BED-NET USAGE DETERMINANTS AND USER PREFERENCE IN CAMBODIA

A USER-CENTERED DESIGN APPROACH TO UNDERSTANDING DETERMINANTS AND PREFERENCES ASSOCIATED WITH BED-NET PRODUCT ATTRIBUTES.
INTRODUCTION
Project background, objectives, and research methods
Intro: Project Team

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Lucas Nene Design I Health 2016
From the Brief:
Cambodia, with its heavy reliance on international donor funding, has faced challenges with tailoring bed net procurements to meet local needs. In an effort to build the evidence base to inform future procurement decisions, this study is intended as a preliminary focus group based investigation to gather qualitative data to identify the determinants of net preference, acceptability, use and then to inform the design of a prospective study to correlate these stated net preferences with actual use.

The purpose is not to demonstrate net use, but rather to serve as a preliminary investigation, gathering qualitative data to identify reported net usage practices and the characteristics and determinants of mosquito net preference and acceptability. This information may be used to change BCC practices, or to guide PMI funding priorities for how to best ensure that people sleep under a treated bed net, or to inform the design of a follow-on prospective study to correlate stated preference with actual mosquito net use. This is fully in line with PMI Operational Research priorities to measuring and understand how best to achieve and maintain LLIN ownership and use.

Primary Objective:
To identify the determinants of net preference and use, including net characteristics and other exogenous factors, among Cambodians living in malaria risk areas.

Secondary Objective:
To determine preferences for specific physical characteristics of mosquito nets, both treated and untreated, most strongly correlated with use and non-use in malaria risk populations in Cambodia.

Intro: Project Objectives
Intro: Project phases and research process

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**Design health**

**PSI**

**PSK**

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This research effort utilizes components of User-Centered Design, including methods common to the fields of user experience research, industrial design, and marketing insights analysis.

PSK field data collectors were tasked with probing deeply into the underlying desires and motivators behind stated preferences. This was accomplished using open-ended, conversational interviewing methods. Questionnaires were used as topical guidelines as opposed to structured scripts, allowing data collectors to pursue emergent paths of inquiry while keeping within the boundaries set by the research objectives.

This approach was supported by the Lead Research Consultant who provided introductory, user-centered research and facilitation training to PSK data collectors prior to data collection. The Lead Research Consultant also provided in-field research support (using a dedicated Khmer interpreter) during the first phase of data collection in Steung Treng Province.

Whenever possible, static interviews and focus groups were avoided in favor of dynamic, scenario-based interviews and group facilitations emphasizing collection of respondent-specific contextual and usage behavior.
BED-NET USAGE DETERMINANTS AND USER PREFERENCE IN CAMBODIA
PROTECTION

Foundation observations and insights to frame bed-net user preference and determinants
INFOGRAPHIC: Seasonal Calendar

PART 2: Perceptions of climate as drivers of bed-net usage

Wet months are associated with an increase of insects [including mosquitos], driving bed-net uptake and use during this time. Dry months are associated with less mosquitos and increased breeze, driving inconsistent or complete non-use of bed-nets during this time.
FRAMEWORK: Drivers of bed-net usage in Home and Remote settings.

HOME SETTINGS

- Greater sense of control over environment
- Little sense of threat from malaria
- Fewer perceived mosquitos
- Less risk of damage to bed-net

USER PERCEPTION

Users in Home settings prioritize a comfortable sleeping experience [and bed-nets which provide this] over an exclusive desire for increased protection.

The control users feel over their Home setting, combined with a perception of lower malaria rates, provides the sense of security necessary to prioritize comfort first.

BED-NET PREFERENCE

- CN

ALTERNATIVE BED-NET

- DN

REMOTE SETTINGS

- Little sense of control over environment
- Greater sense of threat from malaria, insects, and other animal threats
- Community reinforced perception of greater threats
- Higher awareness, and perception of, mosquitos and other insects
- Higher risk of damage to bed-net

USER PERCEPTION

In Remote settings, users prioritize security and function first. Culturally driven, community reinforced, perceptions of malaria and mosquito threats combine with other existing and perceived threats to drive a desire for protection, functionality, and adaptability.

