



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

**March 2001**



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

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This study was conducted by the NetMark Project of the Academy for Educational Development (AED). 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. Nancy Nachbar led the fieldwork, which was conducted by local Zambian data collectors affiliated with RI. Dr. Nachbar also took the lead role in analyzing the data and writing the report.

### **NetMark Research Team**

Dr. Carol Baume	NetMark Research Director
Dr. Halima Mwenesi	NetMark Regional Research Coordinator
Dr. Silvia Holschneider	AED Research and Evaluation Officer
Dr. Nancy Nachbar	AED Research and Evaluation Officer
Ms. Mamapudi Nkgadima	NetMark Regional Marketing Manager
Ms. Anita Bhuyan	AED Research Associate/Data Analyst
Ms. Reena Borwankar	AED Research Associate/Data Analyst

### **Research International**

Mr. Johannes Cichorius	Account Manager
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## **ACRONYMS**

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<b>AED</b>	<b>Academy for Educational Development</b>
<b>ITM</b>	<b>Insecticide Treated Material</b>
<b>RI</b>	<b>Research International</b>
<b>SES</b>	<b>Socio-economic Status</b>
<b>SFH</b>	<b>Society for Family Health</b>
<b>Unicef</b>	<b>United Nations Children’s Fund</b>
<b>USAID</b>	<b>United States Agency for International Development</b>
<b>WHO</b>	<b>World Health Organization</b>

## MAP OF ZAMBIA



## SUMMARY OF FINDINGS

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General knowledge about malaria was good. The English term “malaria” was widely recognized and respondents named symptoms of malaria that are generally consistent with biomedical definitions of the illness. Respondents considered malaria to be serious and had good general knowledge of who is most vulnerable to a serious case of the illness. 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 used some kind of mosquito control, whether commercial (coils or aerosols) or traditional (burning things). Respondents had both positive and negative perceptions of all mosquito control methods, but nets were perceived more positively than all other methods.

Most respondents named several benefits of using a net: protection from mosquitoes and other insects; protection from illness, especially malaria; and allowing a good night’s sleep. Net owners were viewed in a positive light, described as “health conscious,” “caring,” and also “well-to-do” and “high class.” The few respondents who cited negative features of nets mentioned discomfort from heat, feeling restricted, and fear of a child becoming trapped.

There was evidence of limited access to nets. Net owners and traders were easy to locate in urban areas, but difficult to find in rural areas [except where ITM (insecticide treated material) projects were operating]. Traders reported difficulty in maintaining stock. In the commercial outlets visited, there was very limited choice in terms of net size, shape, and color. Consumers preferred conical nets for ease of hanging and rectangular nets because they are roomier. They also generally preferred large, white nets. Large-size nets (double and family/king) were also the most commonly purchased size. Net prices varied widely. Traders reported selling nets from about US\$3.60 for a single-size net to \$12.25 for a double. Consumers reported paying between US\$1.80 and \$8.90 for double-size nets purchased within the past two years. Net owners sometimes traveled long distances to obtain their nets. Respondents considered nets expensive, and most non-owners said they did not own a net because of the expense. Fathers, either alone or with mothers, made the decision to obtain a net, with fathers tending to buy nets in the commercial sector and mothers obtaining them from projects or clinics.

Nets were not always used year-round; many net-owning households used nets only in the rainy season. Vulnerable groups were not necessarily given priority for sleeping under a net. Only about half of the children under five in net-owning households had slept under a net the prior night. However, all four pregnant women in net-owning households had slept under a net the prior night.

Nets were reportedly washed about every 3-6 months, typically with water and soap, in a basin, separately from clothes. Some nets were dried in the sun and others in the shade. Some owners of treated nets were confused about what to do regarding washing.

The concept of treating nets with insecticide was familiar to most urban respondents and to rural respondents in areas with ITM projects, but only a few net owners had treated their nets. A few of these were dissatisfied, saying that they expected the treated net would kill mosquitoes but that it did not. Traders and consumers generally liked the idea of ITMs, but parents were also concerned about the potential danger of insecticides, especially to children and pregnant women. However, consumers said they would feel better if assured by the Ministry of Health and other credible sources that the treatment product was safe.

