RBM Partnership To End Malaria

Vector Control Working Group

Insecticide Impregnated Barriers. A novel concept against malaria vectors

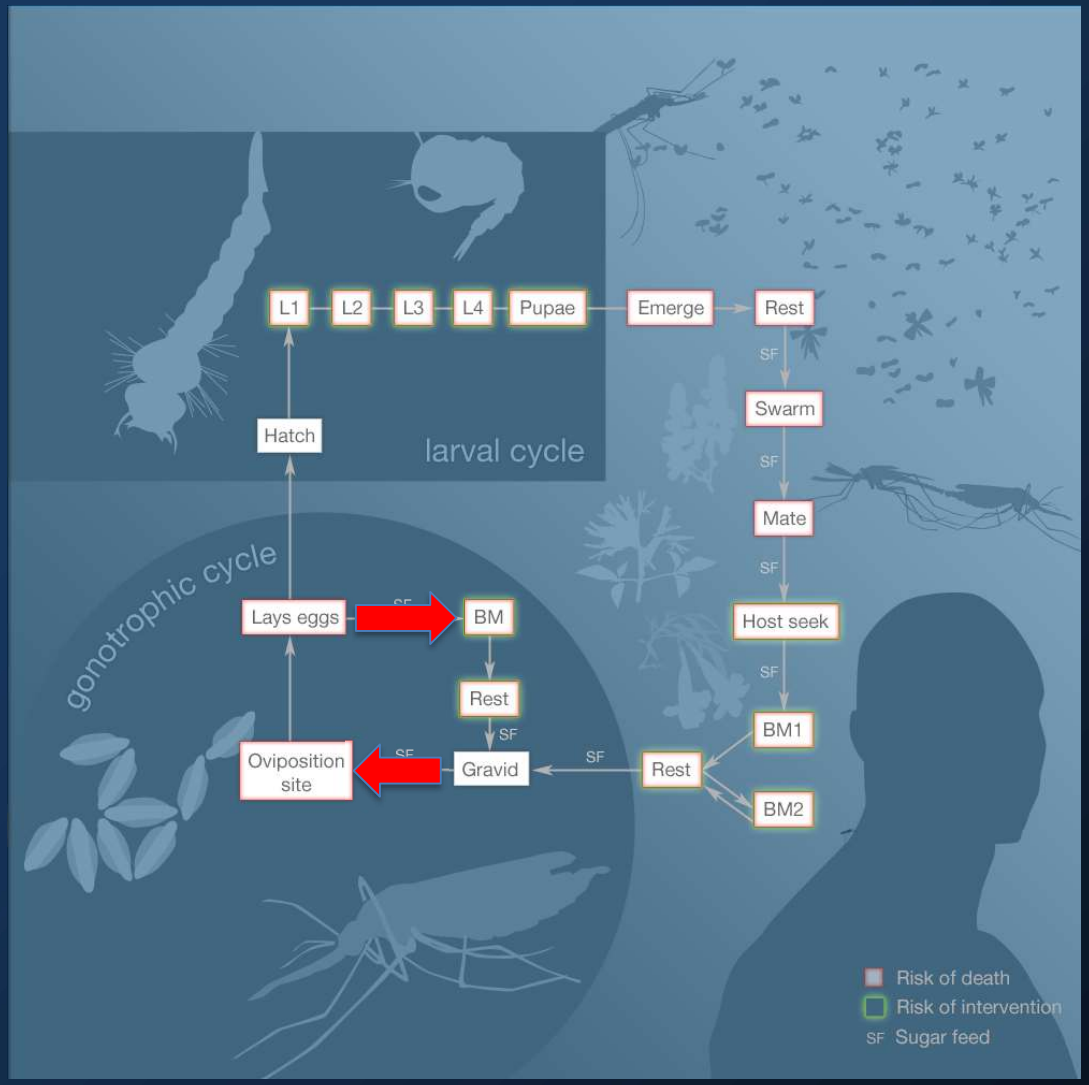
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30th October 2025

Insecticide Impregnated Barriers (IIBs)

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Mosquito Behavior and Barrier Screens



Barriers Screens



Food Source (village)

Barrier Screen

Larval Site

Barrier screens: a method to sample blood-fed and host-seeking exophilic mosquitoes, Burkot, Thomas R.; Russell, Tanya L.; Reimer, Lisa J.; Bugoro, Hugo; Beebe, Nigel W.; Cooper, Robert D.; Sukawati, Supratman; Collins, Frank H.; Lobo, Neil F., Malaria Journal (2013) Malar J. 2013 Feb 5;12:49.

