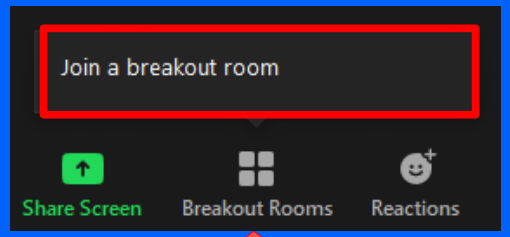
RBM Partnership
To End Malaria

10 March 2022

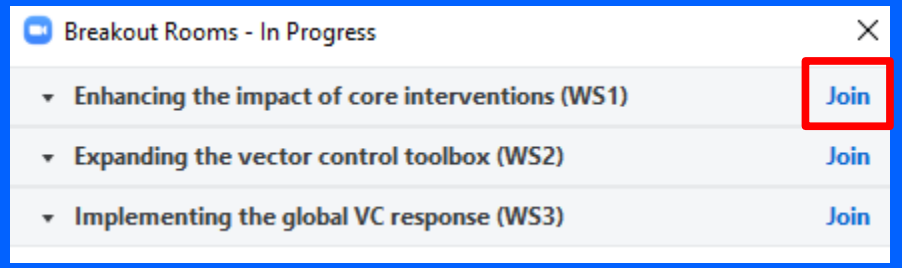
Break-out room instructions

1



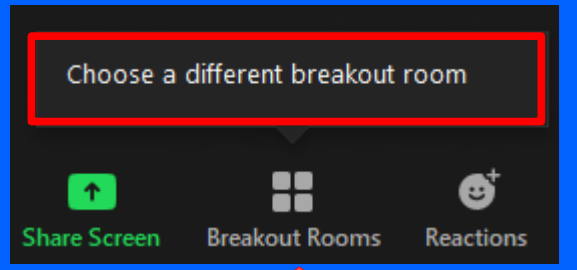
A message
«Join break out room» will appear
on the bottom of your screen

2



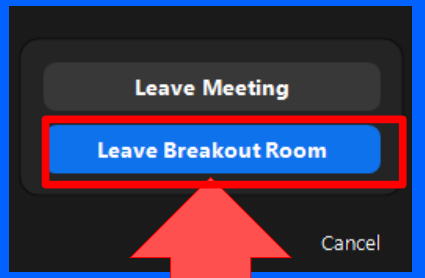
Choose the session you would like to join, by clicking on «join»

3



You can change between rooms

4



Leave break out room,
NOT LEAVE MEETING!!!

RBM Partnership To End Malaria

March 10, 2022

Workstream 1: Enhancing the Impact of Core Interventions

We will start momentarily.

Instructions (EN): We will use the chat function to share ideas as well as for questions and answers. For questions, please write “Question” and indicate @to whom the question is addressed.

Instructions (FR):Nous utiliserons la fonction de chat pour partager des idées ainsi que pour les questions et réponses. Pour toute question, voudriez-vous écrire "Question" et indiquer @à qui la question est addressee.

Objectives

1. Gather VCWG member inputs to develop a common vision of success for optimal selection, deployment, quality, and use of ITNs and IRS

2. Identify key action items to achieve the vision of success for core interventions

3. Gather inputs for the updated Workstream one (WS1) workplan matrix, and four task forces as well as the WS1 meetings in May

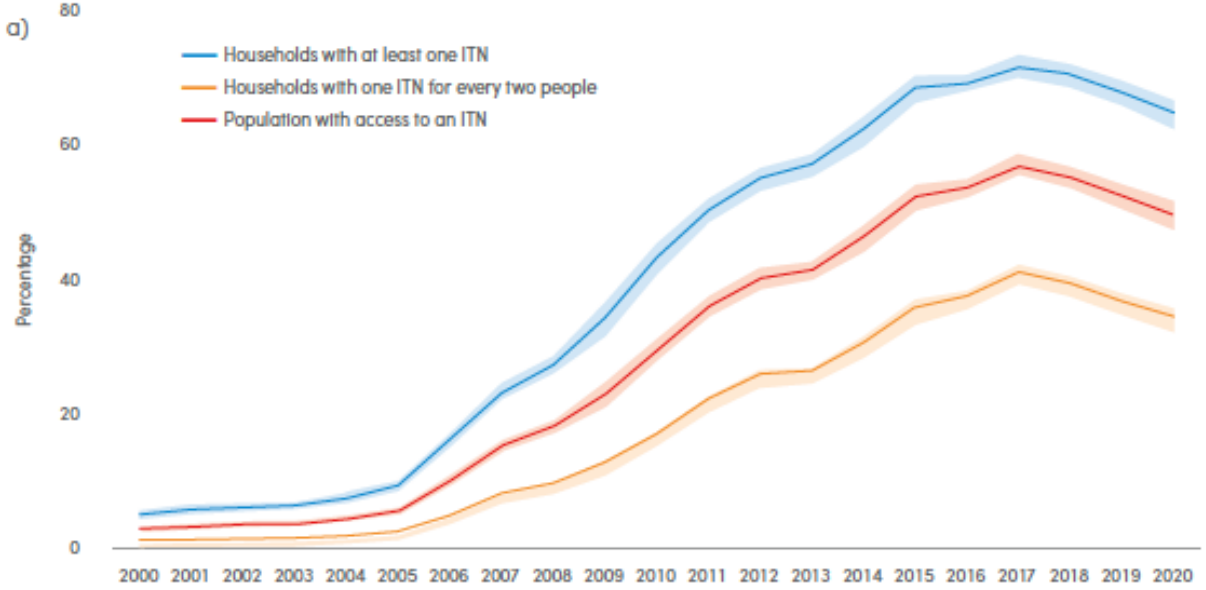
Agenda: Breakout Group, Workstream One

Enhancing the Impact of Core Interventions

Time	Session	Facilitator	Speakers
15:40-15:45	Welcome participants, Session Overview	Allan	
15:45-16:00	Vision for Workstream one: Enhancing the Impact of Core Interventions	Mary	
16:00-16:25	Workstream one workplan and task team planning: Identifying and prioritizing action items to achieve the vision	Mary and Allan	**Ellie Sherrard-Smith, Thomas Churcher,** Imperial College London **Edward Thomsen,** I2I
16:25-17:00	Team 2: Special focus session : *Addressing biological threats: new insecticides for vector control* - Results of the Tanzania cluster-randomized trial evaluating new generation ITNs - Related evidence from the New Nets Project field pilots.	Christen Fornadel	**Dr Jacklin F. Mosha**, National Institute for Medical Research, Mwanza **Dr Nancy Matowo**, LSHTM **Dr Joseph Wagman**, PATH

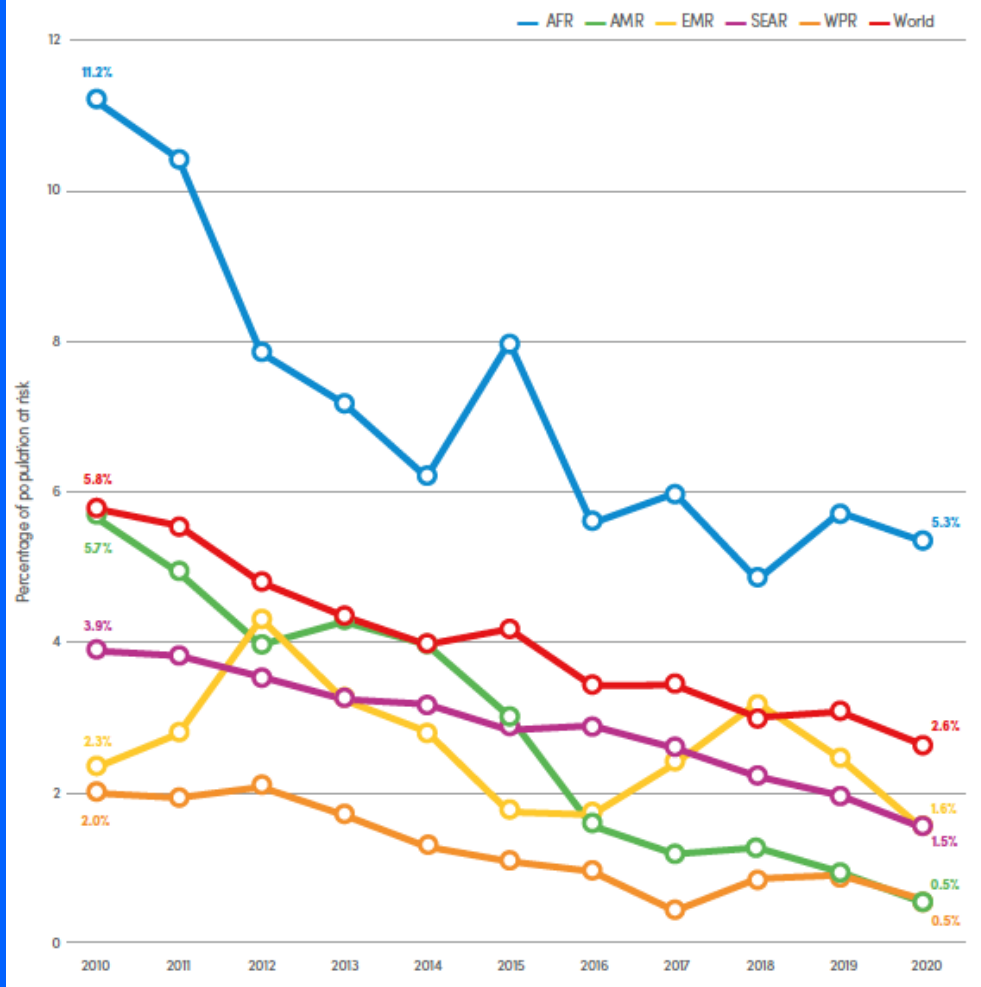
A critical juncture

a) Indicators of population-level access to ITNs, sub-Saharan Africa, 2000–2020 and b) Indicators of population-level use of ITNs, sub-Saharan Africa, 2000–2020 *Sources: ITN coverage model by Malaria Atlas Project (62).*



Source: World Malaria Report 2021

Percentage of the population at risk protected by IRS, by WHO region, 2010–2020[a] *Source: IVCC data and NMP reports.*



AFR: WHO African Region; AMR: WHO Region of the Americas; EMR: WHO Eastern Mediterranean Region; IRS: indoor residual spraying; IVCC: Innovative Vector Control Consortium; NMP: national malaria programme; SEAR: WHO South-East Asia Region; WHO: World Health Organization; WPR: Western Pacific Region.

[a] Among malaria endemic countries, 2020.

WORLD MALARIA REPORT 2021

69

Global vision

The vision of WHO and the global malaria community is a world free of malaria.

