

# Physical and insecticidal durability of new ITNs in four sub-Saharan African countries

VCWG Annual Meeting  
Task Team 4: Addressing Non-Biological Threats  
Accra, Ghana – February 6-8, 2023



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- Durability Monitoring (DM) methodology overview
- Country results
- Next steps



Data collectors conduct an ITN hole assessment during training for the 24-month durability monitoring survey round in Kampala, Uganda.





# DM methodology overview

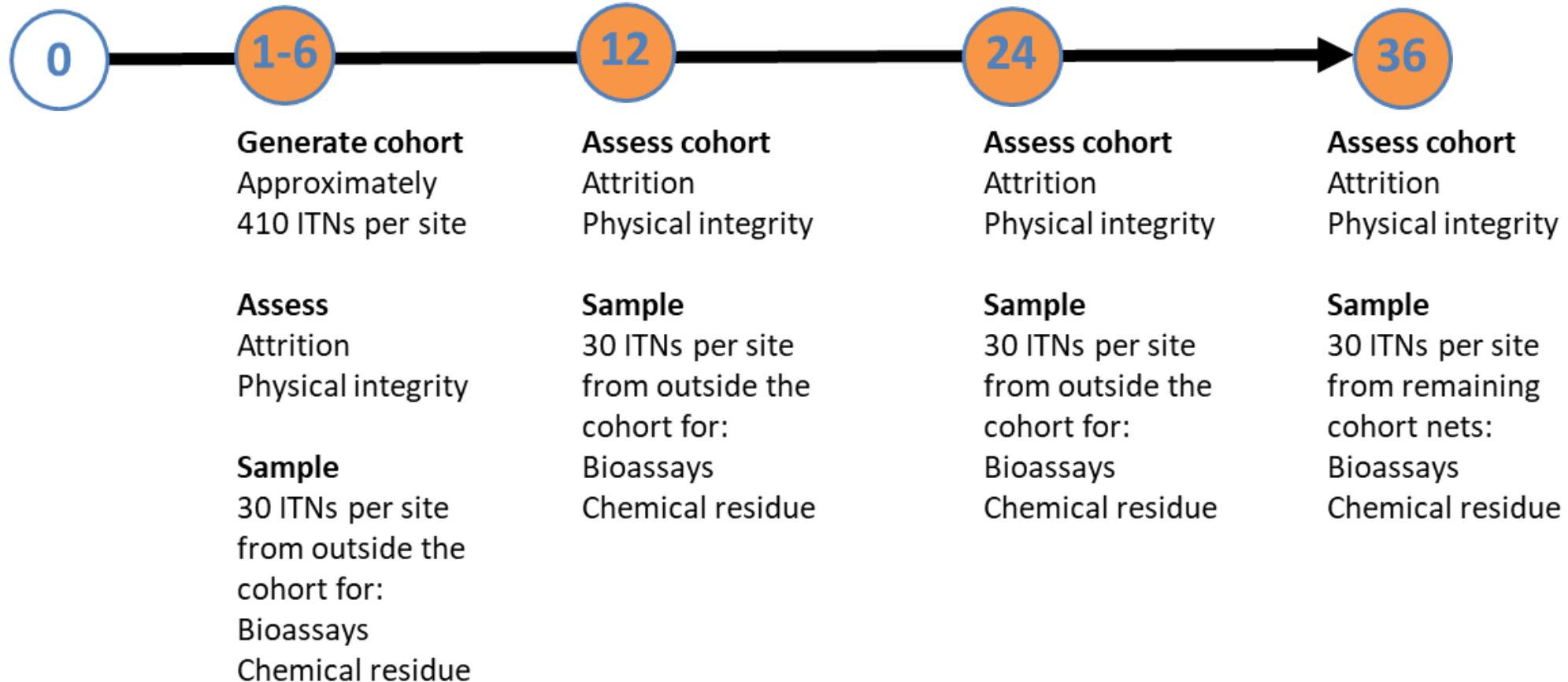


Data collector conducts an interview with the household head during the 36-month durability monitoring survey round in Ghana. Covid precautions were closely followed, as evidenced by the outdoor interview and personal protective equipment worn by the data collector.



