

Consensus Statement on Repurposing ITNs: Applications for BCC Messaging and Actions at the Country Level

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Introduction

In 2014, the World Health Organization (WHO) Global Malaria Programme issued recommendations on the sound management of old long-lasting insecticide-treated nets (ITNs).¹ The policy memo provides succinct guidance on ITN misuse but does not provide recommendations for the safe repurposing of old ITNs. There is a growing demand for guidance on what to do with old or worn-out ITNs throughout their life cycle. This consensus statement provides National Malaria Control/Elimination Programs (NMCPs) and implementing partners with clear recommendations and key messages on three categories of repurposing: beneficial repurposing, neutral repurposing, and misuse.

With the introduction of universal coverage strategies and the ongoing distribution and sale of ITNs, more people have access to and are using ITNs. Older ITNs accumulate in households as they are replaced with new ITNs, and given the lack of environmentally sustainable disposal options, households are instead repurposing the old ITNs. Households have demonstrated countless ways to repurpose an old ITN, including protecting seedlings, creating screening for window and doors, or using under a mattress as pest control. There are also reports of community leaders instituting fines or penalties for families who repurpose or misuse ITNs. This consensus statement provides guidance on preventing ITN misuse and repurposing ITN materials without reprisal.

Definitions

With the growing demand for guidance on what to do with old or worn-out ITNs, it is essential to understand the three categories of ITNs that will be referred to throughout this statement. These categories are:

- **New ITN:** An ITN obtained from the most recent campaign or distribution.
- **Old ITN:** An ITN obtained in an earlier distribution (e.g., a previous campaign or from an antenatal care visit), which may still be used to protect a sleeping space.
- **Inactive ITN:** An ITN that is no longer used by a household to protect a sleeping space for whatever reason, including that it could be torn, dirty or no longer needed. Inactive could also refer to a presumed lack of insecticide if the owner no longer perceives the net to be killing insects. Whether an ITN is considered inactive is determined by the household and does not necessarily reflect quantitative thresholds of efficacy determined by proportionate hole index, bioassay, packaging expiration date, or other methods. Perceptions of whether an ITN is inactive vary among settings and between households.

Bearing in mind these definitions, there are three types of ITN repurposing that are most common:

¹ World Health Organization (WHO). (2014). WHO recommendations on the sound management of old long-lasting insecticidal nets. Geneva: WHO. <http://www.who.int/malaria/publications/atoz/who-recommendation-managing-old-llins/en/>

- **Beneficial repurposing:** The use of inactive ITNs for purposes other than for sleeping under to protect against malaria infection. It is considered beneficial because the ITN material continues to act as a barrier against mosquitos. Examples of beneficial repurposing include using old or inactive ITNs as curtains, patches for holes in viable nets, stuffing eaves, and constructing window or door screening.
- **Neutral Repurposing:** The use of inactive ITNs for household uses that do not prevent mosquito bites. Examples include covering latrines, protecting seedlings, fencing, transporting and storing crops, screening of poultry or animal enclosures, soccer goals, tearing into strips for tying objects, and other household uses.
- **Misuse:** The use of an active ITN for purposes other than its intended use as a bed net to protect against malaria infection, with added environmental harm. Misuse of ITNs is not acceptable under any circumstances and not only defeats the public health purpose of providing protection from malaria, but can also have negative environmental outcomes.² Using a new or old ITN—one that is still useful for sleeping under—for another purpose is misuse. Using any ITN, whether new, old, or inactive, for fishing, is the prime example of misuse.

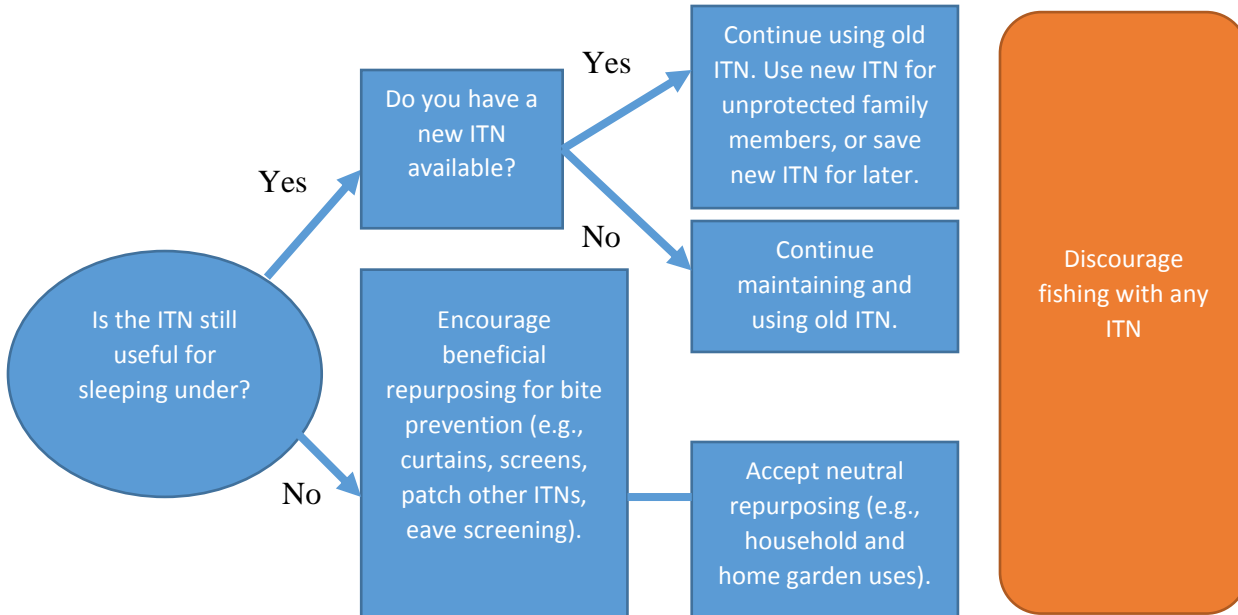
Recommendations & BCC Messaging

Assuming that households have enough ITNs to sleep under, both beneficial and neutral repurposing of inactive nets is acceptable. Households' main priority should be protecting themselves from mosquito bites by sleeping under an ITN.