Milestones (compared to 2015):

- Reduce malaria mortality by at least 75% by 2025 and 90% by 2030
- Reduce malaria case incidence by at least 75% by 2025 and 90% by 2030
- Eliminate malaria from countries in which it was transmitted: at least 20 countries by 2025 and 35 countries by 2030
- Prevent the re-establishment of malaria in all countries that are malaria-free

Vision

Vision Exercise

- What does success look, sound, feel like?
- What will have happened to “shift the needle” driving vector control gains to support the achievement of the 2025 and 2030 milestones?

Workstream one
Enhancing the Impact of Core Interventions

Workplan and task team planning
Identifying and prioritizing action items to achieve the vision

WORKSTREAM ONE: Enhancing the Impact of Core Interventions
Themes: ITNs and IRS
Co-Leads:
Allan Were: Allan_Were@abtassoc.com
Mary Kante: mkante@eauclaireconsulting.co

Focus Output 1 Identify tool gaps or capacity needs & steer research priorities	**Task Teams next steps**	**Focus Output 2** Policy clarification & evaluation pathways	**Task Teams next steps**	**Focus Output 3** Implementation/Operational scale-up support/Training and capacity building initiatives	**Task Teams next steps**
Using data to inform optimal selection and deployment of Core Interventions (ITNs, IRS) – **Task Team 1**		Using data to inform optimal selection and deployment of Core Interventions – **Task Team 1** **Team lead: TBD**		Capacity building, localization, and private sector involvement for sustainable vector control – **Task Team 3** **Team lead: TBD**	
		Addressing biological threats: new insecticides for vector control (for IRS and ITNs) – **Task Team 2** **Team lead: Christen Fornadel**		Addressing non-biological threats **– Task Team 4** - ITN quality - ITN access and use - ITN durability/replacement **Team lead: TBD**	

WS1 Task Team One: *Using data to inform optimal selection and deployment of core interventions (ITNs, IRS)*

Objective: Support members in their efforts to

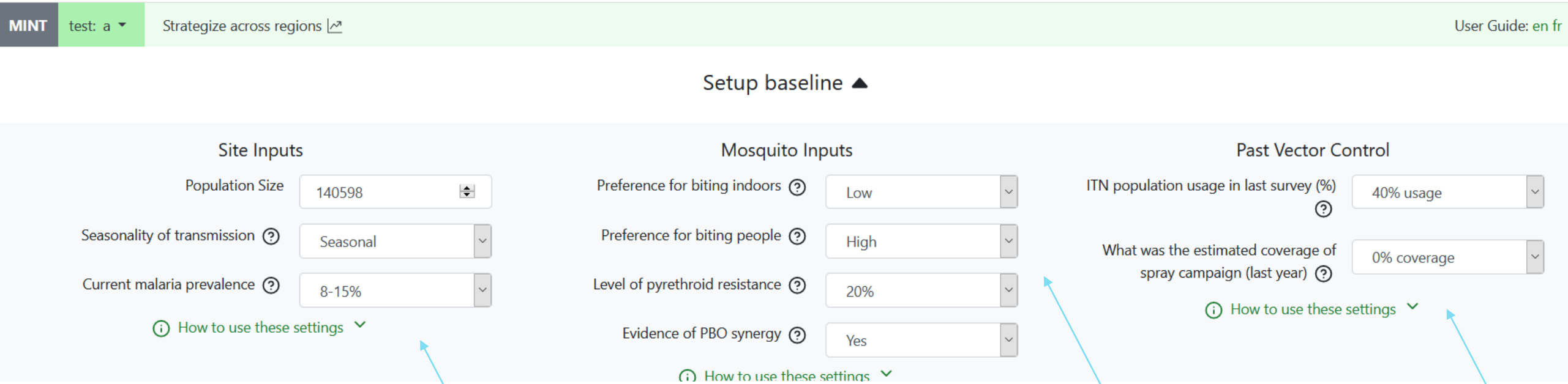
- Identify and support use of key tools and resources for country-led decision-making for ITN and IRS selection and deployment
- Anticipate policy shifts for the selection and deployment of ITNs and IRS, supporting the adaptation and use of new tools and resources

Malaria INtervention Tool MINT v1:

A tool to explore the potential of nets and spray interventions in different ecological settings.

Weblink: https://mint.dide.ic.ac.uk/

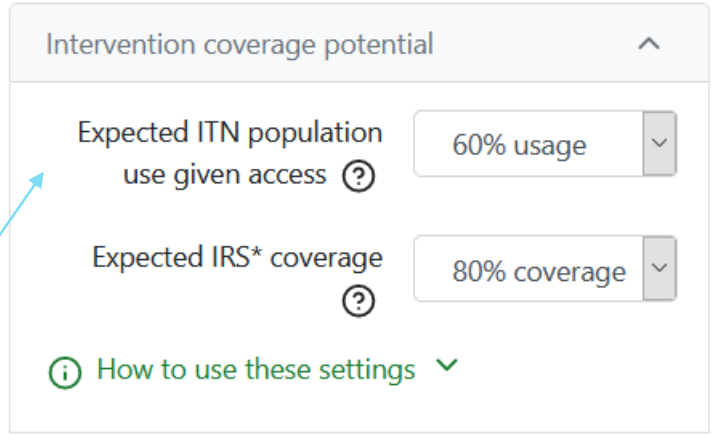
Paper link: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196%2821%2900296-5/fulltext

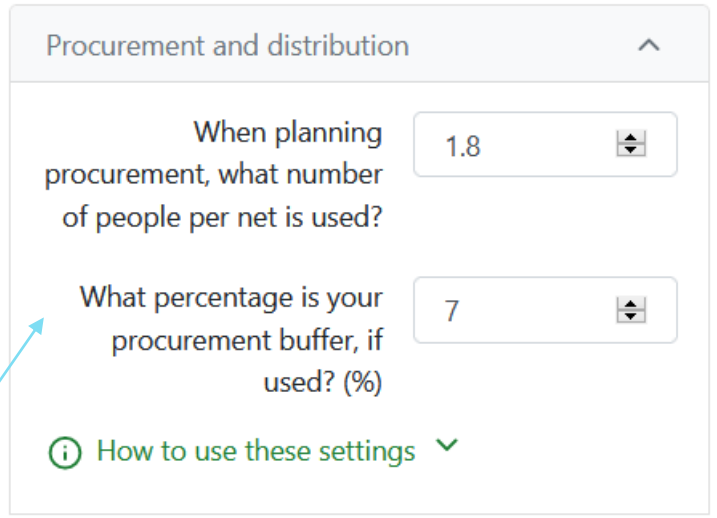


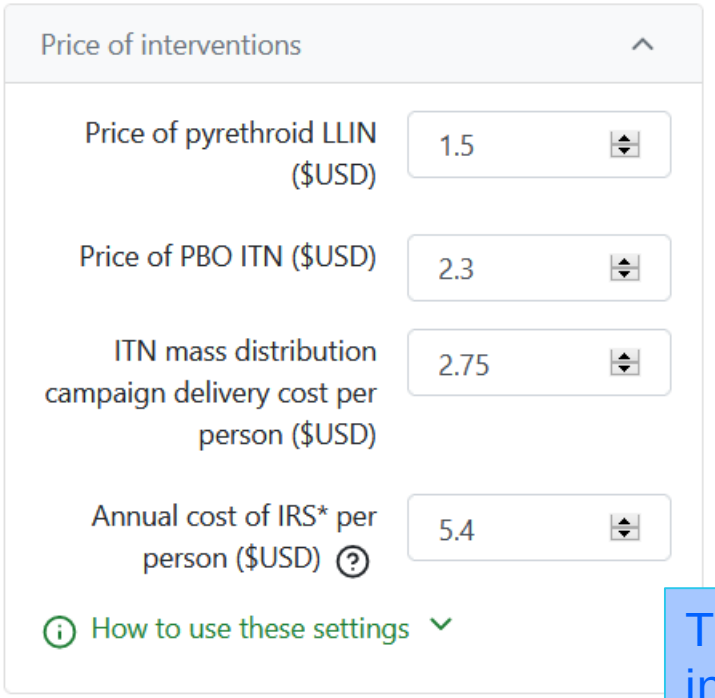
Enter info on the location that you would like to explore

Try out different characteristics for mosquitoes (how indoor / outdoor biting are they? What was the local susceptibility bioassay result (an approx. for resistance)

Set up the simulation to reflect the situation – what interventions are currently in use?







Try out what level of use future interventions (given mass campaigns) is expected

We assume enough nets are procured for the population, but this can be altered to reflect the local situation

The price of interventions and their delivery can be explored and specific to the region under investigation

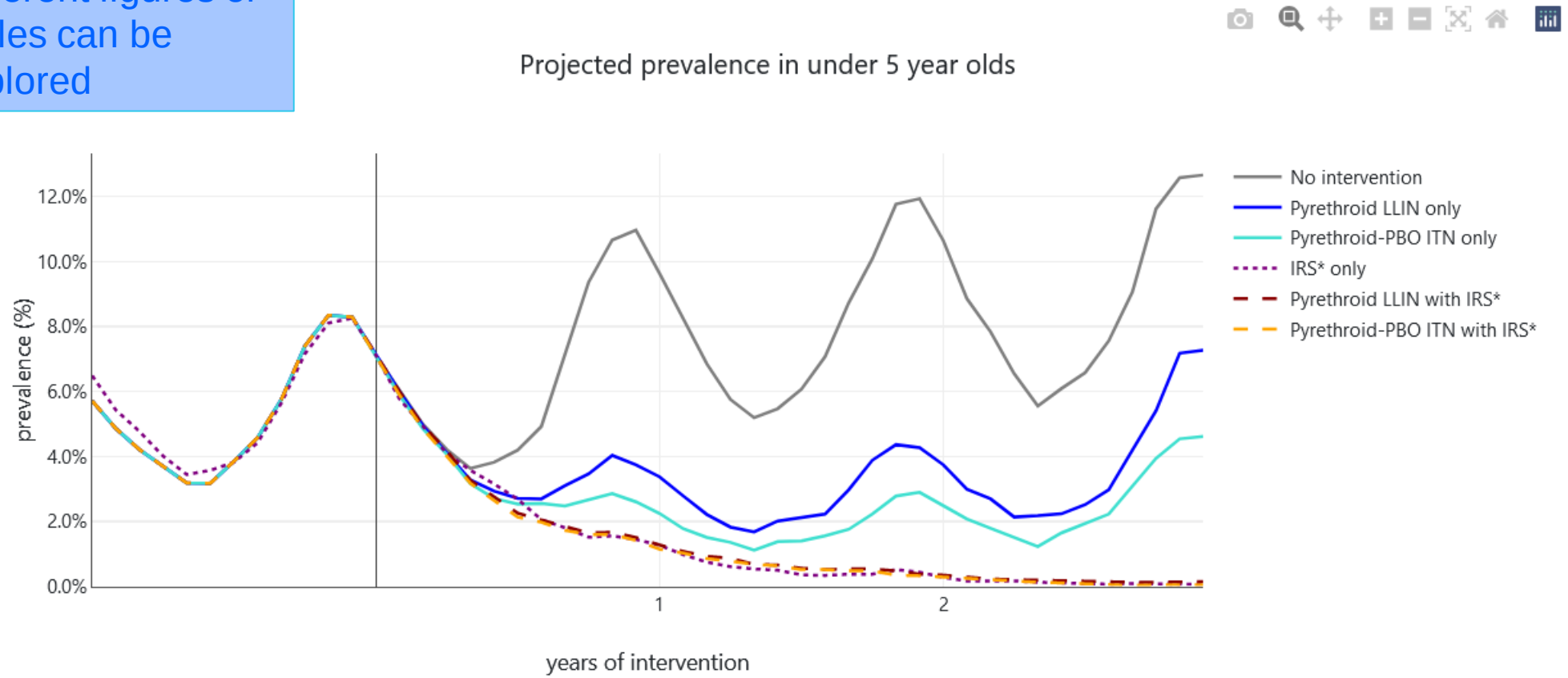
The tool presents results for prevalence and estimated cases averted, and costs per cases averted for different net types with or without long-lasting indoor residual spraying.

