JOHNS HOPKINS
BLOOMBERG SCHOOL
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Photo Credit: VectorWorks Project

SOCIAL AND BEHAVIORAL CONSIDERATIONS FOR EFFECTIVE VECTOR CONTROL INTERVENTIONS

IVM, Evidence and Capacity Work Stream
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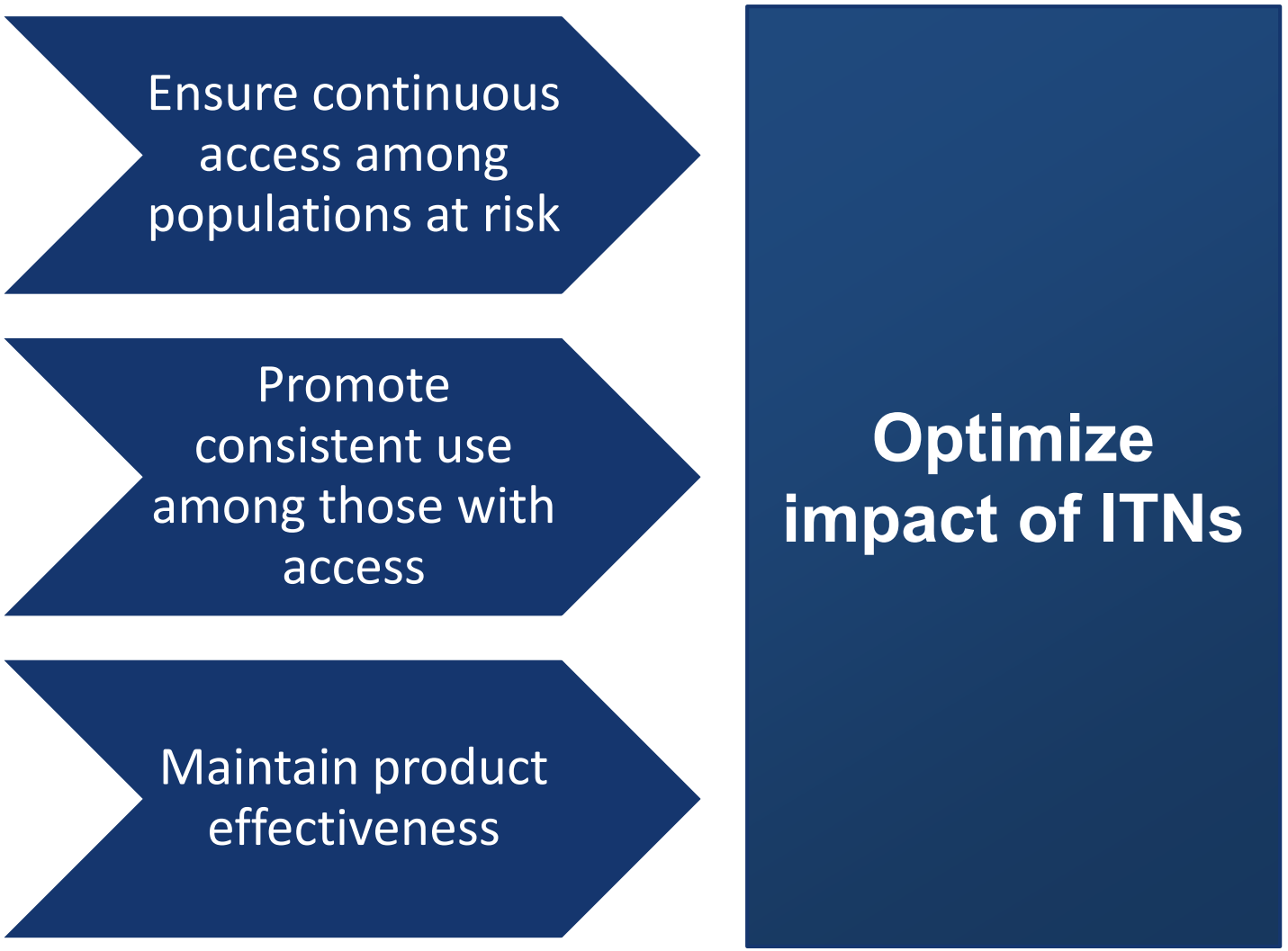
Background

