Modification of unimproved housing for equitable protection against mosquitoes

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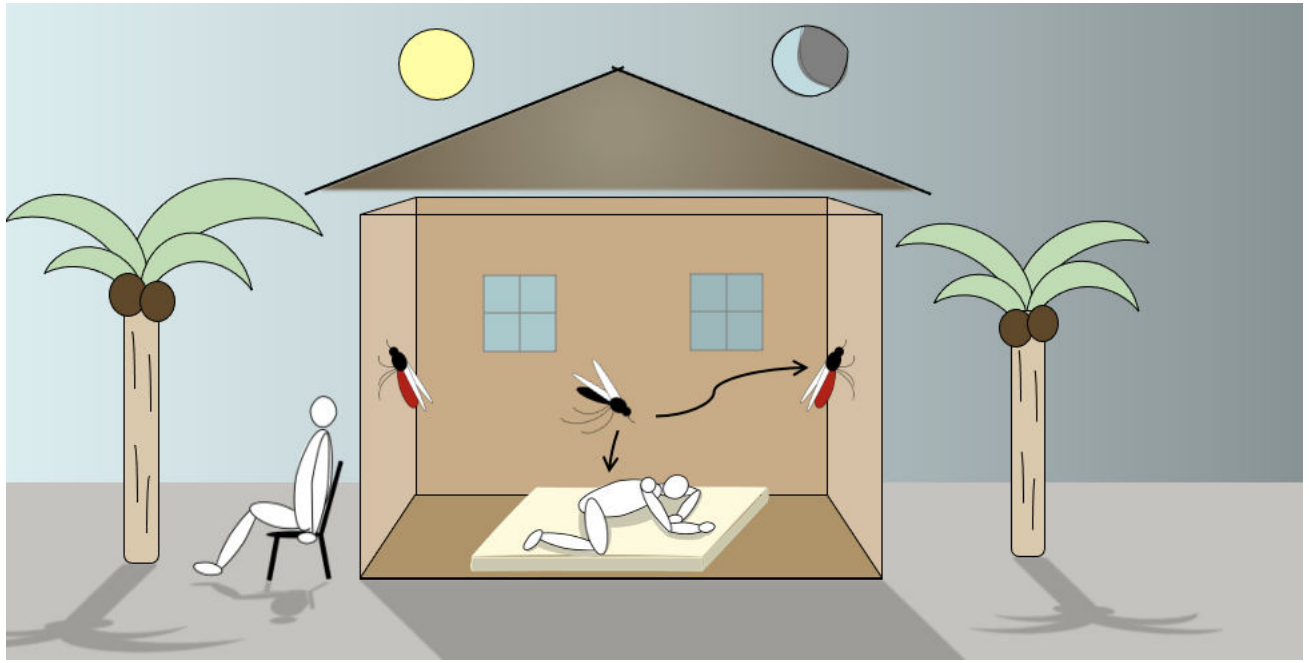
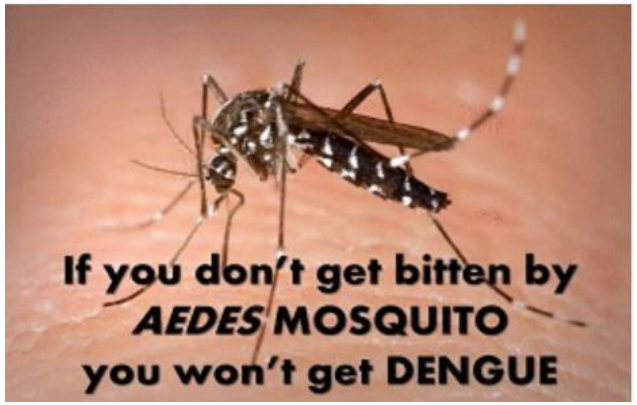
Sub-Saharan Africa needs round the clock protection against multiple disease vectors





Source: CDC and WHO

House modification can be done cheaply

Mosquito house entry reduced by closing all available gaps in homes with treated netting

