



**NetMark Formative
Qualitative Research
on Insecticide Treated
Materials (ITMs)
in Uganda**

February 2001



NetMark Formative Qualitative Research on Insecticide Treated Materials (ITMs) in Uganda is a publication of the NetMark Project. NetMark is supported by the U.S. Agency for International Development under Cooperative Agreement No.HRN-A-00-99-00016-00 and managed by the Academy for Educational Development. The opinions expressed here are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development or the Academy for Educational Development.



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ACKNOWLEDGEMENTS

This study was conducted by the NetMark Project of the Academy for Educational Development. The United States Agency for International Development (USAID) provided funding for this research. Research International (RI) was contracted to implement the research.

A number of individuals participated in the development, conduct, and/or analysis and report writing of this research. Dr. Carol Baume provided overall technical direction for the study. Dr Halima Mwenesi led the fieldwork, which was conducted by local Ugandan data collectors, affiliated with RI. Dr. Nancy Nachbar took the lead role in analyzing the data and writing the report.

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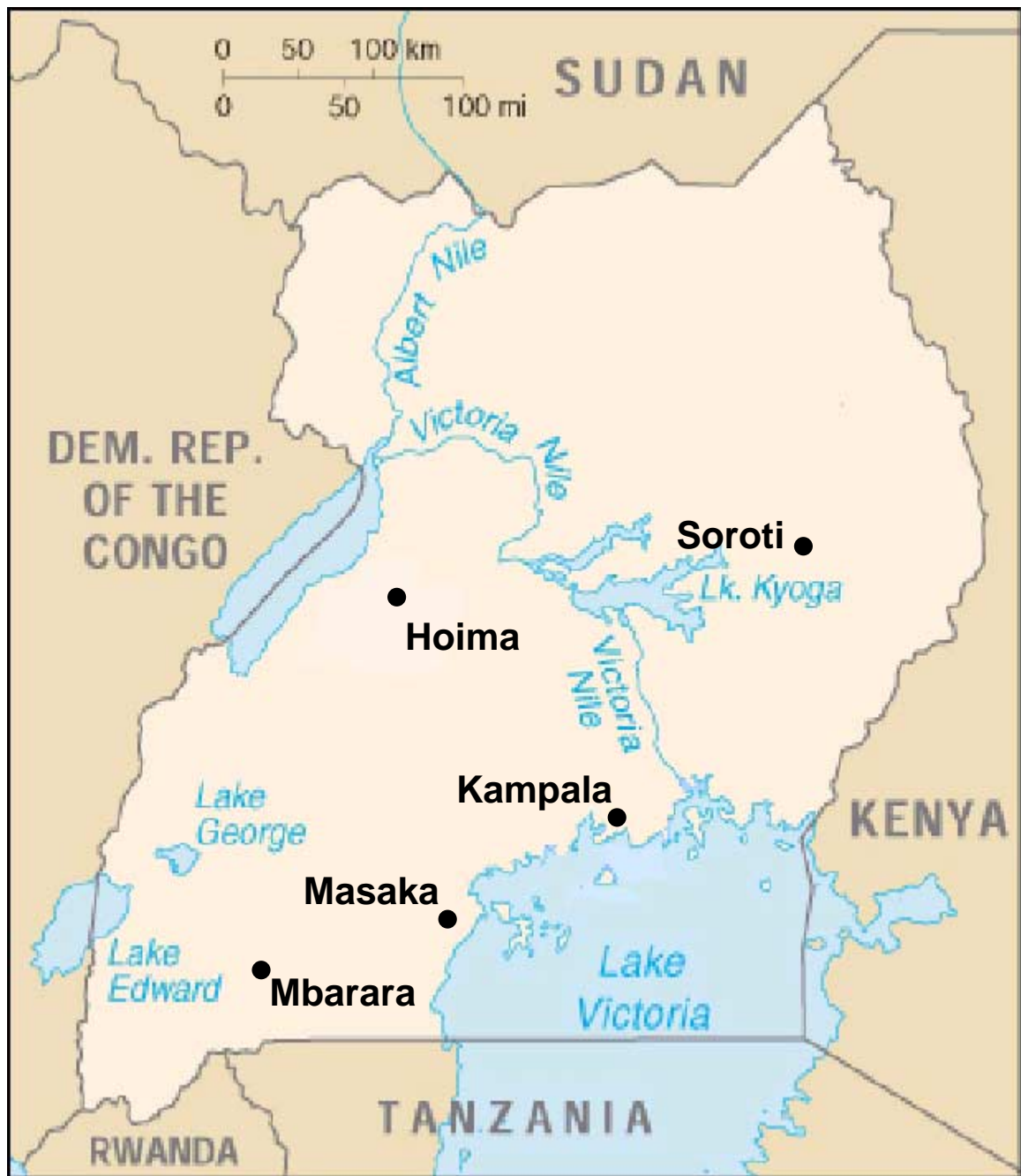
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ACRONYMS

AED	Academy for Educational Development
AMREF	African Medical and Research Foundation
CCF	Christian Children’s Fund
ITM	Insecticide Treated Material
RI	Research International
SES	Socio-economic Status
Unicef	United Nations Children’s Fund
USAID	United States Agency for International Development
WHO	World Health Organization

MAP OF UGANDA



SUMMARY OF FINDINGS

General knowledge about malaria was good. The English term “malaria” was universally recognized and respondents named symptoms of malaria that are generally consistent with biomedical definitions of the illness. Most but not all respondents considered malaria to be serious. Respondents had good general knowledge that children (but not necessarily children between 0-5) are vulnerable to a serious case of the malaria. Awareness that pregnant women are especially vulnerable appeared lower. Almost everyone knew that mosquitoes cause malaria, but some thought there were other causes as well.

Mosquitoes were perceived as a major problem, and almost everyone, even in rural areas, used some kind of commercial mosquito control product (e.g., coils or aerosols). Respondents had relatively negative perceptions of all mosquito control methods, including nets, although more respondents had positive things to say about nets than they did about other products.

The main reasons respondents liked nets were because they protect against mosquitoes/other insects, protect against illness/malaria, and are “long-lasting.” Respondents (net owners and non-owners) viewed net owners as “knowledgeable” and net owners saw themselves as economically savvy, “health conscious” and “caring.” Nets were also viewed as a luxury item, reserved for the rich and educated.

The main disadvantages to owning or sleeping under a net were that respondents perceived nets as hot, restrictive, expensive, unable to protect the entire family, ineffective, and inconvenient to get in and out of or to hang. Some respondents said nets were difficult to use with children (e.g., children could become trapped or suffocate, were hard to keep under the net, might damage the net). The main reason non-owners gave for lack of net ownership was cost, but a few said nets were either unavailable or unnecessary when other insect control products were used.

There was evidence of limited access to adult-size nets. Net owners and traders were relatively easy to locate in urban areas, but much more difficult to find in rural areas. Nets were sold mostly in open-air markets and by hawkers and most net owners reported buying their nets from these sources. Some net traders sold a variety of net sizes, shapes, and colors, but others had a very limited selection. Only one trader sold treated nets. Consumers generally preferred rectangular nets to conical ones. Rectangular nets were liked because they are roomy and fit the shape of the bed. Conical nets were liked because they are easy to hang. Consumers also preferred light-colored nets. Although most consumers owned double- and single-size nets, they generally preferred large sizes (double, king/family, or for a bunk bed). Net prices varied widely. Traders reported selling nets for between US\$3.80 and \$12.70, depending on the size, shape, color, and material. Consumers reported buying single-size nets for between US\$3.20 and \$9.50 and double-size nets for US\$4.40 and \$13.90. Both fathers and mothers made the decision to buy and purchased nets. Baby-net ownership was not common.¹

Nets were not necessarily used year-round; some households reported using them only in rainy season. Vulnerable groups were generally given priority for sleeping under a net; almost all net owners reported that all their children under five slept under a net the prior night. Two women in net-owning households were pregnant and both slept under a net the prior night.

¹ Baby nets are very small, umbrella-shaped nets that stand alone and only fit an infant.

Nets were generally washed at least once a month, typically with water and soap, along with other clothes in a basin used for this purpose or for bathing. A few people added bleach and nets were often soaked in “Omo” (a brand of lye-based detergent soap) before washing and were hung in the sun to dry. Some respondents worried about how washing would affect treated nets and about the required frequency of treatment purchase.

The concept of treating nets with insecticide was largely unknown and no consumer had ever done so. Traders and consumers generally liked the idea of insecticide treated materials (ITMs), but parents were very concerned about their potential danger, especially to children and pregnant women. Some respondents also expressed strong distrust of manufacturers’ motivations for bringing such chemicals to market. However, consumers said they would feel better if assured by a range of credible sources and activities (e.g., product demonstrations) that the treatment products were safe.

Insecticide treatments appeared to be unavailable in the commercial sector; no insecticide treatment traders were found and only one trader was selling pretreated nets. Some traders had never heard of treating nets with insecticide. Although most traders interviewed were enthusiastic about and interested in selling the treatments, some said they could not do so because the market for nets and insecticides is specialized; traders who sold nets generally did not sell other insect control products, such as coils and aerosols.

Traders of insect control products often sold more expensive goods. Net traders said they often gave their customers advice about nets, but this advice was about washing, not about malaria protection. Net traders were motivated to sell nets because of high consumer demand, potential for profit, and a desire to help prevent malaria. Traders said they would be inclined to purchase goods from specific suppliers if they received special incentives.

Consumers and traders wanted net treatments that thoroughly covered/saturated the net; were easy to use, fast, and convenient; required no mixing; dried easily; were safe to use, especially around children; had no bad odor; caused no irritation; and were not wasted in the air. Respondents were shown four dipping products (a tablet, granules in a sachet, liquid in a sachet, and liquid in a bottle) and two spraying options (an aerosol and a flit-gun sprayer). Consumers strongly preferred dipping products to the flit-gun sprayer but expressed no clear preference for dipping products over the aerosol spray. Traders overwhelmingly preferred the aerosol spray to any other option. They liked this product because it was easy to use, already mixed, and was not time consuming. Among the dipping options, consumers expressed no strong preference for one product over others, but traders strongly preferred the liquid in a bottle to any other dipping product. The liquid in a bottle was liked because it dissolved easily in water, and came with a plastic bag with a water demarcation line. Consumers worried about products that could spill, that were perceived to be in insecure packaging, and that children could easily swallow.

SECTION 1

INTRODUCTION

1.1 BACKGROUND

The Problem of Malaria

Malaria is a growing health problem in Africa. Each year, 300-500 million people worldwide suffer from the disease, with 9 out of 10 cases occurring in sub-Saharan Africa (WHO, 1998). Malaria kills at least 1 million people each year and the vast majority of deaths occur among children less than five years of age. In Africa, one out of twenty children is likely to die of a malaria-related illness before his fifth birthday (WHO, 1999). Pregnant women are also particularly susceptible to the disease. Malaria during pregnancy causes severe anemia, miscarriages, stillbirths, and maternal deaths, and may account for up to 40% of preventable low birth weight among newborns in endemic areas (Brabin, 1991; Unicef, 1999). Malaria places a staggering economic burden on already strained national economies and on struggling families. The disease cost sub-Saharan African nations more than US\$2 billion in 1997 (WHO, 1998) and has slowed economic growth in Africa by up to 1.3% each year (Gallup & Sachs, 2000). In addition, malaria reduces human work capacity and productivity, and affects social development indicators such as child health and school attendance (Global Forum for Health Research, 2000).

Consistent use of mosquito nets and curtains that have been treated with insecticide—insecticide treated materials, or ITMs—has been proven effective in reducing malaria. Current data indicate that ITM use can prevent 19% of child deaths from all causes, with some country-specific studies in Africa suggesting that as much as 42% of all-cause mortality among children under-five can be averted. Additionally, malaria morbidity in children under five has been shown to decrease by as much as 21-72% when ITMs are used (Lengeler, 1998).

To date, however, few families in Africa have mosquito nets and there has been little consumer marketing and distribution of ITMs in most African countries. Where they have been marketed (e.g., Tanzania and The Gambia), their supply has been limited and often donor-organized and subsidized. Currently, many households use other anti-mosquito measures such as coils and aerosol sprays to prevent nuisance biting, but the efficacy of these products in preventing malaria remains unknown.

NetMark

NetMark is a United States Agency for International Development (USAID)-funded effort to promote the use of ITMs to prevent malaria in sub-Saharan Africa through the formation of public-private partnerships. Managed and carried out by the Academy for Educational Development (AED), the NetMark partnership includes, in addition to AED, the U.S. Government, The Malaria Consortium of the London and Liverpool Schools of Hygiene and Tropical Medicine, The Johns Hopkins School of Hygiene and Public Health, and Group Africa. The primary goal of NetMark is to develop a sustainable market for ITMs, especially mosquito nets (bednets), in target countries in Africa. The main objectives of the project are to increase the proportion of households that own ITMs; increase nightly use of treated nets, especially by those most vulnerable to malaria (pregnant women and children under five years of age); and increase the proportion of net owners who regularly retreat their nets with insecticide.