Impact | Cost effectiveness

Graphs

Table

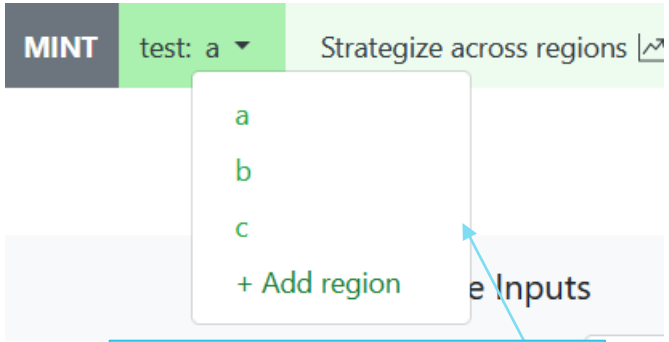
Different figures or tables can be explored



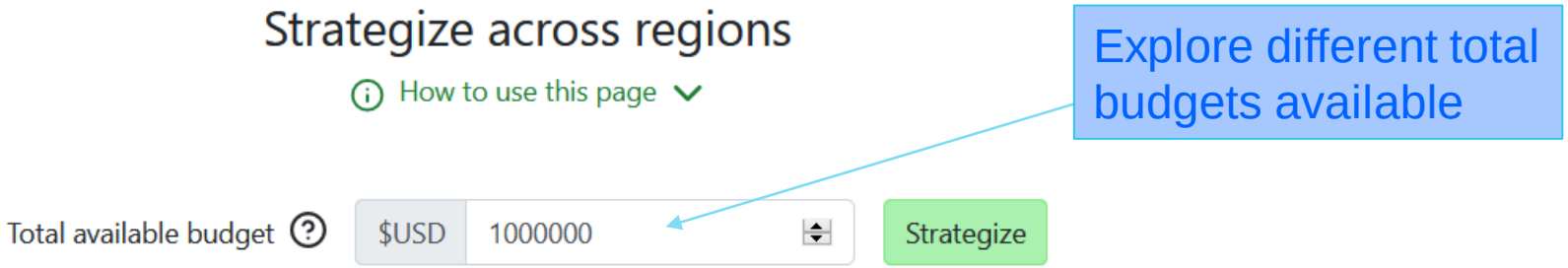
(e.g. showing the prevalence estimates over time since intervention deployed. Nets each 3-years, sprays every year)

Malaria INtervention Tool MINT v2:

A tool to explore the potential of nets and spray interventions in different ecological settings and strategise the interventions across settings depending on the most cost effective options.



Enter info on multiple regions (e.g. a, b, c)



Explore different total budgets available

All strategies

	Maximum Cost Vs Budget	A	B	C	Total Cases Averted	Total Cost
Strategy 1	100%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	198,807	$940,584
Strategy 2	95%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	198,807	$940,584
Strategy 3	90%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	Pyrethroid LLIN only	187,851	$860,928
Strategy 4	85%	Pyrethroid-PBO ITN only	Pyrethroid LLIN only	Pyrethroid LLIN only	183,525	$846,741
Strategy 5	80%	Pyrethroid LLIN only	Pyrethroid-PBO ITN only	Pyrethroid LLIN only	175,368	$794,066

Strategize across regions

How to use this page

Explore different total budgets available

Total available budget | $USD | 3000000 | Strategize

All strategies

	Maximum Cost Vs Budget	A	B	C	Total Cases Averted	Total Cost
Strategy 1	100%	IRS* only	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	261,696	$2,796,204
Strategy 2	95%	IRS* only	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	261,696	$2,796,204
Strategy 3	90%	IRS* only	No intervention	Pyrethroid-PBO ITN only	217,971	$2,695,879
Strategy 4	85%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN with IRS*	Pyrethroid-PBO ITN only	211,752	$1,526,677
Strategy 5	80%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN with IRS*	Pyrethroid-PBO ITN only	211,752	$1,526,677

Test running for countries

- Develop national- , provincial-, and district-level scenarios
- Would anyone be interested to trial the tool and work together in April to see what is and is not useful?

Please reach out! esherrar@ic.ac.uk

Thank you

All strategies

	Maximum Cost Vs Budget	A	B	C	Total Cases Averted	Total Cost
Strategy 1	100%	IRS* only	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	261,696	$2,796,204
Strategy 2	95%	IRS* only	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN only	261,696	$2,796,204
Strategy 3	90%	IRS* only	No intervention	Pyrethroid-PBO ITN only	217,971	$2,695,879
Strategy 4	85%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN with IRS*	Pyrethroid-PBO ITN only	211,752	$1,526,677
Strategy 5	80%	Pyrethroid-PBO ITN only	Pyrethroid-PBO ITN with IRS*	Pyrethroid-PBO ITN only	211,752	$1,526,677

Explore how different regions may benefit from this strategy

Details for Strategy 1

Charts | Table

Region	Intervention	Population	Total Cases Averted	Percentage Of Total Cases Averted	Total Costs	Percentage Of Total Costs	Cost Per Case Averted	Cost Per Person	Cases Averted Per Person
a	IRS* only	140598	149,970	57.3%	$2,277,688	81.5%	$15	$16.2	1.1
b	Pyrethroid-PBO ITN only	34095	43,725	16.7%	$100,325	3.6%	$2	$2.94	1.3
c	Pyrethroid-PBO ITN only	134000	68,001	26%	$418,192	15%	$6	$3.12	0.5
Total		**308693**	**261,696**	**100%**	**$2,796,204**	**100%**			

WS1 Task Team Two

Addressing biological threats - new insecticides for vector control

Special Session – Coming up next

WS1 Task Team Three: *Capacity building, localization, and private sector involvement for sustainable vector control*

Objective: Support members in their efforts to foster sustainable ITN and IRS interventions through the capacity strengthening of NMCPs, local partners, and the private sector.

WS1 Task Team Four: *Addressing non-biological threats*

Objective: Support members in their efforts to evaluate and reinforce effective

- ITN quality
- ITN access and use
- ITN durability/replacement

Raising the Floor on Nets

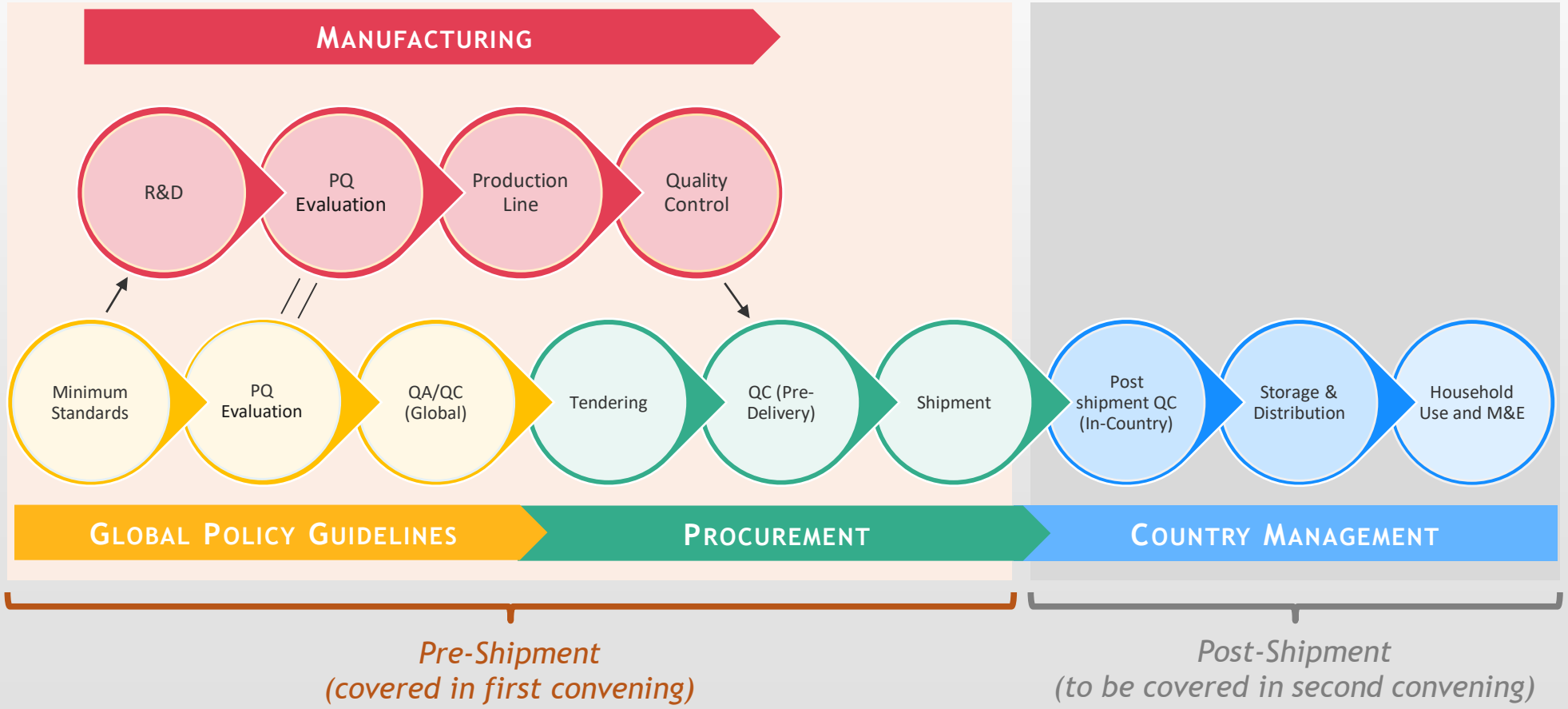
VCWG update

10 March 2022

BILL & MELINDA GATES *foundation*

Overview of the December 2021 convening

- Problem statement: Nets are not consistently performing as expected for the full three years in the field
- Aim: To identify challenges to improving net quality and solutions to resolve these challenges



Major themes

- **Communicate**
  - **Definitions**
  - **Roles**
  - **Trust**
  - **Transparency**

- **Align specifications with performance**

- **Incentivize quality as well as price**

Are we talking about the same thing?

technical definition

the degree to which nets meet the chemical and physical properties defined by their specifications

QUALITY

common definition

whether nets do what we expect under normal usage conditions (remain physically and chemically active for 3 years)

Meeting the technical definition does not always lead to meeting the performance expected in the common definition

More extensive list of meeting outputs can be found at innovationtoimpact.org/raising-the-floor-on-nets/

Next Steps

- Define the roadmap for Raising the Floor of ITNs
  - Theory of change, logical framework, communication plan
  - Case studies to identify areas of focus
  - Harmonize quality testing guidelines for pre-shipment sampling and testing
  - Investigate links between product specifications and eventual performance
  - Review product testing and evaluation methods for potential updating
  - Develop a case for Return on Investment for improved performance of ITNs and identify potential procurement incentives
  - Identify potential additions to ISO 9001 to improve inspection protocols and manufacturing sites
- Second convening in May 2022 focused on post-shipment quality issues
  - Stewardship
  - Data
  - Power

What themes would you like to see covered?