Insecticide treatments appeared to be virtually unavailable in the commercial sector, but traders of nets and insect control products were eager to sell them. The insect control market was not specialized; traders who sold nets generally sold other insect control products such as coils and aerosols. They also often sold commodities that were more expensive than nets and were motivated to sell nets because of high demand. Most did not give their customers any advice on malaria prevention or ITMs. Traders said they would be motivated to purchase goods from a specific supplier if they received special discounts or incentives.

Consumers and traders wanted net treatments that thoroughly cover/saturate the net, are easy to use, convenient, fast, have no bad odor, cause no irritation, and are 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 preferred dipping products to the flit-gun sprayer but had no strong preference when dipping products were compared to the aerosol. Among the dipping products, consumers had no real preference but liked those that dissolved easily, came with gloves, and had a plastic bag with a water demarcation line. They worried about products that could spill, were in packaging perceived as insecure, or that could be mistaken for medicine or food. Traders showed some preference for the aerosol spray, tablet, and liquid in bottle form.

# 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: Lusaka, Choma, Kaoma, Kitwe, and Mansa. North Western Province was deliberately excluded from the study because of insecurity in the region. Two sites, Kitwe and Mansa were purposively chosen because they were sites of ITM promotion; the Society for Family Health (SFH) is working in Kitwe and Unicef operates in Mansa. These sites were selected in order to maximize the ability to obtain information from net owners regarding net purchase, use, and treatment.<sup>1</sup> Table 1.1 identifies the location and ethnic/linguistic make-up of each site. In each of the sites outside Lusaka, the urban center plus a rural community were included in the investigation, for a total of nine communities in the study.

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<sup>1</sup> During the course of data collection, it was learned that in urban Kaoma, the local hospital was selling nets at subsidized prices and offering community net treatment services (but was not doing any active promotion in the community or in rural areas).

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

SITE	PROVINCE	ETHNIC GROUP/LANGUAGE
Lusaka	Lusaka	Multi-ethnic/Bemba, Nyanja, English
Choma	Southern	Bemba, Nyanja, Lubale, Tonga
Kaoma	Western	Bemba, Nyanja, Lozi
Kitwe	Copperbelt	Bemba, Nyanja
Mansa	Luapula	Bemba, Nyanja

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

- 50 *interviews with parents (or guardians)*<sup>2</sup> of children under five
- 10 *focus group discussions* with parents of children under five
- 29 *treatment product demonstration observations* with parents of children under five years of age; and
- 25 *interviews with 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 <sup>3</sup>
Lusaka	10 (urban)	2 (urban)	6 (urban)	5 (urban)
Choma	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	6 (5 urban; 1 rural)
Kaoma	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	4 (4 urban; 0 rural)
Kitwe	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	5 (3 urban; 2 rural)	5 (4 urban; 1 rural)
Mansa	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (4 urban; 1 rural)
<b>TOTAL</b>	50	10	29	25

<sup>2</sup> Throughout this document, the term “parents” is used to refer to biological parents as well as to guardians.

<sup>3</sup> Insect control product traders were extremely difficult to locate in all rural areas, hence few were interviewed.

## **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 at least some respondents who owned nets. The interview sample consisted of a total of 50 individuals, 28 from net-owning households and 22 from non-net-owning households. (All nets encountered in Zambia were hanging mosquito nets that fit over a bed, not the stand-up-umbrella-type baby nets that only fit an infant and are common in some other countries.) Of the 50 interviewees, 18 were men and 32 were women; a greater number of women were interviewed because males were often difficult to locate during the day, when the majority of interviews took place. Between 6 and 11 participants took part in each focus group discussion. Participants in the two focus groups in Lusaka were all from urban Lusaka; one group consisted of upper-middle class men and the other group of lower socio-economic status (SES) women.

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 14 respondents were exposed to the aerosol spray and 15 were exposed to the flit-gun sprayer. Seven respondents were exposed to the bottle, seven to the liquid sachet, nine to the tablet and six to the granule sachet. Table 1.3 provides a breakdown of the product demonstration observations by gender.

