



Republic of Mozambique Ministry of Health National Malaria Control Program

**Data driven decision making for
changing mass campaign strategies**

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Content

- Background
- Malaria in world and Africa
- Malaria in Mozambique
- ITN ownership and Use in Mozambique
- Actual mass campaign strategy
- Objectives
- Methods
 - Study settings; new delivery strategy; study design; statistical analysis
- Results
- Conclusions
- Next steps

Background

- It is well known that the use of insecticide treated nets can reduce malaria morbidity and mortality.
- Several studies published for African countries have shown that high ownership and use coverage are effective in reducing the burden of the disease.
- However, implementation gap has hampered the achievement of this ultimate goal.
- Innovative strategies to achieve higher ownership and use coverage are needed.

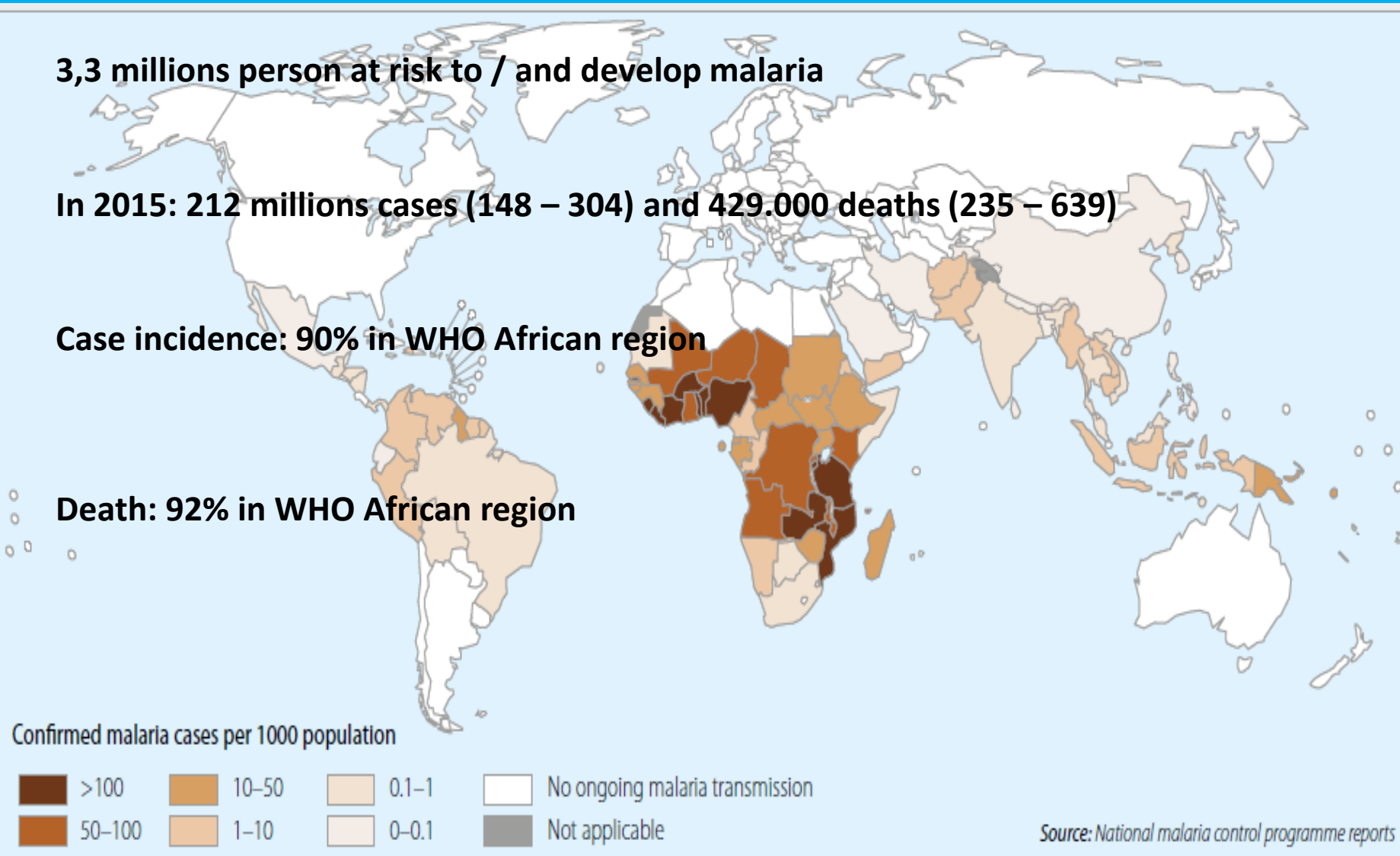
Malaria in World and Africa

3,3 millions person at risk to / and develop malaria

In 2015: 212 millions cases (148 – 304) and 429.000 deaths (235 – 639)