1.2 OBJECTIVES OF THE FORMATIVE RESEARCH

As part of a comprehensive research agenda that includes both market and behavioral research, NetMark conducted qualitative formative research in Nigeria, Senegal, Uganda, and Zambia in order to:

- identify the factors that encourage and discourage:
 - acquisition of nets
 - retreatment of nets with insecticide and
 - use of treated nets by children under five and pregnant women
- provide information for decisions about the characteristics of products (nets and insecticide treatments) to make them as acceptable to consumers as possible
- determine the best promotional strategies for increasing net ownership and correct use of ITMs
- assess aspects of the insect control trade that have implications for the marketing and distribution of nets and insecticide treatments for nets and
- aid in the development of the next phase of research, specifically, the market volume and pricing study (MicroTest™) and the baseline household evaluation survey.

Under contract from NetMark, Research International implemented the study jointly with NetMark.

1.3 SAMPLE AND METHODS

Five sites were selected to represent the geo-ethnic diversity of the country: Kampala, Hoima, Mbarara, Masaka, and Soroti. Because of the insecure situation in the north, the far northern part of the country was not included in the study. Two sites, Masaka and Soroti were purposively chosen because they were sites of ITM promotion; Christian Children's Fund (CCF) is working in Masaka and African Medical and Research Foundation (AMREF) is operating in Soroti. These sites were selected in order to maximize the ability to obtain information from net owners regarding net purchase, use, and treatment.² Table 1.1 identifies the location and ethnic make-up of each site. In each of the sites, an urban area plus a rural community located about 15-20 km away from the urban site were included in the study, for a total of 10 communities in the sample.

² Following data collection, it was learned that the District Health Service (DHS) is providing subsidized ITMs in the Hoima.

Table 1.1: Study sites, location and main ethnic/language groups

SITE	DISTRICT	ETHNIC GROUP/LANGUAGE
Kampala	Central	Baganda
Hoima	Western	Rutoro
Masaka	South Baganda	Baganda
Mbarara	Southern	Banyankore
Soroti	Eastern	Ateso (and Kumam, Kiswahili)

The full formative research protocol utilized a variety of methods and included both consumers and traders. In Uganda, this study consisted of:

- 50 *interviews with parents (or guardians)* of children under five
- 10 *focus group discussions* with parents of children under five
- 30 *treatment product demonstration observations* with parents of children under five
- 32 *interviews with the traders* of insect control products

The following table provides a breakdown of data collection methods by site:

Table 1.2: Breakdown of data collection methods by study site

SITE	CONSUMER INTERVIEW	FOCUS GROUP	PRODUCT DEMONSTRATION OBSERVATION	TRADE INTERVIEW
Kampala	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	9 (urban/rural mix)
Hoima	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (urban/rural mix)
Mbarara	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (urban/rural mix)
Masaka	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 2 rural)	8 (urban/rural mix)
Soroti	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (urban/rural mix)
TOTAL	50	10	30	32

Consumer Component:

The consumer interviews and focus group discussions were designed to elicit information on:

- perceptions of the connection between mosquitoes and illness
- awareness, perceptions, and use of mosquito control products, including nets
- barriers/facilitators to net ownership
- net purchase decision-making
- barriers/facilitators to use of nets and ITMs by children under five and pregnant women
- perceptions of and preferences for nets and ITMs

For the interviews with parents of children under five, field workers deliberately selected some respondents who owned nets. The interview sample included of 27 adult-size net owners (out of 50 respondents). Of the 50 interviews, 23 were conducted with men and 27 with women. On average, 8 individuals participated in each focus group discussion. In urban Kampala, focus group participants came from the upper and upper middle classes. The rest of the urban focus group discussions were conducted with middle class participants and the rural ones were held with participants of lower middle and lower socio-economic status (SES). Half of the focus groups were conducted with men and half were held with women. Table 1.3 provides a breakdown of the study sample by gender.

The purpose of the product demonstrations, conducted with a subset of consumers who had taken part in focus group discussions, was to obtain information on:

- preferences for net treatment product delivery method (dipping or spraying)
- likes and dislikes for the two treatment product delivery methods
- likes and dislikes for specific dipping or spraying net treatment products
- interest in purchasing and using the demonstrated net treatment products
- acceptable price ranges for the demonstrated dipping and spraying treatment products

Each participant was shown one dipping option (i.e., liquid in sachet, liquid in bottle, tablet, granule in sachet) and one spraying option (i.e., aerosol spray or the flit-gun sprayer), demonstrated on a white, single-size net. A total of 15 respondents were exposed to the aerosol spray and 15 were exposed to the flit-gun sprayer. Six respondents were exposed to the liquid bottle, six to the granule sachet, nine to the liquid sachet, and nine to the tablet. Table 1.3 provides a breakdown of the product demonstration observations by gender.

Table 1.3: Breakdown of methods by gender

DATA COLLECTION METHODS	FATHERS	MOTHERS	TOTAL
Interviews with parents	23	27	50
Focus group discussions	5	5	10
Product demonstration observations	15	15	30

Trade Component:

The purpose of the interviews with 32 traders was to learn about:

- insect control product forms and brands currently sold
- how traders currently obtain and wish to obtain their products
- how net purchases are made and reasons net traders decided to sell nets
- willingness to sell insecticide treatments for nets and preferences for particular insecticide treatment products. To determine insecticide treatment product preferences, researchers presented the traders with all six net treatment options in their packaging (aerosol spray, flit-gun sprayer, sachet with liquid, sachet with granules, bottle with liquid, tablet) and explained (but did not demonstrate) how each product worked. Traders were then asked for their reactions to the various methods.

In locating traders to participate in interviews, researchers deliberately sought out net sellers, traders selling other insect control products (e.g., aerosols, coils), and those selling insecticide

treatments for nets. The sample included traders from a range of outlets: general retail stores, including those in markets; wholesale shops, pharmacies, table-top vendors.

1.4 ORGANIZATION OF REPORT

This report presents results from Uganda.³ Findings on each topic are organized as follows:

- summary of main findings
- summary of program and product implications
- detailed discussion of findings.

In reporting results, proportions are sometimes given for the purpose of indicating trends; they should not be taken to represent exact proportions in the general population.

For readers wishing to focus on only the main findings and implications, summaries in bullet form appear at the beginning of each section of this report.

³ Reports on formative qualitative research results for the other countries are also available from NetMark, as are research instruments used in all countries.

SECTION 2

CONNECTION BETWEEN MOSQUITOES AND ILLNESS

Summary of Findings

- There was universal knowledge among parents that mosquitoes transmit malaria, although at the same time, there were misconceptions about other causes of the disease (e.g., drinking unboiled water). Most consumers and members of the insect control trader considered malaria to be a very serious disease that is potentially fatal.
- The English term “malaria” was universally used and recognized by parents and traders.
- Most parents named symptoms of malaria that are generally consistent with clinical descriptions of the mild malaria, but only a few mentioned convulsions/fits, a symptom of severe malaria.
- Mosquitoes were perceived as a problem; some respondents said they were a year-round concern and others saw them as a seasonal problem (occurring in rainy season and during harvests).
- Children were seen as especially susceptible to malaria. Young children and pregnant women were viewed as vulnerable to the consequences of the disease, but some respondents were confused about the key ages at which children are most vulnerable and require protection. The awareness level regarding the vulnerability of pregnant women was lower than that for children.

Summary of Program and Product Implications

- The general concern with malaria and understanding of how it is transmitted is favorable for net and insecticide promotion.
- The fact that malaria is regarded as a serious, potentially deadly disease can be used to advantage in ITM promotion.
- Given that most respondents mentioned symptoms associated with malaria that were generally consistent with the biomedical definition of the term, it appears that identification of the illness is already good and little time needs to be spent educating consumers on symptoms. However, it will be important to link convulsions to severe malaria in public education efforts.
- The fact that mosquitoes are the only cause of malaria should be emphasized in educational efforts.
- The English term “malaria” can be used in health promotion activities and will be widely understood. Use of a single term around which educational efforts can build a common understanding will be very important in efforts to promote behavior change.
- Educational efforts should promote the perception of malaria as a year-round problem, stressing that although the number of mosquitoes (and malaria cases) may rise and fall at different times, protective measures should be taken throughout the year.

- Efforts to promote behavior change should build on current understanding that children are especially vulnerable to malaria and should emphasize that *children under five* and pregnant women are particularly at risk.

Detailed Discussion of Findings

Beliefs about mosquitoes and malaria, and knowledge of the English term “malaria”

All parents interviewed were aware that mosquitoes cause malaria and there was universal knowledge of the English term “malaria.” All 50 caregivers mentioned this term when asked what illnesses mosquitoes cause. All 32 traders of insect control products interviewed also knew this term. “Malaria” was also mentioned in the 9 focus groups in which problems caused by mosquitoes were discussed.

At the same time, a small minority of respondents erroneously believed that mosquitoes cause AIDS, typhoid, cholera, and measles. Additionally, in a minority of focus groups discussions (both in Mbarara), respondents stated that malaria can be caused by drinking unboiled water.

Beliefs about symptoms and severity of malaria

When describing malaria, the majority of parents interviewed mentioned symptoms that are consistent with the clinical descriptions of the disease. These included fever/high temperature/feeling hot and/or cold, shaking (45/50), vomiting (26/50), joint pain/general body weakness (20/50), loss of appetite (16/50), and headache (15/50). Other symptoms mentioned by fewer respondents included diarrhea/dehydration, yellow/pale eyes, sour mouth/dry mouth/blisters, yellow urine, loss of weight, restlessness/inability to sleep, and red eyes. Of note, only 2 of the 50 respondents mentioned convulsions, a symptom of severe malaria. There were no major differences between urban and rural areas in awareness of symptoms.

Although most study participants thought malaria is a serious disease, a significant minority did not. Almost all caregivers (39/49) concluded that malaria is a serious illness, with nearly half (22/49) adding that malaria is potentially fatal and a few (6/49) specifically stating that malaria can cause miscarriages in pregnant women. A minority (10/49) of respondents interviewed believed that malaria is not particularly serious. These study participants, who came mostly from Mbarara and Masaka, stated that malaria is not as serious as it once was, is less serious than other diseases, and that people know how to prevent or treat the illness.

Perceived severity of malaria among parents

“It is quite serious and especially children suffer a lot.” (Mbarara urban male net owner)

“[It causes] death in adults and children, miscarriage in pregnant women.” (Mbarara urban female owner).

“It is very serious because it’s one of the killer diseases in our community. Some get paralyzed.” (Hoima rural female net owner.)

“Malaria is very serious because it can kill a child or a person if not well treated.” (Kampala urban net owner)

“It is serious because many young children keep falling sick. There are many mosquitoes.” (Soroti rural male non-owner)

“Malaria is serious, but at the moment, it is not serious in this area. It makes the child’s body temperature high and sometimes, if you do not treat the child well, you can end up in the hospital, get admitted, and spend a lot of money.” (Masaka rural female non-owner)

“Not so serious because people are conscious and identify the disease quickly and treat it.” (Masaka urban male non-owner)

“It is not very serious, especially in the dry season” (Mbarara rural female net owner)

Nearly all traders said that malaria is a serious disease. The few who claimed that it is not serious stated that people can control the disease by using aerosols, nets, and clearing the bush, or that the lack of demand for (sales of) insect control products indicates a lack of need.

Perceived severity of malaria among traders

“Many people are dying of malaria in rainy season when there are many mosquitoes, since we have ditches for cattle.” (Mbarara rural trader)

“It is actually a serious issue in Soroti, because children under 10 years are dying and the death rate is high in Soroti.” (Soroti urban trader)

“I don’t think malaria is a threat in this area because people try to protect themselves by buying insect control products even though they are not as good as nets, but at least they try to protect themselves through these methods.” (Hoima urban trader)

Mosquitoes were viewed as a problem that is worst (or primarily) occurs during rainy season and harvests. Participants in most of the focus group discussions mentioned seasonality of mosquitoes, as did many of the traders. Also, in a few focus group discussions, respondents commented that they experienced problems with mosquitoes (and other insects) during the day and evenings, not just at night.

Perceptions of the seasonality of mosquitoes and perceptions of the time of day during which mosquitoes are a problem

“...you know, in times of harvest, mosquitoes stay much in maize/reed plants. That’s where they normally stay and when the maize is over, then we are safe.” (Masaka urban male focus group participant)

“Me, I think mosquitoes are a problem during rainy season because that is the time when there is a lot of water, water collects a lot. That is when they are serious.” (Soroti rural male focus group participant)

“The only advantage [of a child sleeping under a net every night] is that the child may not develop insect bites while sleeping. However, this is only limited to the time the child is sleeping. Before sleeping, during the time the child is still awake, waiting to eat food, insects may bite then and that is why I do not recommend that the net is the best preventive method other than spraying.” (Mbarara urban non-owner)

Beliefs about the vulnerability of children under five and pregnant women to malaria

Respondents recognized that children (not necessarily under five) and pregnant women need special protection from mosquitoes. Many also viewed children and pregnant women as particularly susceptible to getting malaria and to dying, and as having low immunity. Many net owners also ensured that their children sleep under nets (see Section 4 for more details). However, understanding of the special vulnerability of children *under five* and pregnant women (and their need for special protection) may be low.