**Table 1.3: Breakdown of consumer sample by gender and methods**

<b>DATA COLLECTION METHOD</b>	<b>FATHERS</b>	<b>MOTHERS</b>	<b>TOTAL</b>
Interviews	18	32	50
Focus group discussions	5	5	10
Product demonstration observations	15	15	30

## **Trade Component:**

The purpose of the interviews with 25 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, wholesale shops, pharmacies, table-top vendors, and one Unicef agent working for an ITM project.

## **1.4 ORGANIZATION OF REPORT**

This report presents results from Zambia.<sup>4</sup> 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.

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<sup>4</sup> 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**

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#### **Summary of Findings**

- There was universal knowledge among parents and members of the insect control trade that mosquitoes transmit malaria, although at the same time, there were misconceptions about other causes of the disease. Almost all consumers and members of the insect control trade considered malaria to be a very serious disease.
- The English term, “malaria” was widely used and recognized.
- Most parents named symptoms of malaria that are generally consistent with clinical descriptions of mild malaria, but did not mention convulsions/fits, a symptom of severe malaria.
- Mosquitoes were perceived as a problem, although some respondents differed in opinion regarding the times of the year when mosquitoes are a concern. Mosquitoes were viewed both as a year-round and seasonal issue, typically worst during rainy season.
- Children were seen as especially susceptible to malaria. Young children and pregnant woman 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 special protection.

#### **Summary of Program and Product Implications**

- The general concern with malaria and understanding of how it is transmitted is favorable for net and insecticide treatment 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 consonant 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 must emphasize the special vulnerability of children under five and pregnant women to suffering severe consequences of malaria. Promotional efforts can build on the existing concept that children are vulnerable to emphasize that *children under five* are particularly at risk.

## **Detailed Discussion of Findings**

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

When asked what illnesses are caused by mosquitoes, nearly all (49/50) consumers spontaneously said the English word “malaria” and all 25 traders knew this disease. The one consumer who did not spontaneously mention “malaria” knew the word when prompted. The term “malaria” was also mentioned in the majority of focus group discussions as a problem caused by mosquitoes.

A minority of respondents erroneously believed that mosquitoes cause other illness, such as influenza, cholera, tuberculosis, asthma, and sleeping sickness. Additionally, misperceptions that there are other causes of malaria (other than mosquito bites) exist. These include drinking well water or unclean water, eating dirty food, changes in the weather, playing in the cold, and being dirty or in dirty surroundings.

### ***Beliefs about the symptoms and severity of malaria***

When describing malaria, most respondents mentioned symptoms that are consistent with clinical descriptions of mild malaria, such as fever (35/50), feeling weak/achy and lacking energy (22/50), loss of appetite (15/50), feeling cold/shivering (15/50), headache (14/50), and vomiting yellow/green stuff (14/50). In addition, some respondents also mentioned symptoms such as diarrhea, coughing, night sweats, and yellow eyes and palms. Almost no one mentioned convulsions, a symptom of severe malaria.

The vast majority of study participants thought malaria is a serious disease that is potentially fatal. Indeed, only 2 of 49 parents responding to questions about severity stated that malaria was not particularly serious and many (44/49) spontaneously said that malaria could cause death. Almost all of the insect control product traders (22/25) also viewed malaria as a serious illness and only three said that it was not serious.

### *Perceived severity of malaria among parents and traders*

“Actually, it’s very serious. Nearly every week one has malaria. My son had a bout of it recently.”  
(Lusaka male non-owner)

“Most of the people who are sick who go to the hospital are suffering from malaria. It is the most prevalent [illness] here in Kaoma.” (Kaoma urban male net owner)

“It attacks in bouts at different times. [It’s] a very serious problem in our area. Especially, children die of malaria. Adults, in rare cases, also die of malaria.” (Choma rural male non-owner)

“It kills, keeps people away from doing their work in the fields.” (Kitwe rural female non-owner)

“It’s very serious. If there is any other disease that is killing people second to this dreaded disease, AIDS, it is malaria.” (Kaoma urban trader selling insect control products, including nets)

“It’s very, very serious and I say this because we sell more and more chloroquine tablets and over-the-counter products. In a day, we sell more than 20 treatments and that can tell you how serious the problem is.” (Choma urban trader selling insect control products)

“In this area, it’s not that serious. It’s quite seasonal.” (Choma rural trader selling insect control products during rainy season only)

Mosquitoes were viewed both as a seasonal and year-round problem. Respondents in focus groups said that mosquitoes were either most prevalent during rainy and hot seasons, or that there were mosquitoes throughout the year.