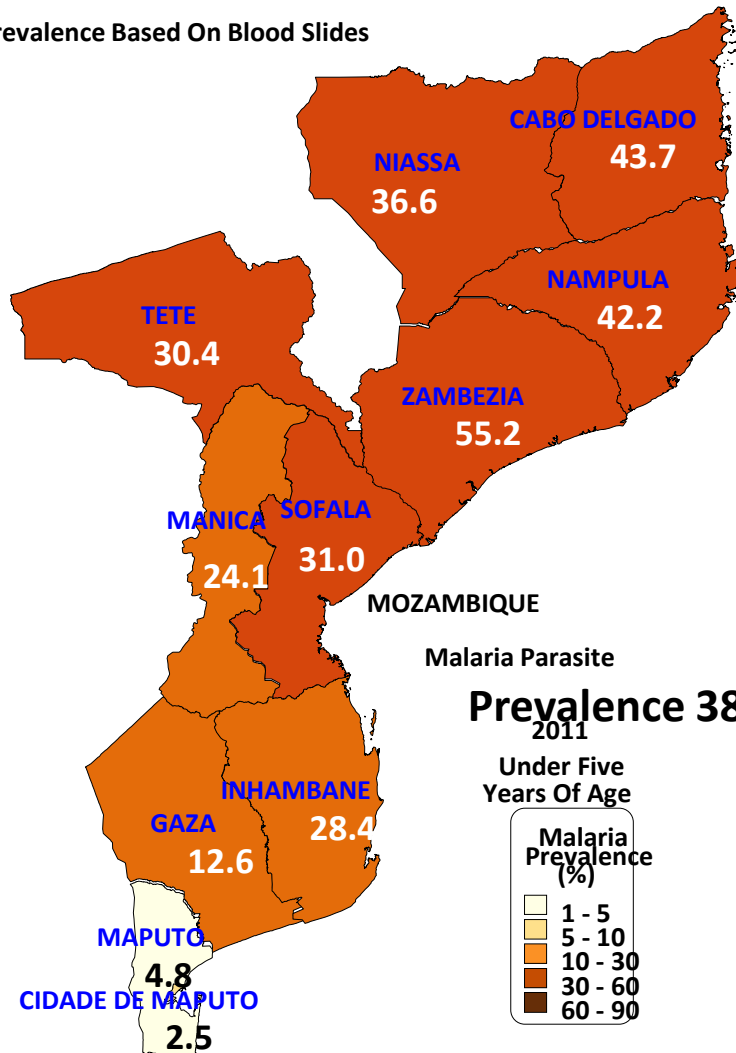
Case incidence: 90% in WHO African region