# Fieldwork and laboratory methods

## Distribution





# Country results



Data collectors conduct an ITN hole assessment in Toamasina II during the 12-month streamlined durability monitoring survey round in Madagascar.

## Interceptor G2 ITNs - 24 months - Banfora

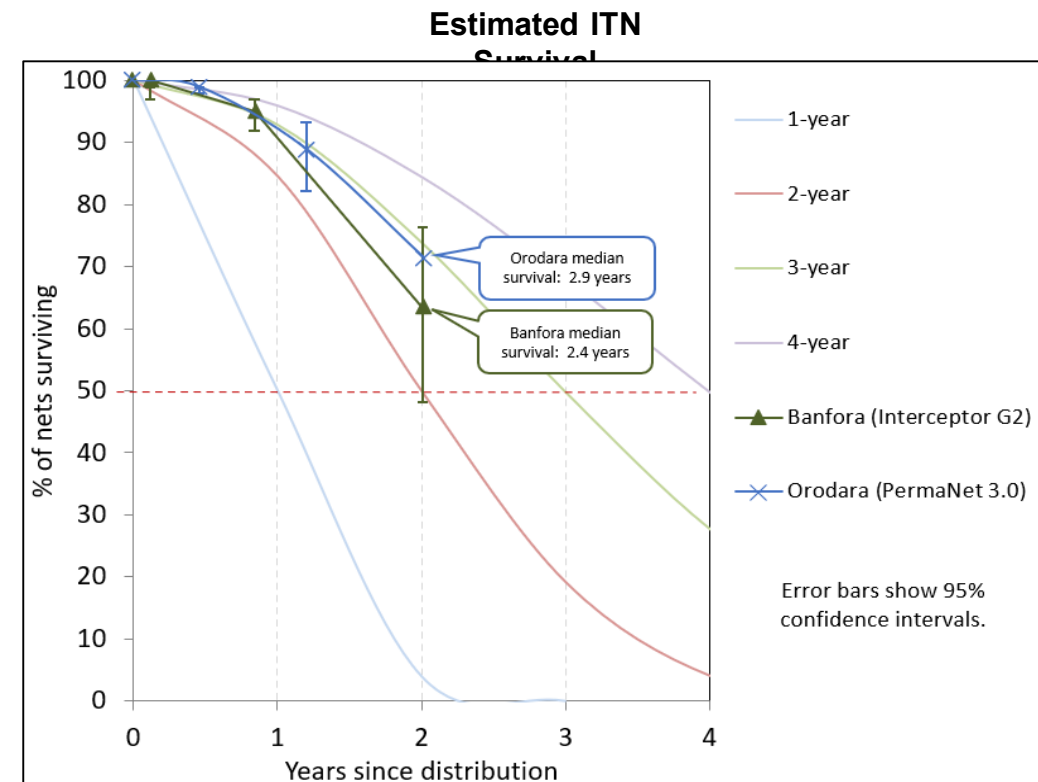
Attrition due to wear and tear	14%
Remaining nets in serviceable condition	84%
ITN survival*	63%
Estimated median survival	2.4 yr.
72-hour mortality against resistant strain**	72%
Chemical loss over loading dose (Mean chemical content) – alpha cypermethrin	19% (2.0 g/kg)
Chemical loss over loading dose (Mean chemical content) – chlorfenapyr	54% (2.2 g/kg)

## PermaNet 3.0 ITNs – 24 months – Orodara

Attrition due to wear and tear	16%
Remaining nets in serviceable condition	90%
ITN survival*	71%
Estimated median survival	2.9 yr.
24-hour mortality against resistant strain – Side (deltamethrin)**	21%
24-hour mortality against resistant strain – Roof (deltamethrin + PBO)**	52%
Chemical loss over loading dose (Mean chemical content) – Side (deltamethrin)	63% (0.8 g/kg)
Chemical loss over loading dose (Mean chemical content) – Roof (deltamethrin)	18% (3.0 g/kg)
Chemical loss over loading dose (Mean chemical content) – Roof (PBO)	69% (7.8 g/kg)

\* Nets present in household and in serviceable condition

\*\* Tunnel test bioassay used for Interceptor G2 nets and cone bioassays used for PermaNet 3.0 nets



