Programmatic monitoring of LLINs for action in the Americas, a methodology based on the Lot Quality Assurance Sampling (LQAS)

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MALARIA IN THE AMERICAS

- 18 endemic countries
- Elimination context and countries with disseminated transmission (Amazon region)
- P. vivax: 70% of cases
- Indigenous, migrants, mobile populations, miners, agriculture workers among the most affected communities
- Challenges in vector control associated with outdoor transmission, exophagic, exophilic vectors





NEED FOR A SIMPLE METHOD FOR LLIN MONITORING

- LLINs have been implemented in the region for more than 15 years
- However important challenges remain in coverage and use
- Information about LLIN use and overall handling practices no generally used to take decisions
- Concerns about use and washing practices have already been raised in some areas
- Much smaller investments than in other regions due to malaria focalization (e.g. 20 000 LLINs being distributed in Panama this year)
- Large scale M&E irrelevant due to malaria focalization
- Interest in an M&E approach that guides decisions at a more local level (foci, micro-territories)

REUSING LOT QUALITY ASSURANCE SAMPLING

•Method designed in 1920s to evaluate the quality of a lot of products, in an industrial setting, using just a small sample of products.

•Most common design is nx19: 19 is the smallest sample size that allows at least 90% sensitivity and specificity for all benchmarks or targets from 10% to 95%

•The sample gives the manager high probability of **rejecting substandard lots**, and of accepting lots that meet the quality standards.

•The method has been used in public health for M&E since 1980s.





ADAPTING LQAS FOR MONITORING LLINS

Goal : To generate programmatic data to trigger action using a method easy to be adopted by local teams

The method has already been used for LLINs M&E in several countries:

- Quality of enumeration
- Post-distribution M&E (Nigeria, Mozambique, Tanzania, Uganda, Guatemala, etc.)

Lots Quality Assurance Survey (LQAS) as a Strategy to Achieving Quality LLIN Campaigns: The Nigerian Experience

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LQAS terms	Adaptation to LLIN M&E
 Decision rule: number of items that must "pass" for a lot to be accepted Unit of Production: The machine or equipment that produced or assembled the lot. 	 Decision rule: number of households/individuals/nets that need to pass a question/test to be deemed well performing Area of interest (AI): District or municipality where services are provided
Batch: A group of items produced in each time by the production unit (machine).	Supervision area (SA): A focus, locality, cluster of localities, micro-area, etc. which is part of a an areas of interest

THE INFORMATION PROVIDED BY THE METHOD DIFFERS PER LEVEL

The method provides two levels of programmatic information for each indicator measured:

- At supervision area (SA) level, whether the indicator is significantly below a set threshold (dichotomous answer). If the SA is significantly below, immediate action should be taken.
- At area of interest level (AI), quantitative estimates of the indicator, which helps countries in estimating durability, comparing areas to each other, comparing indicators to understand the reasons for net deterioration, etc.



Example of an area of interest (municipality)

- **7** supervision areas (foci) (minimum 5)
- 19 households / supervision area
- Total n=113 households



INDICATORS MEASURED AT SUPERVISION AREA LEVEL

- At supervision level, the method requires setting permitted errors, thresholds for each indicator of interest and to define a question to measure the indicator.
- MOHs need to define their targets

Type of indicator	Indicator	Target	Question	Decision Rule
Use	% of people sleeping under a net the night before	80%	Did you sleep under a net last night?	13
Access	% of people that claim having access to a sleeping under a net the night before	90%	Did you have access to sleeping under a net last night?	15
	% of households with enough nets to cover all sleeping spaces	90%	Does the HH have enough nets to cover all sleeping spaces?	15
Physical integrity	% of nets in serviceable condition	6 months: 95% 1 year: 90% 1.5 years: 85%	Does the net have a PhI=< a 64?	6 months: 16 1 year: 15 1.5 years: 13

Example of decision rule table

		LQAS Table: Decision Rules for Sample Sizes of 12 30 and Target Covered/Average of 10% - 95%																
6 I				A	/erage C	overage	e (Baseli	ne) / an	nual cov	erage o	bjective	(Monit	oring an	d Evalua	tion)			
size	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
12	N/A	N/A	1	1	2	2	3	4	5	5	6	7	7	8	8	9	10	11
13	N/A	N/A	1	1	2	3	3	4	5	6	6	7	8	8	9	10	11	11
14	N/A	N/A	1	1	2	3	4	4	5	6	7	8	8	9	10	11	11	12
15	N/A	N/A	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13
16	N/A	N/A	1	2	2	3	4	5	6	7	8	9	9	10	11	12	13	14
17	N/A	N/A	1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15
18	N/A	N/A	1	2	2	3	5	6	7	8	9	10	11	11	12	-13	4.4	1.6
19	N/A	N/A	1	2	3	4	5	6	7	8	9	10	11	12	13	.4	15	.6
20	N/A	N/A	1	2	3	4	5	6	7	8	9	11	12	13	14	-15	10	17
21	N/A	N/A	1	2	3	4	5	6	8	9	10	11	12	13	14	16	17	18
22	N/A	N/A	1	2	3	4	5	7	8	9	10	12	13	14	15	16	18	19
23	N/A	N/A	1	2	3	4	6	7	8	10	11	12	13	14	16	17	18	20
24	N/A	N/A	1	2	3	4	6	7	9	10	11	13	14	15	16	18	19	21
25	N/A	1	2	2	4	5	6	8	9	10	12	13	14	16	17	18	20	21
26	N/A	1	2	3	4	5	6	8	9	11	12	14	15	16	18	19	21	22
27	N/A	1	2	3	4	5	7	8	10	11	13	14	15	17	18	20	21	23
28	N/A	1	2	3	4	5	7	8	10	12	13	15	16	18	19	21	22	24
29	N/A	1	2	3	4	5	7	9	10	12	13	15	17	18	20	21	23	25
30	N/A	1	2	3	4	5	7	9	11	12	14	16	17	19	20	22	24	26