Death: 92% in WHO African region

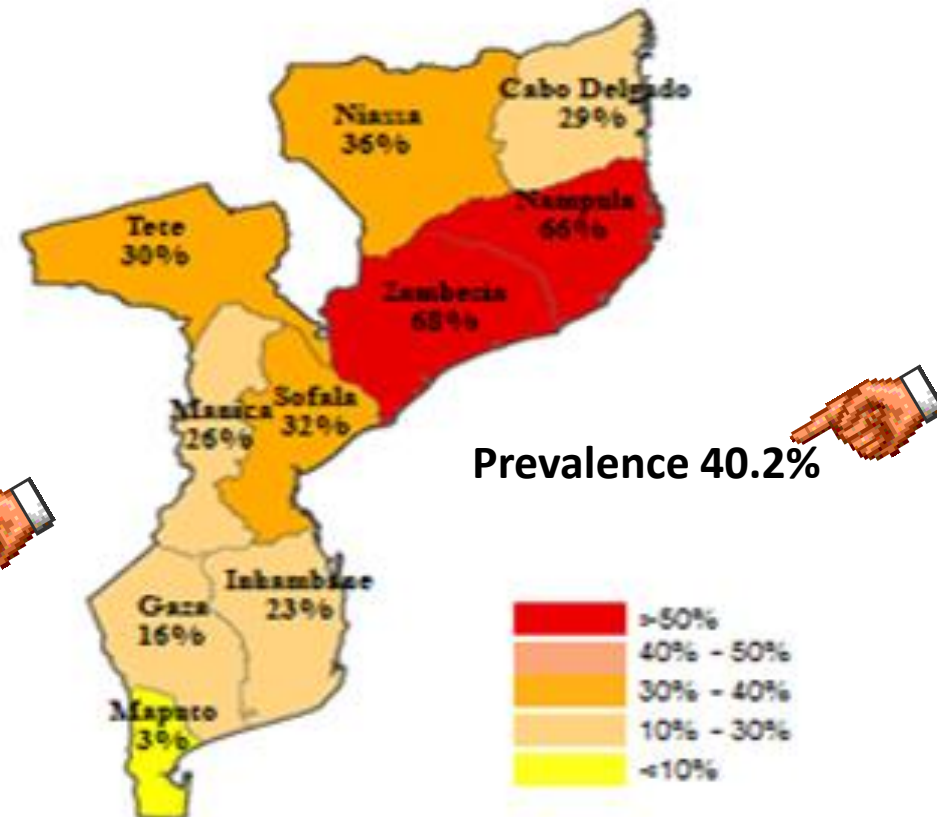


Malaria prevalence in Mozambique

Prevalence Based On Blood Slides



2015 IMASIDA



ITN ownership among HH:

Mozambique DHS 2011 - 2015

	IDS	IMASIDA	Evolução
Provinces	2011	2015	(%)
Niassa	47.2	67.0	19.8
Cabo Delgado	61.3	77.2	15.9
Nampula	60.5	61.0	0.5
Zambézia	46.5	56.8	10.3
Tete	47.3	70.3	23.0
Manica	53.9	47.8	-6.1
Sofala	56.8	62.0	5.2
Inhambane	53.9	86.3	32.4
Gaza	46.0	71.4	25.4
Maputo Província	37.6	71.0	33.4
Maputo Cidade	43.2	72.0	28.8
Moçambique	51.4	66.0	14.6



