ITN CARE & REPAIR:
Improving Net Lifespan Through Behavior Change Communication

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents do not necessarily reflect the views of USAID or the United States Government.
SUMMARY

The NetWorks project conducted qualitative research and designed Social Behavior Change Communication (SBCC) campaigns in Nigeria and Uganda to test whether SBCC campaigns could improve net care and repair attitudes and behaviors, and whether changes in these behaviors would prolong the useful life of Insecticide Treated Nets (ITNs) in the field.

BACKGROUND

As many countries have now achieved high Insecticide Treated Nets (ITNs) coverage and are approaching their universal coverage targets, maintaining coverage becomes the focus of discussion. ITNs are expected to remain effective for malaria prevention for at least three years, and potentially longer. However, studies have shown that ITNs durability varies greatly under field conditions. In this context, net durability, or median net lifespan, has been increasingly recognized as important in understanding how often nets need to be replaced to maintain universal coverage. Extending the useful life of nets in the field can have implications for procurement and net replacement strategies. Significant cost-savings may be possible if nets last longer. The physical characteristics of the nets themselves are only one component of net durability. The primary factors in net lifespan, however, are related to how the net is used and maintained the household.

Previously, little was known about how ITNs are cared for within households. There was a lack of quantitative and qualitative research examining these behaviors, and the motivators and barriers to net care and repair. In addition, it was not well understood if and how behavior change communication might modify these practices, and how those practices might influence the lifespan of nets.

The NetWorks project examined this issue closely, beginning by establishing working definitions of net care and repair concepts. “Net care and repair” refers to actions that will maintain mosquito nets in good condition so that they continue to be used in homes to prevent malaria. “Caring for nets” refers to actions intended to prevent damage to nets, for example, by handling nets carefully, keeping them away from sources of damage, and washing nets gently and not too often. “Repairing nets” means closing holes and tears by stitching, patching, tying knots, or any other method. A conceptual framework (see Figure 1) presents a number of factors that potentially influence net care and repair, and also lists several of the key net care and repair behaviors.
Figure 1: Conceptual Framework

Attitudes
- Perception of importance of net integrity for net efficacy/prevention
- Perception of malaria risk
- Perception of importance of net integrity for looking good/tidiness
- Perception of net value
- Perception of money saved by using an effective net
- Self-efficacy
- Perception of time available to repair/adapt
- Perception of damage as repairable or not
- Perception that net no longer effective
- Perception that net no longer ‘nice’
- New/replacement nets affordability/accessible

Intentions
- Intend to adapt net
- Intend to avoid holes
- Intend to repair holes
- Intend to replace net

Behaviors
- Adaptive behaviors: Add borders, modify shape to reinforce net
- Preventive behaviors: Careful handling, washing, tying up during the day, drying correctly; avoid fire hazards
- Repair behaviors: Soon after tear; while it is small; sewing, patching, tying
- Replacement behavior and disposal, re-purposing of “old” nets

Outcomes
- Net Integrity
- Impact
  - Longer net lifespan
  - Decreased parasitemia/incidence
  - Program cost-savings
  - Household cost-savings (~10$ per episode)

Social norms and beliefs
Knowledge of how to care and repair

Hundreds of audience members attended village song contest competitions, where local musicians performed original songs and choreography about care and repair of mosquito nets. An intact net and a torn net were on display.
**LEARNING ABOUT NET CARE AND REPAIR**

NetWorks conducted qualitative research in Nigeria, Senegal, Uganda, and Mali to better understand care and repair behavior, attitudes and norms, and determine effective ways to promote behavior for net care repair. The research methods were similar across the countries and these qualitative methods elicited rich, in-depth information on net care and repair from the perspective of net users.