The vast majority of parents did identify vulnerable groups when they were shown a drawing of five family members [a woman (not pregnant), a man, a pregnant woman, a child of 3 years, and a child of 6 years) and asked who should sleep under a mosquito net. Almost all respondents selected the child of 3 years (48/50) or the pregnant woman (43/50) as their first or second choice. In the majority of focus group discussions, participants stated that children under five and pregnant women were especially susceptible to malaria and in half the focus groups, respondents said these individuals should sleep under mosquito nets.

On the other hand, when asked who is most likely to get malaria, more than half of the caregivers (30/50) mentioned children (including those as old as 10), and only a few specifically stated children under five years of age (9/50) or pregnant women (8/50). Other responses made by some participants were adults (9/50) and those who do not protect themselves from mosquitoes (7/50).

When asked who was most likely to die from malaria, again more than half of the caregivers (33/50) said children and only a few specifically mentioned children under five (9/50) or pregnant women (9/50). Other responses included those who do not protect themselves from mosquitoes or fail to seek timely treatment (4/50) and those who live around stagnant water (3/50).

SECTION 3

COMPARISON OF MOSQUITO CONTROL MEASURES

Summary of Findings

- Virtually all respondents (whether urban or rural) reported using a commercial method of mosquito control.
- Although the awareness of traditional insect control methods (e.g., burning leaves and keeping the environment clean) was high among urban and rural caregivers, the reported use of these methods was much lower than for commercial products.
- There was high awareness of mosquito nets among all respondents including non-owners. There was also high awareness of aerosols and mosquito coils, which were the most commonly used products for mosquito control in both urban and rural areas.
- Window and door screens were not often mentioned as ways to control mosquitoes and few homes had them. There was low awareness of repellants and almost no awareness of flit gun sprayers. Neither method was reportedly used much. Very few respondents had heard of or used electric mats.
- All insect control products were seen as having more negative than positive attributes (i.e., the number of respondents making negative statements about insect control products was higher than the number of respondents making positive ones); however, nets were generally viewed more favorably than were other methods of mosquito control.
- Coils were liked because they are affordable and help keep away mosquitoes. They were disliked because they cause irritation and respondents worried about the product's adverse impact on health.
- Aerosol sprays were liked because they kill mosquitoes (and other insects) but respondents expressed serious concern about their potentially adverse health effects.
- Nets were liked because they afford protection against mosquitoes, but were disliked because they were seen as hot, expensive, and unable to protect the whole family. Some respondents also worried about the dangers of net use while intoxicated.

Summary of Program and Product Implications

- The fact that urban and rural dwellers commonly used commercial insect control products is favorable for net and insecticide promotion.
- The high awareness of mosquito nets as an insect control product and the perception that they afford good protection against mosquitoes is favorable for net promotion.
- The perception of nets as expensive must be considered in determining their price. Communication efforts will need to promote nets as a lasting and economical solution to malaria and mosquito problems.
- The perception of nets as uncomfortably hot needs to be addressed in any promotional activities. This perception should be addressed in product formulation (although any product modification must be weighed against potential increases in cost to the consumer). By

ensuring that their product meets consumer wants, commercial players can help ensure the development of strong brands of nets.

- More information may be necessary to better understand concerns about net use combined with alcohol use.

Detailed Discussion of Findings

Awareness and use of mosquito control methods and products

There was high awareness and use of commercial mosquito control products in both urban and rural communities. All but one respondent reported use of at least one commercial method of mosquito control (including nets) in the previous year. Net use generally occurred in conjunction with other commercial insect control products, but some net owners (9/27) reported using nets alone.

The commercial methods that respondents were most aware of are mosquito nets (43/50)⁴, aerosols (32/50) and mosquito coils (26/50). Although 27 of the 50 interviewees were net owners, the fact that nearly all of the 50 respondents mentioned nets indicates an extremely high level of awareness of this product. These same products were also mentioned in nearly all focus group discussions as methods that people knew of or used. Awareness of electric mats (or lamps) was very low. A small number of respondents (4/50) said they had heard of electric mats as a mosquito control method, but appeared to have been referring to insect control lamps. There was also low awareness of repellants (this form of mosquito control was mentioned by only 6 of 50 respondents) and of flit guns (mentioned by only one respondent). (See Table 3.1.) Few respondents mentioned window or door screens. These findings are supported by data from the focus group discussions, where repellants and window/door screens were mentioned in only a few groups and the electric lamp in only one.

The most commonly used commercial methods were the same as those discussed above (although caution must be used in interpreting data on nets because net owners were deliberately chosen to participate in this study). Out of 50 respondents, 19 used aerosols and 15 used coils in the past year. Few respondents reported having window/door screens. Only three respondents said they used repellents and only one reported using a flit gun sprayer or electric mat. (See Table 3.1.)

Commercial methods were used in all study sites. Coils were used in both urban and rural areas. Although aerosol use was reported in all rural areas except Soroti, its use was more common in urban centers.

Environmental methods (e.g., clearing bushes or stagnant water, cutting grass) of mosquito control⁵ were very common, with 23 of 50 respondents stating they had done so in the previous year. (See Table 3.1.) This approach was also cited in all but one focus group discussion. Traditional methods for repelling mosquitoes, such as burning things were also widely known and used. Eighteen of 50 respondents said they burned something (e.g., leaves, wood) in the past year as a way to control mosquitoes. (See Table 3.1.) This method, in addition to closing doors and windows was mentioned in nearly all focus group discussions.

⁴ The majority of respondents who did not own a net mentioned mosquito nets as a way to control mosquitoes

⁵ Clearing brush, or stagnant water, while potentially useful in minimizing nuisance biting from certain mosquitoes, does not, in fact, have any effect on the anopheles mosquito that transmits malaria and breeds only in clean, clear water.

Table 3.1: Awareness/past year usage of insect control methods (in decreasing order)

Insect Control Measure	# Aware (n = 50)	# Aware Who Also Use Method
Mosquito net on bed	43	27
Keep environment clean	32	23
Flit spray with aerosols	32	19
Mosquito coils	26	15
Burn things	18	8
Repellent	6	3
Electric Mat	4	1
Flit gun sprayer	1	1

Perceptions of insect control products, including nets

All insect control products are seen as having more negative than positive attributes. That is, more respondents listed negative aspects about insect control products than they did positive ones. Within this generally mixed review of insect control products, a greater number of respondents had positive things to say about nets than about any other product. Table 3.2 summarizes respondents perceptions of the main positive and negative attributes of nets, coils, and aerosols.

Coils

Respondents liked coils because they viewed them as affordable and helpful in keeping away mosquitoes. Although a very small minority of respondents liked the smell, the majority strongly disliked the irritation caused by the smoke and worried that use of this product is harmful to their health or that of children or pregnant women. Some also worried that coils pose a fire hazard. (See Table 3.2.) These findings are supported by data from the focus group discussions. In a minority of focus groups, respondents listed positive attributes of coils, with the most common being their affordability and repelling effect. But, in the majority of the groups, many respondents cited the same disadvantages listed above. (See text box and Table 3.2.)

<i>Perceptions of coils</i>	
<p>“It is very cheap and can protect those who are not covered by nets. It smells very bad.” (Mbarara rural female net owner)</p>	
<p>“It is not very effective.” (Masaka urban female net owner)</p>	
<p>“It prevents mosquitoes. It’s more effective because it’s long-term. The smell irritates me so much. It brings coughing. Breathing becomes hard.” (Soroti rural female net owner)</p>	
<p>“It is cheap. Its smoke is dangerous and irritating.” (Kampala urban female net owner)</p>	
<p><u>Soroti urban female focus group discussion</u></p>	
Respondent:	<p>“It is comfortable, maybe, to use the mosquito coil because it lasts for a long time burning...so you can get your sleep without having a bite for a long time.”</p>
Respondent:	<p>“Compared to the other one (burning herbs).”</p>
Respondent:	<p>“But, I don’t know if it also gives us some flu, or what?”</p>
Respondent:	<p>“Yes.”</p>
Respondent:	<p>“One of the disadvantages is at times it caused cough. You find that, that smoke there, and also, people say it can cause asthma, especially in young children.”</p>

Aerosols

Parents participating in the interviews liked aerosol sprays because they kill mosquitoes (and other insects) and are easy to use, but many respondents disliked the fact that sprays offer only temporary relief from mosquitoes and have a strong, irritating scent. Additionally, most respondents had serious concerns about the effects of aerosols on humans. Many parents interviewed said aerosols were hazardous/dangerous to health, were poisonous, or caused irritation. Findings from the focus groups support these statements. Indeed, in the majority of focus groups, respondents expressed very negative comments about this product. (See text box and Table 3.2.)

Perceptions of aerosols

“It exterminates other crouching insects, like cockroaches. The side effects make me dizzy.”
(Kampala rural male non-owner).

“It kills the mosquitoes easily. It is easy to use. It is cheap, compared to the nets. The spray has a bad and strong smell.” (Mbarara rural male non-owner)

“It covers a wider area, in case you have many children and few nets. Aerosols can be dangerous, in case a child lands on it.” (Mbarara rural female net owner)

“The spray is good because it’s easy to use. I do not like it because the smell is strong and I end up coughing.” (Masaka urban female non-owner)

“They instantly kill mosquitoes. They irritate a lot and have a very bad scent in them. The sprays only work for a short time and mosquitoes will still be in the house after the spray has evaporated.” (Soroti urban female net owner)

“They cause irritation like flu, making breathing difficult, especially to asthmatics. It is more expensive than coils.” (Soroti urban female baby net owner)

Mbarara urban female focus group discussion

Respondent: “It’s irritating and may be dangerous. When you spray, it is said that the mosquito fly away from the room and comes back later. It may contaminate the food in the house and when you spray early, the mosquitoes flies away and comes back later during the night and when you spray during the night, it irritates the nose....”

Respondent: “...It is poisonous....”

Respondent: “... You may die.”

Moderator: “What is its effect on children...?”

Respondent: “... When you spray late, for example, I always keep my five-year-old child away from the room I’m spraying and they still complain of headaches and breathing problems, so it’s hard for me to use the spray. Instead, I’d rather use mosquito nets.”

Nets

Nets were generally liked because they protect against mosquitoes, and other insects, and are long lasting, but were disliked because they were perceived as hot, expensive, and unable to protect the entire family. Some respondents also complained that mosquitoes can still bite through the net and perceived nets as dangerous because they can catch fire, and can cause choking or even death (especially to children). Some respondents also worried about net use by those who are inebriated, citing danger of strangulation or fire. (See text box and Table 3.2.)

Perceptions of nets

“Mosquitoes cannot enter the net. It covers a large area of the bed. A net is too hot. If you do not keep it away from children, they may suffocate.” (Kampala urban male net owner)

“It prevents mosquitoes and other insects from biting the baby. It can suffocate the baby, in case it pulls it, that is, you have not tacked it under the mattress.” (Kampala urban female net owner)

“It prevents mosquitoes. It is very sensitive to fire in case a child bypasses it carelessly with a candle. It can easily burn.” (Kampala urban female non-owner)

“They don’t irritate. They are more affordable. They sometimes get hot and make it uncomfortable for us to sleep under.” (Soroti urban female baby net owner)

“[They are] long lasting, can be used for years effectively. It can be used to cover many people, depending on the size. They are quite expensive to the community of low-income people. They are not totally safe.” (Soroti urban male net owner)

“They do not have a choking smell, like the sprays. They are very expensive. They reduce the number of mosquitoes entering the house. It does not keep away all the mosquitoes.” (Mbarara urban female net owner)

“They at least prevent mosquitoes from biting you. It is quite inconveniencing to spread each time you go to bed. Sometimes, they get so hot to make life difficult in bed.” (Soroti urban female net owner)

Focus group discussion (Masaka rural female group)

Respondent: “Mosquitoes do not enter the net and you sleep comfortably.”

Respondent: “The net does not give you smoke, like the coil. The smoke is not is not good especially for the children. The child wakes up in the morning with flu.”

Respondent: “A net may [only] last for a month if it catches fire.”

Respondent: “A net may not have so many problems, but one has to be careful so that it does not catch fire.”

Respondent: “Nets are also expensive because in a house it is not possible for every child to have a net of their own.”

Respondent: “Other children sleep down, they do not sleep on beds, so how will you put a net?”

Respondent: “A net is good but one cannot cover the whole family with the net or cannot get all the children under one net.”