ITN use amongst total children's U5

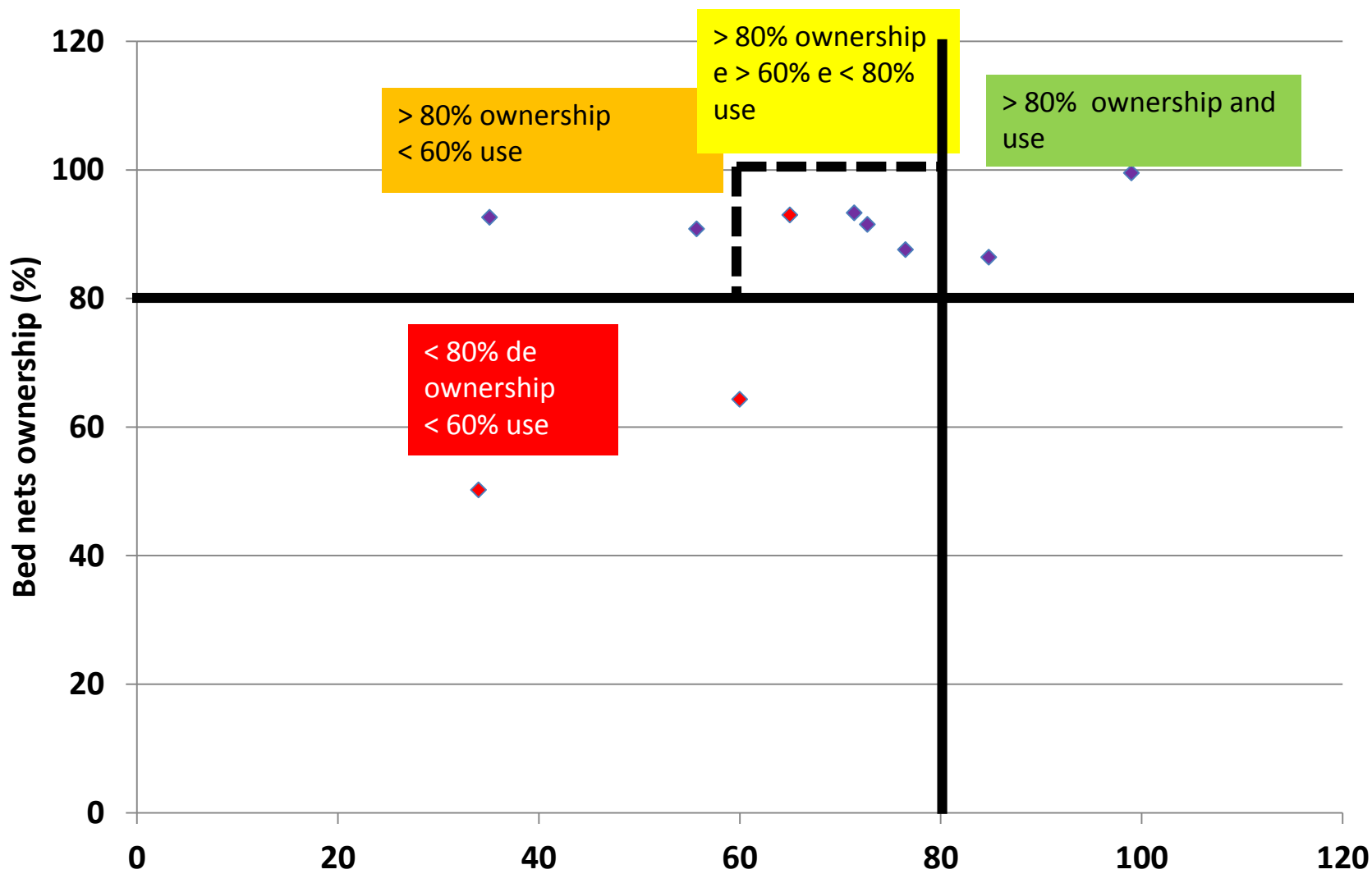
Mozambique DHS 2011 - 2015

	IDS	IMASIDA	Evolução
Provinces	2011	2015	(%)
Niassa	38.9	47.7	8.8
Cabo Delgado	49.7	65.2	15.5
Nampula	51.1	51.6	0.5
Zambézia	31.6	47.3	15.7
Tete	31.5	39.0	7.5
Manica	38.0	37.6	-0.4
Sofala	39.9	45.7	5.8
Inhambane	24.3	63.3	39.0
Gaza	9.7	24.4	14.7
Maputo Província	21.8	52.3	30.5
Maputo Cidade	30.9	55.5	24.6
Moçambique	35.7	47.9	12.2



Studies about LLIN ownership and use in Mozambique

Título do Estudo	Fonte	Resultados
An assessment of Lot Quality Assurance Sampling to evaluate malaria outcome indicators: extending malaria indicator surveys	Biedron C et al. (2010). International Journal of Epidemiology 2010;	No province in Mozambique achieved the 70% coverage target for household possession of bednets or ITNs
Inquérito demográfico e de saúde 2011	IDS 2011	50.2% HH with at least 1 LLIN; 34% of Pregnat Women slept under LLIN; 35% of childrens U5 slept under LLIN (among all childrens)
Evaluation of a universal coverage bed net distribution campaign in four districts in Sofala Province, Mozambique	Plucinski et al. Malaria Journal 2014, 13:427	One year after the campaign, 65% (95% CI: 57-72%) of sleeping spaces were observed to have hanging bed nets
Household survey of availability of long-lasting insecticide-treated nets and its determinants in rural Mozambique	Quive et al. Malar J (2015) 14:304	62.5% (95% CI 57.5–66.7) had at least one long-lasting insecticide-treated net
Factors associated with the use of mosquito bed nets: results from two cross-sectional household surveys in Zambézia Province, Mozambique	Moon et al. Malar J (2016) 15:196	64.3 % were in possession of at least one mosquito bed net. Of pregnant respondents, 58.6 % reported sleeping under a mosquito net. 60% percent of children 0–59 months slept under a mosquito net the previous night in 2014 (among all childrens)



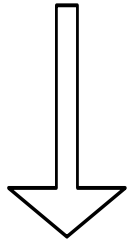
● Mozambique studies (never used coupons/vouchers)