Thank You

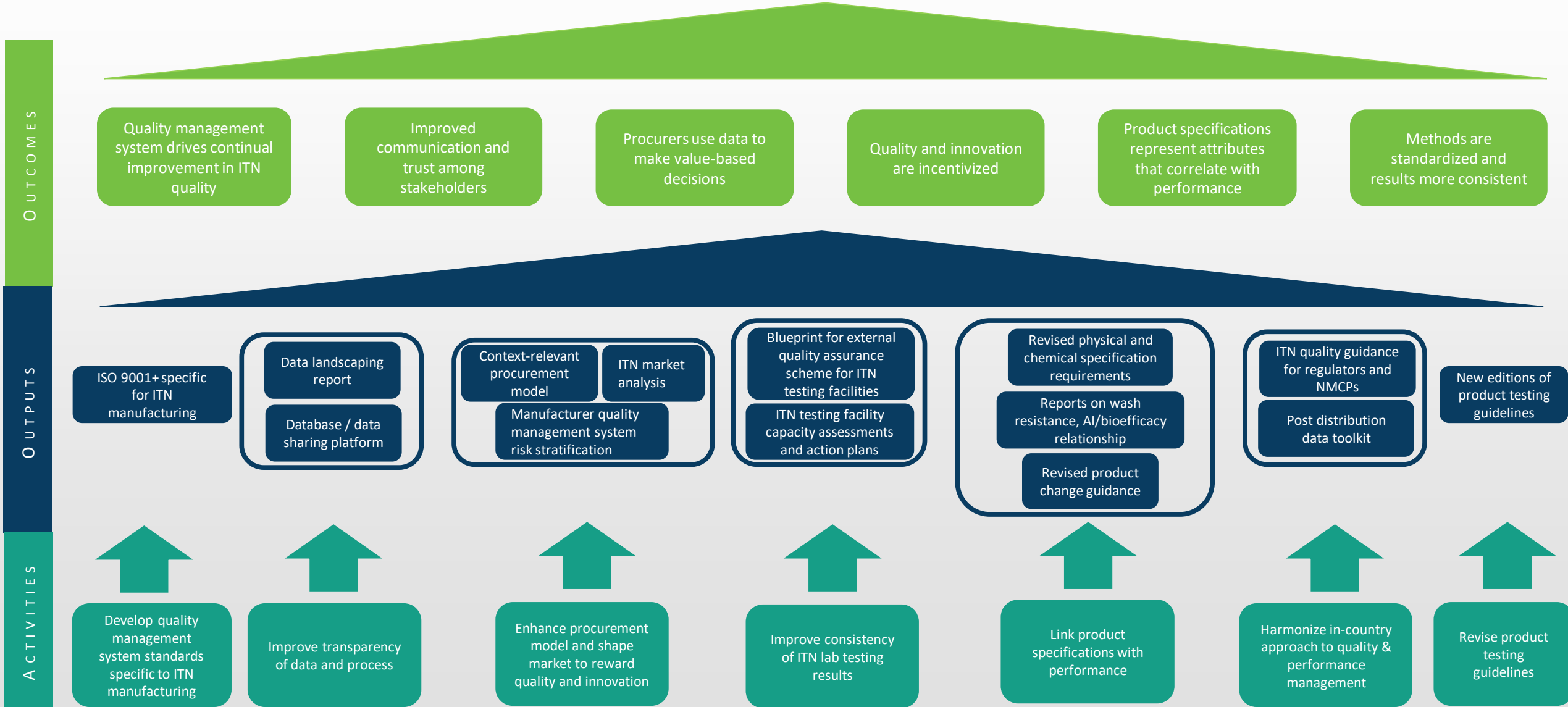
Any comments/suggestions welcome:

Eddie Thomsen – edward.thomsen@lstmed.ac.uk
Angus Spiers - angus.spiers@innovation2impact.org

Draft theory of change

Save More Lives

Better access to safe, high quality, efficacious vector control tools



WS1 Task Team Two – Special Session

Addressing biological threats - new insecticides for vector control

WS1 Task Team 2: *Addressing biological threats - new insecticides for vector control*

Objectives:

1) Keep the membership apprised of new IRS or ITNs that are currently under evaluation and any related evidence
2) To share SOPs for monitoring of both resistance to any new insecticides (in preparation of deployment when approved), as well as monitoring of the products themselves
3) To seek inputs from members on key topics or emerging issues to consider for discussion, sharing with members, other actions

Effectiveness of three types of dual active ingredient treated nets compared to pyrethroid long lasting insecticidal nets against malaria in an area with pyrethroid-resistant mosquitoes in Tanzania: a four-arm, cluster-randomised trial

Jacklin F. Mosha[1] & Nancy S. Matowo[2]

[1]National Institute for Medical Research, Mwanza Medical Research Center, Tanzania

[2] London School of Hygiene and Tropical Medicine, Department of Disease Control, UK

VCWG: 10th March 2022

Project Tanzania

Description of product

LN brand	LN specificity: Dose AI/m^2 of netting fabric	Fibre	Manufacturer
Interceptor® (reference)	Alpha-cypermethrin 200 mg	Polyester	BASF
Interceptor® G2	Alpha-cypermethrin 100 mg **+ Chlorfenapyr 200 mg**	Polyester	BASF
Olyset™ Plus	Permethrin 800 mg **+ PBO 400 mg**	Polyethylene	Sumitomo Chemicals
Royal guard®	Alpha-cypermethrin 216 mg **+ Pyriproxyfen 225 mg**	Polyethylene	Disease Control Technologies LLC

- Pyrethroid: Neurotoxicity, Fast Knock down and killing
- Chlorfenapyr: Disrupts the insect's ability to produce energy, slow killing effect.
- Pyriproxyfen: Disrupt female reproduction and fertility of eggs
- Piperonyl butoxide: Enhance the potency of the PY insecticide

Study design/ outcomes

- Four-arm, cluster-randomised trial: 21 clusters / arm

Main outcomes:

- Malaria infection prevalence by RDT in children aged 6 months to 14 years (measured at 12, 18, **24,** 30 and 36 months)
- Malaria case incidence (RDT) in children aged 6 months to 10 years (over **24 months** follow up)
- EIR and Anopheles density (over **24 months** & 36 months follow up) &

Other outcomes

- Cost per disability-adjusted life-year (DALY)
- Strength and resistance mechanism (yearly)
- Net attrition and hole index in nets collected yearly
- Mortality & blood feeding & sterility every 6 months (cone, tunnel and hut)

Study Site, Misungwi, Tanzania

Study Area

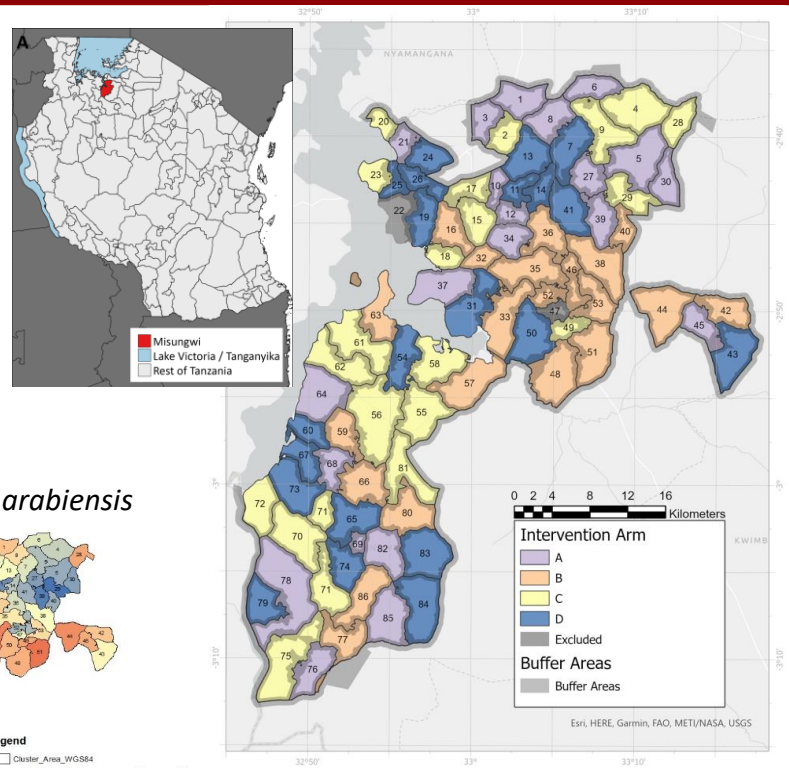
- 72 villages (84 clusters)
- 42,314 Households (study census 2018)
- 251,155 population size

Malaria:

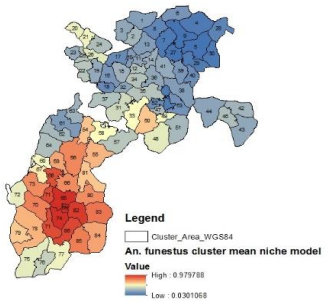
- 2017 prevalence in primary school children = 46.3% (NMCP)
- Two transmission seasons following start rainy seasons: Oct-Dec and February-May

Vector information:

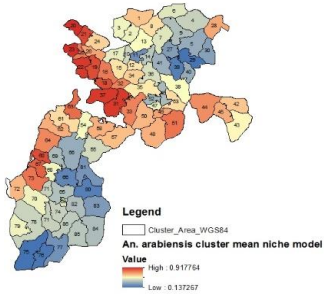
- *An.funestus* predominant in South part
- *An.gambiae* s.s. Northern part between (February-May)
- *An.arabienis* s.s. All study area
- Pyrethroid resistance Mortality < 60%



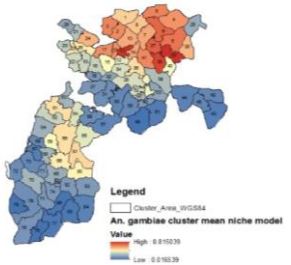
An. funestus



An. arabiensis



An. gambiae s.s.