<table>
<thead>
<tr>
<th>Characteristics of Qualitative Studies</th>
<th>Nigeria</th>
<th>Senegal</th>
<th>Uganda</th>
<th>Mali</th>
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<tbody>
<tr>
<td>Participants</td>
<td>Adult net users</td>
<td>Adult net users</td>
<td>Adult net users</td>
<td>Adult net users</td>
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<tr>
<td>Data collection methodologies</td>
<td>Background questionnaire</td>
<td>In-depth interviews</td>
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<td>In-depth interviews</td>
<td>Focus group discussions</td>
<td>Observations of net care practices</td>
<td>Focus group discussions</td>
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<tr>
<td>Study sites</td>
<td>1 rural &amp; 1 peri-urban site in 2 LGAs in Nasarawa State (4 sites)</td>
<td>1 rural &amp; 1 peri-urban site in 8 regions (16 sites)</td>
<td>2 rural sites in the Eastern Region</td>
<td>2 rural and 2 peri-urban sites in Sikasso and Kayes regions</td>
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</tbody>
</table>

**Common themes across studies**

Several key themes were common across the four studies in that respondents shared very similar viewpoints. Similar topics include the ways in which nets are damaged, how damage can be prevented and nets be repaired, and the barriers and motivators of net care and repair behavior.

How do nets become damaged?

- Net damage was common and reported as being caused by behaviors related to daily use.
- The most cited causes were children and rodents. Improper handling and rough surfaces were also mentioned.
- Nets were washed more frequently than recommended, were rubbed vigorously, and often dried in the sun.
- Many people believed that long-lasting ITNs need to be re-treated with insecticide after several washes.

*“Some children can be very foolish in their playing; they can raise up any sharp object and damage the net, knowingly or unknowingly to them.”*

- Nigeria interview participant; mother with a child under five years in rural Nasarawa

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(Insert Table and Text as appropriate)
What motivates net care and repair?

- Rationales for cleaning and repairing nets were cleanliness and aesthetics of the net after.
- Motivations for taking care of and repairing nets centered around caring for one's family, avoiding mosquito bites, saving money, and maintaining the positive opinion of others by keeping a clean and intact net.
- Strong social norms were related to net hygiene and appearance; dirty nets are considered unhealthy and socially unacceptable while clean nets were associated with being a responsible person who cares about the health of their family.

What inhibits net care and repair?

- Barriers to net care and repair related to lack of time or not knowing how to repair.
- Most users would prefer purchasing a new net to repairing an old one, but finances limit their ability to do so.
- Net users do not consider nets to be worthy of repair when they are overly damaged or when holes are too large or too numerous.
- Because of the value placed on net cleanliness, some people may not find it acceptable to reduce the frequency with which they wash their nets.

Nuances across studies

Despite the many similarities across the qualitative research studies, there also were some variations. Such nuances are helpful to better tailor the SBCC interventions to specific contexts. Some of the variations include:

- Several respondents in Nigeria mentioned that washing nets frequently caused them to develop holes and that older nets were more likely to tear during washing.
- In Nigeria, participants felt that washing frequently had an added benefit of keeping rodents away.
- Net repair in Senegal was further limited by the perspective that net degradation was inevitable and that repairs themselves could weaken nets.
- In Senegal, participants were motivated to keep their nets in good condition because they were uncertain when they could expect another net.
- While in Nigeria and Senegal, keeping the net clean was considered part of net care, in Uganda, the term "care" was defined in relationship to damage (or prevention of damage); washing was not considered to be an element of net care.

SBCC CAMPAIGNS IN UGANDA AND NIGERIA

Campaign design and key messages

SBCC campaigns were developed in both Nigeria and Uganda to promote net care and repair behaviors. The SBCC interventions followed the P-process® (CCP) and used an evidence-based design, informed by the qualitative formative research described above. Through this process, the target audience was identified: adults who own and use mosquito nets, with a focus on women, as they tended to be in charge of net care and repair duties. The key messages were also identified and are listed in the table below. Communication efforts focused on reinforcing existing social norms around well-maintained nets and provide people with small doable actions for overcoming barriers.
Materials and messages were designed in collaboration with local malaria stakeholders and creative experts. The multi-channel SBCC strategies in both countries consisted of advocacy, radio broadcasts, inter-personal communication and print materials (primarily job aids). Campaign materials, messages, concepts and radio spots were pre-tested and further refined before launch. In order to make care and repair messages more interesting, NetWorks used entertainment education approaches in both countries; song contests were held in the intervention communities. Every community in the intervention districts composed a song that included a demonstration on proper use and repair of ITNs. Winning songs were professionally recorded and played on the radio. In Uganda the musical troupes had “face-off” competitions across communities and districts to select the winning song, which was endorsed by a popular musical celebrity. Both SBCC campaigns were rolled out in two phases with a midline assessment to inform strategy refinements. The SBCC strategies and other materials used during the campaigns in Nigeria and Uganda are publicly available on the web on the Care and Repair of LLINs eToolkit.