● Studies in countries that used coupons/vouchers

“Old” Mass Campaign Strategy

- HHR form collecting data related to:
 - Names of HHs members, age, sex/gender, family relationship
- HHR data analysis
- LLIN allocation based on sleeping patterns according to data collected during HHR (age, sex, family relationship);
- # of LLIN per HH known during distribution phase;
- DP known before distribution phase but after HHR

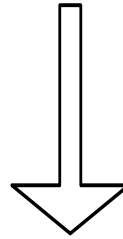
Possibilities of bed nets distribution for a HH with 3 members in actual strategy



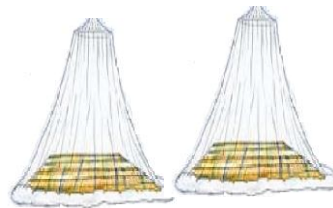
Father (35 Years)
Mother (28 years)
Son (2 years)



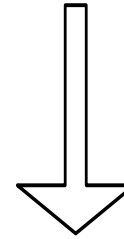
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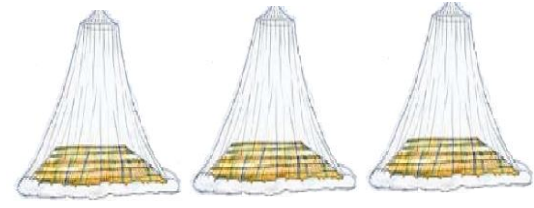
Father (35 Years)
Mother (28 years)
Son (10 years)



(recebe 2 redes)



Father (35 Years)
grandparent (68 years)
Son (10 years)




(recebe 3 redes)

- On the brainstorm-like situation analysis of the “Old” delivery model, besides low ownership and use coverage, the following bottlenecks were found:
 - HHR – miss to register or double HHR
 - the ascription of LLIN per household was made based on a complex criteria, depending on too many parameters
 - long queues to obtain LLIN because of identification problems related to the HHR Assim, decidiu-se testar um novo modelo de distribuição em massa de REMILDS

Therefore, new delivery strategy was developed and piloted

Pilot study overview



Type of implementation research objective, implementation question, and research methods			
Objective	Description	Implementation question	Research methods and data collection approaches
Explore	Explore an idea or phenomenon to make hypotheses or generalisations from specific examples	What are the possible factors and agents responsible for good implementation of a health intervention? For enhancing or expanding a health intervention?	Qualitative methods: grounded theory, ethnography, phenomenology, case studies and narrative approaches; key informant interviews, focus groups, historical reviews Quantitative: network analysis, cross sectional surveys Mixed methods: combining qualitative and quantitative methods
Describe	Identify and describe the phenomenon and its correlates or possible causes	What describes the context in which implementation occurs? What describes the main factors influencing implementation in a given context?	Quantitative: cross sectional (descriptive) surveys, network analysis Qualitative methods: ethnography, phenomenology, case studies and narrative approaches; key informant interviews, focus groups, historical reviews Mixed methods: both qualitative and quantitative inquiry with convergence of data and analyses
Influence	Test whether an intervention produces an expected outcome		
With adequacy	With sufficient confidence that the intervention and outcomes are occurring	Is coverage of a health intervention changing among beneficiaries of the intervention?	Before-after or time series in intervention recipients only; participatory action research
With plausibility	With greater confidence that the outcome is due to the intervention	Is a health outcome plausibly due to the implemented intervention rather than other causes?	Concurrent, non-randomised cluster trials: health intervention implemented in some areas and not in others; before-after or cross sectional study in programme recipients and non-recipients; typical quality improvement

Peters DH *et al.* (2013). **Implementation research: what it is and how to do it.** *BMJ* 2013;347:f6753 doi: 10.1136/bmj.f6753 (Published 20 November 2013)

