

Notice the two torn LLINs on this shelter



# Expanding vector control for Humanitarian Emergencies

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# **RBM Vector Control in Humanitarian Emergency Initiative**

## ***Mission Statement***

*To reduce human suffering and death from vector-borne diseases in Humanitarian Emergencies by:*

- a) improving delivery, uptake, integration and evaluation of existing vector surveillance and control tools;*
- b) facilitating the development of an evidence-base and uptake of supplementary and emerging tools.*

<https://endmalaria.org/vector-control-humanitarian-emergencies>



# Selected tools with high potential

Ready for Deployment

## Passive emanators



## Targeted IRS

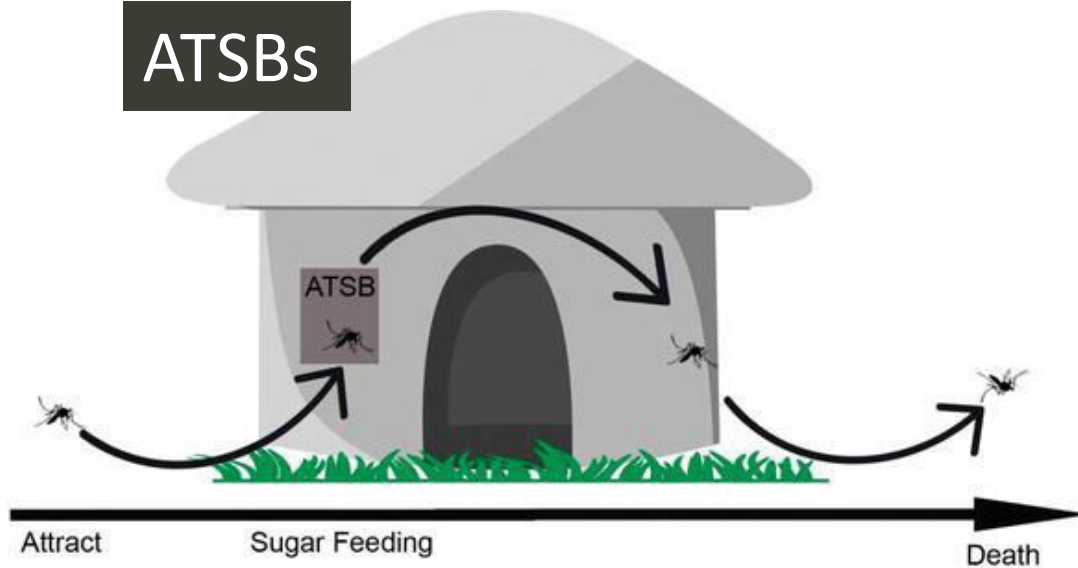


## Larval control



Operational Research

## ATSBs



## Treated textiles

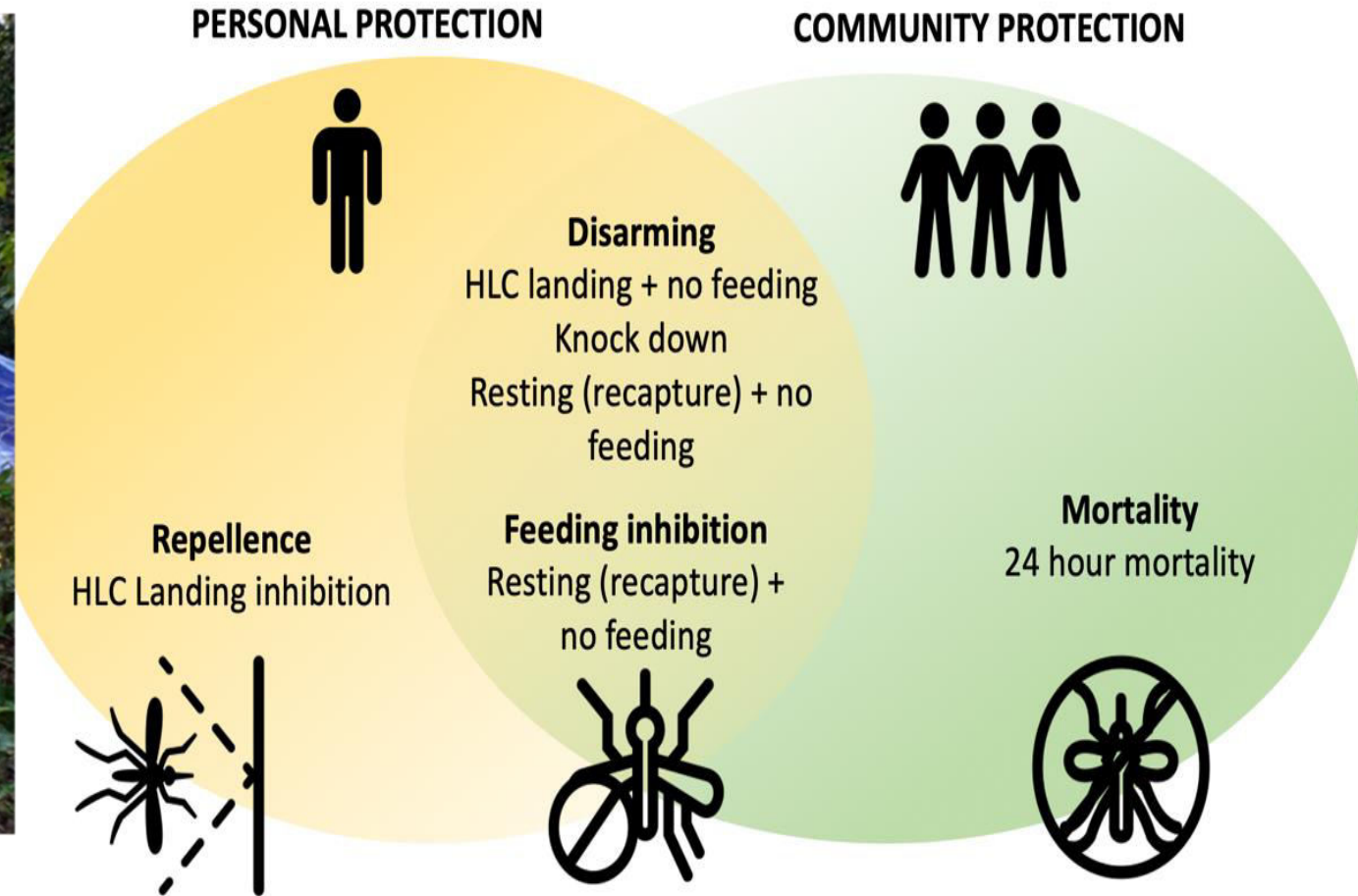


# Passive Emanators (spatial repellents)

- Strong evidence of community impact beyond “repellency”
- reduction in vectorial capacity even in temporary shelters