<table>
<thead>
<tr>
<th>Issue to address identified in informative research</th>
<th>Key Messages for SBCC</th>
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</table>
| Known causes of damage of nets | Fold or tie net away when not in use to keep out of reach of children, do not let children play with net  
To avoid attracting rodents, do not soil a net with food, keep food away from nets  
Like a newborn baby, nets need to be handled with care |
| Lack of clarity on what are and how to carry out the concrete care and repair behaviors | You can tie, patch or stitch holes in nets  
Wash nets only when dirty and no more than once every three months, wash gently with mild soap |
| Making net care and repair a priority and incorporated into household routines | Nets are valuable and worth the time to care and repair  
A torn net can still be effective if repaired  
Repair small holes immediately  
When laying out the net for the evening, inspect it regularly for holes  
Holes in your net are like holes in your fence; they can allow thieves (mosquitoes) to enter |

**Highlights from Nigeria**

This SBCC activity, the NetCaRe campaign, took place in 20 rural and peri-urban settlements of Kokona local government area (LGA) in Nasarawa State. Two six-month phases ran between 2012 and 2014. The objective of the pilot was that all households sleeping under ITNs in the participating settlements would have the knowledge, skills and understanding of the importance of maintaining their nets and that they would practice net care and repair behaviors regularly. Both pilots also used community theater, dialogues, and home visits.
Highlights from Uganda

The Net Care and Repair Behavior Change Communication Pilot Campaign was implemented in 30 focal villages within the Serere District between June 2013 and April 2014. Kaliru District served as the control site. The Uganda pilot included an additional component – school-based interventions. School activities included communal sewing sessions, as well as a Music, Dance, and Drama (MDD) competition. Care and repair messaging was embedded in the curricula for children in primary grades 2-7. Students were taught basic net repair and maintenance procedures as part of the regular arts class and students were encouraged to promote these behaviors among their family members.

EVALUATION OF SBCC PILOTS

The SBCC pilots implemented in Nigeria and Uganda were evaluated using a two-stage representative cluster sampling design and collected data at baseline and endline in the intervention and control districts. Household questionnaires collected data on household characteristics, attitudes, and beliefs towards care and repair, recall to the campaign messages, and reported care and repair behavior. In addition, the physical condition of household nets was assessed at baseline and endline. Net integrity was measured by observing nets and documenting the number and size of the holes using the proportionate hole index (pHI) method, as recommended by the World Health Organization. Using this method, nets were classified into three categories: ‘good’, ‘damaged’, and ‘too torn’. Nets in the categories ‘good’ and ‘damaged’ are considered still ‘serviceable’ nets. Outcome measures such as net attrition rate, percentage of nets in serviceable condition, and median net lifespan were also analyzed.

Results in Nigeria

The SBCC intervention was targeted for communities in Kokona LGA, where 72.7% of survey respondents reported exposure to any care and repair message in the previous six months. However, exposure to the campaign messages was also relatively high in the control LGA of Toto, at 46.8%. Respondents in the control communities heard the campaign messages primarily via radio (29.1%) and health workers (15.5%), indicating that a boost in signal strength of the local radio station during the course of the SBCC intervention resulted in care and repair messages reaching the control LGA. As a result of this “contamination” effect of the SBCC campaign, the survey data was analyzed according to exposure to messages.

The level of exposure (“dose”), based on the number of different sources of information that respondents cited, was positively associated with attitude scores. Attitude scores were calculated from eight questions to create a composite score indicating how confident
respondents were about net care and repair and how normative they felt these behaviors were. The more sources respondents cited, the more likely they were to have a more positive attitude towards net care and repair, indicating a significant effect of the SBCC campaign on attitudes.

Attitudes were also positively associated with observed repairs made to nets, and with the proportion of nets in serviceable condition (Figure 2). Nearly 60% of nets in households with positive attitude or very positive attitude were in serviceable condition, compared to only 18% of nets in households with negative attitudes. On the other hand, repair behaviors required having a very positive attitude in order to be practiced; net repairs improved by being in households with very positive attitudes – households with poor attitude or positive attitude did not have as many nets repaired (15-17%).