## Interceptor G2 ITNs - 24 months - Karongi

Attrition due to wear and tear	5%
Remaining nets in serviceable condition	81%
ITN survival*	73%
Estimated median survival	3 yr.
72-hour mortality against resistant strain**	80%
Chemical loss over loading dose (Mean chemical content) – alpha cypermethrin	***
Chemical loss over loading dose (Mean chemical content) – chlorfenapyr	***

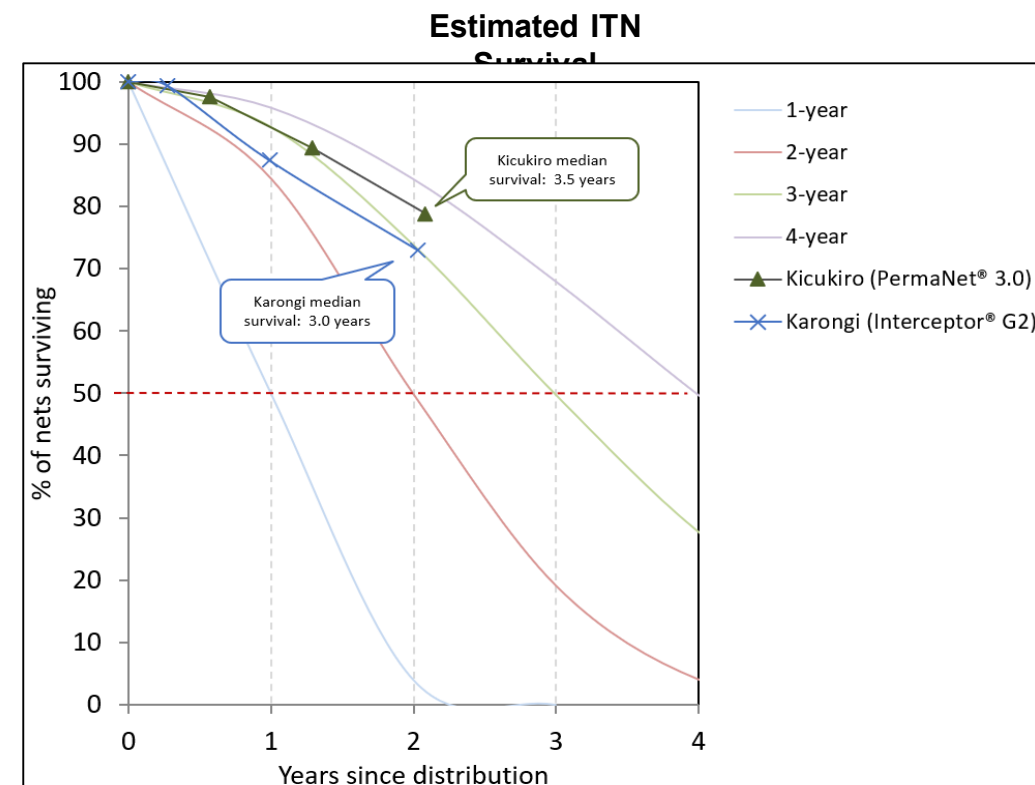
## PermaNet 3.0 ITNs – 24 months – Kicukiro

Attrition due to wear and tear	2%
Remaining nets in serviceable condition	84%
ITN survival*	79%
Estimated median survival	3.5 yr.
24-hour mortality against resistant strain – Side (deltamethrin)**	51%
24-hour mortality against resistant strain – Roof (deltamethrin + PBO)**	51%
Chemical loss over loading dose (Mean chemical content) – Side (deltamethrin)	***
Chemical loss over loading dose (Mean chemical content) – Roof (deltamethrin)	***
Chemical loss over loading dose (Mean chemical content) – Roof (PBO)	***

\* Nets present in household and in serviceable condition

\*\* Tunnel test bioassay used for Interceptor G2 nets and cone bioassays used for PermaNet 3.0 nets

\*\*\* Chemical content data will be added when available



## Olyset Plus ITNs – 24 months – Moyamaba

Attrition due to wear and tear	6%
Remaining nets in serviceable condition	67%
ITN survival*	61%
Estimated median survival	2.3 yr.