Photo Credit: VectorWorks Project

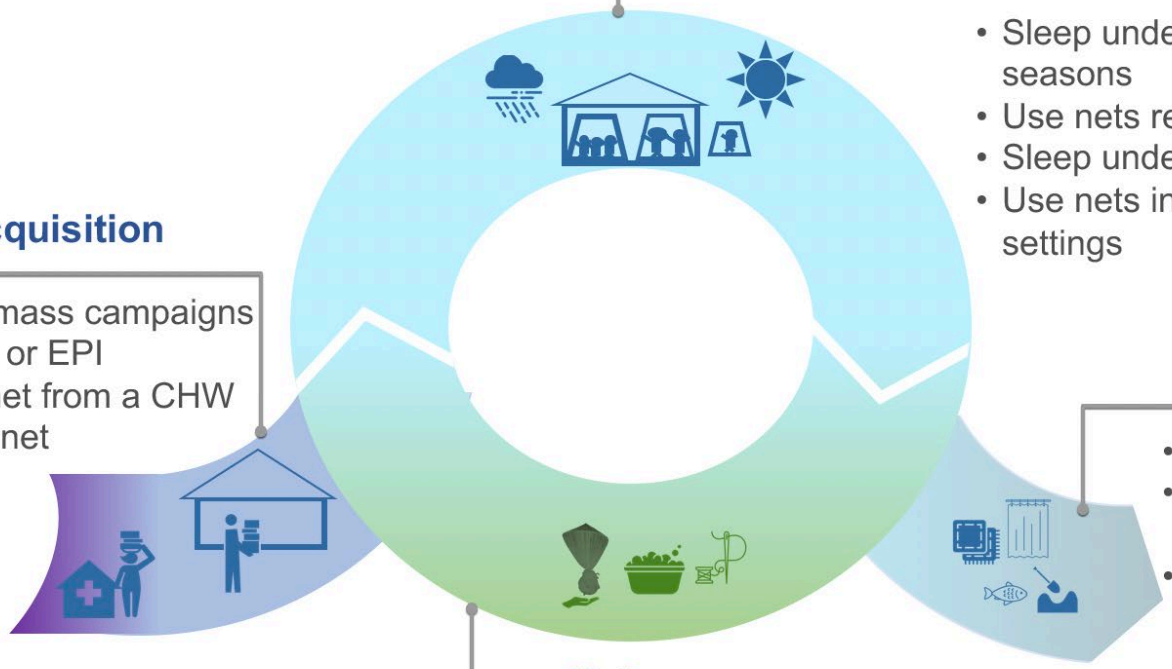
Overview

- Social and behavioral considerations for improved vector control interventions
  - Optimizing core vector control interventions
  - Identifying and characterizing gaps that remain
  - Targeting complementary tools
- Conclusions

Optimizing Core Interventions - The Case of ITNs



Social and Behavior Change for ITNs



Net use

- Sleep under a net in both dry and rainy seasons
- Use nets regardless of shape, color, etc.
- Sleep under a net indoors and outdoors
- Use nets in high and low transmission settings

Net acquisition

- Register in mass campaigns
- Attend ANC or EPI
- Request a net from a CHW
- Purchase a net

Net end of life

- Patch other ITNs
- Turn ITNs into curtains or screens
- Stuff ITNs into open eaves