### *Perceptions of seasonality of mosquitoes*

“[In] rainy season, there are a lot of mosquitoes, especially during the period December and May.”  
(Mansa rural male focus group participant)

“It does not depend on the season. There are mosquitoes all the time, even in the cold season.”  
(Mansa urban female focus group participant)

Respondent 1: “Malaria is throughout the year in this area. There are no seasons.”

Respondent 2: “Malaria is throughout the year in this area, so we need your help so that malaria can be reduced. There is nothing like this season there is less malaria or what. It is throughout the year.” (Choma rural female focus group discussion)

Respondent1: “There are mosquitoes from January to December. It is actually a swarm of mosquitoes. Now they are not so much. It’s like they have been chased away by the cold....”

Respondent2: “It is mostly during hot season that we have mosquitoes.” (Kitwe urban male focus group discussion)

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

Parents recognized that children (not necessarily under five) and pregnant women need special protection from mosquitoes. Many respondents also viewed children as particularly susceptible to getting malaria and to dying, and as having low immunity. However, understanding of the special vulnerability of children *under five* and pregnant women to suffering severe consequences of malaria may be low.

Most 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; all 50 respondents selected the child of 3 years and most (39/50) selected pregnant women as either the first or second choice.

On the other hand, when asked a more specific question about who is most likely to catch malaria, 13 of 50 respondents said “young children” or children under five. Only one respondent mentioned pregnant women. Some respondents (17/50) said that everyone was vulnerable.

When asked who was most likely to die from the disease, 13 of 50 respondents mentioned “young children” or children under five. About the same number of respondents (15/50) mentioned children, but did not specify an age. Only one respondent mentioned pregnant women.

## **SECTION 3**

### **COMPARISON OF MOSQUITO CONTROL MEASURES**

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#### **Summary of Findings**

- Virtually everyone reported using some method of mosquito control, whether commercial or traditional. In both urban and rural areas, people used commercial insect control products to combat mosquitoes. Reported use of traditional insect control methods (e.g., burning things) was much lower than that for commercial products, but was common in rural areas.
- There was high awareness of mosquito nets and moderate awareness of coils and aerosols. Nets were the most commonly reported methods used as a means to control mosquitoes<sup>5</sup>, followed by coils and aerosols. There was low awareness and use of repellents and flit gun sprayers. There was practically no awareness or use of electric mats.
- Respondents had both positive and negative perceptions about all insect control products, but appeared to view nets more positively than coils or aerosols.
- Participants liked coils because they perceived them as providing protection against bites, but they strongly disliked the odor and side-effects of the smoke.
- Consumers liked aerosols because they kill mosquitoes and other insects, but they perceived aerosols as expensive and some disliked the smell and its perceived side-effects.
- Nets were seen as providing protection against mosquitoes. Some respondents also said they provided a long-lasting solution to mosquito problems and that they protected against malaria. Few consumers listed any dislikes about nets, but those who did, perceived nets as unaffordable and as hot/suffocating/uncomfortable.

#### **Summary of Program and Product Implications**

- The fact that urban and rural dwellers are familiar with and many use 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 and malaria is favorable for net promotion.
- The perception of nets as unaffordable must be considered in determining price, and promotional efforts will need to show that nets are a lasting and economical solution to mosquito/malaria problems.
- The perception of nets as hot, uncomfortable and restrictive of air circulation should be taken into consideration in any promotional activities. These perceptions should also 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.

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<sup>5</sup> However, since net owners were deliberately oversampled in this study, reported net use may be high. Population-based data on net ownership is available via NetMark's quantitative baseline survey.