24-hour mortality against resistant strain – permethrin + PBO**	4%
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Chemical loss over loading dose (Mean chemical content) – permethrin	22% (15.7 g/kg)
Chemical loss over loading dose (Mean chemical content) – PBO	57% (4.3 g/kg)

## PermaNet 3.0 ITNs – 24 months – Bo

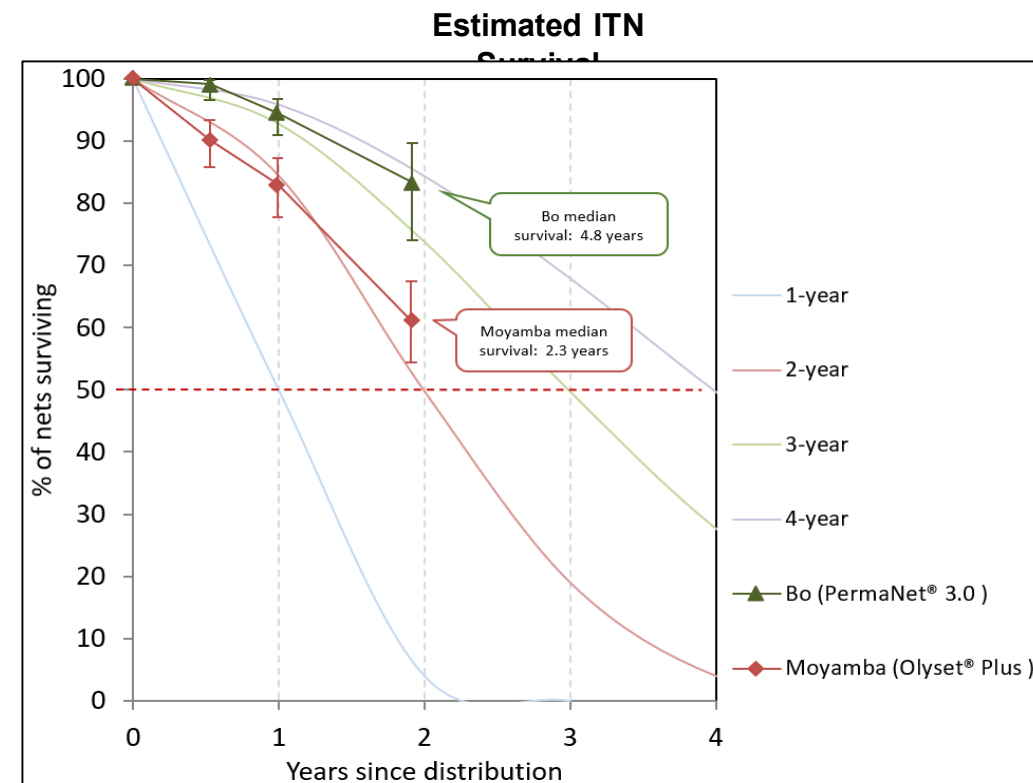
Attrition due to wear and tear	5%
Remaining nets in serviceable condition	93%
ITN survival*	84%
Estimated median survival	4.8 yr.

24-hour mortality against resistant strain – Side (deltamethrin)**	3%
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24-hour mortality against resistant strain – Roof (deltamethrin + PBO)**	9%
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Chemical loss over loading dose (Mean chemical content) – Side (deltamethrin)	62% ( 0.8 g/kg)
Chemical loss over loading dose (Mean chemical content) – Roof (deltamethrin)	0% ( 4.0 g/kg)
Chemical loss over loading dose (Mean chemical content) – Roof (PBO)	66% ( 8.4 g/kg)

\* Nets present in household and in serviceable condition  
 \*\* Cone bioassays used for PermaNet 3.0 and Olyset Plus nets



