.7 – 45.7)	63.1 (61.1–65.0)			39.9 (37.9 – 41.9)	49.9 (47.8–51.9)			30.4 (28.5 – 32.2)	48.3 (46.3–50.4)		40.9 (38.9–42.9)	53.2 (51.2 – 55.2)

Interim results – interpret with caution

Human behavior findings

In-depth interviews, focus group discussions 2020–2021

- Two rounds of data collected in 2020 and 2021
- Round 3 data collection planned for July and August 2022
- Coding and analyzing the data to explore:
    - Behaviors that impact malaria risk
    - Malaria prevention methods
    - Bed nets
        - Use
        - Access
        - Benefits
        - Preferences
        - Maintenance
        - Challenges and solutions

Interim results – interpret with caution

Human behavior findings

Bed net access

- Most participants received their nets through door-to-door or centralized distributions, ANC, and immunization visits
    - Many **participants found the door-to-door method of distributing nets to be easy** and noted that they received an appropriate number of nets for their family.
    - Others reported receiving an **inadequate number of nets and requested more frequent distributions**. Requests ranged from having nets consistently available at health facilities to yearly distributions.
    - People noted that **families that lived in remote areas may have a harder time collecting nets**, and that if people were not at home at the time of distribution there was no way to collect their nets.
- Most people reported getting their nets for free and described being dependent on the government distributions to get nets. Many were not confident they would be able to replace nets that were damaged before the next distribution.

"It is very difficult to replace the old net because campaign distribution is done only after three years."
-IDI, Osun

Interim results – interpret with caution

Human behavior findings

Bed net use

- Most participants in all districts stressed the importance of always using a bed net.
- Awareness of the effectiveness of nets at preventing malaria transmission is a key motivating factor.
- Several participants reported that their net use increased after they themselves or someone they know got seriously ill with malaria.
- Some report that prevalence of malaria has been reduced due to use, either broadly in the community or within their own household.

"In this community I don't know anybody that doesn't make use of bed net. We always use bed net. So I don't think there is any household that doesn't use it."
-IDI, Kwara

Interim results – interpret with caution

Human behavior findings

Bed net barriers to use

- Seasonal differences are the biggest factor that affects people's decision to not use a net.
    - Even among participants who state the importance of always using a net, many of them also **report higher bed net usage during the rainy season**.
    - **Heat is the main challenge to using a bed net during dry season,** with many participants saying it's too uncomfortable to sleep under the net.
    - Participants also report **seeing a decrease in the number of mosquitos during dry season**, which also impacts their decision not to use a net during dry season.

- Travel and having visitors also impact net use.
    - Some participants reported that the only reason they don't use is **if they're away from home and don't have a net available**
    - Others mention **offering their own nets to guests** when they have visitors, leaving them without a net for themselves.

Interim results – interpret with caution

Entomological landscape

	Ejigbo (Standard ITNs)	Asa (IG2 ITNs)	Moro (RG ITNs)	Ife North (PBO ITNs)
	2020	**2020**	**2020**	**2020**
Most abundant vector (% of likely vector species collected)	*An. gambiae* s.l. (88%)	*An. gambiae* s.l. (100%)	*An. gambiae* s.l. (100%)	*An. funestus* s.l. (82%)
Second most abundant vector (% of all anophelines collected)	*An. funestus* s.l. (6%)	–	–	*An. gambiae* s.l. (14%)
***An. gambiae* molecular IDs**				
An. gambiae s.s.	73.3%	66.7%	73.4%	66.7%
An. coluzzii	26.7%	26.7%	21.5%	33.3%
An. arabiensis	–	2.5%	5.1%	–
Monthly CDC LT densities				
HLC nightly landing rates (*An. gambiae* s.l.)				
Indoor:outdoor ratio	0.92	9.75	2.50	10.00
Pyrethroid resistance profile	**MODERATE to HIGH: Partially mitigated by PBO**			
WHO tube test mortality	73%–94%	12%–38%	41%–57%	20%–71%

- Mix of *An. gambiae* s.s., *An. funestus, An. coluzzii, An. arabiensis*
- Moderate to high levels of pyrethroid resistance—partially mitigated by PBO
- Tendency for higher indoor than outdoor biting rates

Interim results – interpret with caution

Estimates of ITN durability

12-month

Estimates for the survival of campaign nets in serviceable condition after 12 months:

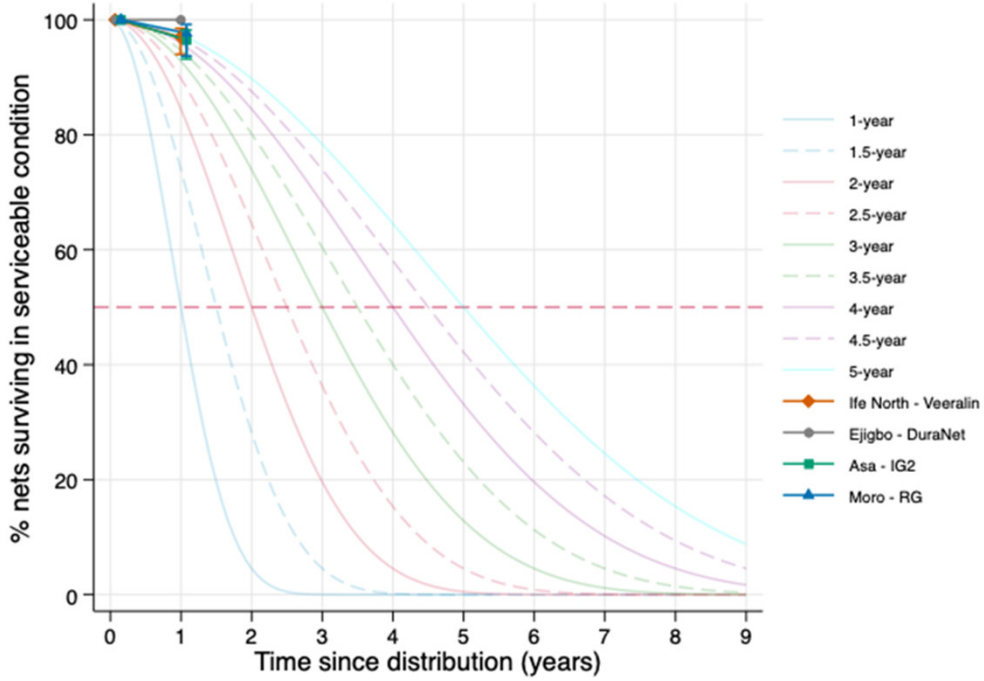
100% in Ejigbo

96.5% in Asa

97.7% in Moro

97.0% in Ife North

Estimated net survival in serviceable condition with 95% error bars plotted against hypothetical survival curves with defined median survival



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Interim results – interpret with caution

Key takeaways – interim results

- Mass ITN distributions (universal coverage campaigns) are **strongly associated with increased ITN use and decreases in malaria transmission regardless of ITN type**.
- In areas of moderate to high transmission with pyrethroid-resistant vectors:
    - Distribution of any of the new net types (**IG2, PBO, and RG ITNs) seem more effective at controlling malaria than campaigns distributing standard, pyrethroid-only ITNs**.
    - May be **less pronounced in West African settings** with complex resistance profiles.
- More complete and nuanced analyses will consider **access, impact, and durability of ITNs after more than one year, as well as ITN use patterns and climate patterns**.

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Thank you – Obrigado – Merci

Questions, comments & discussion

Interim results – interpret with caution

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