## Detailed Discussion of Findings

### *Awareness and use of mosquito control methods and products*

Mosquitoes were perceived to be a major problem, and there was moderate awareness and use of commercial mosquito control products. Virtually all respondents (48/50) reported using some form of mosquito control (i.e., commercial or traditional), including mosquito nets in the past year. About half of the respondents (26/50) said they used a commercial method *other than* a net in the past year. Slightly less than half the respondents from rural areas (8/20) and slightly more than half the respondents from urban areas (18/30) reported using a commercial method other than a net in the past year.

The commercial methods respondents were most aware of were nets (41/50)<sup>6</sup>, aerosol sprays (28/50), and coils (26/50). These same methods were mentioned in almost all focus group discussions. Very few respondents listed flit gun sprayers (7/50), repellants (4/50), or electric mats (1/50) as a method of mosquito control. No one named window or door screens.

Similarly, the most commonly used methods were nets, coils, and aerosol sprays.<sup>7</sup> Very few people used repellants, flit gun sprayers, or electric mats.

Awareness of environmental management methods of mosquito control (e.g., clearing bushes or stagnant water, cutting grass) was moderate,<sup>8</sup> with 21 of 50 respondents mentioning this approach. Burning things [e.g., mango pits; weeds such as *mutanda masenya* (literally, “mosquito repellant”) and *lwenye*] was mentioned by 10 of 50 respondents, 7 of whom (all from rural areas) reported using this method.

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

Insect Control Method	# Aware (n = 50)	# Aware Who Also Use Method
Mosquito nets	41	28
Aerosols	28	15
Mosquito coils	26	15
Keep environment clean*	21	NA
Burn things	10	7
Flit gun sprayers	7	2
Repellants	4	3
Electric mat**	4	1

\*Respondents who mentioned environmental methods of mosquito control were not asked if they used these methods.

\*\*Only one of these 4 respondents spontaneously mentioned electric mats. When prompted, the other three said they had heard of the product. All other responses reported in this table were given without prompting.

<sup>6</sup> The majority of the respondents who did not own a net (14/22) mentioned mosquito nets as a way to control mosquitoes.

<sup>7</sup> Owing to deliberate sampling of net owners, reported ownership may be higher in this study than in the general population.

<sup>8</sup> 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.

### ***Perceptions of insect control products, including nets***

All insect control products were seen as having both positive and negative attributes, but consumers viewed mosquito nets more favorably than aerosols or coils. Most comments about nets were positive, but most comments about coils and aerosols were negative. Table 3.2 summarizes the positive and negative attributes of nets, coils, and aerosols.

### ***Coils***

The main reason that consumers liked coils was that they help protect against mosquito bites. The main reasons that consumers disliked coils were because of the smoke/smell, which consumers said is “suffocating,” “makes it hard to breathe,” and causes sneezing and congestion. A few respondents also perceived coils as expensive. At the same time, respondents in a few focus groups viewed coils as inexpensive. Traders of insect control products believed coils sold well because they can be sold individually, are inexpensive, and readily available. (See text box and Table 3.2.)

### ***Perceptions of coils***

“I dislike the smell of the coils when they are burning.” (Choma rural female non-owner)

“Mosquito coils, once you buy, the smoke shall cover the entire household, unlike mosquito nets, because one cannot afford to buy for all the rooms of the house. Certain types of mosquito coils have a very terrible scent and a bad amount of smoke that would make you have a very uncomfortable sleep. Mosquito coils do not last long. When you purchase it, it will finish in a short time.” (Kaoma urban female net owner)

“I dislike coils because the effect does not last long. They would repel the mosquito for a short time but the mosquitoes would come back as soon as the smoke or the coil runs out.” (Kaoma rural male non-owner)

“Coils make it better to sleep in the house. If there are no coils, we hardly sleep. The only drawback is the high cost of buying the coils. Mosquitoes are in the house, even during the day.” (Kaoma rural female non-owner)

“It [coils] is very affordable, readily available on the market. You do not need to go to other countries to get it. It is very easy to use. One does not need to be too knowledgeable [to use it.] It tends to finish quite fast. It has a choking scent. It’s quite dangerous for asthmatic people, in that they get suffocated.” (Lusaka male non-owner)

“It chases mosquitoes away. The smell causes sneezing, so I do not like them.” (Mansa urban female net owner)

### ***Aerosols***

The main reasons consumers liked aerosols were that they kill mosquitoes and other insects, and are “powerful.” The main reason that respondents disliked aerosols was that they were perceived as expensive. Additionally, a few respondents disliked the strong smell of aerosols. A few respondents also viewed the product as a temporary measure only. These same likes and dislikes emerged in focus group discussions. Traders believed aerosols are popular because they are easy to use, multi-purpose, immediately effective, available in different sizes and scents, and are highly advertised. (See text box and Table 3.2.)