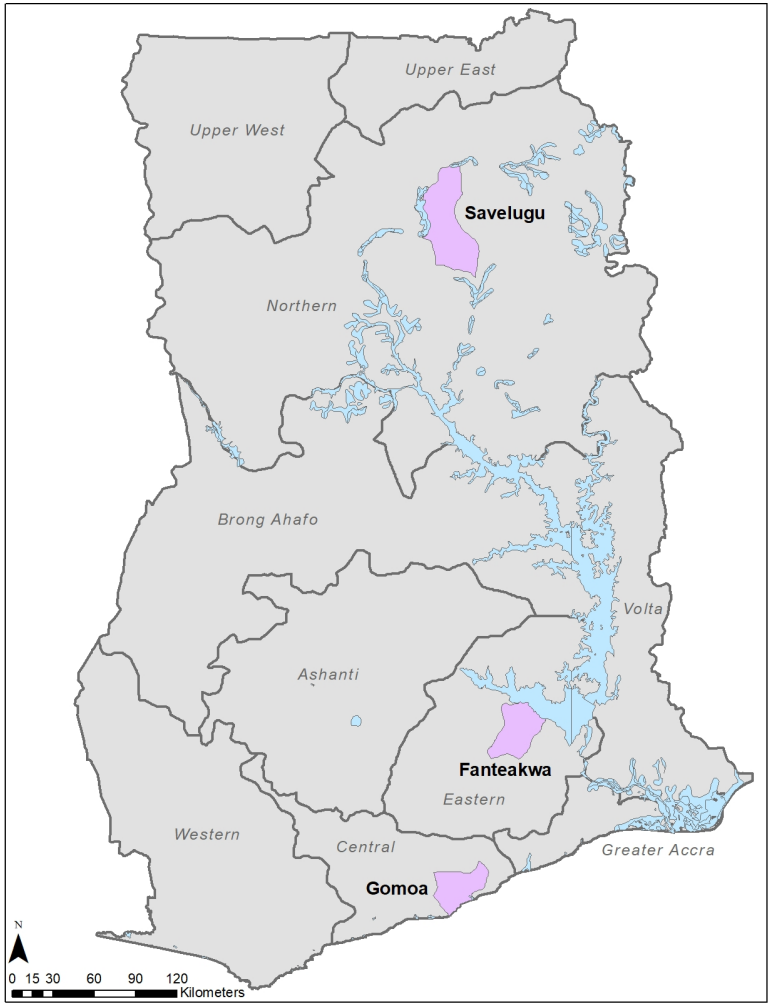
Net care

- Tie up when not in use
- Handle gently
- Keep away from children and pests
- Wash in a basin with mild soap
- Repair when torn

Citation: Social and behavior change for insecticide-treated nets. 2019. https://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/pmi-vectorworks-social-and-behavior-change-for-insecticide-treated-nets-2019-toolkit.pdf

Example: ITN Use in Ghana

- A gap remains between access and use: only 63% of population with access use their nets
- Qualitative research to understand experiences behind the numbers[1]



[1] Ahorlu et al. 2019. Understanding the gap between access and use: a qualitative study on barriers and facilitators to insecticide-treated net use in Ghana. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-019-3051-0.

Key Findings – Barriers

"For me, even if I will sleep in it (ITN), it will not last for seconds then I start to sweat, you will think hot water has been poured on me so I do not sleep in it."

-Male Community Leader, Eastern Region, Ghana

Key Findings – Facilitators

"I had in the past refused to use the net because of the heat, itching, and other complaints I had heard about. However, I was attacked by malaria and had to be hospitalized for a week and almost died. After being discharged from the hospital, I decided to use the net regularly."