Comfort is a “luxury” not expected in this setting- particularly if it can hinder functionality or adaptability.

BED-NET PREFERENCE

- DN
- HN

ALTERNATIVE BED-NET

- CN
COMFORT

Foundation observations and insights to frame bed-net user preference and determinants
CAPACITY
User insights and observations related to interior dimensions, occupant capacity and usage behaviors
INFOGRAPHIC: Common bed-net sizes with perceived capacity

Average height
All dimensions in cm

W: 160  Polyethylene, Cotton
L: 180

W: 180  Polyethylene, Cotton
L: 180

W: 190  Unknown
L: 240  Synthetic

W: 190  Unknown
L: 245  Synthetic

W: 180  Unknown
L: 260  Synthetic
LLIN’s are not large enough for co-sleeping families, driving desire for larger conventional nets.

“If two people, distributed net is comfortable; but we have many members – it’s narrow.”

“I used [the distributed net] for under half a month. It is only suitable for 1 person.”

“Sleeping three people in the distributed net is not comfortable.”

“The LLIN is not big enough for parents and kids to sleep together.”
Currently, conventional nets are the only bed-net products available to meet the size requirements of users.

“For 4-5 people, net should be 3 meters wide.”

“Purchased a 2x2 meter conventional net – four people can sleep in it.”

“I use the big net because I have a lot of children. If I use the [distributed net] it is a bit too small.”

“The size of the distributed net is small for his family, wishes the bed-net could fit six people.”

“Sometime customer needs 2-3m length to load many family members at once.”
INTERIOR SPACE

User insights and drivers related to interior size and the user experience
LLINs do not offer users a comfortable interior height, driving preference and usage of larger conventional nets.

“People prefer market net because distributed net’s height is short...”

“I have suggestion; please, health center, produce taller distributed net... easier to sleep.”

“The distributed net is small and short unlike bed-net from market; it is bigger and higher.”

“The conventional net is high so that it is fresh and comfortable.”

“I think purchased net is good because it’s large for me to move around in.”
FRAMEWORK: Distributed net height leads to untucking and breach

Average height
All dimensions in cm

Manufacturers state LLIN height as 150cm*

+/- 20cm height lost for tucking in mat. Additional height lost due to sagging.

Interior movement leads to untucking and breach

Wind gusts cause untucking and breach

Height is a primary driver of conventional net purchase. Conventional nets observed in the field were frequently 1.8 to 2 meters in height

*150 cm height taken from manufacturers information for LLINs brands observed in the field including Olyset, MAGNet, and Dura Net
MATERIAL ATTRIBUTES

Material attributes as drivers of preferences and determinants
Part 1: Hard/Rough Bed-Nets

Many users lack a technical vocabulary of bed-net materials or manufacturing processes. In place, respondents use physical descriptors of material attributes in order to discuss their preferences, behaviors, and desires.

These material attributes can be divided into two categories:
“Hard/rough” fabrics
“Soft/smooth” fabrics

We observed that “Hard/rough” material attributes were universally associated with LLINs made with polyethylene yarns. These yarns have a “plastic” feeling similar to monofilament fishing net.

Users did not associate “hard/rough” qualities with conventional bed-nets.

While “Hard/rough” is synonymous with polyethylene LLINs, it’s important to note that not all distributed nets are considered “hard/rough.” Distributed hammock nets were not identified as “hard/rough”, nor were some previously distributed nets.

These previously distributed LLINs had material attributes that did not match existing descriptions of polyethylene LLINs, leading the team to conclude that these LLINs could have been made from materials like polyester, or could have been soft/smooth ITNs.
Users associate hard/rough fabrics with strength and durability.