Objective of the pilot

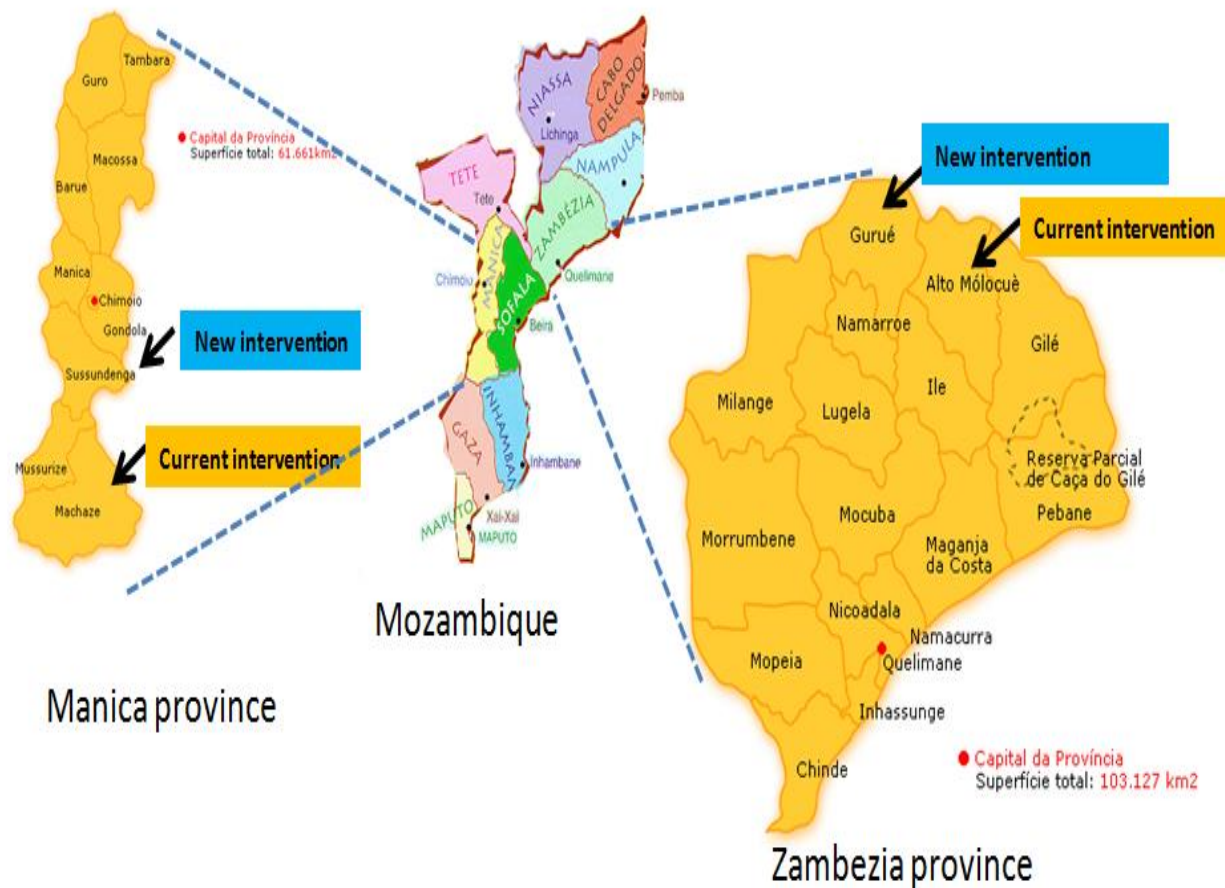
- Pilot objective: test whether the new delivery model is improving LLIN coverage in two rural districts of Mozambique .

Specific objectives

- To characterize the implementation context in terms of human resources, target population, and planned LLIN to distribute;
- To describe the implementation strategies used in the following seven domains (Proctor, 2013):
 - actor(s), action(s), targets of the action(s), temporality, dose, implementation outcomes addressed, and justification;
- To measure implementation outcomes (percentage of distributed LLIN and percentage of benefited target households) with the new and “old” delivery model.

Methods

Study Setting



Eligibility criteria:

- i) they would benefit from the LLIN distribution campaign in the concerned period;
- ii) ii) have population size similarities;
- iii) iii) have similarity in the number of nets allocated for distribution; and
- iv) iv) present rural characteristics.

Specification of the new and actual delivery model

Domain	“Old” Delivery Model (ODM)	New Delivery Model (NDM)
Actor(s)	Institutional (health professionals) and community (volunteers – registrars)	Institutional (health professionals) and community (volunteers – registrars)
Action(s)	LLIN allocation based on sleeping patterns according to data collected during HHR (age, sex, family relationship); # of LLIN per HH known during distribution phase; DP known before distribution phase but after HHR	Attribution of coupons and stickers during household registration; 1 LLIN for every 2 person; # LLIN per household known during HHR; DP known during HHR;
Target(s) of the action	Health professionals and community registrars: knowledge and skills about the intervention	Health professionals and community registrars: knowledge and skills about the intervention
Temporality	October - December 2015	October - December 2015