-Male Community Member, Northern Region, Ghana

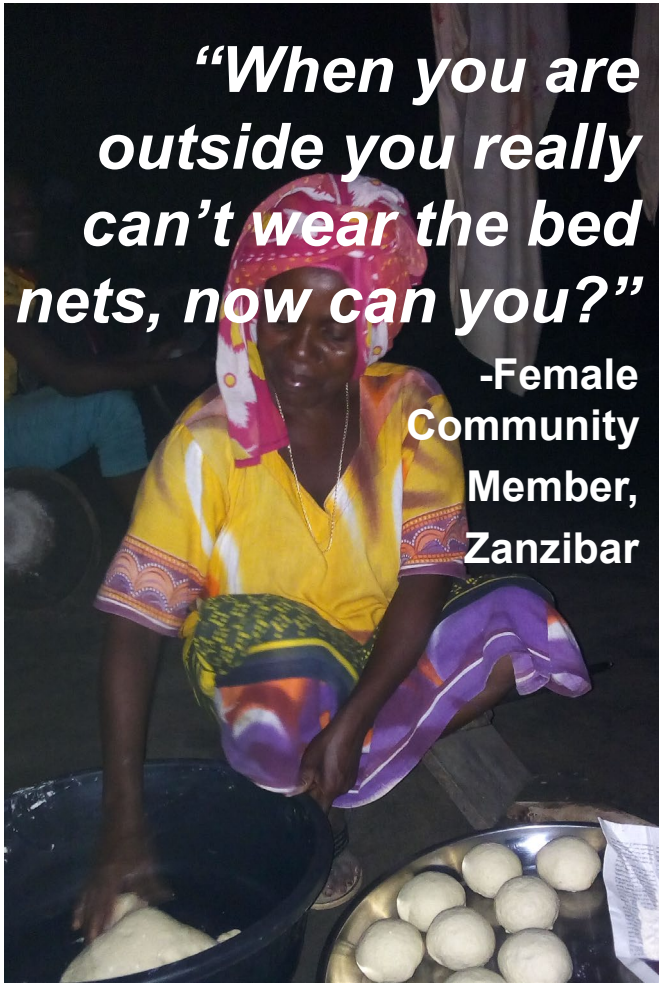
Other Key Findings

- It's not just "users" and "non-users"; ITN use exists on a spectrum
- ITN use can vary throughout the night, across seasons, and over time
- Addressing challenges to *consistent* use is critical

Recommendations

1. Identify, disseminate, and evaluate local solutions for ITN use in challenging environments
2. Highlight cost and time savings of prevention over treatment
3. Increase saliency of malaria risk and benefits of a “good night’s sleep”
4. Increase ITN airing time before first use and ensure clear explanation
5. Develop a culture of ITN use, beginning in primary schools

Identifying and Characterizing Gaps

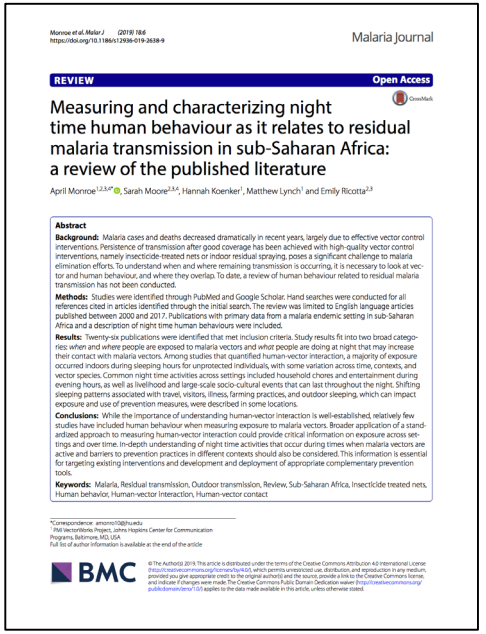


"When you are outside you really can't wear the bed nets, now can you?"

-Female Community Member, Zanzibar

What We Know

- Relatively few studies of nighttime human behavior and even fewer that integrate human and vector data[1,2]
- Common nighttime activity categories across settings
  - Routine activities
  - Special events
  - Nighttime occupations
- Gender norms can impact risk of exposure and use of prevention measures
- Additional high-risk groups
  - Mobile populations
  - Internally displaced persons and refugees



Monroe et al. Malar J (2019) 18:6
https://doi.org/10.1186/s12936-019-2638-9

Malaria Journal

REVIEW — Open Access

Measuring and characterizing night time human behaviour as it relates to residual malaria transmission in sub-Saharan Africa: a review of the published literature

April Monroe[1,2,3*], Sarah Moore[2,3,4], Hannah Koenker[1], Matthew Lynch[1] and Emily Ricotta[2,3]

Abstract

Background: Malaria cases and deaths decreased dramatically in recent years, largely due to effective vector control interventions. Persistence of transmission after good coverage has been achieved with high-quality vector control interventions, namely insecticide-treated nets or indoor residual spraying, poses a significant challenge to malaria elimination efforts. To understand when and where remaining transmission is occurring, it is necessary to look at vector and human behaviour, and where they overlap. To date, a review of human behaviour related to residual malaria transmission has not been conducted.