Polyethylene LLINs are thought to be stronger than soft/smooth fabric bed-nets. They are capable of taking more wear and abuse.

“Distributed net is too rough, so very strong.”

“Distributed net is stronger than conventional nets.”

“Distributed net is good...when we sleep and kick or touch it with our nail it was not easy to tear.”

“Distributed net can wash many times and still good fabric.”
Hard/rough fabrics have ‘memory,’ causing these LLINs to retain their shape instead of ‘flowing’ into place like soft/smooth fabrics. As polyethylene LLINs are used, the fabric will begin to shrink, wrinkle, and deform. This negatively impacts the user experience.

“Hard = easy to wrinkle.”
“Shrinkage is because of material… when we use for long time will shrink.”
“Shrink as rubber… when we pull it, elastic like rubber.”
“The [LLIN] that I use is hard and stretchy.”
“Distributed net wrinkled after 2-3 months.”
Conventional nets observed in the field are not made from hard/rough fabrics such as polyethylene. They do not shrink and deform.

This lack of shrinkage and material deformation reinforces preference for conventional nets.

“Purchased net doesn’t get stretchy, shrink, or get bigger mesh holes.”

“Conventional nets A, B, C don’t shrink.”

“The purchased net doesn’t shrink – it kind of expands when it gets older.”

“The longer we use that distributed net, it becomes smaller unlike the purchased one.”
A bed-net’s mesh hole size is the most recognizable and understood protective attribute of a bed-net.

The large mesh holes of polyethylene LLINs cause doubt and concern. Users worry that the mesh hole size is not capable of providing protection.

“Use conventional net in forest because distributed net... holes are big so mosquitos can easily enter.”

“Look at its hole! Is big as a fishing net hole!”

“If its holes are big, I worry about my safety.”

“It has big net mesh so we worry.”

“[First thing noticed when acquiring bed-net], I would think maybe the mosquito can get inside the bed-net.”

“Don’t take distributed net to forest because mosquito can enter when still new.”

“I tested it by catching them to put in the net and then they even got out of the net by themselves.”
A bed-net’s mesh hole size is the most recognizable and understood protective attribute of the bed-net.

Small mesh holes provide an immediate understanding and sense of security for users—indicating a high level of product quality.

“It is quality bed-net it has small [mesh holes]... mosquitos cannot access inside.”

“Small hole bed-net is best.”

“Most important is that it has small [mesh holes]...”

“Small holes make me feel safe.”

“Distributed nets don’t prevent small ants – we need to move to other place.”
CHEMICAL TREATMENT

“Chemical treatment” directly refers to the insecticidal chemicals present in Insecticide Treated Nets, Insecticide Treatment Kit sachets, and Long Lasting Insecticidal Nets.

Because users lack the technical vocabulary to distinguish the type or name of the various chemical compounds, we will use the general translations provided including: “chemical”, “chemical treatment”, and “chemical protection” when referencing the insecticidal chemicals associated with ITNs, ITK, and LLIN products.
Users desire and value the unique protection that chemically treated bed-nets [LLIN/ITN] provide. Chemical treatment is thought to provide increased security and comfort.

“If borrowing bed-net, prefers distributed net because of insecticidal treatment.”

“Conventional net from mobile vendors look beautiful but doesn’t compare in protection.”

“Family praises me when I get net chemically treated because it prevents mosquitoes.”

“The purchased net is good but it doesn’t have the chemical and mosquitoes can get in when it has a rip.”

“Distributed net is small and short but has chemical to protect from cockroaches, mosquitoes, and ants.”
DISTRIBUTION’S AFFECT ON BEDNET USAGE

Distribution program influence on bednet preference and determinants of usage and non-usage
LLIN distribution programs do not consistently account for Cambodian co-sleeping habits. This drives oversupply of distributed nets within some households.

“All members of household will get one [LLIN] each... 5 members, 5 nets.”