Ecological niche model

Epidemiological data collection

Cross-sectional survey: **prevalence**

45 HH selected per cluster

- Up to 2 children (6 months-14 years) are tested per HH
- Approximately 5000 children are tested at each time point

- <u>Measured:</u>
  Malaria by RDT
  Anaemia
  Temperature

Cohort follow-up: **case incidence**

35 HH (year 1) and 40HH (year 2) are selected per cluster

- One child (6 months-10 years) per HH
- 2940 (cohort year 1) and 3360 (cohort year 2) children are selected and followed every 2 weeks for 1 year

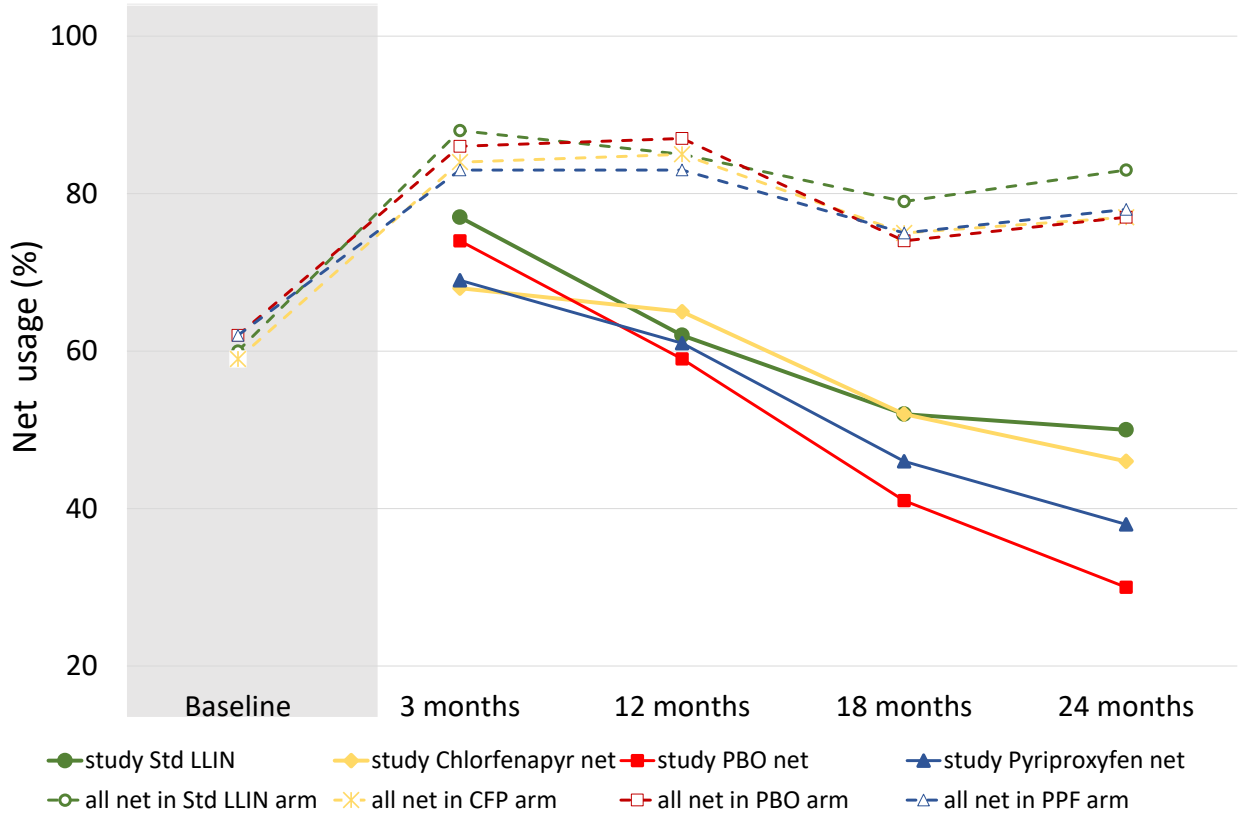
- <u>Measured:</u>
- Malaria by RDT
- Temperature

Baseline

	Std LLIN arm (Interceptor)	Chlorfenapyr arm (Interceptor G2)	PBO arm (Olyset plus)	Pyriproxyfen arm (Royal Guard)
Study cluster characteristics				
Population (all study area)	61183	60115	57631	57567
Population (core area)	43877	41748	45020	43266
Households and children characteristics baseline cross sectional survey (sept 2018)				
SES (poorest households)	28.9%	30.7%	36.6%	36.1%
LLIN use in selected children	63.6%	62.5%	63.4%	64.9%
Malaria infection prevalence	46.6%	42.7%	42.0%	46.2%
Entomological characteristics (Sept-Dec 2018)				
Mean indoor vector per house per night	5.9 (0.8-11.1)	2.8 (0-6.0)	1.9 (0.8-7.6)	4.2 (0.8-7.6)
Sporozoite rate	4.4%	2.2%	3.0%	3.3%
EIR per HH per night	0.35 (0.01-0.68)	0.04 (0-0.08)	0.07 (0.01-0.13)	0.11 (0.01-0.21)
% *An. funestus*	94.3%	95.4%	92.8%	95.0%
% *An. arabiensis* /*An.gambiae* s.l.	85%	81%	71%	84%

- Malaria infection prevalence, SES, LLIN use, population density and species composition similar in all 4 arms.
- Vector density and EIR higher in Std LLIN and Pyriproxyfen arm (95%CI overlap and collection covered only 4 months, long dry season and short rainy season)

Study net usage and all net usage in all age groups



- Overall net usage increase from 60% to 80% after the net distribution and remain constant
- 3 months after distribution study net usage was between 69% and 77% but rapidly decrease to 30% to 50% at 24 months.
- PBO net usage decrease the most drastically followed by Pyriproxyfen net.

Infection prevalence (Intention to treat)

Intervention	Malaria prevalence	OR*	95%CI	p value**
12 months				
Std LLIN arm (Ref)	31%	1.00		
Chlorfenapyr arm	16%	0.47	0.31-0.71	<0.001
PBO arm	19%	0.65	0.44-0.99	0.042
Pyriproxyfen arm	22%	0.69	0.48-1.04	0.075
18 months				
Std LLIN arm (Ref)	52%			
Chlorfenapyr arm	41%	0.66	0.45-0.97	0.037
PBO arm	43%	0.76	0.52-1.12	0.170
Pyriproxyfen arm	51%	0.98	0.67-1.44	0.918
24 months				
Std LLIN arm (Ref)	46%	1		
Chlorfenapyr arm	26%	0.45	0.30-0.67	<0.001
PBO arm	41%	0.99	0.67-1.45	0.961
Pyriproxyfen arm	38%	0.79	0.54-1.17	0.235

- Significant reduction in prevalence at 24 months (main end point) was only observed for Chlorfenapyr arm.
- Reduction in prevalence observed in all the intervention arms at 12 months compared to std LLIN arm but borderline for PBO and Pyriproxyfen.

*adjusted for the baseline prevalence well as the other covariates used in the randomisation procedure

**P-value <0.017 is considered statistically significant after Bonferroni correction

Case incidence

	Incidence per child per year	rate ratio*	95%CI	p value**
Year 1				
Std LLIN arm (ref)	0.32	1		
Chlorfenapyr arm	0.13	0.46	0.28-0.74	0.002
PBO arm	0.13	0.53	0.33-0.85	0.009
Pyriproxyfen arm	0.27	0.94	0.60-1.48	0.803
Year 2				
Std LLIN arm (ref)	0.57	1		
Chlorfenapyr arm	0.31	0.61	0.40-0.94	0.025
PBO arm	0.48	1.11	0.73-1.67	0.631
Pyriproxyfen arm	0.53	1.02	0.67-1.55	0.924

- Overall 44% reduction in malaria incidence in children 6 months to 10 years residing in Chlorfenapyr arm compare to those in standard LLIN arm (not in table)
- 47% reduction in Malaria case incidence in year 1 in children residing in PBO arm compared to those in standard LLIN and no reduction in year 2.
- No significant reduction in malaria incidence in the Pyriproxyfen arm compared to standard LLIN.

*adjusted for the baseline prevalence well as the other covariates used in the randomisation procedure

**P-value <0.017 is considered statistically significant after Bonferroni correction

Entomological cross sectional survey

CDC light traps

- randomly selected houses per cluster in 84 clusters (21 clusters per arm)
- Each cluster visited every quarter (32 house-CDC nights collection per cluster per year)
- 36% relative reduction in EIR (relative risk 0.64) between the intervention relative to reference arms
- Questionnaire (ODK) and direct observations
- SES, house design, LLINs coverage

Mosquito processing and molecular analysis

- Morphological IDs on Anopheles species, physiological status
- Sporozoite rate: CSP ELISA on a sub-sample (10 Anopheles per species per HH) from CDC light traps
- PCR for species ID on samples confirmed positive with Plasmodium falciparum and three extra from each surveyed cluster

Anopheles density & Entomological inoculation rate

	Density / night/ HH	DR*	95% CI	p value**	EIR / night/ HH	DR*	95%CI	p value**
Year 1								
Std LLIN arm (ref)	2.5	1			0.04	1		
Chlorfenapyr arm	0.7	0.33	0.19-0.58	<0.001	0.00	0.1	0.02-0.40	0.002
PBO arm	0.7	0.42	0.24-0.73	0.002	0.01	0.3	0.09-0.79	0.017
Pyriproxyfen arm	1.2	0.62	0.36-1.08	0.090	0.02	0.5	0.19-1.20	0.118
Year 2								
Std LLIN arm (ref)	7.6	1			0.09	1		
Chlorfenapyr arm	6.0	0.51	0.32-0.83	0.006	0.02	0.2	0.08-0.40	<0.001
PBO arm	4.7	0.64	0.40-1.03	0.068	0.06	0.7	0.34-1.31	0.243
Pyriproxyfen arm	9.1	0.9	0.56-1.44	0.656	0.10	0.8	0.40-1.67	0.580

*adjusted for the baseline prevalence well as the other covariates used in the randomisation procedure
**P-value <0.017 is considered statistically significant after Bonferroni correction

Compared to standard LLIN:

- Chlorfenapyr Net, 57% (density) and 85% (EIR) overall (year 1 and 2) reduction
- PBO net, 46% (density) and 44% (EIR) reduction
- Pyriproxyfen net, 23% (density) and 27% (EIR) reduction.