Methods: Studies were identified through PubMed and Google Scholar. Hand searches were conducted for all references cited in articles identified through the initial search. The review was limited to English language articles published between 2000 and 2017. Publications with primary data from a malaria endemic setting in sub-Saharan Africa and a description of night time human behaviours were included.

Results: Twenty-six publications were identified that met inclusion criteria. Study results fit into two broad categories *when* and *where* people are exposed to malaria vectors and *what* people are doing at night that may increase their contact with malaria vectors. Among studies that quantified human-vector interaction, a majority of exposure occurred indoors during sleeping hours for unprotected individuals, with some variation across time, contexts, and vector species. Common night time activities across settings included household chores and entertainment during evening hours, as well as livelihood and large-scale socio-cultural events that can last throughout the night. Shifting sleeping patterns associated with travel, visitors, illness, farming practices, and outdoor sleeping, which can impact exposure and use of prevention measures, were described in some locations.

Conclusions: While the importance of understanding human-vector interaction is well-established, relatively few studies have included human behaviour when measuring exposure to malaria vectors. Broader application of a standardized approach to measuring human-vector interaction could provide critical information on exposure across settings and over time. In-depth understanding of night time activities that occur during times when malaria vectors are active and barriers to prevention practices in different contexts should also be considered. This information is essential for targeting existing interventions and development and deployment of appropriate complementary prevention tools.

Keywords: Malaria, Residual transmission, Outdoor transmission, Review, Sub-Saharan Africa, Insecticide treated nets, Human behavior, Human-vector interaction, Human-vector contact

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[1] Monroe et al. 2019. Measuring and characterizing night time human behaviour as it relates to residual malaria transmission in sub-Saharan Africa: a review of the published literature. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-019-2638-9.

[2] Sherrard-Smith et al. 2019. Mosquito feeding behavior and how it influences residual malaria transmission across Africa. https://www.pnas.org/content/116/30/15086.short.