Utility of Barrier Screens to sample outdoor mosquitoes in an area targeted for malaria elimination. Stevenson JC, Simubali L, Hamapumbu H, Lobo NF, Norris DE. American Journal of Tropical Medicine and Hygiene. Oct 2015; 93(4):427.

Using barrier screens to characterize mosquito composition, flight activity, and abdominal status in South Lampung, Indonesia. Davidson JR@, Sukowati S, Shinta, Asih PBS, Syafruddin D, Baskin RN, St Laurent B@, Hawley WA, Liu F, Burkot TR, Collins FH, Lobo NF. Parasit Vectors. 2018 Jul 31;11(1):440.

Interventions

Interventions take advantage of mosquito behaviors

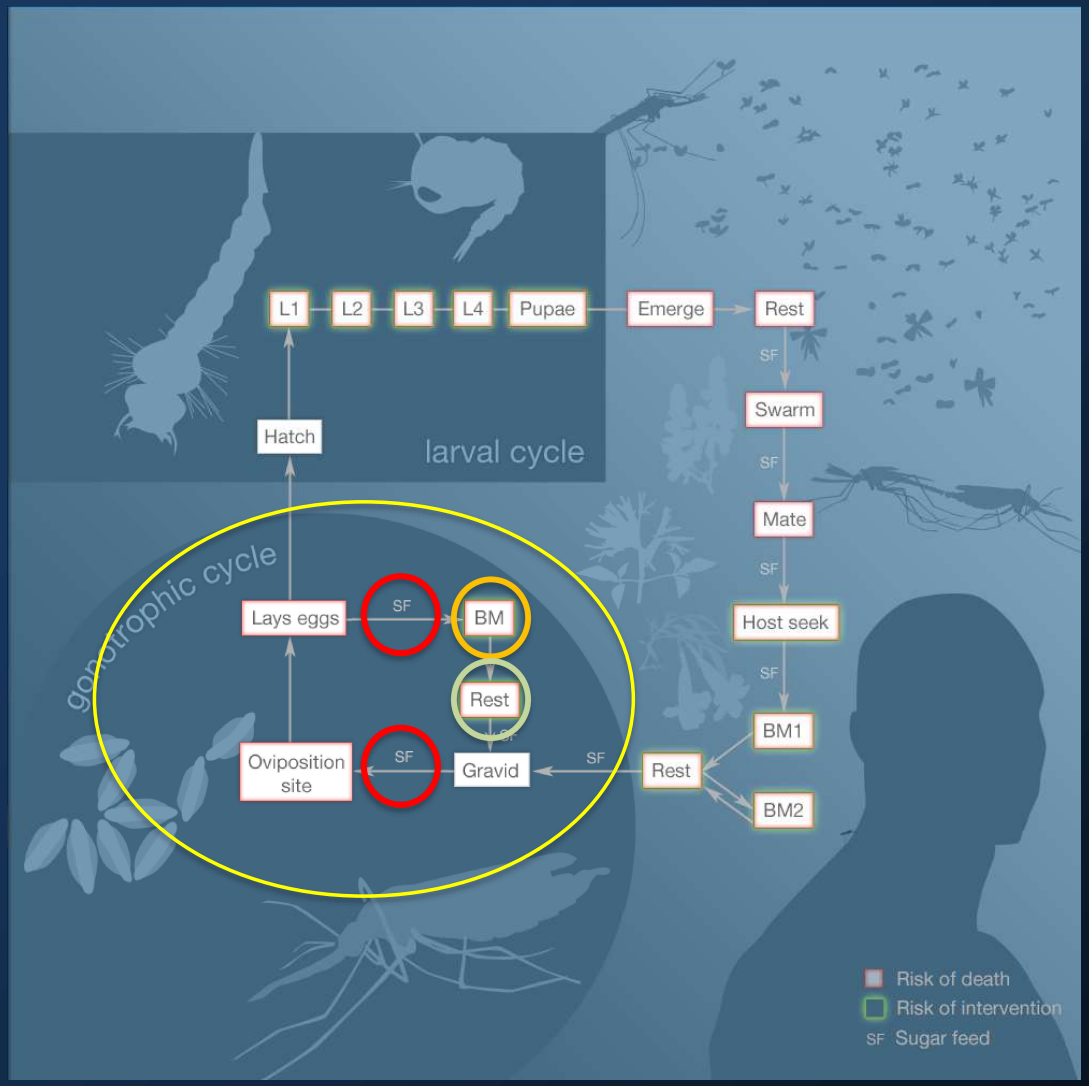
1. ITNs: Indoor, human feeding, late night feeding.