Reduction in EIR mainly driven by density except for Chlorfenapyr net (Sporozoite rate 0.8% vs 1.8% (std LLIN) OR: 0.48 (95%CI: 0.24–0.95), p value: 0.035)

Conclusions

Chlorfenapyr Net (Interceptor G2)

- More effective than standard LLIN over the two years
- Effect on incidence and entomological outcome lower in year 2
  - Decrease net usage (textile durability)
  - 80% reduction of chlorfenapyr content

PBO Net (Olyset Plus)

- This RCT further indicates superior effectiveness of Olyset plus over standard pyrethroid LLINs for one year but did not confirm the sustained effectiveness found in previous trials.
- Rapid drop in Olyset plus usage could partly explain the lack of effectiveness in year 2.
- Poor textile durability of the nets is likely to be the main factor of usage reduction.

Pyriproxyfen net (Royal Guard)

- There was some indication that Royal guard reduced malaria prevalence and entomological outcomes compared to standard LLIN in year 1, however the effect was not large enough to be significant.
- There was no indication of an effect of Royal guard on malaria case incidence in any year despite high usage of study net in cohort children.
- Low bio-efficacy of PPF could explain the results as well as decrease net usage over time and/or PPF resistance in the main malaria vector An. funestus.

Acknowledgements

This presentation includes data from:

- Eliud Lukole (epi and textile durability)
- Jacklyn Martin (Textile durability and bio-efficacy)
- Manisha Kulkarni (Ecological niche model)
- Charles Thickstun (Map and cluster delineation)

Collaborators

- Tanzania National Malaria control Programme
- RMO Mwanza, DMO Misungwi, Malaria Focal Person, DC Misungwi, DED and CHMT representatives
- Community in Misungwi
- Field technicians

Funding

- DFID/MRC UK/NIHR/Wellcome: Joint Global Health trial (Main RCT: 2 years)
- B&MGF (Entomo Bio-efficacy and hut trial) through IVCC
- PMI/USAID (SBCC for net distribution)

March 10, 2022

New Nets Project interim results

Evidence from pilots in Burkina Faso, Rwanda, and Mozambique

Dr. Joe Wagman, Project Director, PATH

PATH

New Nets Project partners

Unitaid Innovation in Global Health · The Global Fund To Fight AIDS, Tuberculosis and Malaria · USAID FROM THE AMERICAN PEOPLE · Bill & Melinda Gates foundation

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

PATH · CNRFP · rbc Rwanda Biomedical Center — A Healthy People. A Wealthy Nation · University of Rwanda · PNCM · Instituto Nacional de Saúde Moçambique · Tropical Health · Nigerian Institute of Medical Research NIMR · Ibolda Health International Ltd.

- Cost-effectiveness determination from pilot implementations

LSTM Liverpool School of Tropical Medicine

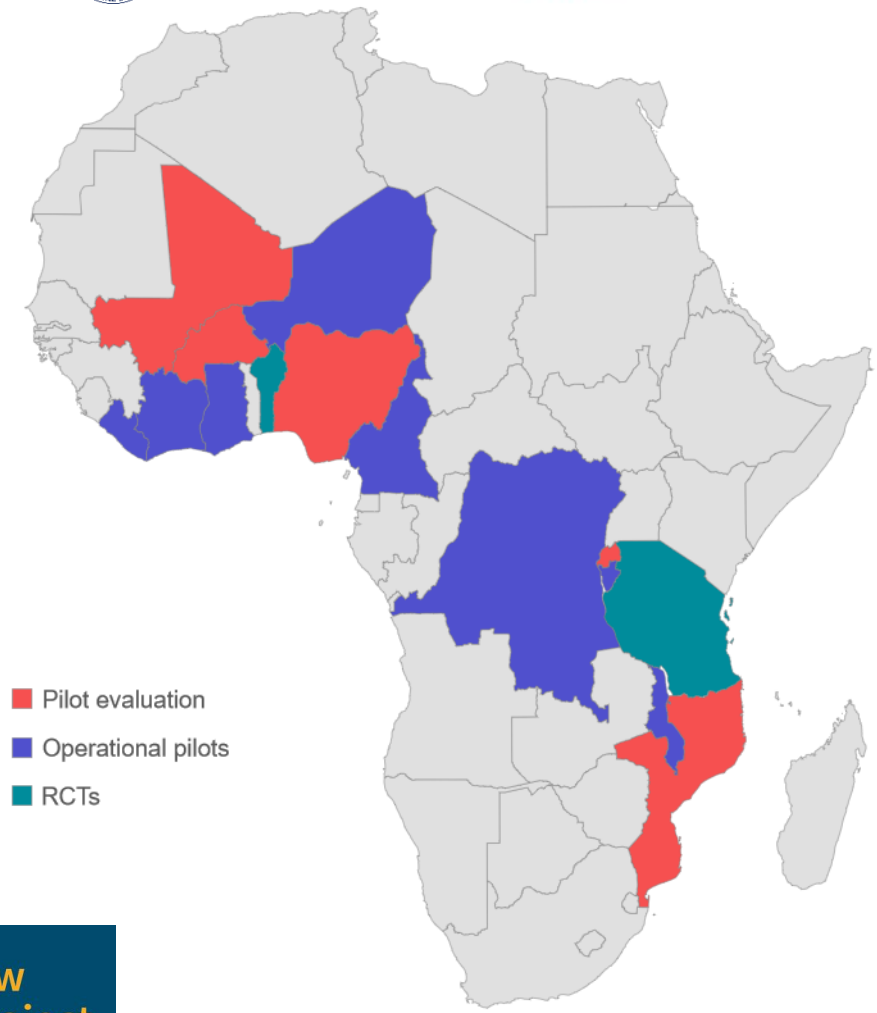
- Entomological correlates of epidemiological impact

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



The New Nets Project

PATH

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

Anthropology

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

Cost-effectiveness

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

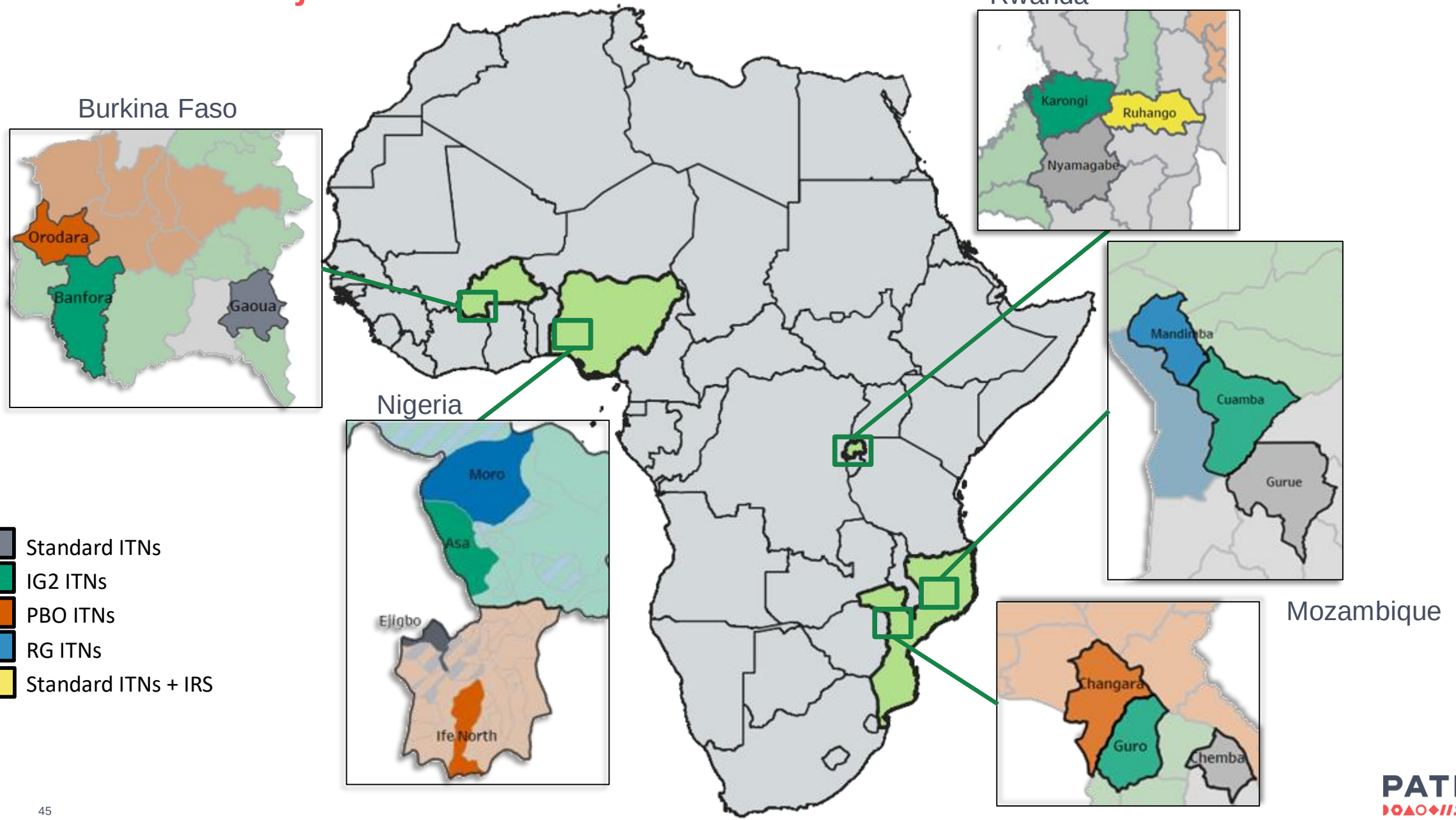
Durability monitoring

- Survivorship, attrition, physical integrity, and insecticidal content

PATH

Interim results – interpret with caution

New Nets Project Pilot Evaluations



Interim results – interpret with caution

Burkina Faso

NNP Pilot Surveys

Burkina Faso

- **Mix of species**: *Anopheles gambiae* s.s., *An. coluzzii, An. funestus*.
- **High levels of pyrethroid resistance** by multiple mechanisms.
- Roughly **equal rates of indoor and outdoor biting**.