Table 3.2: Main perceived positive and negative attributes of the three most commonly used commercial insect control products (coils, aerosols, and mosquito nets)

Method	Positive [+]	Negative [-]
<i>Coils</i>	<ul style="list-style-type: none"> ▪ Are affordable/cheap ▪ Keep away mosquitoes 	<ul style="list-style-type: none"> ▪ Are irritating ▪ Smell bad ▪ Smoke is harmful to health, especially that of children and pregnant women ▪ Smoke causes coughing, flu, asthma
<i>Aerosols</i>	<ul style="list-style-type: none"> ▪ Kill mosquitoes instantly ▪ Kill other insects ▪ Are easy to use 	<ul style="list-style-type: none"> ▪ Are irritating ▪ Are hazardous, dangerous to health, especially to children ▪ Cause dizziness, cough, irritation, flu ▪ Smell strong and bad ▪ Work only temporarily and for a short time
<i>Mosquito nets</i>	<ul style="list-style-type: none"> ▪ Protect against mosquitoes/bites ▪ Protect against other insects ▪ Last long ▪ Have no smell or irritating effect 	<ul style="list-style-type: none"> ▪ Are hot ▪ Are expensive ▪ Do not protect whole family ▪ Mosquitoes can still bite through the net ▪ Can catch fire ▪ Can choke, strangle, cause death, especially to children ▪ Are difficult/dangerous to use when inebriated ▪ Are inconvenient to get in and out of ▪ Can be hard to hang

SECTION 4

NET OWNERSHIP AND USE

Summary of Findings

- In urban areas, adult-size net owners were easy to locate, but in rural areas, especially those at greater distances from the urban center, they were difficult to find. (See Section 7 for more information on net access and availability.) Although some net-owning households had more than one net, most had only one. Baby net use appears minimal.⁶
- Almost all non-owners have used a net in the past and said that economic factors are the major deterrent to current net ownership.
- In some families, nets were reportedly used throughout the year and in others nets were used mainly during the rainy season.
- In the vast majority of net-owning households, all children under five in those homes reportedly slept under a net the previous night; some parents specifically noted the special vulnerability of young children to illness/malaria as the reason for putting them under the net. Of the two net-owning households where respondents reported there was a pregnant woman, both had slept under a net the previous night.
- The most commonly cited benefits to having a child under five sleep under a net every night were protection from mosquitoes and from illness, including malaria. The most commonly noted barriers were that nets were “hot” and “uncomfortable,” that the child might get trapped or suffocate, and that nets were inconvenient if the child had to get up in the middle of the night.
- Net owners were somewhat more likely than non-owners to say that others would think it is a good idea for a child under five to sleep under a net every night. There were no major differences between net owners and non-owners regarding perceived benefits or barriers.
- Nets were perceived as a luxury item, owned by people who are “rich” or “educated.” Compared to non-owners, net owners are more likely to perceive net owners as “health conscious” and “caring.”
- Both mothers and fathers (independently and sometimes together) made the decision to buy a net and did the purchasing. Their main motivation was protection against mosquitoes and malaria.

Summary of Program and Product Implications

- The fact that net owners were located in all study sites indicates the general acceptability of this product. Demand for nets is high, as demonstrated by the fact that most non-owners expressed the desire to own and use them.
- The fact that net owners were difficult to locate in rural areas, suggests one problem may be inadequate access to nets (e.g., price, availability). A key challenge will be to make nets affordable and available.

⁶ Baby nets are very small, umbrella-shaped nets that stand alone and only fit an infant.

- Net/ITM promotional efforts can build on the already strong demand for nets and consumer desire to protect against mosquitoes and malaria, but will need to counter the perception that nets are only for the rich. The image of net owners as “knowledgeable,” “health conscious,” and “caring” can be used in promotional campaigns.
- Promotional and educational efforts are needed to ensure year-round net use, particularly by the most vulnerable groups. These efforts should reinforce consumers’ existing positive practices of having their children under five sleep under a net.
- Product development and promotional efforts should take into consideration the fact that net owners feel hot and should address the general perception that nets are inconvenient. Decisions about product modifications should take into consideration any potential increase in cost to the consumer. Educational efforts should also counter concerns that young children will become trapped or suffocate in the net.
- Promotional activities and point-of-sale communication/education must be directed at both women and men.

Detailed Discussion of Findings

Net ownership and use

When interviewers deliberately sought out net owners, they were able to locate 27 users of adult-size nets, with at least one user found in nine of the 10 study communities. Locating owners of adult-size nets was relatively easy in urban locations, particularly the capital, Kampala, but much more difficult in rural areas, especially those that were a greater distance from the urban center. Baby net use did not appear to be common, as evidenced by the fact that only two users of baby nets (both of whom also used adult-size nets) were found. Although some net owners (7/27) had more than one net (including those who owned baby nets), most had only one.

Reasons for lack of net use among non-owners

Almost all non-owners of nets (20/23) reported having slept under a net in the past. Many did so in the home of their parents or relatives. Others mentioned using nets in boarding schools and some stated that they had slept under nets prior to marriage or to becoming parents. In the Hoima region, a few respondents reported having used nets in the “fishing lands.”

Economic factors were cited as the major deterrent to net use. When the 23 non-owners were asked why they did not sleep under a net, nearly all (18/23) said that they wished to do so, but many (12/23) stated that they were unable to afford nets. A few respondents (most of whom were from Hoima) said that there was no need to use nets because mosquitoes were not a big problem in their area. A few respondents (also in Hoima) said that they did not use nets because this product was unavailable. A few respondents said it was not necessary to use nets because they used other insect control products and a few also linked their non-use of nets to negative perceptions of the product (e.g., nets are uncomfortable or inconvenient).

Reasons for lack of net ownership among non-owners

“I do not sleep under a net because I do not have money to buy it. I want it because mosquitoes are biting me at night.” (Mbarara urban male non-owner)

“I have no money and yet, I have to buy food, look after my children. I hope to buy a net in the future so that I can effectively protect myself and my children from malaria.” (Soroti urban male non-owner)

“The problem’s to do with money. I cannot afford one. Yes [I would like one] ‘cause I have kids who require it and they are the most vulnerable.” (Masaka rural male non-owner)

“I do not sleep under the net because there are other insecticides, like coils and sprays. I do not think that I would ever use a net because I do not have money and there are cases of nets catching fire.” (Masaka rural male non-owner)

“I shifted from Teso and didn’t find nets this end. This is why I don’t use nets and I don’t think I will ever use one since they are not available.” (Hoima rural male non-owner)

“It’s very uncomfortable. It looks as if you are lying in a boat. It creates a lot of heat. When the mosquito happens to enter the net, it is very hard for it to come out and thus it bites you the whole night.” (Masaka urban male non-owner)

Net use patterns among net owners

Net owners did not use nets consistently throughout the year. Some respondents said nets are used every night or almost every night when the family sleeps inside, but others said nets are used mainly during rainy season.

Net use the previous night among children under five and pregnant women

Nearly all net owners (24/27) reported that their children under five years of age slept under the mosquito net the previous night. When asked who and what determines sleeping arrangements, many respondents stated that children had the priority for net use and some said this was because of their special vulnerability. Two net-owning households reported that there was a pregnant woman living there and that she had slept under a net the previous night.

Perceived benefits and drawbacks to having a child under five sleep under a net every night

When parents (net owners and non-owners) were asked to name the benefits of a child under five sleeping under a mosquito net every night, the most commonly mentioned benefits were protection from illness (including malaria) (26/50) and protection against mosquitoes and other insects (21/50). Some respondents also mentioned the warmth of the net on cold nights and more peaceful sleep as an advantage, and a few said that net use saves money that might otherwise be spent on treating illness. Net owners were somewhat more likely to list protection against illness (including malaria) as a benefit than were non-owners, but the difference between the two groups was minimal. Net owners were also more likely than non-owners to say that others would think it’s a good idea for a child under five to sleep under a net every night.

Perceived benefits of nightly net use by children under five years of age

“It protects the child from being bitten by mosquitoes which causes fever. The child will be healthy in that it shall not be bitten by other insects.” (Masaka rural female net owner)

“No mosquitoes can bite him and hence, little chances of malaria attack.” (Mbarara rural male non-owner)

“Mosquitoes cannot get to him and even the other insects that are harmful cannot get to him.” (Masaka rural female non-owner)

“The child is fully protected from those irritating mosquito bites.” (Soroti urban female net owner)

“Everybody thinks that I’m a good mother because the children sleep under a net.” (Kampala urban female net owner)

“The mother is the one who thinks that it is a good idea to sleep under the net because the responsibility of taking care of the child in most cases is left to the mother. So, if the child gets sick, she will be the one to suffer.” (Mbarara urban male non-owner)

“It helps the father to save money because the child will not be falling sick all the time.” (Masaka urban male net owner)

The main barrier that emerged when respondents imagined putting their child under a net every night was that nets are viewed as “hot” and uncomfortable (as stated by 17 of the 50 respondents). The same number of respondents also said that there were people who thought sleeping under a net was not a good idea. Some respondents, largely net owners (14/50), also worried that their child would get trapped or suffocate under the net. Additionally some net owners and non-owners (12/50) complained that nets are inconvenient if one has to get up in the middle of the night and a few respondents (6/50) said it was hard to get the child to stay under a net. A few net owners (3/27) also complained that children damage or dirty the net. There were no major differences in perceptions of these barriers between net owners and non-owners.

Perceived barriers to nightly net use by children under five years of age

“I think that if the net has very small holes, it can make the child uncomfortable, in the case of breathing. Some nets may be hot, depending on the make.” (Kampala urban male non-owner).

“There is too much heat, so the child sleeps restlessly sometimes.” (Soroti rural female net owner)

“The child can easily pull it to herself and in the process, suffocate.” (Kampala urban female net owner)

“A lot of heat during the dry season, and you might fear that the child will fold themselves on the net and suffocate. The disadvantage may come if a child gets the heat of the net everyday and might die.” (Mbarara rural female net owner)

“For any crying child, it’s very inconveniencing because you need to be taking down and putting up the net.” (Hoima urban female net owner)

“I see no disadvantage but the child keeps pulling it off herself. I have to keep checking her.” (Kampala urban female net owner)

“The child can tear the net in the process of coming out if there’s nobody [to watch or help].” (Kampala urban female net owner)

Table 4.1: Perceived benefits and barriers to having a child under five sleep under a net every night (in rank order)

	NET OWNERS (n = 27)	NON-OWNERS (n = 23)
Benefits	<ul style="list-style-type: none"> ▪ Protection against illness, including malaria (16) ▪ Protection against mosquitoes and other insects (12) ▪ Warmth (3) ▪ Money not spent on drugs/illness (2) 	<ul style="list-style-type: none"> ▪ Protection against illness, including malaria (10) ▪ Protection against mosquitoes and other insects (9) ▪ Warmth (3) ▪ Money not spent on drugs/illness (2) ▪ Peaceful sleep (2)
Barriers	<ul style="list-style-type: none"> ▪ Heat / lack of air / discomfort (10) ▪ Can trap / suffocate child (10) ▪ None (10) ▪ Difficult / inconvenient to get in and out of during the night (6) ▪ Hard to keep child under net (3) ▪ Child can dirty / damage net (2) ▪ Lack of money to buy net (2) 	<ul style="list-style-type: none"> ▪ Heat / lack of air / discomfort (10) ▪ None (8) ▪ Difficult/inconvenient to get in and out of during the night (6) ▪ Can trap / suffocate child (4) ▪ Hard to keep child under net (3)

Perceptions of nets and of the people who own them

Many respondents viewed nets as beyond the means of many and as a luxury item. Specifically, non-owners perceived net owners as “rich” (17/23) and “educated.” This sentiment was echoed by net owners and some net traders who, in describing typical net purchasers, used these same words. Both non-owners and owners also said that people who used nets were “knowledgeable” about their use (12/23). Compared to non-owners, net owners were more likely to view people who used nets as health conscious and caring individuals who want to protect their health and prevent malaria (about half the net owners made this characterization, whereas only a few non-users did). Net owners also perceived themselves to be economically savvy, stating that using nets saves money that would otherwise be spent on treating illness.

Net purchase and decision-making about net purchase among net owners

Net owners reported that either they or their spouses were the ones who decided to buy the net and made the purchase. Some respondents also reported that the decision or purchase was made jointly. The few traders who commented on who typically buys a net said that both men and women do so.

The main reasons net owners gave for why they purchased a net were protection against mosquitoes and against malaria. Indeed, nearly all (21/27) owners cited these reasons, with 8 specifically mentioning protection against malaria/fever as their main motivation. Some respondents also indicated that they bought the net in order to protect their children. Only one respondent emphasized the long-term economic benefit of purchasing a net.

SECTION 5

GENERAL SLEEPING PATTERNS

Summary of Findings

- Data from focus group discussions show that children under five sometimes sleep with their parents and sometimes sleep separately or with other children. Some children sleep in beds (including bunk beds) and others sleep on mats, benches, dirt floors, etc. Men and women sleep in the same bed, on the same mat, or in the same room and when women are pregnant, they may remain in the same sleeping space or sleep separately from their husbands.