Temporary shelter use-case





# Linking to tool development for outdoor transmission to Humanitarian Emergencies



Photo MSF/Cambodia  
**Outdoor transmission Mekong**



Photo UNHCR  
**Humanitarian Emergency**

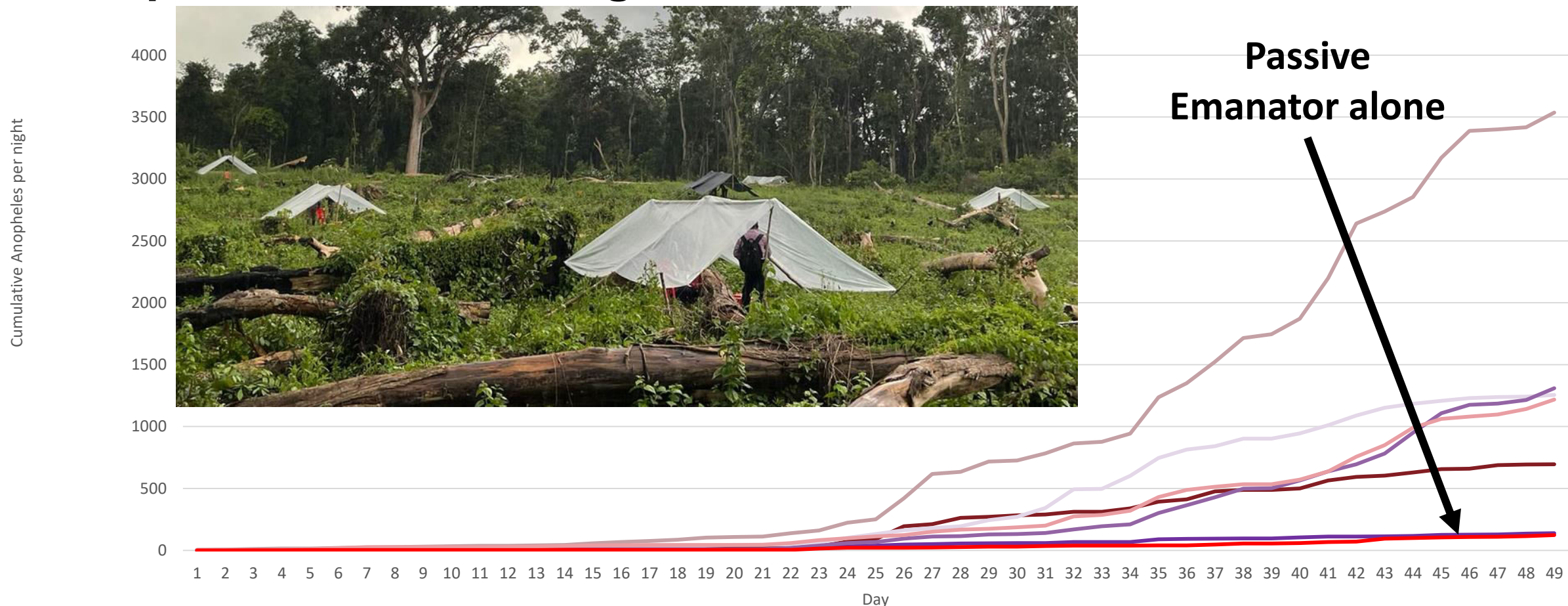


# Field assessment in Northern Nigeria

(MENTOR Initiative)



# IVCC/UCSF Field trial with topical and passive emanator, etofenprox treated clothing



**Passive Emanator Packaging: 2,000 units in a 35 liter case weighing 12 kg**

- PIRK
- ETO Civilian 0x wash + Picaridin 20%
- ETO Ranger 20x wash + Picaridin 20%
- CONTROL
- ETO Ranger 0x wash + Picaridin 20%
- ETO Civilian 20x wash + Picaridin 20%
- PIRK + ETO civilian 0x wash + Picaridin 20%



# IRS in temporary and emergency shelters

- Expanding sprayable structures to include IDP/refugee temporary shelters and tents
- Practical guidance needed for emergencies.
- **Not all formulations have same residual efficacy on tents and tarpaulins**



MENTOR Initiative South Sudan



MENTOR Initiative Northern Mozambique



# Larvicide: improved targeting and delivery

- Multiple country programs, Goodbye Malaria, AGAMal, PMI and others are implementing or piloting larvicide programs plus dozens of others
- Improved targeting technologies (ZZAPP information management)
- Improved wide-area delivery application equipment

## Obstacle

- Product choice is limited in Africa (but not elsewhere)
- A general lack of expertise to deliver → risk of wasted resources & perception of low cost-effectiveness

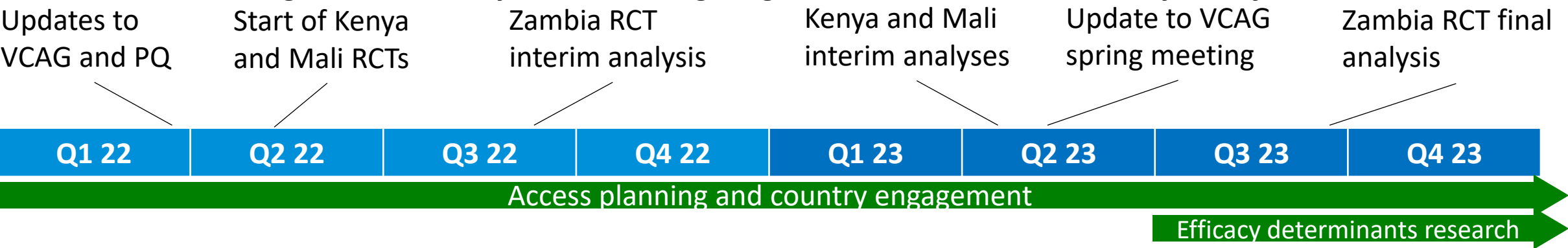
## Solution

- Improve access to all PQ-listed products
- Platform to share knowledge on products best practice delivery (PAMCA)
- Update technical manuals and build capacity and experience (including targeting and monitoring methods)

# ATSB: Opening a new product class

*Potential in camp settings where vegetation and alternate nectar sources are reduced*

*RCTs are running in Zambia, Kenya and Mali targeting a submission to VCAG & PQ by end of 2024*