2. IRS: Indoor resting

3. Insecticide impregnated Barriers (IIBs)?



Interventions



ITNs

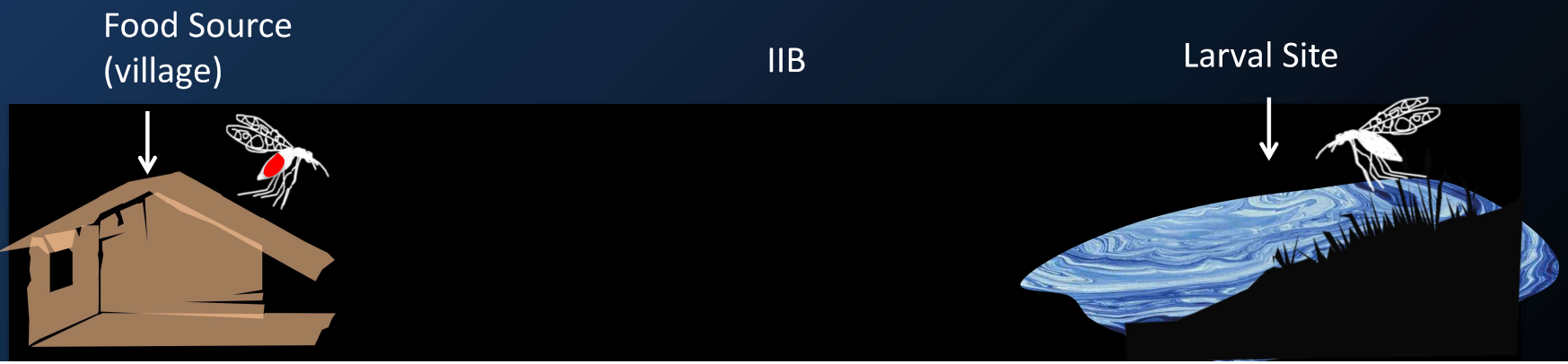
IRS

IIB

Insecticide Impregnated Barriers

- Barrier Screens used to trap and characterize mosquito behavior
- **Insecticide Impregnated Barriers** may control malaria
  - Effects all vectors (indoor and outdoor feeding)
  - Would impact vectors twice in a gonotrophic cycle