Summary of Program and Product Implications

- Nets must be made available and designed so that they are adaptable to the range of sleeping patterns found in this research. Specifically, nets will need to work on mats, beds and other sleeping surfaces, and accommodate multiple persons together in one sleeping space, as well as individuals. Ideally, they would also work on bunk beds.
- Because pregnant women may move from the place where nets are hung (e.g., the bed they share with their husband) to a separate sleeping space, educational efforts must address the need for pregnant women to remain under a net throughout pregnancy.

Detailed Discussion of Findings

Sleeping patterns

General sleeping patterns were discussed in all focus group discussions and no clear pattern emerged. In most focus group discussions, participants said that young children (e.g., under 3 or under 5) sleep in the same bed with their parents, but also in most focus group discussions, participants stated that young children (including infants) sleep on their own or with other children. Young children were also said to sleep in beds, on beds, mats, benches, dirt floors, mattresses, and paper bags. In some focus groups, respondents mentioned that children regularly sleep in bunk beds.

Sleeping patterns of husbands and non-pregnant wives were discussed in a few focus groups and in all of these, respondents said that men and women share the same bed or room. No clear sleeping pattern was discernable for pregnant women. In some focus groups, respondents said pregnant women sleep alone on a bed or mat, whereas in others participants said that pregnant women sleep with their husbands throughout pregnancy. In still others, respondents claimed that pregnant women transfer to their own sleeping place (a bed or mat) later in pregnancy (e.g., after the fifth month of pregnancy).

SECTION 6

NET WASHING PATTERNS

Summary of Findings

- Respondents reported that nets were typically washed every 2-4 weeks with lye-based detergents and bleach, together with other clothes. These items were washed in a basin reserved for washing and bathing. Some respondents complained that it was bothersome to remove and reinsert the ring in conical-shaped nets. Nets were typically dried in the sun, not the shade.
- Respondents had questions about how net washing works in conjunction with net treatment. In particular, respondents were uncertain about whether nets need to be washed first before being treated and whether treated nets can be washed at all. Some study participants also expressed concern that if nets required treatment after every wash, the treatments would become unaffordable.

Summary of Program and Product Implications

- Net product development should consider ways to make the conical net ring easy to remove and replace (although any product modification must be weighed against potential increases in cost to the consumer).
- Since bleach and lye-based soaps are commonly used in net washing, any potential chemical reactions between these products and insecticide treatments must be addressed in product formulation, instructions on use, and in promotional efforts.
- If washing basins are also used for bathing, instructions will be required on the product regarding how to adequately clean the basin and communication efforts are needed to ensure that consumers understand what to do.
- The current practice of drying nets in the sun is not compatible with recommendations that ITMs be dried in the shade. Product formulation should take into consideration current consumer drying practices. If the product recommendation of shade drying remains, promotional efforts will need to address the inconsistency between product guidelines and current practice.
- Net treatment product development and product unit cost should consider current consumer practices regarding the frequency of net washing. Promotional efforts should address the process involved in treating nets (particularly in relation to washing) and emphasize that the effectiveness of the net treatment is dependent on the frequency of net washing.

Detailed Discussion of Findings

Net washing patterns

Net owners reported washing their nets anywhere from every weekend (2/27) to once a year (1/27), but most commonly, every 2-3 weeks (9/27) or every month (6/27). A couple respondents also said they washed their net when it “gets dirty” and when they have the time.

Nets were most commonly washed along with other clothes, using water and bar or powdered soap in a basin that is used for washing and bathing. Only a few respondents (7/27) said they washed their nets separately from other items. Nets were often soaked in water with “Omo” (a brand of lye-based detergent soap) before washing. A couple net owners reported using “Jik” (a brand of bleach) to remove stains or ‘brighten and whiten’ the net. Several respondents said that soaking the net in “Omo” in water/warm water made washing easier.

Few respondents had any complaints about the washing process or gave recommendations regarding ways to make it easier, but some (6/27) complained that having to remove the conical net ring before cleaning and replace it after washing, made the process hard. One respondent who reported washing her net once a year said that she would probably wash her net every 3 months if she did not have to take the ring out before doing so.

Most respondents mentioned that they dried their nets on the wire line in the sun.

Beliefs regarding washing and treatment effects

In a minority of focus group discussions, respondents raised questions about washing treated nets, including whether the net needed to be washed prior to treatment and whether a treated net could still be washed. In one focus group discussion, respondents worried that washing nets often (or as much as needed) would require more frequent purchase of treatments, thus increasing the cost of using treatments.

Comments regarding washing a treated net – Mbarara rural males

- Moderator: “This insecticide takes 6 months but it will also depend on how often you wash the net, thus they advise that if you wash your net 3 times before 6 months, then you have to retreat the net. What do you think about the net treatment?”
- Respondent: “It will have a problem with the cost, as I had already told you that my floor is dust, you will find me washing every week, thus failing to buy it.”
- Respondent: “It can also be harmful.”
- Respondent: “If you wash it three times you have to buy more treatment.”
- Respondent: “This means that it will be expensive.”
- Respondent: “Then it will fail me.”

SECTION 7

NET ACCESS AND AVAILABILITY

Summary of Findings

- Net traders were located in all regions, but not always in rural areas. Open-air markets and hawkers were the most common source of nets. Although a range of net shapes, colors and sizes were available on the market, many traders offered a very limited selection of nets and only one trader sold pretreated nets. Net branding did not appear to be strong; the only two brands found were “Mbu net” and “B52.”
- Conical and rectangular nets were the most widely available shapes and conical nets were the most commonly owned. White and green nets were more commonly available than other colors and white nets were the most commonly owned. In the one region where traders sold a broad range of colors, consumers also owned nets of different colors.
- Traders generally sold double- and single-size nets and these sizes were what owners had.
- Traders were selling nets for 6,000 – 20,000 Ush (US\$3.80 - \$12.70), but the most common range was 8,000 - 10,000 Ush (US\$5.10 - \$6.30). Non-owners were generally accurate in their perception of net prices and viewed nets as too expensive.

Summary of Program and Product Implications

- Nets need to be made more widely available, particularly in rural areas.
- Nets are currently out to expensive for many Ugandans and need to be made more affordable.
- The variety of nets (i.e., size, shape, color) traders offer should be expanded.
- Commercial players in the ITM market need to develop strong net branding.

Detailed Discussion of Findings

Types of nets owned, cost, and place of purchase

Net traders were located in all five study sites, but not in all rural areas.⁷ Some traders sold a variety of shapes, colors and sizes, while others had a very limited selection. Only one trader (a pharmacist in Masaka) was selling pretreated nets (from Frandsen Vestergard Company). These nets were supplied in cartons containing 6-12 dozen nets which were individually wrapped in polythene and bore no indication that they were pretreated.

Conical and rectangular nets were the most widely available shapes, although in Soroti, net traders also had square-shaped nets. Single- and double-size nets were commonly sold, but no trader interviewed sold family-size nets and only traders interviewed in Kampala sold baby nets. Although white and green nets were the most widely available colors, a few net sellers also had blue nets and a couple had other colors (e.g., gray and pink).

⁷ As noted earlier, net owners were also difficult to find in rural areas.

Findings regarding the types of nets that respondents owned generally correspond with trader data. The majority of net owners had conical nets, although some owned rectangular ones. The most commonly owned net sizes were double (16/23) and single (13/27). Only one respondent had a family-size net. The most commonly owned net color was white, but respondents in three regions also had pink nets, and in Soroti respondents had nets in light blue, cream, and army green. Most respondents reported purchasing their nets in open-air markets or from street hawkers.

Most nets found on the market or in homes were either unbranded or the brand was difficult to decipher. “Mmbu Net” and “B52” were the only two distinguishable net brands.

Traders reported selling nets for 6,000 - 20,000 (US\$3.80 - \$12.70), depending on the size, shape, color and material. The more common range was between 8,000-10,000 Ush (US\$5.10 - \$6.30). No respondent reported buying a net for less than 5,000 Ush (US\$3.20) or for more than 22,000 Ush (US\$13.90), again depending on size, shape, color and material. Single-size nets were purchased for 5,000 - 15,000 Ush (US\$3.20 - \$9.50) and double-size nets for 7,000 - 22,000 Ush (US\$4.40 - \$13.90). Among owners of double-size nets, most paid less than 15,000 Ush (US\$9.50). These figures generally correspond with what potential consumers thought that nets cost. When non-owners were asked how much they thought nets cost, some did not know, but most respondents estimated the price to be between 5,000 Ush and 30,000 Ush (US\$3.20 and \$19.00), with the majority saying that nets cost between 8,000 Ush and 15,000 Ush (US\$5.10 and \$9.50).

SECTION 8

NET PREFERENCES

Summary of Findings

- Respondents wanted nets to come in a variety of sizes, shapes and colors. They generally preferred large nets, but some liked smaller ones.
- Both rectangular and conical nets were liked but rectangular nets were preferred over conical ones because consumers felt they fit the bed better and seemed more spacious. But, respondents did not like the fact that rectangular nets were difficult to hang. Consumers preferred the ease of hanging the conical net but did not like its shape as much as that of the rectangular one.
- Consumers generally preferred light colors but also liked dark ones. Respondents liked light colors because they are more “hygienic,” and show dirt and mosquitoes. They liked dark colors because they *do not* show dirt easily and are “warm.”

Summary of Program and Product Implications

- NetMark should strive to bring a variety of net shapes, colors, and sizes to market.
- Net product development should combine the positive attributes of conical nets (i.e., easy to tie/ties from one point) with the positive attributes of rectangular nets (i.e., more spacious appearance and fits shape of/covers whole sleeping space). However, any decisions on product modification should be weighed against potential increases in cost to the consumer.
- Promotional activities for rectangular nets can emphasize its shape, spacious appearance and air flow/heat reduction. Conical net promotion can emphasize its ease in hanging.

Detailed Discussion of Findings

Net size, shape and color preferences

Respondents wanted nets to come in a variety of shapes, colors, and sizes. In the majority of focus groups, participants expressed a desire for large nets (i.e., double- or family/king-size, or for a bunk bed), but some also wanted smaller nets (e.g., single- three-quarters-size).

Focus group participants were shown pictures of conical and rectangular nets and asked their preferences. Both shapes were liked, but there was a general preference for the rectangular net. This shape of net was liked because it fits the size of the bed, can be used on bunk beds, appears more spacious (and so, less hot), seems able to cover more people, and does not have to be tucked in. But, respondents also worry that the rectangular net will be difficult to hang and, as a result, will tear easily. In some focus groups, respondents said conical nets are hotter than rectangular ones and do not cover the whole bed.

Net shape preferences

Mbarara urban females focus group discussion

Moderator: “What do you like about the net?”

Respondent: “Its rectangular shape, which is that of the bed...”

Respondent: “it’s good because it covers the whole bed, unlike the conical shaped one, which covers half of the bed...”

Respondent: “I would use it to cover the children, unlike the conical ones, which has heat.”

Soroti rural male focus group discussion

Respondent: “I prefer or like the round net because it is easy to tie up at one point.

Respondent: “It is also wide enough. It can take up to three people...”

Respondent: “...Me, I also prefer the round one.”

Respondent: “Me, I best like the one that has a mat. If I spread my mat very well on the floor, it will fit it properly. It will cover all of it well and even tying, I will tie it firmly because it has those four provisions for the ropes.”

Regarding color, respondents once again wanted variety. They generally preferred white and light blue, but some also liked dark blue and dark green. Lighter colors were liked because they “make you look clean,” show dirt, attract mosquitoes to the net, and are “more hygienic.” At the same time, in some focus groups, respondents felt that white was *unsuitable* because it showed dirt easily. Darker colors were liked because they did not show dirt easily and were “warm.”

Net color preferences

Hoima urban male focus group discussion

Respondent: “I would prefer light blue because I can see a mosquito when it has landed on it.”

Respondent: “I would prefer light blue because here we normally use local candles which produce smoke, hence the net gets very dirty easily.”

Masaka urban male focus group discussion

Respondent: “They usually tell us that the mosquito is more attracted to bright colors, like white. When light strikes white, then mosquitoes go to that direction. I do not know if we can get other colors that are not white.”

Moderator: “Like which colors?”

Respondent: “Like green and blue for those people who cook in the house. White is not suitable because it can easily get dirty because of the smoke.”

Net color preferences, continued

Mbarara urban female group

Respondent: “We prefer white.”

Moderator: “Why do you prefer white more than other colors?”

Respondent: “It shows dirt easily.”

Moderator: “And you who mentioned light blue?”

Respondent: “...if a mosquito is in the white net, it can be seen easily, rather than being in this net (green) and you should know that you have to wash a white net more often.”

Respondent: It’s more or less like white.

SECTION 9

NET TREATMENT PATTERNS, PREFERENCES AND PERCEPTIONS

Summary of Findings

- The idea of net treatment was new to most respondents and no one had ever treated their net. Although potential consumers had generally positive reactions to this concept, they were also very concerned that the product is dangerous, hazardous, and may even kill. They were particularly concerned about potential harm to children.
- Traders were also receptive to the concept of net treatments, although some had never heard of it and others raised concerns about safety.
- Parents were especially worried that net treatments were dangerous for pregnant women and children under five, but said they could be reassured by credible sources.
- The main concern regarding the insecticide and pregnancy was that pregnant women will feel nauseous or vomit from the smell and that the chemical will damage the fetus or cause miscarriage.
- The main concern regarding the insecticide and children under five was that the smell will suffocate children and that the chemical will poison them, if the net is put in their mouths.
- Consumers wanted insecticide treatments for nets that are effective, ensure net coverage and do not have adverse effects. They also wanted a product that is easy to use and ready-made. Traders wanted a product that is easy to use and requires no preparation.