Since households have autonomy over their ITNs and how they are used, they ultimately make the decision about whether an ITN is still useful for sleeping under. Figure 1 is a flowchart that makes it easy for decision makers to understand when ITNs can and cannot be repurposed and for what beneficial uses.

² USAID Programmatic Environmental Assessment: Integrated Vector Management Program for Malaria Vector Control. 2016 update.
<https://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/usaaid-2016-update-to-programmatic-environmental-assessment-ivm-mvc.pdf>

Figure 1: Flowchart of recommendations for ITN use and repurposing



The following recommendations can be translated into key messages for NMCPs and implementing partners to reinforce the ideas behind beneficial and neutral repurposing and ITN misuse.

- Households should continue to maintain and use their ITNs for as long as possible and follow recommendations for effective care to prolong useful life. Any ITN is better than no ITN.
- Households are encouraged to continue using old ITNs until they are worn, then switch to new ITNs when they become available.
- SBCC messaging can and should be used to extend the perceived life span of ITNs before they are deemed inactive by households.³
- Community leaders and households should work together to promote beneficial repurposing, accept neutral repurposing, and discourage misuse.
- Once a family deems an ITN inactive, beneficial repurposing is recommended and should be promoted.
- Neutral repurposing of inactive nets is acceptable.
- Repurposing new ITNs is never acceptable.
- Fishing with any ITN is never acceptable.
- New nets may be stored—away from rodents and children—for a period of time while older nets are still useful for sleeping under.
- National programs can clarify misuse and discourage specific practices, through a combination of structural interventions (e.g., fines and policing) and SBCC messaging. Enforcement policies should take into consideration whether fines/penalties may have the unintended consequence of further impoverishing vulnerable groups.

³ Koenker et al (2015). Impact of a behaviour change intervention on long-lasting insecticidal net care and repair behaviour and net condition in Nasarawa State, Nigeria. *Malaria Journal*. 14(18).

Evidence Base

These recommendations are based on the evidence that ITNs pose little or no hazard to human health. The following findings are from relevant evaluations, policy documents, and other background information.

Toxicity of pyrethrins and pyrethroids to humans:

- The field use of pyrethroids poses little or no hazard to people treating nets or to users of treated nets.⁴
- Pyrethroid insecticides are approved for use on ITNs due to their safety for humans and repellency, high knock down effect, and mosquito irritancy and efficacy at low dosages.⁵ These insecticides have been shown to pose very low health risks to humans and other mammals, and do not rapidly break down unless washed or exposed to sunlight.⁶ Note that ITNs repurposed for doors (latrines, fencing, vegetable covers) would be subject to intense sun exposure, leading to accelerated breakdown of pyrethroids compared to indoor use.

Human exposure via transfer to edible crops:

- Pyrethrins and pyrethroids adsorb strongly to soils and are not taken up substantially by the roots of vascular plants⁸.
- These compounds have been widely used in agricultural pest control; little hazard is posed to mammals (including humans) by natural routes of exposure resulting from the normal use of pyrethrin or pyrethroid-containing substances⁸.
- Use of old ITN netting on edible crops is unlikely to result in any acute exposures to the insecticides.

Toxicity of pyrethrins and pyrethroids to fish and other aquatic life:

- Pyrethroid compounds do bioconcentrate in aquatic organisms and can be extremely toxic to fish.⁷ A modeling study examining how ITNs might release insecticide when submerged in water bodies found aquatic macroinvertebrates (such as shrimp) are generally more at risk than fish species, but interaction between specific insecticides and the environment modifies this relationship.⁸

⁴ Zaim M, Aitio A, Nakashima N (2000). Safety of pyrethroid treated mosquito nets. *Medical & Veterinary Entomology*, 14(1):1–5.

⁵ World Health Organization (WHO). Safety of pyrethroids for public health use. WHO/CDS/WHOPEP/GCDPP/2005.10 WHO/PCS/RA/2005.1. http://apps.who.int/iris/bitstream/10665/69008/1/WHO_CDS_WHOPEP_GCDPP_2005.10.pdf

⁶ USAID Programmatic Environmental Assessment: Integrated Vector Management Program for Malaria Vector Control. 2016 update. <https://www.pmi.gov/docs/default-source/default-document-library/tools-curricula/usaaid-2016-update-to-programmatic-environmental-assessment-ivm-mvc.pdf>

⁷ US Department of Health and Human Services. (2003). Toxicological profile of pyrethrins and pyrethroids. <https://www.atsdr.cdc.gov/toxprofiles/tp155.pdf>

⁸ Lawson J, Harman C, Bouwer E. Assessing the potential toxicity hazard to aquatic life from immersion of insecticide-treated mosquito nets during fishing and washing. Presented at the American Society of Tropical Medicine and Hygiene Annual Meeting, November 16, 2016. <http://www.abstractsonline.com/pp8/#!/4114/presentation/1646>