Insecticide-treated nets (ITNs) are the most effective intervention for preventing malaria; they are credited with averting 68% of cases from 2000-2015 [1]. ITNs are being distributed at a massive scale; 684 million ITNs were distributed globally from 2015 to 2017 and they are replaced periodically, usually at 3-year intervals [2]. Durability monitoring studies have shown that ITNs wear out at different rates and these studies shed light on the factors affecting ITN durability.

1. Maximizing ITN survival is essential to sustaining gains in malaria. People can’t use a net when they don’t have one, and “net too torn” is the most common reason for discarding nets [3]. Nets are replaced on the assumption that they have a median survival time of 3 years, but this means that only 50% of nets are still usable after 3 years; these rates may have already dropped to 70-90% the year before [4, 5, 6, 7, 8]. Consequently, between the time of the first distribution and the next one, a large proportion of the population has been potentially exposed to malaria-carrying mosquitoes as more and more nets wear out.

2. ITN survival can vary dramatically from place to place. Findings from several sites, including Myanmar, the Democratic Republic of Congo (DRC), Zanzibar, Nigeria, Tanzania, and Mozambique show a wide range of median survival times, from 1.6 years in DRC to 3, 4 or even 5 years in other places [4, 5, 6, 7, 8, 3, 9]. These findings suggest that in some places, nets may need to be replaced more frequently. Whether this can be done by mass campaigns for specific regions (particularly if the country wants to maintain an overall 3-year cycle) or continuous distribution will depend on the operational context [10, 11]. On the other hand, places with longer median survival times could distribute nets at wider intervals, freeing up resources for more nets [5, 12].

3. Human behavior – particularly net care - is a major determinant of ITN survival. Contrary to some expectations, the differences in net survival are largely due to the way households handle nets, not climate or brand. For example, almost all (98%) of nets in Mongala, DRC (median survival of 1.6 years) were found hanging loosely during the day, while this was the case for only 15% in Zamfara, Nigeria (where nets have a median survival time of 5.3 years) [5, 7]. While demographics, such as the number of children in the household, and types of sleeping spaces, such as mats, may influence net durability, these factors are outside the control of national malaria control programs and good care behavior may overcome some of these issues [12].
4. **Net care should be a priority theme in social and behavior change (SBC) programs.** Having very positive attitudes toward net care has been shown to have a protective effect on ITN durability [12]. Pilots of net care social and behavior change communication campaigns have found that SBC can positively influence net care attitudes and median survival [13, 14, 15]. Studies have also found that the decision to discard a net is subjective; some households consider lightly damaged nets as “too torn” even though others in similar condition are used in the same community [16]. WHO encourages households to use their ITNs for as long as possible, because any ITN (even a very torn one) is better than none [17]. Even though not every region in every endemic country will have durability monitoring data, questions to track net care attitudes and practices can be incorporated in Malaria Behavior Surveys, knowledge, attitude, and practice (KAP) surveys, and other household surveys [18].

Since most people usually cannot obtain new ITNs outside periodic mass distributions, promoting net care gives households an opportunity to maximize access by prolonging the usability of the ITNs they do have. Good net care behaviors, such as tying or folding up the net when not in use, are small doable actions that cost nothing for households to practice and they take little time. Importantly, they empower households with a proven way to protect their families from malaria [13].

5. **There will be an ongoing need to monitor ITN quality.** In addition to measuring median ITN survival rates, durability monitoring can identify issues that may arise in the manufacturing process such as insecticide loss, textile insufficiency, or seam failures. Some post-market surveillance from multiple sites is necessary to understand whether quality standards are being maintained. It will also be useful to monitor new types of nets. While there is little reason to believe that the physical durability of nets with new active ingredients will be different, understanding how long the active ingredients are effective on these nets is of crucial importance.

Durability monitoring studies can be used to fine-tune distribution strategies and protect investments in nets. Durability monitoring data should be triangulated with an understanding of the operational context to identify the best mix and timing of net distribution channels [10, 11]. Since the data shows considerable room for improvement in net care behaviors in most sites thus far, concerted SBC efforts are also needed [4, 5, 6, 7, 8, 12]. Prolonging ITN survival is possible, and there are evidence and tools for how it might be achieved [13, 14, 13].
Key resources:

- **ITN Distribution Strategy Decision Flowchart** – a decision tree for selecting distribution channels based on an understanding of the local operational context
- **NetCALC** – a tool for modelling ITN distribution approaches based on country-specific data
- **Incorporating net care into malaria social and behavior change communication strategies: a step-by-step guide** – SBC guidance

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