- Eaves
- Windows
- Wall holes

Semi field system testing of insecticide netting

Fig. 1a: Semi-field system

Fig. 1b: Experimental hut built in the SFS

Fig. 1c: Large netting suspended on the hut

Fig. 1d: Experimental hut built in the SFS

Fig. 1e: Large netting suspended on the hut

Entomological data in indicate efficacy against *Anopheles, Culex* and *Aedes*

Species	Test items	Total recaptured (N)	Total mortality (n)	%Arithmetic mean (95% CI)	Odds ratio (95% CI)	P-value
Overall (All mosquitoes)	Aged Olyset Plus	**3,209**	**1,748**	**54.9 (50.0 – 59.8)**	**1.00**	
	Aged ITS	**3,424**	**1,670**	**50.6 (45.7 – 55.5)**	**0.80 (0.59 – 1.08)**	**0.141**
	New ITS	**3,027**	**2,002**	**67.6 (62.4 – 72.8)**	**2.25 (1.65-3.06)**	**<0.0001**
	No treatment	**3,710**	**204**	**5.6 (4.7 – 6.5)**	**0.03 (0.02 – 0.04)**	**<0.0001**
An. arabiensis (Kingani strain)	Aged Olyset Plus	805	561	68.0 (60.9, 75.2)	1.00	
	Aged ITS	848	542	63.9 (56.5, 71.3)	0.82 (0.62 – 1.10)	0.183
	New ITS	749	609	81.8 (76.3, 87.3)	2.36 (1.17 – 3.26)	<0.0001
	No treatment	898	64	7.5 (5.4, 9.6)	0.03 (0.02 – 0.04)	<0.0001
An. funestus (FUMOZ strain)	Aged Olyset Plus	733	565	78.7 (72.0, 85.3)	1.00	
	Aged ITS	773	500	65.7 (57.1, 74.3)	0.44 (0.27 – 0.72)	0.001
	New ITS	717	620	87.9 (81.5, 94.4)	2.41 (1.40 – 4.16)	0.002
	No treatment	963	52	5.5 (3.7, 7.3)	0.01 (0.00 – 0.01)	<0.0001
Cx. quinquefasciatus (Bagamoyo strain)	Aged Olyset Plus	823	308	36.1 (28.7, 43.5)	1.00	
	Aged ITS	901	323	36.2 (26.6, 45.8)	0.97 (0.65 – 1.43)	0.859
	New ITS	800	341	43.3 (33.3, 53.3)	1.39 (0.94 – 2.06)	0.103
	No treatment	903	47	5.2 (3.5, 6.9)	0.07 (0.04 – 0.12)	<0.0001
Ae. aegypti (Bagamoyo strain)	Aged Olyset Plus	848	314	36.8 (28.7, 44.9)	1.00	
	Aged ITS	902	305	36.7 (28.1, 45.2)	0.98 (0.60 – 1.61)	0.950
	New ITS	761	432	57.5 (47.2, 67.7)	3.01 (1.82 – 4.96)	<0.0001
	No treatment	946	41	4.3 (2.8, 5.8)	0.06 (0.03 – 0.11)	<0.0001

Treatment, volunteer, hut and day are fixed effect and observation as random effect. For overall, species was included as a fixed effect.

Entomological data in mathematical models indicate substantial improvements relative to pyrethroid PBO ITNs