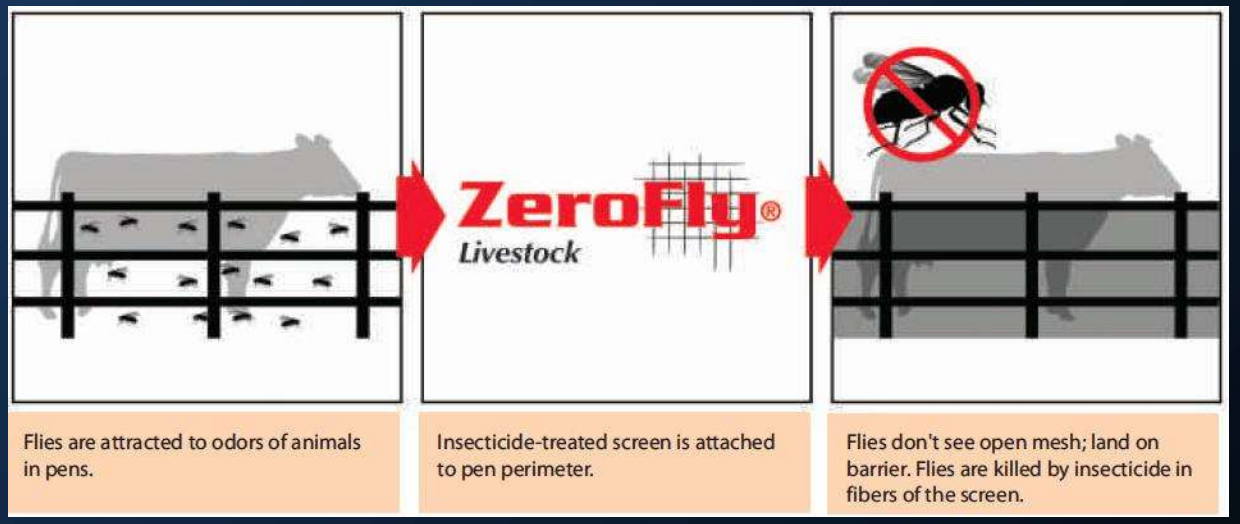




Product

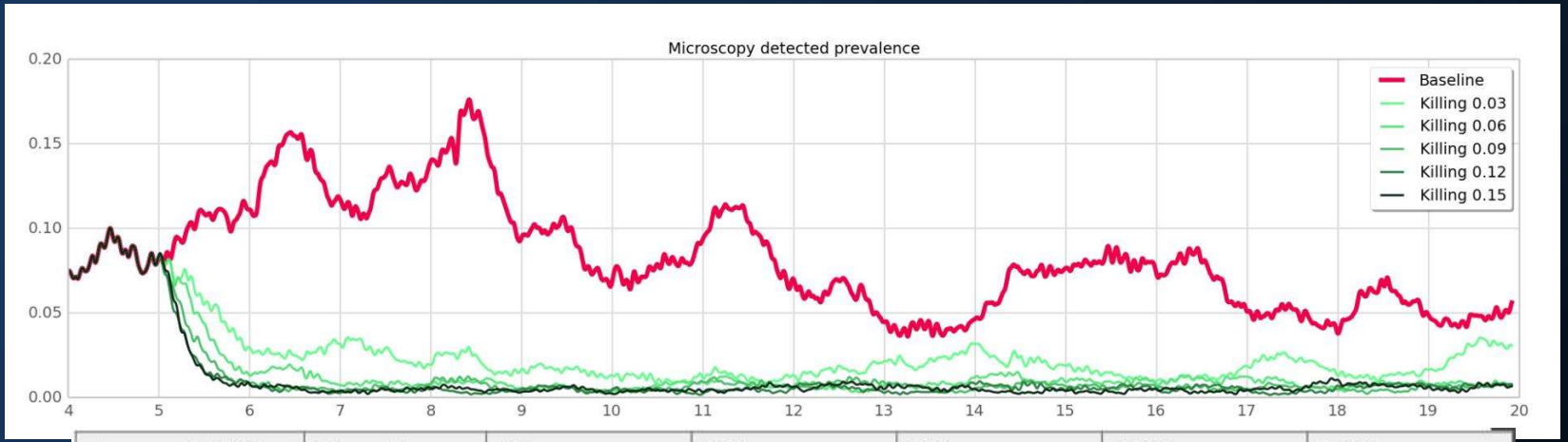
- Product : Vestergaard Frandsen
  - PermaNet®Screen
  - Deltamethrin-treated insect screening
  - sun and water stable insecticide impregnated screens

Formerly



Solomon Islands Modeling - EMOD

- Simulations with IIBs
  - Fully effective for 2.5 years and exponential decay for 6 months
  - IIBs renewed every 3 years
  - Mosquito Killing from 2% to 15%
  - Low levels of introduced cases