Source: Adapted from Liverpool School of Tropical Medicine and UNICEF. LQAS Survey Report

HOUSEHOLD, PEOPLE AND NET-BASED INDICATORS

- LLIN indicator of interest can be household based (% of household with all sleeping spaces covered), people-based (% of people that slept under a net the night before) or net-based (% of nets in serviceable physical condition)
- Random selection of an individual or net within the household to sum 19 people or 19 nets.









ADDITIONAL INDICATORS CAN BE CALCULATED AT AREA OF INTEREST LEVEL

ATTRITION AND PHYSICAL DURABILITY

Durability is estimated combining attrition and physical integrity measured at least 3 times.

3 questions can be added to estimate attrition and durability:

- No of nets received
- No of nets still in the household
- No nets given to other people

(e.g. relatives, visitors, neighbors)



BIOEFFICACY

Measuring bio efficacy of 19 nets in each supervision area is not feasibly for most countries. Am is to collect and test 20-30 per areas of interest, hence just a few (e.g. 1-5) per supervision area.





FIELD SAMPLING STRATEGY

If a HH census is not available:

- Place yourself in the western most point of the locality
- Turn a pencil on the floor or on top of a notebook
- Walk in the direction indicated by the pencil an sample one out of every 5 households
- In a defined number of households (e.g. 1,5,10, 15, 19) take a net for bio efficacy testing



- Unidad de muestreo seleccionada (vivienda)
- Unidad de muestreo no seleccionada (vivienda)
- Vivienda seleccionada para tomar 1 mosquitero para pruebas de bioeficacia





USING DATA FOR DECISION MAKING

• Results help identifying which supervision areas need immediate action and what kind of action

Area	Access	Use	Physical	Washing and	Interpretation	Action	
			condition	drying			
SA 1	Complies	Does not	Complies	Complies	People keep their nets installed, and they	REQUIRED	
		comply			are in good physical condition and	Implement SBCC campaign to increase use.	
					possibly, in good chemical conditions as	In future monitoring rounds: check whether	NU FIdidHU
					people are complying with washing and	physical integrity decays quickly after	Brus Laguna Barra
					drying recommendations. However, use is	increased use and whether increase used leads	Kuswa Apaika
					lower than expected.	to changes in washing and drying practices	oincatala
SA 2	Complies	Complies	Does not	Does not comply	People keep their nets installed and use	REQUIRED	Reserva de la
			comply		them as expected, but physical protection	You may need to replace nets because. In	Río Plátano Ahuas
					is lower than expected. In addition, bio	future distributions, implement SBCC	Guaguina
					efficacy may be lower than expected as	campaigns to improve net handling practices in	Gu Su
					people do not comply with washing and	the population.	
					drying recommendations		Waropusirpi
SA 3	Complies	Does not	Complies	Does not comply	People keep their nets installed but use	REQUIRED	Baiti
		comply			them less than expected. Nets are in good	Implement campaign to promote use and good	a Moo
					physical condition, but washing and drying	net maintenance practice	
					practices suggest that bio efficacy may be		
					lower than expected.		SA2
SA 4	Complies	Complies	Complies	Complies	People keep their net installed, use them,	NOT REQUIRED	Balana Rus Rus
					wash them as expected. Physical		Coco Milar Crincrín
					protection is good as needs are in the		ConselViante Marrie
					expected physical condition. Bio efficacy is		
					likely good, as people complied with		
					washing and drying practices.		1

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UPCOMING PILOT IMPLEMENTATION IN HONDURAS

campo (1).

- Supported by CHAI •
- One foci to start with
- Monitoring use, access, washing and drying • practices, physical integrity and bio efficacy







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emision				Nota: Si	a respuesta a la pi	regunta sobre el número	de mosquiteros en la	vivienda es cero (0), pregunte al jefe de la vir	viviend
					¿cuál la razón par	a que no tenga mosquit	eros en la casa? y escri	ba la respuesta en	el siguiente recuadro:	
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imponen una barrera física entre las personas y los mosquitos, para evitar que estos los

piquen. Por otro lado, matan o repelen a los mosquitos que se acercan a las personas,

reduciendo el número de mosquitos en el ambiente, y por tanto, reduciendo el número de picadas que las personas reciben. La OMS determina que un MTILD debe mantenerse en

por ende, en qué momento dejan de ser efectivos. Entender estos indicadores, permite identificar acciones que puedan aumentar el uso y la vida útil de los mosquiteros en



Pan American Health Organization

Technical guidelines for monitoring and rapid assessment of the possession and use of longlasting insecticide-treated nets in the Americas Region

Technical-operational document in elaboration

(draft for internal review)

Regional Malaria Program





FEEDBACK IS EXPECTED

• PAHO guidelines are under development, feedback is welcome

• Plans for piloting the methodology in 2 countries of Central America

• CHAI is supporting pilot implementation in Central America