In Nigeria, positive attitudes to net care and repair were also associated with a full 12-month improvement in median estimated net lifespan (Figure 3). Attitudes and exposure to the SBCC campaign remained the most significant predictors of net condition even when controlling for household characteristics, such as number of children under five, wealth quintile, and education level of head of household.

When not in use, tying or folding up a net is an effective way to prevent damage to nets, especially damage caused by children or rodents.
The proof of principle pilot achieved its objectives. Specifically, exposure to SBCC interventions was associated with positive attitudes regarding net care and repair, which in turn were associated with more repaired nets and nets in better condition. As a result of the pilot’s success, Nigeria has started to integrate the net care and repair key messages into existing malaria SBCC platforms.

Results in Uganda

In Uganda, the SBCC campaign succeeded at reaching its target population; 81% exposure reported in the intervention site vs 49% in the control site. As in Nigeria, increasing exposure was associated with more positive attitudes towards net care and repair (Figure 4). There was some exposure to messages even in the control district, and the association was observed there, but to a lesser degree than in the intervention district.

Nets in Uganda also showed a significant correlation with household attitudes towards care and repair. Nets in households with a positive or very positive attitude were about twice as likely to be in serviceable condition at endline, compared to nets in households with negative attitude, even when controlling for background characteristics (Figure 5).

The impact of the Uganda SBCC efforts on net integrity showed results similar to those in Nigeria. The SBCC campaign reached its target audience and influenced attitudes, and those attitudes in turn had a significant effect on net condition.

MOVING FORWARD WITH NET CARE & REPAIR MESSAGING

These studies provide valuable insight into perceptions and attitudes of Insecticide Treated Nets (ITNs) users related to care and repair of Insecticide Treated Nets (ITNs). This is the first time there has been clear evidence about the impact of SBCC on care and repair behavior and the impact of changes in behavior on the useful life on nets.
Evidence shows that preventative behaviors are more important than repair behaviors. Nets that were tied up during the day tended to be in better condition, and the presence of repairs to nets did not significantly improve their condition. The pilots also showed that behavior change related to preventing damage is easier to induce than change related to repairing nets. Therefore, getting people to prevent holes is likely to have the biggest impact on overall net condition.

This evidence suggests ways to use SBCC messaging to increase the lifespan of Insecticide Treated Nets (ITNs). In general, messages should promote the benefits of intact nets and address barriers to care and repair.

Specifically, SBCC should encourage people to take good care of them as part of their daily activities. Messages should include compelling motivators, such as local social norms related to net aesthetics. Following best practices for SBCC, formative research prior to constructing messages can ensure that the language used fits the local context, and new messages and materials should be pretested before finalization.

Promotion of care and repair behaviors through SBCC can cultivate positive attitudes towards net care and repair. These attitudes result in improved behaviors and contribute to a stronger net use culture. Further, SBCC efforts can change behaviors that impact Insecticide Treated Nets (ITNs) longevity. Theoretically, these results indicate that SBCC saves money, but more evidence from more countries is still needed to prove this point.

Next Steps

While these pilots utilized a stand-alone intervention, reinforcing care and repair behavior does not need to be a separate activity, as it is easily integrated into existing malaria-related SBCC efforts. The key care and repair messages can be included into existing malaria SBCC strategies simply by adding a radio spot, updating content within job aids, and including the messages during trainings with community health workers.

Key Messages
- Be careful with your net
- “Tie it up, fold it up”
- Inspect nets regularly
- Repair holes promptly
already working on malaria. Like net use messages, care and repair messages should be included at the time of ITNs distribution and given out continuously to net users to remind them of this everyday maintenance behavior.

The cost of integrating care and repair messages into larger malaria communication efforts is negligible: these are simple, inexpensive, and feasible actions. These studies have shown that they are very likely to result in longer life of nets and better protection of families.

For more information:

In addition to the references listed below, the Care and Repair of LLINs eToolkit contains many valuable resources for understanding care and repair behaviors, implementing SBCC interventions, measuring care and repair attitudes and behavior, and evaluating net condition.


Loll DK et al. “‘You need to take care of it like you take care of your soul’: perceptions and behaviours related to mosquito net damage, care, and repair in Senegal.” Malaria Journal 2014 12:322.


NetWorks. “Insecticide Treated Nets (ITNs) care and repair abstracts.” Available at https://www.k4health.org/toolkits/care-repair-Insecticide Treated Nets (ITNs)/peer-reviewed-literature