Example: Zanzibar

Bwejuu

Charawe

Miwani

Mbaleni

Tunduni

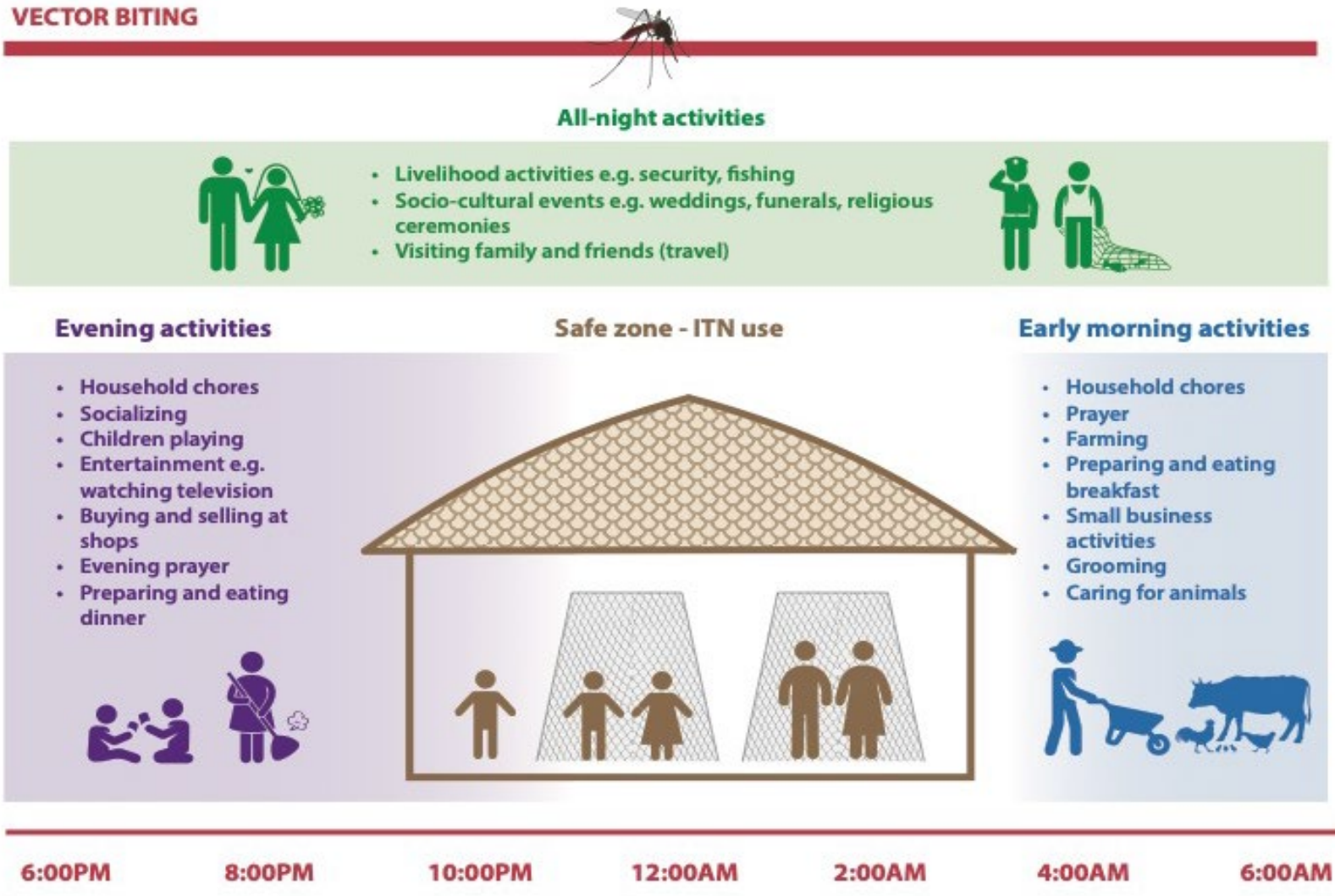
Donge Mchangani

Example: Zanzibar

- Seasonal migration and travel perceived as a critical issue
- Community initiatives for seasonal workers

"Aaa, the challenge is that, those guests who come are not given nets and sleep as a group of 20 or 15 people. They are from outside of Zanzibar…They come for farming, especially during the rainy days."

-Male community leader



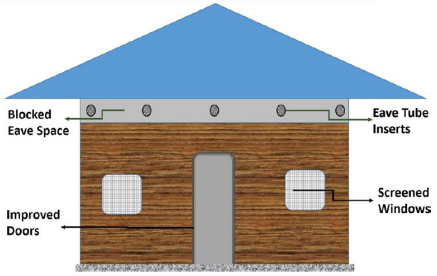
Citation: Monroe et al. 2019. Human behaviour and residual malaria transmission in Zanzibar: findings from in-depth interviews and direct observation of community events. https://malariajournal.biomedcentral.com/articles/10.1186/s12936-019-2855-2

Recommendations

1. Maintain high coverage of core vector control
2. Deploy complementary tools that target mosquitoes outdoors or those that are effective regardless of whether mosquitoes bite indoors or outdoors e.g. larval source management
3. Target interventions and communication to reach higher risk groups and locations
4. Consider expansion of community-level programs targeting seasonal workers and travelers