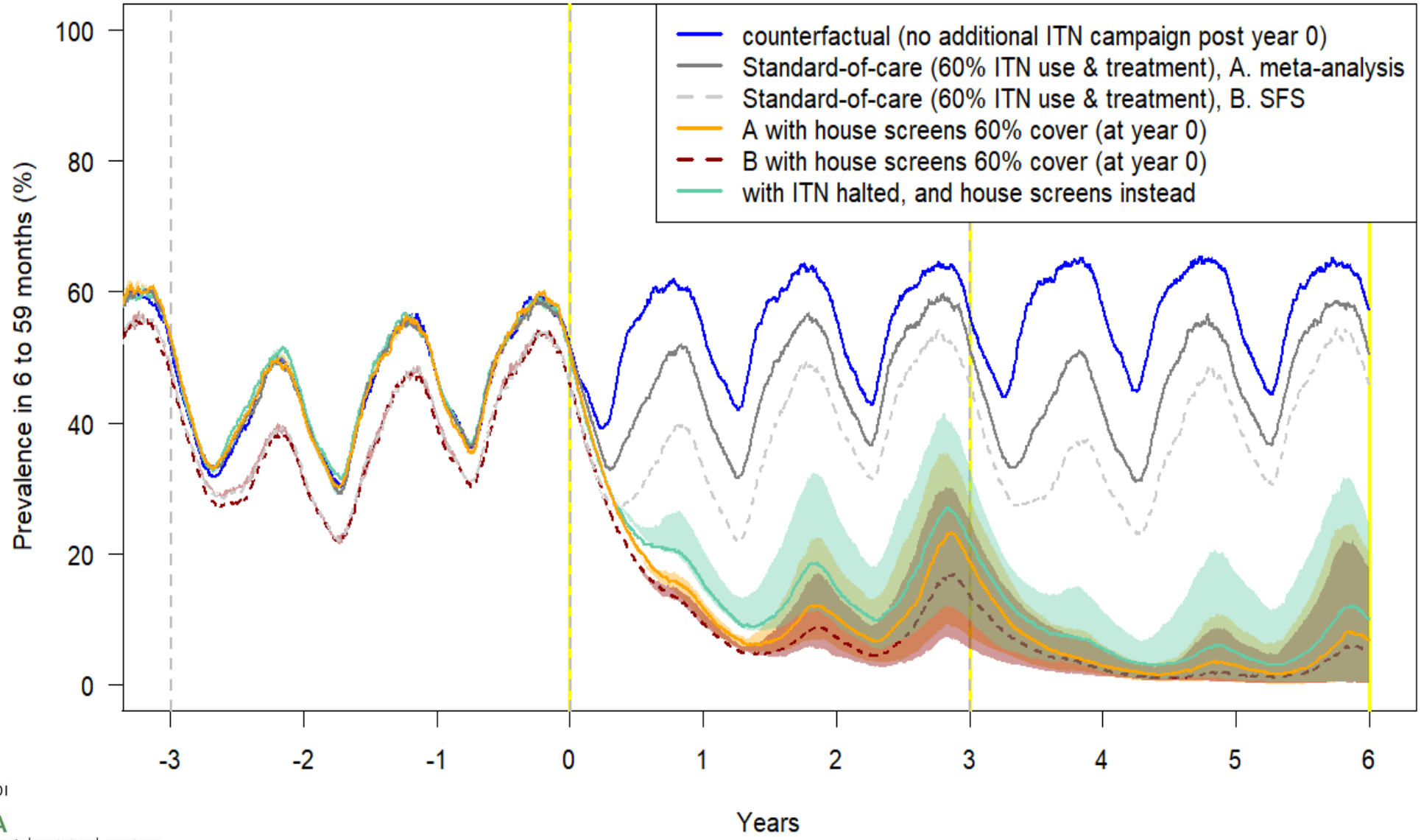


Figure by: Ellie Sherrard-Smith

Installation was fast, feasible and acceptable

Variables	Arithmetic mean (95% Confidence Interval)
N=206	
Installation time (hours and minutes)	**01:04** (00:01 - 04:26)
Average fabric per household (metres)	
Total	**29.5** (1.6 – 64.2)
Eaves	24.1 (0.8 – 60.2)
Windows	3.4 (0.3 – 17.2)
Overall wall holes per household	2.0 (0 – 20.5)
Willingness to purchase material for self-installation	**% (n)**
Yes	**95.3** (181/190)
No	4.2 (8/190)
Don't know	0.5 (1/190)

Odufuwa et al., Trials. 2022 Jul 19;23(1):578. doi: 10.1186/s13063-022-06408-4.

Take home messages

- House screening has the potential to protect against multiple vector borne diseases in *unimproved houses*
- Equally protect all household residents
- High user acceptance
- Cost in line with ITNs ($1.29 per person year)
- More flexible in regards to choice of new chemistries
- Less disruptive and longer lasting than IRS

Thank you all for listening