Domain	“Old” Delivery Model (ODM)	New Delivery Model (NDM)
Dose	Trainings: 3 days for micro-planning, 4 hours for training of registrar trainers, 4 hours for registrar training, 4 hours for training of data analysts, 7 days for HHR data analysis, 1 day for training of distribution teams. 7 days for HHR. 5 days for LLIN distribution	Trainings: 3 days for micro-planning, 4 hours for training of registrar trainers, 4 hours for registrar training, 1 day for training of distribution teams. 7 days for HHR. 5 days for LLIN distribution.
Primary Implementation outcomes	Coverage-type: percentage of LLIN distributed; percentage of target households benefited	Coverage-type: percentage of LLIN distributed; percentage of target households benefited
Justification	Theoretical justification: Socio-ecological model. Working with institutional and community actors to achieve better health outcomes	Programmatic justification: the type of household’s registration, the complex criteria for LLIN attribution and the long queues to benefit the LLINs related to the actual intervention. Theoretical justification: Socio-ecological model embedded in social practice theory

New delivery model strategy

- Three implementation strategies were designed and tested:
 - 1) use of coupons during households' registration;
 - 2) use of stickers to identify the registered households;
 - 3) simplification of the criterion for LLIN allocation (one LLIN for every two people): no cap.
- The rest of the distribution strategies remain similar to “old” delivery model.

Coupon

<p>Provincia _____ Distrito _____</p> <p>Número da Série: Nº 024011 Data do Registro: ____/____/____</p> <p>Nome do/a Chefe/representante da Família: _____</p> <p>Comunidade/Povoado/Beiro _____</p> <p>Nome do líder Comunitário: _____</p> <p>Neste dia irá receber ____ () redes mosquiteiras: N. de membros do AF: _____</p> <p>Nome do Posto de Distribuição: _____</p>	<p>Provincia _____ Distrito _____</p> <p>Número da Série: Nº 024011 Data do Registro: ____/____/____</p> <p>Nome do/a Chefe/representante da Família: _____</p> <p>Comunidade/Povoado/Beiro _____</p> <p>Nome do líder Comunitário: _____</p> <p>Neste dia irá receber ____ () redes mosquiteiras: N. de membros do AF: _____</p> <p>Nome do Posto de Distribuição: _____</p>
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Província Zambé Distrito Gumbe
 Número de Série **Nº 24001**
 Data do Registro 01/12/15
 Nome do Chefe/representante da Família Ali Jauel
 Comunidade/Povoado/Beiro Barro A
 Nome do líder Comunitário Pomela lino
 Neste dia irá receber 2 redes mosquiteiras; N. de membros do AF: 4
 Nome do Posto de Distribuição Campo municipal

SENHA PARA A RECEÇÃO DE REDE MOSQUITEIRA DE LONGA DURAÇÃO
 Província Zambé Distrito Gumbe Data do Registro 01/12/15
 Número de Série: **Nº 024001**
 Nome do/a Chefe/representante da Família: Ali Jauel
 Comunidade/Povoado/Beiro Barro A
 Nome do líder Comunitário Pomela lino
 Neste dia irá receber 2 redes mosquiteiras; N. de membros do AF: 4
 Nome do Posto de Distribuição Campo municipal
) redes mosquiteiras; N. de membros do AF: _____
 Distribuição _____

Sticker

MINISTÉRIO DA SAÚDE
Registro das Agregações Familiares para a Recepção de Redes Mosquiteiras

Provincia de: _____ Distrito de: _____

Localidade de: _____ Comunidade: _____

CASA REGISTRADA

O Registrador _____ Data: ___/___/___



de baixo da rede,
malária

Study design

- An **implementation research** approach using a quasi-experimental design has been carried out between October and December 2015
- The following variables were used in this study:
 - i) number of human resources (institutional and community) involved in the campaign;
 - ii) number of registered target households;
 - iii) number of LLIN distributed;
 - iv) number of target households benefited

Statistical analysis

- Measure of:
 - descriptive statistics,
 - Frequency, and % for quantitative variables
 - relative risks
 - Ratio of the probability of the outcome in the NDM vs ADM
 - implementation effectiveness measures were used
 - here referred as the degree to which an intervention accomplishes better outcomes in relation to the intervention compared, expressed in %
 - Better outcomes: reaching at least 80% of planned LLINs distributed; reaching at least 80 % of planned HHs benefited; and Difference of at least 5% between the new and actual delivery model