Summary of Program and Product Implications

- Since the concept of net treatments is new and not well known, major ITM promotional and communication efforts are required. ITM promotional efforts should emphasize the effectiveness of net treatment in preventing malaria and killing/repelling mosquitoes. These efforts could also emphasize the fact that mosquitoes do not like to enter homes where treated nets are hanging, and that by killing and repelling mosquitoes, treated nets afford some protection to family members not under the net. This latter emphasis would help counter one of the perceived disadvantages of nets: that they do not protect the whole family.
- The positive reaction to the benefits of insecticide treatments is favorable for treatment promotion.
- Product safety concerns must be addressed and should specifically counter worries regarding use by pregnant women and children under five years of age. Concerns related to chemical inhalation and ingestion through sucking (in the case of children) should receive particular attention.
- To address consumer lack of trust in insecticide treatments for nets and to help remove suspicion of net treatment products, commercial players will need to develop strong and trusted net treatment brands.
- Care needs to be taken when selecting who will give assurances of safety. Consumers will need to receive information from multiple sources.

- Any future net treatment product testing should explore whether specific products deliver the different benefits cited by consumers as important.

Detailed Discussion of Findings

Awareness of and reactions to the concept of insecticide treatments for nets

The concept of net treatment was unknown to most respondents. Although at least one participant in most focus group discussions had heard about treated nets, only 12 of 50 parents interviewed reporting ever having heard of this process. None of the 23 net owners interviewed owned a treated net or had ever treated their net and only 6 had ever heard treatments. Of the traders interviewed, some (including those who sold nets) had never heard of the concept of insecticide treatments.

Reactions to the idea of insecticide treatments for nets were generally positive, but the majority of parents were very concerned about product safety and the potential adverse effects of the chemicals, particularly in relation to young children and pregnant women. Most respondents (37/50) agreed that a treated net would work better than one that was untreated, but most also felt that it is dangerous for a pregnant woman (31/50) or young child (29/50) to sleep under such a net. Despite these concerns, the majority of parents said that they would be willing to try net treatments if they knew more about the product (although a few also commented that these insecticides were unavailable or might be very expensive).

Reactions to the concept of insecticide treatments for nets

“Yes. I heard people talk about it (ITMs) and I think I would treat my nets because it would kill mosquitoes completely.” (Hoima rural female non-owner who had heard of ITMs)

“If I had heard about it, then I would have started using it. This is because non-treated nets do not kill mosquitoes, unlike treated ones.” (Kampala rural female net owner who had never heard of ITMs)

“It’s such a good idea because it takes 3-4 months controlling mosquitoes.” (Soroti urban male net owner who had heard of ITMs)

“It’s a good idea, but the insecticides are not available.” (Soroti urban female non-owner who had heard of ITMs)

“Recently, I heard [about ITMs]. I was not excited because I knew it might be so expensive that it would not be easy to buy.” (Soroti urban male net owner who had heard of ITMs)

“It is a good idea because it kills mosquitoes. The young children are protected from falling sick of malaria. But, how much will these chemicals cost?” (Soroti rural female net owner who had heard of ITMs)

“If the purpose is to prevent the mosquitoes from getting near or at the net, then it is a very good idea. I hope the insecticides are not the kind that irritate the nose and have a bad smell that instead chases you from your own bed.” (Soroti urban female net owner who had never heard of ITMs)

“It’s dangerous because one can easily inhale those chemicals, which is a health hazard. Probably, they cause skin irritation.” (Soroti urban female baby net owner who had never heard of ITMs)

“I think that as this insecticide kills mosquitoes on the net, then it can also affect one’s life.” (Kampala rural male non-net owner who had never heard of ITNs.)”

When asked to explain why they believed treated nets are dangerous to young children and pregnant women, respondents expressed concern that the smell of the insecticide would make a pregnant woman feel nauseous or vomit, or that the chemical would harm the fetus or cause miscarriage. They also worried that the smell would cause young children to suffocate and that young children would be poisoned if they put the net in their mouth.

Reasons respondents believed insecticide treated nets are dangerous to young children and pregnant women

“I think it can affect me and my children because as it kill mosquitoes, it can kill a child. A child can chew the net and die or the spray itself can also work like Doom which chokes one’s nose.” (Mbarara rural female net owner who had never heard of ITMs)

“[It’s dangerous for a pregnant woman to sleep under a treated net] because chemicals may cause her to vomit.” (Kampala urban female net owner who had never heard of ITMs)

“If the treatment is too strong, it can cause the child to sneeze, affecting his life. A child can put the net into the mouth, which could lead to death.” (Kampala rural female net owner who had never heard of ITMs)

“...the child may get sick from breathing it into its body and [it] could result to another illness altogether.” (Soroti rural female net owner who had never heard of ITMs)

“It may be dangerous because the treatment may affect the unborn baby.” (Masaka urban female non-owner who had heard of ITMs)

These mixed reactions were echoed in focus group discussions. In four of the focus group discussions (all in Hoima and Soroti), respondents had overwhelmingly positive things to say about insecticides, but in four of the focus group discussions (all in Masaka and Mbarara), opinions were mixed and in the remaining two (both in Kampala), the response was strongly negative. Overall, where the idea of net treatment was liked, respondents felt that treated nets were more efficacious than untreated ones. They also liked the fact that mosquitoes would die and in several focus groups, respondents commented that these nets would be especially good for pregnant women and children who had low immunity and needed extra protection. Where treatments were not liked, there were very strong fears about the potential danger of the chemical, particularly for pregnant women and children. Indeed, in several focus groups respondents felt that the insecticide was likely to kill them or their children. Further, in some of the focus groups, respondents expressed strong distrust of the chemicals and of the motivation of chemical manufacturers (e.g., manufacturers would do anything for profit).

Reactions to the idea of insecticide treatment of nets (from focus group discussions)

Soroti urban female focus group discussion

- Moderator: "...now would you use an insecticide treated net in your home?"
- Respondent: "Yes." [Two other respondents also answer "yes."]
- Respondent: "Because, if it is treated, then you stand few chances of getting mosquito risks."
- Respondent: "Because, if it is treated, the mosquito will not also land on it..."
- Moderator: "So, I would like to know, if you would use such a net and who do you think would sleep under that net?"
- Respondent: "All of us." [Repeated by other respondents]

Kampala rural male focus group discussion

- Respondent: "That practice [of treating a net] is extremely bad. They have side effects."
- Respondent: "It's not only side effects. A mosquito is a living creature and I also am. If it can fall down and die, what about me who is inside the net. It can cause me problems..."
- Respondent: "...chemicals are very dangerous, 'cause they are poisonous..."
- Respondent: "...In addition to what he has added, where Uganda has reached, we are over-deceived on chemicals. There are even campaigns, where I buy my net, use it for five years, but you add chemical on it. This means that after every two weeks, I have to buy and add chemicals because it's obvious the other one will have worn out..."
- Respondent: "You know, at first I will buy a net and after three years, I will forget about treatment and leave it on the side. Even if I had the money, I would buy it. Then, after four days, the insects will be already there, so you find that it is a waste of time and money."
- Moderator: "you mean that is sort of laziness?"
- Respondent: "It's laziness at times and at times ineffectiveness of the drug. Here, when I spray mosquitoes for the first time, they will die and I shall be happy, but I would be happy to stay with mosquitoes...For me, as a person, it will take four months, inhaling that drug, little by little."
- Respondent: "You can even count 10 years."
- Respondent: "Yes...I will accumulate a lot of diseases. And, on behalf of the young kids, who their brains are still growing, it will be retarded because of the chemical."
- Respondent: "...Because they do not tell us that there is something wrong and they use scientific words..."

Credibility of information sources for countering ITM safety concerns

In some focus group discussions, participants offered suggestions for how to counter safety concerns. Working through churches, doing demonstrations/teach people how to use the insecticide, and using the radio and receiving assurances from the Ministry of Health were suggested in more than one focus group. In one focus group, participants expressed mixed feelings about health workers, with some saying that they would use a net if a health worker told them it was safe and many others saying that health workers were untrustworthy.

Consumer suggestions for how to counter ITM safety concerns

Moderator: "If your public health worker told you about safety of this net, would you use it?"

Respondent: "Health workers also deceive us about drugs, which we use for infections and our bodies just swell. So, I cannot believe in them."

Respondent: "Another reason why we do not believe in health workers is they are always fighting against themselves...Like the AIDS vaccine, some say it is effective and others say that it is not. Then, why use a dangerous net if there is one that is not dangerous? What kills the life of the mosquito will definitely kill me."

Masaka urban male group

Moderator: "Which person's word would you trust on the safety of the treated nets?"

Respondent: "He would have been a doctor."

Respondent: "Because he's the one who knows about health, so he will explain to us that we shouldn't fear a treated net."

Respondent: "...I would think a radio would be better because people really listen to them."

Moderator: "What is that person on radio whose word they would trust?"

Respondent: "Mulindwa." (a popular Central Broadcasting Station presenter)

Respondent: "No."

Respondent: "...He is a person he knows."

Respondent: "When Mulindwa says something, people believe in it."

Respondent: "Since such a thing is about health, then the Ministry of Health can advertise because we take everything that comes out of it to be right."

Respondent: "Yes. The moment he comes and says he is coming from the Ministry of Health, we automatically believe in him..."

Treatment product preferences (generic reactions)

After being exposed to a range of product options, parents preferred net treatment products that cover the whole net easily and thoroughly soak the net, do not have a bad smell or cause irritation, and are safe. They also wanted a product that requires no preparation, is effective and does not take a lot of time. Traders also expressed desire for products that require no preparation and do not take a lot of time. (See Section 11 for more details.)

SECTION 10

TRADER ISSUES RELATED TO NETS AND INSECTIDE TREATMENTS FOR NETS

Summary of Findings

- As mentioned previously, insect control product traders were relatively easy to locate in urban and rural areas, but net traders were hard to locate in rural ones. In urban areas, they were found mostly in open-air markets.
- Net treatments appeared to be unavailable in the market, but the vast majority of traders of insect control products were enthusiastic about net treatments and expressed willingness (and enthusiasm) to sell the treatments along with the nets. Their main reasons for wanting to sell ITMs were to provide a convenient and desirable service to their customers, to help their customers avoid malaria, and to make a profit.
- A minority of traders said it would be difficult for them to sell treatments along with the nets because the market for nets and insecticides is specialized (traders of nets often do not sell other insect control products and vice-versa).
- To encourage purchase and use of mosquito nets, traders recommended that net prices be reduced and that the public receive education and sensitization regarding the benefits and correct use of ITMs.
- According to traders, Doom was the most commonly sold brand, followed by Baygon, Farco, Bop, and White Crane (not necessarily in that order).
- Traders often sold items that are more expensive than insect control products.
- Traders reported that aerosols were the fastest selling insect control product because they are effective and work against many insects. They also reported that coils were another fast-selling product because they are cheap.
- Traders generally got their products directly from wholesalers, not from suppliers. Only a few traders said that products were delivered directly to their outlet.
- Traders said they would be motivated to purchase goods from a specific manufacturer/supplier if allowed to pay on consignment and/or if products could be delivered directly to their outlet. Traders did not like the idea of retro deals, whereby cash bonuses are given after achieving a certain level of sales.
- The main factors motivating net traders to sell this product were high consumer demand and the belief that a profit could be made. Some net traders were also motivated by altruistic reasons.
- Traders stated that both men and women purchased nets and that most entered the shop knowing what they want. Some traders reported an increase in sales during the rainy season.
- Most traders said they gave their customers advice about nets, but in general, this advice was about hanging and washing, not about malaria prevention or ITMs.
- To encourage purchase of insect control products, most traders gave their customers information on product efficacy and offered the products at competitive or reduced prices. Some also offered installment or payment plans.