	Gaoua (Standard ITNs)			Banfora (IG2 ITNs)			Orodara (PBO ITNs)		
	2019	2020	2021	2019	2020	2021	2019†	2020	2021
Population that slept under a net last night (95% CI)	**20.8%** (18.6%–23.1%)	**44.2%** (40.9%–47.5%)	**37.0%** (30.5%–42.5%)	**67.7%** (64.9%–70.3%)	**90.4%** (88.5%–92.1%)	**82.8%** (79.0%–86.6%)	**78.8%** (76.1%–81.2%)	**84.8%** (82.3%–87.0%)	**83.5%** (79.9%–87.1%)
Population ITN access (95% CI)	**44.4%** (42.4%–46.2%)	**53.8%** (51.4%–56.2%)	**40.5%** (37.9%–43.1%)	**58.9%** (57.1%–60.7%)	**84.2%** (83.1%–85.3%)	**74.9%** (73.5%–76.2%)	**94.0%** (93.1%–94.9%)	**87.4%** (86.3%–88.5%)	**82.0%** (80.7%–83.3%)
Use given access*	**0.47**	**0.82**	**0.91**	**1.15**	**1.07**	**1.11**	**0.84**	**0.97**	**1.02**

Malaria prevalence in children from CSS (RDT+) (95% CI)	Gaoua (Standard ITNs)			Banfora (IG2 ITNs)			Orodara (PBO ITNs)		
	2019	2020	2021	2019	2020	2021	2019†	2020	2021
<5	**81.0%** (74.9%–86.0%)	**48.9%** (41.9%–56.1%)	**21.1%** (15.5%–27.5%)	**39.6%** (33.0%–46.6%)	**18.4%** (13.5%–24.6%)	**11.6%** (7.4%–17.0%)	**28.4%** (22.4%–35.3%)	**3.7%** (1.8%–7.5%)	**2.1%** (0.6%–5.3%)
5 - 10			**54.5%** (47.1% – 61.7%)			**36.1%** (29.3% – 43.4%)			**19.9%** (14.5% – 26.3%)

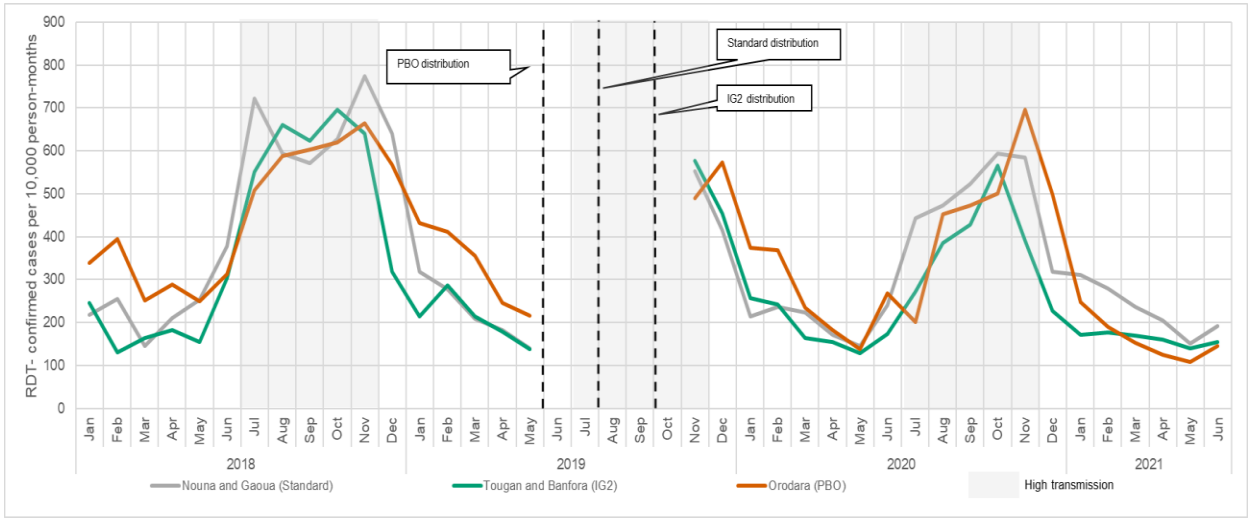
†The ITN distribution campaign was complete at the time of the cross-sectional survey.
*Use given access is calculated by dividing use (population that slept under a net last night) by access. Values over 1 are possible given that the calculation is a ratio.

Interim results – interpret with caution

NNP Pilot: Passive case detection to date

Burkina Faso

Average monthly incidence rate (per 10,000 person-months) by district, 2018–2021



Difference-in-difference (DiD) comparison of malaria incidence with next-generation ITNs and standard ITNs.

	Year 1 (November–May) change from baseline	Year 1 DiD relative to standard ITNs	Year 2 (June–May) change from baseline	Year 2 DiD relative to standard ITNs
Gaoua and Nouna (Std. ITNs)	**−18.4%** (−24.8% to −14.8%)		**−20.6%** (−24.9% to −17.5%)	
Banfora and Tougan (IG2 ITNs)	**−0.76%** (−6.1% to 1.8%)	**−18%**	**−35.3%** (−36.7% to −34.6%)	**14.7%**
Orodara (PBO ITNs)	**−22.9%** (−28.8% to −2.7%)	**4.5%**	**−26.4%** (−29.2% to −24.8%)	**5.8%**

Interim results – interpret with caution

Rwanda


rbc
Rwanda
Biomedical
Centre
Healthy People, Wealthy Nation


UR
UNIVERSITY OF
RWANDA

NNP Pilot Surveys

Rwanda

- **Mix of species**: *An. gambiae* s.s., *An. funestus*, *An. arabiensis.*
- **Low to moderate levels of pyrethroid resistance**—mitigated by PBO.
- Roughly **equal rates of indoor and outdoor biting**.
- Overall, relatively **low rates of biting**

	Nyamagabe (Standard ITNs)		Karongi (IG2 ITNs)		Ruhango (Standard ITNs + IRS)	
	Feb* 2020	Dec 2020	Feb 2020	Dec 2020	Feb* 2020	Dec 2020
Population that slept under a net last night (95% CI)	**70.5%** (66.8%–74.0%)	**68.7%** (65.0%–72.2%)	**68.2%** (64.5%–71.8%)	**70.9%** (67.3%–74.3%)	**73.3%** (69.8%–76.6%)	**78.8%** (75.4%–82.0%)
Population ITN access (95% CI)	**81.8%** (79.5%–84.1%)	**80.7%** (78.6%–82.7%)	**82.2%** (79.8%–84.7%)	**86.1%** (84.3%–87.9%)	**88.1%** (86.5%–89.8%)	**88.6%** (87.2%–90.0%)
Use given access†	**0.86**	**0.85**	**0.83**	**0.82**	**0.83**	**0.89**

	Nyamagabe (Standard ITNs)		Karongi (IG2 ITNs)		Ruhango (Standard ITNs + IRS)	
	Feb* 2020	Dec 2020	Feb 2020	Dec 2020	Feb* 2020	Dec 2020
Malaria prevalence for all ages (RDT+) (95% CI)	**2.36%** (1.14%–4.30%)	**2.70%** (1.36%–4.78%)	**2.47%** (1.24%–4.38%)	**2.69%** (1.40%–4.65%)	**1.33%** (0.49%–2.87%)	**5.24%** (3.27%–7.89%)

† Use given access is calculated by dividing use (population that slept under a net last night) by access. Values over 1 are possible given that the calculation is a ratio.
*The ITN distribution campaign was ongoing at the time of the cross-sectional survey.

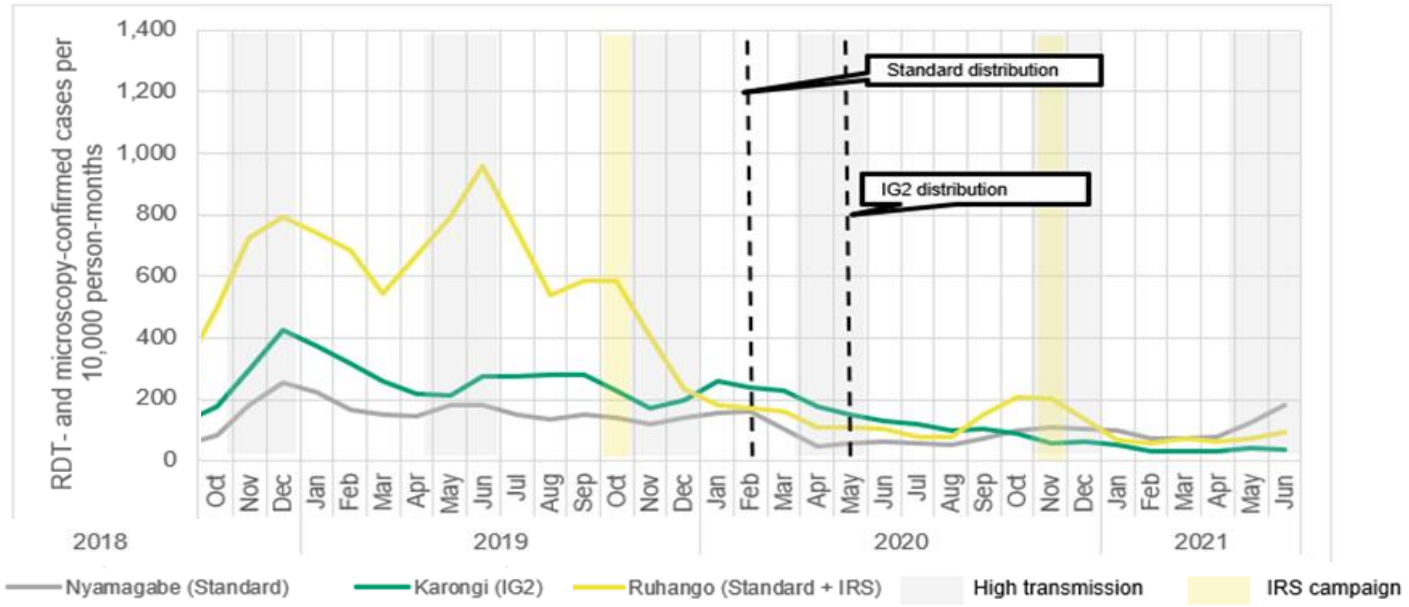
PATH

Interim results – interpret with caution

NNP Pilot: Passive case detection to date

Rwanda

Average monthly incidence rate (per 10,000 person-months) by district, 2018–2020



Difference-in-difference (DiD) comparison of malaria incidence with next-generation ITNs, standard pyrethroid ITNs, and standard pyrethroid ITNs + IRS

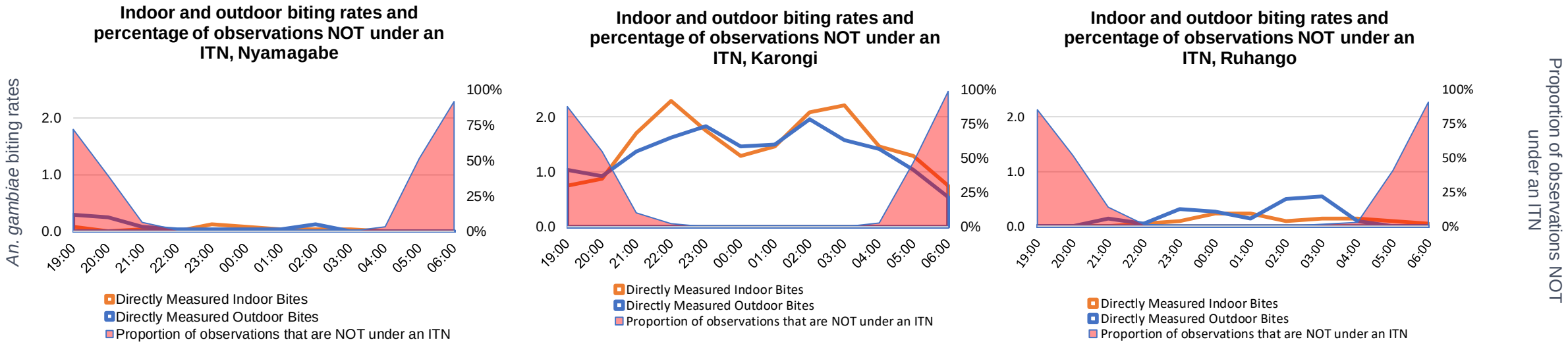
	Year 1 (April–March) change from baseline	DiD relative to standard ITNs
Nyamagabe (Standard ITNs)	**−48%** (−53% to −45%)	
Karongi (IG2 ITNs)	**−62%** (−71% to −54%)	**13%**
Ruhango (Standard ITNs + IRS)	**−77%** (−78% to −75%)	**29%**

Interim results – interpret with caution

Vector landscape

Rwanda

Indoor and outdoor biting rates and percentage of observations not under an ITN by district.