“Have 8 members in family and each year get 8 nets. [Two children] use one net- still have four left over and will receive more in a few months.”

“Depends on...family: four people can get 3 nets and 1 hammock net.”
Household level distribution is inconsistent village to village and often ignores existing usage of conventional nets at Home.

This drives oversupply of distributed nets within some households.

“Have 4 conventional nets and 3 [LLINs]...”

“I have three distributed nets but I don’t use them, I use the one I bought from market.”

“All members of household will get one [LLIN] each... 5 members, 5 nets.”

“Family of four, given two distributed nets.”

“If two people, 1 LLIN, four people, 2 LLIN – average of 5-7 people per home.”
Over-supply of LLINs [via frequency of distribution or number of LLINs provided to individual households] incentivizes users to “create value” from this resource.

The product attributes of polyethylene LLINs are not valued as bed-nets – but they are ideal for alternative purposes such as fishing, agricultural, and household use.

“When we have no money, use the distributed net for fishing.”

“I would regret receiving nets that could not be used for fishing.”

“People can’t use that ‘Indian-net’ to hunt the shrimp, but the distributed net can. People receive that net but rarely use it.”

“They will use distributed net for fishing because is mall and easy to use.”

“Lots of people [use LLIN for hunting shrimp] because they don’t use within their family.”
MANAGEMENT OF BEDNET RESOURCES

Management strategies for prolonging bed-net usage in Home and Remote settings
FRAMEWORK: Household Bed-Net Inventory
Distribution programs and product attributes drive how bed-nets are classified and used in order to maximize their usable lifespan.

**END OF LIFE STATUS**
Bed-nets which have been abandoned. These are used for alternative purposes like agriculture and fishing.

**UNUSED STATUS**
New bed-nets [often distributed nets] which remain stored in their packaging, awaiting future use.

**RESERVE STATUS**
Used bed-nets which have lost their chemical, have holes or other defects but still considered usable. These are saved for non-standard activities such as traveling to remote areas, hosting guests, etc..

**ACTIVE USE STATUS**
These bed-nets are used daily by the household. Often includes a large conventional net or mix of conventional and distributed nets.
SUMMARY OF MAIN DRIVERS

Determinants and preferences driving self-selection and purchase of bed-nets
Bed-net size is the biggest aspirational driver for female customers.

This makes size-for-price the primary determinant for customer evaluation and selection of conventional net.

“I like only the big net that will make the sleeping space wide.”

“They love a big net that is comfortable, convenient, large, high if they are rich.”

“Most important for buying bed-net is size and height.”

“I focus on size when buying. I want to know how many people can sleep in.”

“People ask for big net first- then negotiate on price.”
Material type, specifically mesh-hole size, is the secondary determinant of bed-net selection and purchase.

“They buy nets because distributed net has bigger hole than what they buy.”

“I think about material with small holes and big size.”

“I think about material with small holes, big size, and height.”

“I focus on holes when buying. I want small holes when I go to forest and sleep...”
Distributed LLINs are not associated with value or quality. LLINs are products for poor people to use.

“We will use distributed net if NGO give us but if want us to buy [LLIN].. maybe, no.”

“Would absolutely not buy this [LLIN] if sold.”

“Villagers complain distributed net is hard, smells bad, and causes itching.”

“Distributed net has less quality, lasts less time.”

“We can just look at it [LLIN] and know it’s not suitable for using.”

“We don’t complain about distributed net because our living condition not good, so we keep using.”

“At time when my living is difficult, I use [the distributed net].”
Even after receiving a distributed net, users will continue to aspire to, and seek conventional bed-nets.

“Bought a net because distributed net is: small, short, get allergic reaction.”

“Distributed net is difficult to use; that’s why I decided to buy net from market to use.”

“I bought conventional net after I got distributed net- conventional net is easy when relatives visit... bigger than distributed net.”

“Provided 3 distributed nets and I bought my own conventional net and hammock net.”
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