Summary of Program and Product Implications

- Nets need to be made more widely available, particularly in rural areas.
- Traders' generally positive reaction to insecticide treatments and their to sell nets and insecticides together is favorable for ITM promotion and sales. The fact that the insect control/net market may be specialized means that that certain types of outlets (e.g., bedding or "family" shops) may need to be matched with certain products/product packaging (e.g., the net packaged together with insecticide) and not others (e.g., the insecticide alone). On the other hand, there will be instances where the same trader can sell both nets and treatments. Doing so in domestic shops might help to reassure customers that insecticides are safe. To encourage traders to carry both nets and insecticide treatments, promotional efforts should highlight (where appropriate) high demand for these products, convenience to the customer, and the potential to make a profit. Such efforts should also highlight the fact that by selling these products, traders can help their customers reduce their chance of getting malaria and of mosquito (and other insect) bites.
- Insect control products are strongly branded and commercial players will need to ensure that ITMs are also strongly branded in order to secure consumer trust and loyalty.
- Strong trade and manufacturing/supplier relationships are essential in order to ensure the success of ITMs.
- Nets and treatments should be promoted throughout the year, but special efforts should be made during the rainy season and during times when consumers have more disposable income.
- Promotional efforts (including those at the point of sale) should target both men and women. They may need to counter the perception that only "rich" and "educated" people buy nets.
- Since most traders do report giving some advice about net hanging and washing, they should be encouraged to take a proactive role in advising their customers about the benefits and efficacy of ITMs and about how to treat nets.
- To encourage net sales, nets must be offered at competitive prices and traders should consider allowing customers to pay in installments.

Detailed Discussion of Findings

Availability of insecticide treatments for nets

Net treatments were essentially unavailable to most people and only one trader of these products was located (at the same pharmacy in Masaka where pretreated nets were sold). This trader was selling bulk liquid treatments and a single-dose Zeneca product (Iconet) in a sachet, which he stated sold faster than the bulk treatment because "most people have one net." This treatment kit was priced at 5,000 Ush (\$3.20). The trader began selling treatments because, "we had no drugs and yet our customers wanted them, and so our purchasing officer had to go for them." This trader also advised his customers to treat their nets every six months. Several other net sellers also stated that they did not sell insecticide treatments because they were unavailable, despite consumer interest. (See below for more detail.)

Trader openness to selling insecticide treatments with nets

Despite the fact that with one exception, none of the traders had any experience with selling insecticide treatments, the vast majority were willing and eager to do so. Indeed, some net sellers who wanted to sell insecticide treatments complained that they had been unable to locate individual treatments, yet consumers were asking for them. The main reasons traders wished to sell insecticide treatments along with nets were that doing so would: (1) be more convenient for consumers, (2) allow the traders to educate their customers about the products, (3) help their customers prevent malaria because treated nets were more effective than untreated ones, and (4) help traders make a profit. A small minority of traders said it would be difficult for them to sell treatments along with the nets because the market for nets and insecticides was specialized and certain kinds of shops cannot sell certain kinds of products. Only two traders questioned the utility of selling treatments, stating that consumers do not use nets.

Trader recommendations regarding the promotion of nets and treatments

The most common recommendations from traders regarding how to encourage the use and purchase of mosquito nets were to “subsidize” or “reduce the price” of nets and insecticide treatments, and to educate people about the benefits of nets and insecticides (including how to use them). Some traders suggested extensive advertising through mass media (e.g., radio, television, newspapers, and poster), especially radio, and through local, community-based efforts (e.g., village-level sensitization). Several traders also emphasized the need to sensitize people about the safety concerns of using insecticide treatments and suggested setting up demonstration centers in rural areas to show villagers how to treat nets .

Trader recommendations regarding the promotion of nets

“The Ministry of Industry in collaboration with the Ministry of Health should encourage producers of nets to reduce prices so that every Ugandan can afford to buy a net.” (Masaka urban trader selling nets)

“They should encourage sellers/manufacturers to cut the price of nets to a minimum price. Publicize the methods of net treatment and use.” (Masaka urban trader selling nets)

“They should get on an agent who sells at a low price. Use the local radio station, specifying the outlet and the price.” (Hoima urban trader selling nets)

“First, they should reduce the price of a net from 7000 to maybe 3000. They should bring an agent to sell us the nets from here rather than us travelling far to buy nets. They should also come and gather people and educate them about nets and why they should use them, so that people get to know that they must use nets and have nets. Also, tell people through radios but there are few people who would listen because many people do not have radios.” (Soroti rural trader selling insect control products)

“Provide information to people most especially through radio broadcasting.” (Hoima rural wholesaler/retailer selling insect control products)

Traders' recommendations regarding the promotion of net treatments

“Tell them that nets without treatment are not 100% effective. “Tell them that preventing mosquito bites is cutting on some costs of treating malaria, which is so expensive.” (Soroti urban trader)

“They should first show people how the method works and educate them, by sensitizing them on the effectiveness of this method.” (Masaka rural trader)

“Some people know about the treatment, but they do not know where to buy them. They should advertise. Supply nets plus treatment. Educate the consumer.” (Kampala urban trader)

“Where are those insecticides? And besides, someone from the village will not spend their little money on those insecticides. I would rather suggest that the mosquito nets be manufactured with the treatment already in them, thus a person buys the net already treated and this will make the net more effective and there will be no doubt about performance.” (Soroti urban trader)

Insect control product categories and brands sold by traders

Although most of the net sellers did not also carry insect control products (e.g., coils, aerosols) and most of the insect control product sellers did not also carry nets, a few retail stores and one pharmacy did offer both types of products to their customers.

Among 19 traders of insect control products (e.g., coils, aerosols, repellants), Doom was the most commonly sold brand. Other common brands were Baygon, Farco and Bop (aerosols) and White Crane (coils). Other available brands were Aroxol, Autan, Elephant, Fuma Killer, Johnson, Maxmi, Motox, Panma, Ridsect, Tox, Transelektra, and Tricle.

The fastest selling product form was aerosols and the fastest selling brand was Doom. Some traders said that coils were the fastest selling product category. When traders were asked why a particular product category was fastest selling, the most common reason mentioned for aerosols was that it was effective and worked against many insects. Another important reason was that the particular brand was familiar and trusted. Other reasons were that the product came in different sizes and did not smell bad. The most common reason given for why coils were the fastest selling product category were that they were “cheap.”

Traders of insect control products often sold other items that are more expensive than the coils, nets, aerosols, or repellants. Examples include perfumes at 10,000 - 50,000 Ush (US\$6.35 - \$31.65), and sacks of sugar at 45,000-50,000 Ush (US\$28.50 - \$31.65) and drugs at 1,250,000 Ush (US\$791). Traders of mosquito nets sometimes sold other bedding products such as mattresses (125,000 Ush or US\$79.10) and blankets at 35,000 – 70,000 Ush (US\$22.15 – 44.30). In rare cases, the nets or other insect control products (e.g., aerosols) were the most expensive products sold.

How traders obtain their products

Most traders in this study got their products from wholesalers. In some instances, they get their items from suppliers. The most common means of procuring products was for the trader to collect them, but some received deliveries from wholesalers or suppliers. Although traders reported that they collected or received their fastest selling product anywhere from once every two days to once a year, most respondents obtained their fastest moving product once or twice monthly.

Traders' motivation to buy from specific suppliers/manufacturers

Traders said they would be motivated to purchase their goods from a specific supplier or manufacturer if offered the option of payment on consignment (after goods are sold). They also preferred manufacturers/suppliers who deliver the products, who offer cash and trade discounts, who are trustworthy, nice and pleasant to deal with, who sell their products at inexpensive prices, and who do sales promotion “sensitization” and advertising. One respondent also said he would prefer a supplier who gave trials of new products and that this was particularly important if the supplier were “new.” Traders did not like the idea of retro deals (whereby cash bonuses are given after achieving a certain level of sales), particularly for products that were expected to be slower moving.

Traders' motivation to buy from specific suppliers

“I would be motivated by paying on consignment because I would get business even without enough capital, since I have to pay later.” (Hoima rural trader selling insect control products)

“Payment on consignment, because you need to pay after you have sold the goods and it really helps, in case you don't have enough capital.” (Hoima urban trader selling insect control products)

“If the supplier is willing to sell and deliver goods to my shop. If he is willing to sell to me on credit and at a favorable price.” (Masaka urban trader selling insect control products)

“I would like a supplier who would do me some good by delivering the products because right now, I spend 78,000 Ush just to transport myself to Kisumu in Kenya in order to restock my store, among other expenses.” (Soroti urban trader selling nets)

“If the supplier delivers the product to my outlet. If the supplier carries out a lot of advertising. If the supplier can give trade and cash discounts.” (Kampala urban trader selling insect control products)

“Business needs a selling language and handling of customers. So, I will always look for a wholesaler who talks nicely, can give trade and cash discounts.” (Masaka urban trader selling insect control products)

Reasons for selling nets and typical purchase situations

Most net traders said they began selling nets because they saw that there was high demand (e.g., customers were asking for nets) and they believed a profit could be made. The desire to help their customers remain free from mosquito bites and malaria also motivated some traders to start selling nets.

Reasons Net Traders Began Selling Mosquito Nets

“It was on high demand because previously, I used to sell bed sheets and curtains and I realized that people were asking for mosquito nets. In fact, personally due to increased mosquitoes at home, I used some sheets to frame them into net protection from mosquitoes. That’s when I developed the idea of doing business in mosquito nets” (Soroti Urban retailer)

“I saw that there were many mosquitoes around and so I thought people would buy if I stocked. So many people could come to ask for the mosquito nets. There were not many shops selling nets.” (Soroti urban wholesaler/retailer)

“To get money and earn a living. To help people against mosquitoes.” (Hoima urban retailer)

“Because we wanted people to get protection from insects like mosquitoes, hence preventing malaria.” (Masaka urban pharmacy)

Traders confirmed consumer reports that both men and women buy nets. Most traders also said that consumers ask for the product when they come to the outlet, with some requesting treated nets and others requesting untreated ones. Several traders mentioned that demand for nets peaks during rainy season and that in some cases, the typical consumer is one who has been bitten by mosquitoes, has rashes from mosquito bites, and/or has (or recently had) malaria. One trader stated that consumers also come looking for mosquito nets during times when they have money.

Typical purchase situations

“So many people always ask but they do not buy because of the price. They always ask for mosquito nets during the rainy season, when mosquitoes are many. The people who buy the nets are working class people who can afford.” (Soroti urban trader)

“People know that the nets are for protection against mosquito bites and so, they just come in and request for them. For the nylon, army green type without holes, it’s the local people who live in areas of heavy mosquitoes presence that demand for them. Otherwise, the other type with holes in them are demanded by the educated who are around town.” (Soroti urban trader)

“People when they have mosquito bites on their bodies [come in to buy nets]. Adults, both men and women are the ones who purchase the nets. They come asking for mosquito nets, not a product against mosquitoes.” (Kampala urban trader)

“We usually get many customers for nets during the rainy season. Both male and female come asking for nets, with some asking for treated nets, while others ask for non-treated.” (Masaka urban trader)

“All sexes, male and female come at different times. Anytime of the month, when they get money to buy. They specify that they want mosquito nets which are treated.” (Masaka urban retailer)

Giving advice

Most net traders said they did offer their customers advice about the nets, but typically this advice comes after the purchase and is about how to hang or wash/maintain the net. However, some traders reported that they told their customers about the benefit of nets prior to purchase. One net trader also reported advising customers to purchase insecticide treatment for the net (which the trader did not sell, stating that such products were not allowed to be sold in a “domestic” shop) and another trader (a pharmacist) reported telling customers how to retreat the net.

How traders encourage consumers to buy insect control products from them

The most common ways that traders reported encouraging customers to buy insect control products from them is by giving information about a product, especially regarding its efficacy, and by offering the product at a good or reduced price. Some traders also allowed customers to pay on credit or by installments. Other means for encouraging purchase, mentioned by a few traders include advertising or displaying the product, and educating customers about the dangers of malaria, and giving bonuses or extra products to customers who purchase a lot.

How traders encourage consumers to buy insect control products from them

“By giving them goods on credit. Selling goods at a relatively low price. Talking and convincing them through word of mouth, radio and media adverts.” (Kampala urban retailer selling nets)

“Give customers advice about the use and treatment of the net. The moment you do that then he/she will bring another one to the shop.” (Masaka urban supermarket selling nets)

“Tell them the dangers of allowing mosquitoes to bite you. Tell them how good and safe the control products are. Tell them that prevention is better than cure and so, if they bought the control products, they will be safe.” (Soroti urban retail net seller)

“By advertising, for example, putting posters on windows and door of my shop; window display. By giving customers constant buyers credit facilities. By giving customers information about the effectiveness of some brands I have in stock.” (Masaka rural retailer not selling nets)

SECTION 11

INSECTICIDE TREATMENT PRODUCT PREFERENCES

As discussed in Section 1, both consumers and traders were asked to express their likes and dislikes and preferences for various net treatment methods and products. For consumers, researchers conducted a demonstration of net treatment on a single-size, white net. The demonstration was performed with one of four dipping treatment products: the tablet, liquid bottle, liquid sachet or granule sachet and one of two spraying options: the aerosol spray or the flit-gun sprayer. The researcher then asked for the respondent's reactions to each and for their comparison of the two. For the traders, researchers showed all six net treatment options (the tablet, liquid bottle, liquid sachet, granule sachet, aerosol, and flit gun sprayer) and explained, but did not demonstrate how each product worked. Traders were then asked for their reactions to the various methods.