Annual EIR	Baseline	3%	6%	9%	12%	15%
After 1 year	1.05	.41	.23	.12	.05	.04
After 2 years	1.31	.21	.09	.02	.01	.01
After 3 years	1.22	.20	.03	.02	.01	.01

Suggest that IIBs would be very useful in eliminating malaria



IIB's : only 20% of distance (distance = encounter rate) coverage required
(modeling suggests 7.5% but we are going more than double)

Trial in Solomon Islands

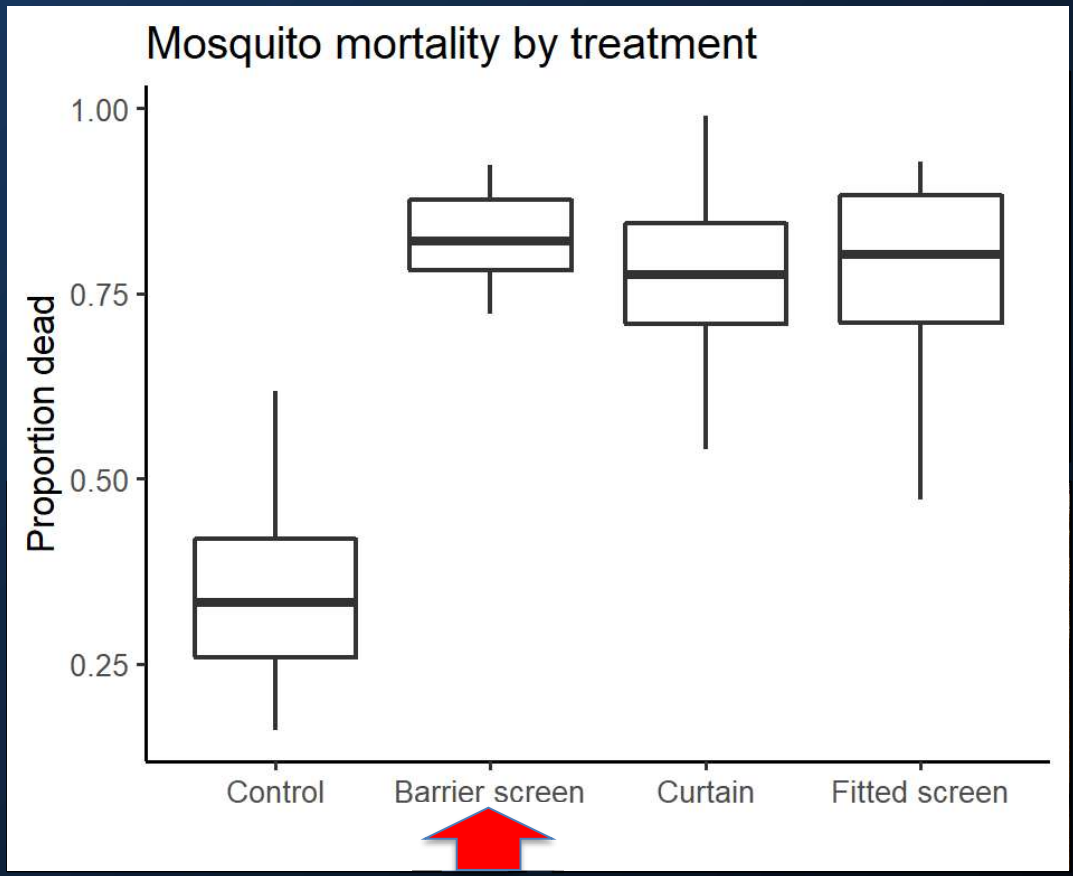
El Niño year (2014) – less rain, no malaria -> Study halted



SFS study in Zambia

Evaluated
- Fitted Screens
- Curtains
- Barriers

Impact on
- Landing
- Mortality



Summary

- We need new paradigms for outdoor malaria transmission (actually all malaria transmission)
- IIBs (or ITOPS – Insecticide Treated Outdoor Portable Screens) represent potential
- Require entomological and epidemiological evidence