Bait station installation, Zambia. Credit: PATH/MRC



Bait station monitoring, Kenya. Credit: KEMRI



Bait station distribution, Mali. Credit: USTT-B



# Etofenprox treated textiles: IVCC/UCSF Semi-field testing Thailand

## Much less dermal absorption/ greater wash resistance than permethrin

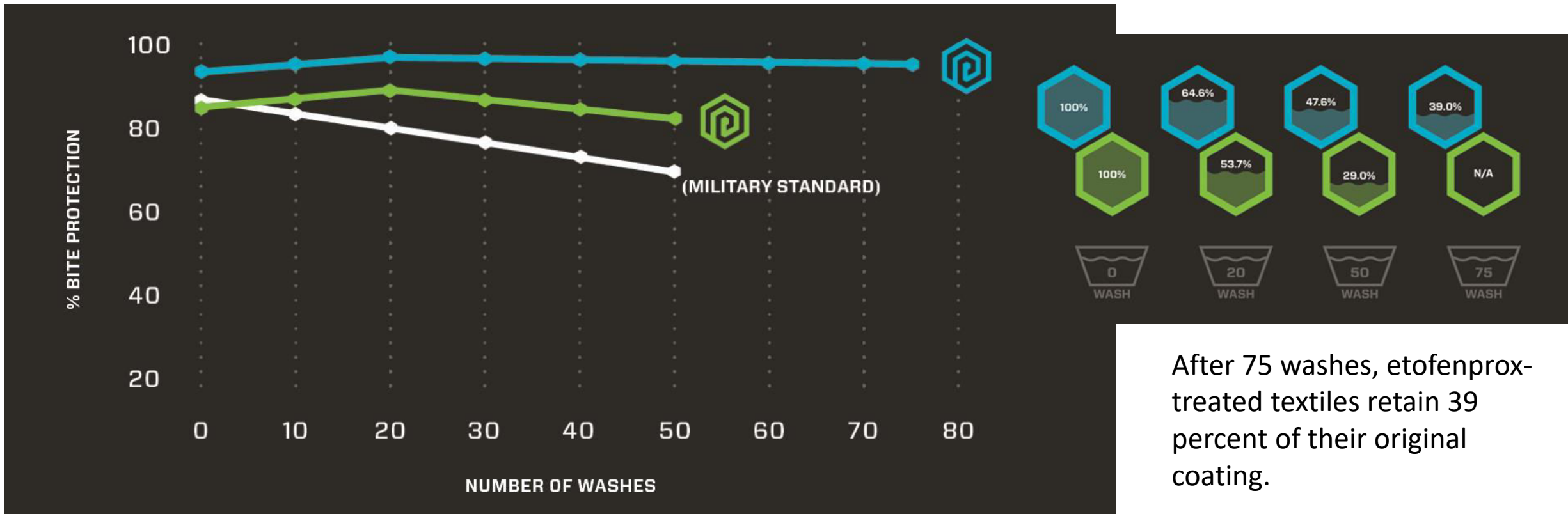
Discussions with Mitsui Chemicals Crop & Life Solutions, MCCLS (manufacturer), WarmKraft (EPA registrant), for treatment of other textiles, blankets?



# Etofenprox versus permethrin

## Superior wash resistance compared to permethrin

- The following chart shows the difference between etofenprox (blue) and permethrin (green) bite protection after extended washes





# Etofenprox versus permethrin: superior safety profile

Parameter	Permethrin	Etofenprox
Acute Oral Toxicity LD50	>2,700 mg/kg	>5,000 mg/kg
Acute Dermal Toxicity LD50	>2,000 mg/kg	>5,000 mg/kg
Acute Inhalation Toxicity LC50	>2.6 mg/L	>2.1 mg/L
Sub-chronic Dermal Toxicity	500 mg/kg/day (rat)	No systemic toxicity
Subchronic Inhalation Toxicity NOAEL (rats)	11 mg/kg/day	10.6 mg/kg/day
Acute neurotoxicity NOAEL (rats)	25 mg/kg/day	2,000 mg/kg
Carcinogenicity	Likely to be carcinogenic to humans (according to the U.S. EPA)	Not Likely to be carcinogenic

# Expanded toolbox for Vector Control in Humanitarian Emergencies

- **Passive Emanators (Spatial Repellents)**
- **IRS on Temporary Shelters**
- **Improved targeting and delivery of larvicides**



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- **Attractive Targeted Sugar Baits**
  - **Etofenprox Treated Textiles**