Summary of Findings

- Consumers preferred dipping to spraying, but only when the flit gun sprayer was included in the analysis. The flit gun sprayer is disliked. Consumers showed no strong preference for dipping over the aerosol spray product.
- Traders strongly preferred the aerosol to any other net treatment product. Of the 30 traders shown all six insecticide product options, 24 chose the aerosol, four opted for the bottle, two selected the tablet and one chose the liquid sachet.
- Consumers liked dipping products and spraying products for different reasons. Dipping products were liked for their ability to fully saturate the net and therefore, appeared more effective. The liquid in a bottle and liquid sachet were appreciated for their ability to dissolve easily in water. Consumers also liked that some dipping products were packaged with plastic bags indicating the watermark and that they came with gloves.
- The aerosol was liked because it is easy to use, quick, and premixed. It (along with the flit gun sprayer) was disliked for its lack of ability to saturate the net and the fact that product was wasted in the air. Consumers also did not like the aerosol's odor.
- Consumers voiced strong safety concerns regarding both dipping and spraying products.
- For both dipping and spraying options, some consumers requested that the product come in different sizes.
- Consumers said they were willing to pay a median price of 1250 Ush (US\$0.80) for the aerosol spray, 1,725 Ush (US\$1.10) for the bottle, 500 Ush (US\$0.30) for the tablet, and 1,500 Ush (US\$0.95) for the liquid sachet and granule. The median price consumers were willing to pay for the flit gun was 2,000 Ush (US\$1.25), but this calculation includes those who said their price included both flit gun and the chemical. Data must be interpreted with caution because of small numbers of respondents reporting prices.
- The median price at which traders said the aerosol could be sold was 2,000 Ush (US\$1.30).

Summary of Program and Product Implications

- Product development should take into consideration consumer likes and dislikes. Sprays will need operate in such a way to ensure the net is fully covered and that the product is not wasted in the air. Manufacturers should also consider packaging it in such a way as to indicate how much of the product has been used. Dipping products should dissolve easily in water and should come with measurement indicators and gloves. Both dipping and spraying products should be offered in multiple sizes.
- In addition to being promoted as effective, sprays should be promoted as easy to use, quick, already mixed, and able to saturate the net. Dipping products should be promoted as ensuring complete net coverage, effective, and easy to use.
- Considerable effort must be to be directed to promoting sprays and dipping products as safe. The particular concerns about use around children, inhalation, or skin contact with insecticides must be addressed.

Detailed Discussion of Findings

Overall, consumers appeared to prefer dipping products to spraying options, but when dipping products were compared to the aerosol spray alone, this preference disappeared. That is, respondents showed no clear preference for the dipping or the aerosol spray. (See Table 11.1.)

Table 11.1: Consumer preference between dipping and spraying methods of treating nets

Produce choice among those exposed to a dipping product and a spraying product (n = 29)	Product choice among those exposed to a dipping product and the aerosol (n = 15)	Product choice among those exposed to a dipping product and the flit gun sprayer (n=15)
Dipping 20	Dipping 9	Dipping 12
Spraying 10	Aerosol 6	Flit gun sprayer 3

* Because of the relatively small sample size, the difference between the numbers in the second column (i.e., 8 and 6) is too small to be considered meaningful.

Consumer likes and dislikes regarding net treatment products

Consumers liked dipping products because they felt certain that by soaking the net, it would be fully saturated and covered by the chemical. Thus, respondents were sure of the product's effectiveness. As with their reaction to the spraying options, many consumers worried that the dipping products were potentially harmful (even lethal), especially to children. A few consumers felt that dipping was time consuming and complicated. (See Table 11.2 and text boxes that follow.)

Consumers did not express a strong preference for any one dipping product over. (See Table 11.3.) Among all the dipping options, products in liquid form (i.e., the bottle or sachet) were liked for their ability to dissolve quickly in water, whereas the granules and tablet were seen as more problematic in this regard. (See Table 11.2.)

Among the spraying options, the flit gun sprayer was not liked and was viewed as cumbersome, time consuming and tiresome. It was also seen as wasteful because the product escaped into the air, and also as dangerous because of the potential for the chemical to be inhaled, to get into one's

eyes, or to drop on children. Respondents also worried that the spray would not fully saturate the net and thus, would not be effective (See Table 11.2.) Consumers who were exposed to the aerosol spray expressed these same concerns about safety/exposure to the chemical through inhalation, and about wastage/lack of net saturation. Indeed, worry about lack of net saturation was often a key reason that consumers who selected a dipping product over the aerosol did so. Although a few consumers liked the aerosol's smell, many had quite negative reactions to the odor. A few consumers also worried that the aerosol would be too expensive (See Table 11.2.)

On the other hand, the aerosol was liked because it was easy and quick to use, did not require much effort and was already mixed. Respondents also liked the fact that the net would dry easily after being sprayed. (See Table 11.2.)

Table 11.2: Consumer likes and concerns/dislikes about dipping and spraying methods for treating nets

Method	Likes	Concerns or Dislikes
Dipping	<ul style="list-style-type: none"> ▪ Fully saturates and covers net ▪ Seems long-lasting and effective (because of net saturation) ▪ Product not wasted in air 	<ul style="list-style-type: none"> ▪ Chemical might cause harm to children ▪ Time consuming and hard to do
Spraying	<ul style="list-style-type: none"> ▪ Easy and convenient ▪ No mixing required ▪ Not time consuming ▪ Net will dry easily 	<ul style="list-style-type: none"> ▪ Product is wasted in air ▪ Does not fully saturate net (so not sure of effectiveness) ▪ Product smells bad (aerosol) and may be harmful to inhale (aerosol and flit gun) ▪ Tiresome and time consuming (flit gun only) ▪ Expensive (aerosol only)

Reasons those consumers who liked dipping products did so

“It doesn’t take a lot of time to use this process. Requirements, like water and basin are available here, so I don’t need to buy them. The only thing I need to buy is the chemical for treating. It is cheap and all the chemical remains on the net, doesn’t evaporate.” (Consumer who saw tablet compared to flit fun sprayer)

“Because the net can be soaked thoroughly, unlike the spray where one can mix some parts without chemicals.” (Consumer who saw liquid in bottle compared to aerosol)

“Because I spend less money and I’m very sure that what I’m doing will last longer.” (Consumer who saw liquid sachet compared to aerosol)

“It might be more effective in killing of mosquitoes, as compared to the [spray]. The net absorbs the mixtures very well than the spraying because it [spray] escapes while applying onto the net.” (Consumer who saw granule in sachet compared to aerosol)

“Because I will protect myself by using gloves. Because I am very sure that the net has really been saturated. It has ready measurements. I can see that it [the tablet] really dissolved in water.” (Consumer who saw liquid in sachet compared to flit gun sprayer)

Reasons consumers who liked spraying products did so

“The process is not long, unlike the dipping where you have to dip and dry. It does not require gloves. It does not require me to measure the chemical.” (Consumer exposed to tablet and aerosol, who chose aerosol)

“It is easy and quick to apply than dipping. Dipping involves a lot of labor. [Spraying] does not disturb you by mixing with water because it’s ready for use. Its smell should be reduced to avoid irritation. Its smell gives me a stomach problem” (Consumer exposed to sachet and aerosol, who chose aerosol)

“That chemical is generally dangerous to one’s life, because it reduces one’s life span. It’s less time consuming [than dipping] because I don’t have to dry it for long. It’s less time consuming because after spraying it, I immediately hang it on the bed.” (Consumer exposed to tablet and aerosol, who chose aerosol)

“It’s easy to use but it can be difficult for old people in the village. The method takes little chemical. By spraying, you can inhale the chemical and be affected. The net can dry quickly. It’s easy to use. It exposes the person who is using the chemical and it can affect him. You cannot be sure whether the net has been saturated with the mixture (Consumer exposed to tablet and aerosol, who chose aerosol)

Table 11.3: Number of consumers preferring various dipping options to spraying options

Method	Number selecting this option over the spraying option out of number exposed (N = 29)
Granule sachet	4 of 6
Liquid sachet	5 of 9
Tablet	5 of 9
Bottle	4 of 5

Consumer reactions to product packaging

Only a few consumers offered comments on the packaging of the aerosol. Some wanted the spray to come in sizes for treatment of multiple nets. Others wanted to see how much spray was left over after use. Several respondents wanted the product to have instructions and a brand name on the label (See Table 11.4)

Respondents had mixed reactions to the packaging of the bottle, liking the fact that the product came with gloves but worrying that the bottle could be easily pierced or opened and that the chemical could leak and harm children. A few respondents also wanted the bottle to come in different sizes for treatment of more than one net. Although no one mentioned that the bottle (like the tablet) came with its own measuring bag and water-line indicator, this feature, was noted and liked among consumers preferring the tablet because they felt it helped avoid measurement error and made the mixing/dipping process easier (see Table 11.4). The only comments regarding the packaging of the granules was that it should be waterproof.

The sachet, bottle, and tablet came with gloves and reactions to inclusion of these were mixed, although most consumers seemed to want gloves because they offered good protection (indeed several consumers who liked the granule option disliked the fact that the product did not include gloves). However, some respondents also felt that gloves signaled that the chemical was dangerous and even life threatening (see Table 11.4).

Table 11.4: Consumer likes and dislikes about dipping product packaging

Dipping product packaging likes	Dipping product packaging dislikes
<ul style="list-style-type: none">▪ Measuring bag with water demarcation▪ Gloves (give protection)	<ul style="list-style-type: none">▪ Gloves (indicate danger of chemical)▪ Product can spill or leak (bottle)

NB: Products that come with gloves are the liquid bottle, tablet, and liquid sachet. Products that come with plastic bags with demarcation lines are the liquid bottle and tablet.

Prices of net treatments consumers are willing to pay

Respondents said they would be willing to pay between 100-3,000 Ush (US\$0.05-\$1.90) for the aerosol spray, with the median price being 1250 Ush (US\$0.80). Those respondents exposed to the flit gun said they would pay between 500 (US\$0.30) and 2,000 Ush (US\$1.25). Those saying they would pay higher amounts (e.g., 3,000 Ush and up—US\$1.90) said they would do so because they would purchase both the flit gun and the chemical. The six respondents exposed to the bottle option said they would pay between 100-5,000 Ush (US\$0.05 - \$3.15) for it, with the median price falling at 1,725 Ush (US\$1.10). Respondents exposed to the tablet said they would

be willing to pay between 200 and 2000 Ush (US\$0.15 - \$1.25) for it, with the median price being 500 Ush (US\$0.30). For the liquid sachet, respondents were willing to pay between 500 and 4,500 Ush (US\$0.30 - \$2.85) and the median suggested price was 1,500 Ush (US\$0.95). Consumers were willing to pay between 200 and 5000 Ush (US\$0.15 - \$3.15) for the granule sachet. (See Table 11.5.)

Table 11.5: Price of net treatment consumers say they are willing to pay

Product	Price
Aerosol spray (N = 15)	US\$0.80 (median) US\$0.05 - \$1.90 (range)
Flit gun sprayer (N = 15)	US\$1.40 (median, sometimes including sprayer and treatment) US\$0.30 - \$1.25 (range, sometimes including sprayer and treatment)
Bottle (N = 6)	US\$1.10 (median) US\$0.05 - \$3.15 (range)
Tablet (N = 9)	US\$0.30 (median) US\$0.15 - US\$1.25 (range)
Liquid sachet (N = 9)	US\$0.95 (median) US\$0.30 - \$2.85 (range)
Granule sachet (N = 6)	US\$0.95 (median) US\$0.15 - \$3.15 (range)

Trader product choices and recommendations regarding their price

Traders strongly preferred the aerosol spray to any other net treatment product. Twenty-five of the 32 traders selected the aerosol over the other 5 net treatment products they were shown. The median price at which traders felt aerosol sprays could be sold was 2000 Ush (US\$1.25), although prices for aerosols indicated ranges from 800-6,000 Ush (US\$0.50-\$3.80). Four traders selected the bottle over the other products shown and said it could be sold for between 500-3,000 (US\$0.30-and \$1.90). One trader selected the tablet, pricing it at 5000 Ush (US\$3.20), one chose the liquid sachet, saying it could be sold for 800 Ush (US\$0.50) and one chose the flit-gun sprayer, saying it could be sold for 700 Ush (US\$0.45).

The reasons traders gave for choosing the aerosol over other products were the same as those given by consumers (i.e., easy and convenient to use, no mixing required, not time consuming).

When asked to choose among dipping products only, 22 of the 32 traders selected the liquid bottle, four opted for the tablet, three for the liquid sachet, and one for the granule. Reasons traders gave for selecting the bottle were that it dissolves easily, comes with a bag with a water line, and gloves.

Table 11.6: Traders' product choices out of all dipping and spraying products

Product	Traders' favorite overall product (out of 6 products shown) (N=32)	Acceptable price for favorite product
Aerosol	25	US\$1.25 (median) US\$0.50 - \$3.20 (range)
Bottle	4	US\$0.50 (median) US\$0.30 - \$1.90 (range)
Tablet	2	US\$3.20 – \$3.80 (range)
Liquid sachet	1	US\$ 0.50
Flit gun sprayer	1	US\$0.45
Total	31	NA

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