First steps toward understanding the intersection of human and mosquito behaviors in driving malaria transmission risk: mapping the proportion of time (observations made) not under an ITN to indoor and outdoor biting rates.

Interim results – interpret with caution

Northern Mozambique

NNP Pilot Surveys

Northern Mozambique

- **Mix of species**: *An. gambiae* s.s. and *An. funestus.*
- **Moderate to high levels of pyrethroid resistance**—mitigated by PBO.
- Roughly **equal rates of indoor and outdoor biting**.
- **No obvious peaks** hours for biting – consistent throughout the night

	Gurue (standard ITNs)		Cuamba (IG2 ITNs)		Mandimba (RG ITNs)	
	2020	2021	2020	2021	2020	2021
Population that slept under a net last night (95% CI)	**23.0%** (21.3%–24.7%)	**87.4%** (82.8%–90.8%)	**19.4%** (17.9%–21.0%)	**67.9%** (57.0%–77.1%)	**17.0%** (15.5%–18.6%)	**81.6%** (74.7%–87.0%)
Population ITN access (95% CI)	**23.1%** (21.8%–24.4%)	**85.7%** (82.5%–88.8%)	**21.0%** (19.7%–22.3%)	**64.8%** (54.8%–74.8%)	**16.4%** (15.3%–17.6%)	**75.5%** (69.0%–82.3%)
Use given access*	**0.99**	**1.02**	**0.92**	**1.05**	**1.03**	**1.08**

Malaria prevalence for children under 5 years old (RDT+) (95% CI)	Gurue (Standard ITNs)		Cuamba (IG2 ITNs)		Mandimba (RG ITNs)	
	2020	2021	2020	2021	2020	2021
	64.9% (54.8%–75.0%)	**52.5%** (42.9%– 61.9%)	**47.5%** (38.1%–57.0%)	**29.4%** (20.9%–39.5%)	**66.0%** (57.5%–74.4%)	**46.2%** (38.2%– 54.4%)

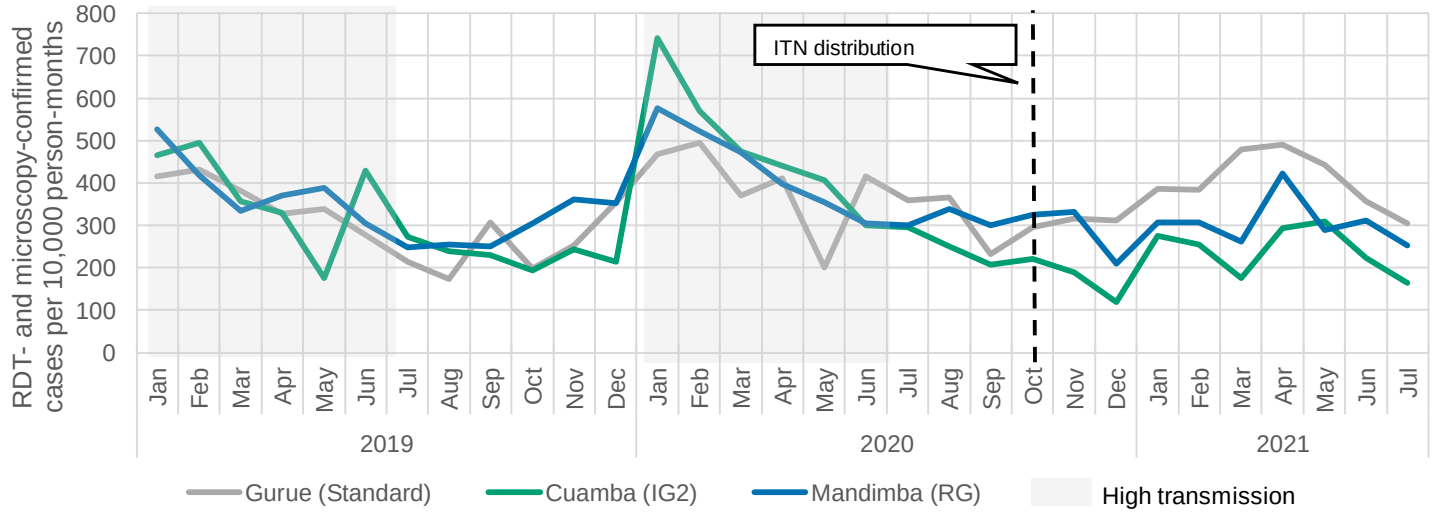
PATH

Interim results – interpret with caution

NNP Pilot: Passive case detection to date

Northern Mozambique

Average monthly incidence rate (per 10,000 person-months) by district, 2019–2020



Difference-in-difference (DiD) comparison of malaria incidence with next-generation ITNs and standard pyrethroid ITNs

	2021 year 1 (Jan–June) change from baseline	DiD relative to standard ITNs
Gurue (Standard ITNs)	**8%** (−3% to 24%)	
Cuamba (IG2 ITNs)	**−48%** (−52% to −40%)	**56%**
Mandimba (RG ITNs)	**−28%** (−31% to −23%)	**36%**

Interim results – interpret with caution

Western Mozambique

ITN landscape

Western Mozambique

- **Mix of species**: *An. gambiae* s.s. and *An. funestus.*
- **Moderate to high levels of pyrethroid resistance**—mitigated by PBO.
- Roughly **equal rates of indoor and outdoor biting**.
- **No obvious peaks** hours for biting – consistent throughout the night

	Chemba (Standard ITNs)		Guro (IG2 ITNs)		Changara (PBO ITNs)	
	2020	2021	2020	2021	2020	2021
Population that slept under a net last night (95% CI)	**33.3%** (32.1%–34.7%)	**90.1%** (87.1%-92.4%)	**18.5%** (17.2%–19.8%)	**92.8%** (90.4%–94.7%)	**23.0%** (21.8%–24.2%)	**84.6%** (80.5%–88.0%)
Population ITN access (95% CI)	**30.4%** (29.3%–31.6%)	**86%** (82.0%–90.1%)	**18.8%** (17.5%–20.1%)	**88.9%** (86.8%–91.1%)	**26.3%** (24.9%–27.6%)	**84.2%** (81.1%–87.3%)
Use given access*	**1.10**	**1.05**	**0.98**	**1.04**	**0.88**	**1.00**

	Chemba (Standard ITNs)		Guro (IG2 ITNs)		Changara (PBO ITNs)	
	2020	2021	2020	2021	2020	2021
Malaria prevalence for children under 5 years old (RDT+) (95% CI)	**44.3%** (36.5%–52.1%)	**39.0%** (31.3%– 47.2%)	**17.1%** (11.6%–22.7%)	**3.8%** (2.2%– 6.7%)	**5.7%** (2.3%–9.1%)	**2.1%** (0.8%– 5.4%)

*Use given access is calculated by dividing use (population that slept under a net last night) by access. Values over 1 are possible given that the calculation is a ratio.

PATH

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**.

Thank you – Obrigado – Merci

Questions, comments & discussion


PATH

RBM Partnership
To End Malaria

Thank you! We look forward to speaking with you.

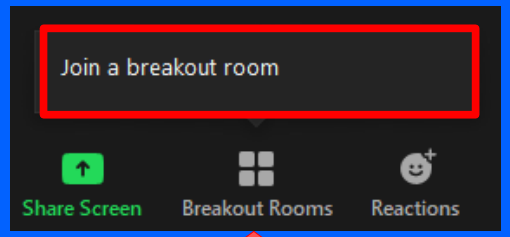
Allan: Allan_Were@abtassoc.com
Mary: mkante@eauclaireconsulting.co
Christen: Christen.Fornadel@ivcc.com

RBM Partnership
To End Malaria

10 March 2022

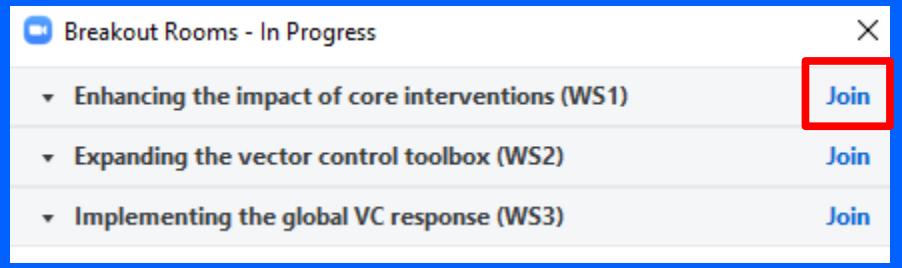
Break-out room instructions

1



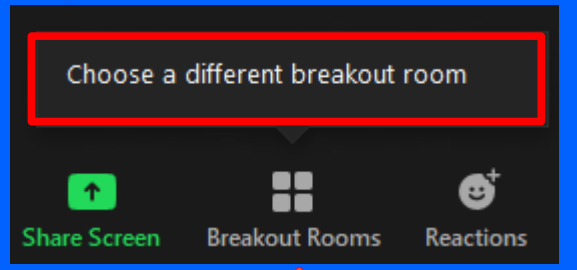
A message
«Join break out room» will appear
on the bottom of your screen

2



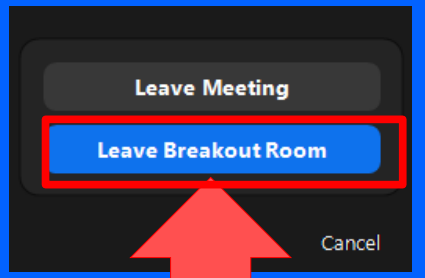
Choose the session you would like to join, by clicking on «join»

3



You can change between rooms

4



Leave break out room,
NOT LEAVE MEETING!!!