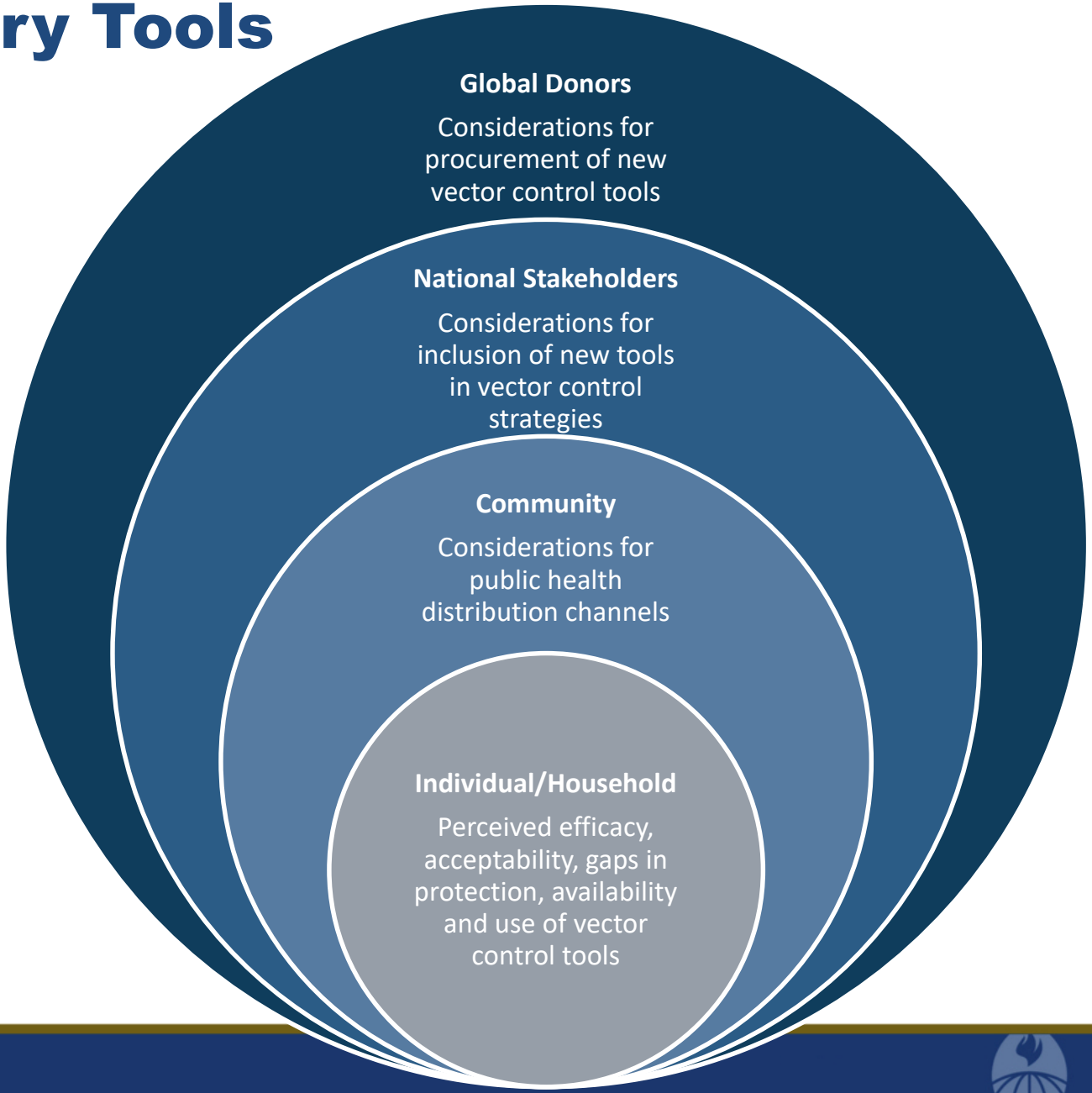
Complementary Tools Available Or In The Pipeline

- Topical repellents
- Insecticide-treated clothing and hammocks
- Larval source management
- Spatial repellents
- Push-pull systems
- Eave tubes and eave baffles
- Attractive targeted sugar baits
- Ivermectin
- Improved housing



Social and Behavioral Considerations for Complementary Tools

Important to understand factors that can influence the **success of new tools at all levels**



Conclusions

1. Effective vector control interventions depend on understanding the perspectives and experiences of the target population
2. It is critical to ask the right questions
3. Human behavior is complex - many factors; many levels
4. For at-risk individuals, malaria is often one of many priorities
5. The most complete picture comes when epidemiological and entomological perspectives are integrated with social science research

Thank You!

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