Results

Implementation context data

Districts	Pop	Pop density	# of HHs	# of LLINs	Intervention
Gurue	403,558	71.2	95,432	248,730	New delivery model
Molocue	375,504	58.9	89,648	208,613	“Old” Delivery Model
Sussundeng	165,616	23.3	41,553	96,040	New delivery model
Machaze	134,515	10.1	30,798	76,260	“Old” Delivery Model

There were no significant and statistically difference between these parameters in the New and “Old” Delivery Model

Homogeneity on population, HHs, and planned LLIN

Human Resources Involved

Involved human resources	Districts							
	Gurue		Alto-Molocue		Sussundenga		Machaze	
	New Delivery		“Old” Delivery		New Delivery		“Old” Delivery	
	n	%	n	%	n	%	n	%
Number of members of the coordination team	5	0.5	5	0.5	5	1.1	5	1.3
Number of district trainers	24	2.2	22	2.0	10	2.1	8	2.1
Number of household registrars	721	65.0	671	62.4	296	63.4	240	62.3
Number of data analysts	NA	NA	47	4.4	NA	NA	17	4.4
Number of distribution teams	30	2.7	28	2.6	13	2.8	10	2.6
Number of people involved in distribution	150	13.5	140	13.0	65	13.9	50	13.0
Number of community assistants	180	16.2	168	15.6	78	16.7	60	15.6
Total of involved human resources	1,110	100.0	1,076	100.0	467	100.0	385	100.0

Implementation Outcome: LLIN

Districts	Distributed LLIN				Planned LLIN	RR	I. effect (%)
	Yes		No				
	n	%	n	%			
Sussundenga (NDM)	94,021	97.9	2,019	2.1	96,040	1.07	6.5
Machaze (ODM)	69,829	91.6	6,431	8.4	76,260		-
Total	163,850	95.1	8,450	4.9	172,300		
Gurue (NDM)	208,627	83.9	40,103	16.1	248,730	1.17	14.4
Alto-Molocue (ODM)	149,784	71.8	58,829	28.2	208,613		-
Total	358,411	78.4	98,932	21.6	457,343		
New Delivery Model	302,648	87.8	42,122	12.2	344,770	1.14	12.2
“Old” Delivery Model	219,613	77.1	65,260	22.9	284,873	(1.13 – 1.14)	

Implementation Outcome: HH coverage

Districts	Benefited Households				Planned HHs	RR	I. effect (%)
	Yes		No				
	n	%	n	%			
Sussundenga (NDM)	36,113	86.9	5,440	13.1	41,553	0.98	-
Machaze (ODM)	27,275	88.6	3,523	11.4	30,798		1.9
Total	63,388	87.6	8,963	12.4	72,351		
Gurue (NDM)	74,340	77.9	21,092	22.1	95,432	1.16	13.6
Alto-Molocue (ODM)	60,361	67.3	29,287	32.7	89,648		-
Total	134,701	72.8	50,379	27.2	185,080		
New Delivery Model	110,453	80.6	26,532	19.4	136,985	1.11	9.8
“Old” Delivery Model	87,636	72.8	32,810	27.2	120,446	(1.10 – 1.11)	-

LLIN per person ratio

LLIN delivery modle	Population	Distributed LLINs	Ratio LLIN: Person
“Old” Delivery Model	510,019	219,613	0.4
New Delivery Model	569,174	302,648	0.5

Conclusions

- The new delivery model of LLIN distribution in campaign revealed to:
 - Overcome some of the bottlenecks of the actual delivery model;
 - Deliver more LLIN and benefits more HHs
 - Increase the pace and effectiveness of implementation toward universal coverage goal, which might contribute to slash the burden of malaria in Mozambique.

Next steps

- For the piloted districts:
 - Evaluate ownership and use (beneficiaries perspective)
 - Evaluate cost-effectiveness of the new delivery model
- Test the new delivery model in a wider scale (Nampula 2016)
- Analyze the implementation fidelity (the degree to which the intervention is implemented as it was designed in the plan)
- Collect experiences for National Campaign 2017

OBRIGADO

Não tínhamos como nos Prevenir da Malária, as REMILDs vão Proteger toda Família