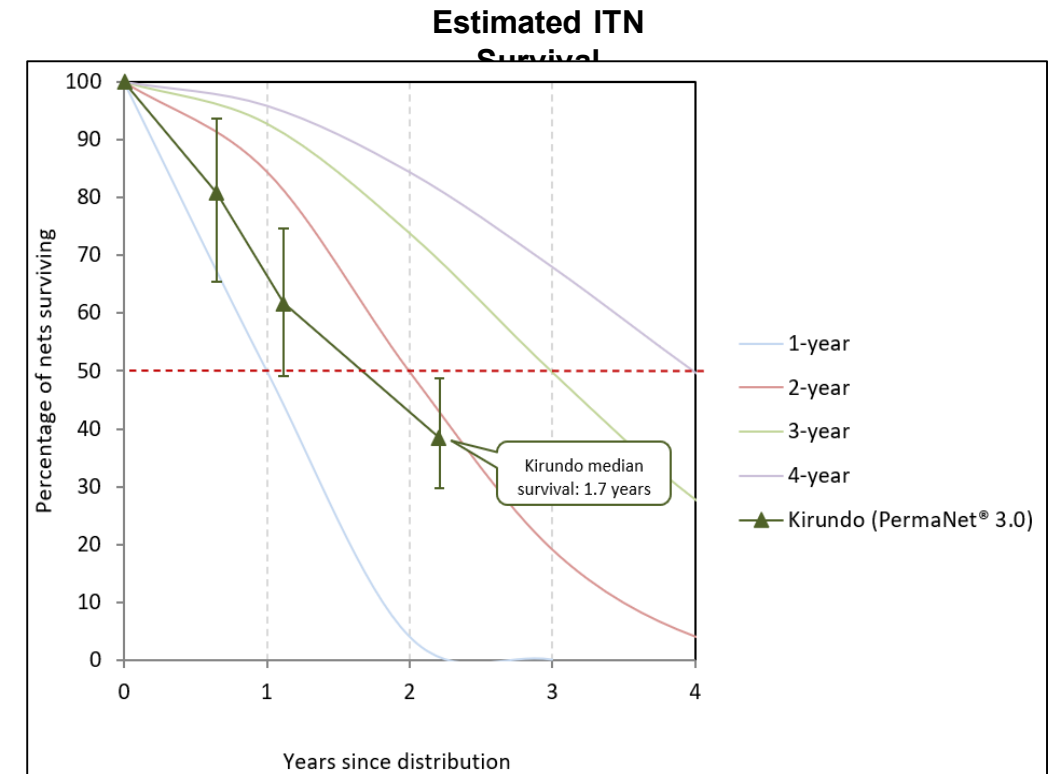


## PermaNet 3.0 ITNs – 24 months – Kirundo

Attrition due to wear and tear	16%
Remaining nets in serviceable condition	51%
ITN survival*	38%
Estimated median survival	1.7 yr.
24-hour mortality against resistant strain – Side (deltamethrin)**	99%
24-hour mortality against resistant strain – Roof (deltamethrin + PBO)**	99%
Chemical loss over loading dose (Mean chemical content)	n/a

\* Nets present in household and in serviceable condition

\*\* Cone bioassays used for PermaNet 3.0 nets



# Next steps



Data collection team conducts a ITN hole assessment during the 24-month durability survey round in Burundi.



# Next steps



Data collector conducts an interview with a household member during the baseline round of durability monitoring in Zambia.

- Complete 36-month survey rounds and circulate final reports
  - Burkina Faso: July 2022
  - Rwanda: May 2023
  - Sierra Leone: April 2023
  - Burundi: N/A
  - *Additional studies with at least one new net type are ongoing in Uganda, Cote d'Ivoire, Zambia, Senegal, Liberia, Madagascar, Nigeria, Cameroon, Malawi, DRC and Ethiopia through PMI VectorLink*
- Support the development and operationalization of forthcoming WHO ITN pre-qualification and post-market surveillance guidance



## Burkina Faso

- Burkina Faso National Malaria Program
- USAID Mission in Burkina Faso
- PMI VectorLink Burkina Faso
- Health Sciences Research Institute
- Wallon Agricultural Research Center

## Rwanda

- Rwanda Biomedical Center- Malaria and Other Parasitic Diseases Division
- USAID Mission in Rwanda
- PMI VectorLink Rwanda
- Centers for Disease Control and Prevention/Atlanta

## Sierra Leone

- Sierra Leone National Malaria Program
- USAID Mission in Sierra Leone
- PMI VectorLink Sierra Leone
- Nest Builders International
- Centers for Disease Control and Prevention/Atlanta

## Burundi

- Burundi National Malaria Program
- USAID Mission in Burundi
- PMI VectorLink Burundi

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