### *Perceptions of aerosols*

“Target [aerosol] kills all mosquitoes and other insects in the house.” (Kitwe rural female non-owner)

“They prevent myself from mosquito bites which can cause malaria. Some are too strong. That can cause sneezing, especially in my child, even adults. They are flammable and can catch fire. They are expensive to buy.” (Kitwe rural male non-owner)

“I like the spray because on top of keeping the mosquitoes away from the house, it also kills them.” (Choma rural female net owner)

“Aerosols, though helpful, are only a temporary measure.” (Kaoma urban male net owner)

“I don’t like spraying because it affects us when we inhale some of the fumes from the aerosol. It causes skin reactions and coughing for the kids, especially.” (Choma urban male net owner)

### *Nets*

The most dominant reason that consumers liked nets was that they perceived nets as offering protection/complete protection from mosquito bites. Other reasons consumers liked nets were that they were a durable, “long-lasting” solution to mosquito problems and that they provided protection against malaria. Respondents in almost half the focus group discussions also said that nets were cheaper/more economical than buying aerosols or other products. Very few respondents mentioned any disadvantages related to net use. The few who did said that they could not afford to buy nets and that nets were uncomfortable/hot/suffocating. In one focus group respondents also said that nets were difficult to hang. (See text box and Table 3.2.)

### *Perceptions of nets*

“A mosquito net is good because it offers a permanent solution to prevention of mosquito bites, even if one has no money to enable him to buy insecticides (aerosols). Mosquito nets are very helpful at home because no mosquito can have access to one’s body. Even drunkards can benefit because they would not bother to spray. Children and adults alike can benefit with no limit. One would not mind the mosquitoes, even when he has no money to buy sprays.” (Choma urban male net owner)

“I like the mosquito net because even when the mosquitoes are many, my child and myself can be protected from being bitten. I dislike nothing.” (Choma rural female net owner).

“It’s not easily affordable, to buy mosquito nets for everybody in the house.” (Kaoma urban female net owner)

“Mosquito nets tend to make me feel suffocated, as if something has reduced the amount of air circulation. The net makes me feel very hot and the feeling is quite discomforting, actually. Even some of my daughters tell me they feel uncomfortably hot. The mosquito net tends to protect you from mosquito bites. As a result, you do not frequently suffer from malaria.” (Kaoma urban female net owner)

“It protects us against mosquito bites, especially in hot season, as there are very few mosquitoes inside the nets.” (Kitwe urban female net owner)

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

<b>Method</b>	<b>Positive Attributes [+]</b>	<b>Negative Attributes [-]</b>
<i>Coils</i>	<ul style="list-style-type: none"> <li>▪ Protect from bites</li> <li>▪ Are affordable</li> </ul>	<ul style="list-style-type: none"> <li>▪ Smell bad</li> <li>▪ Smoke makes it hard to breathe, causes sneezing, congestion</li> <li>▪ Are expensive</li> </ul>
<i>Aerosols</i>	<ul style="list-style-type: none"> <li>▪ Kill mosquitoes</li> <li>▪ Kill other insects</li> </ul>	<ul style="list-style-type: none"> <li>▪ Are expensive</li> <li>▪ Are a temporary measure</li> <li>▪ Take time for the scent/smell to go away</li> </ul>
<i>Mosquito nets</i>	<ul style="list-style-type: none"> <li>▪ Protect from bites/offers complete protection</li> <li>▪ Are a long lasting solution/durable</li> <li>▪ Protect from malaria</li> </ul>	<ul style="list-style-type: none"> <li>▪ Are not affordable</li> <li>▪ Are uncomfortable/hot/suffocating</li> </ul>

## **SECTION 4**

### **NET OWNERSHIP AND USE**

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#### **Summary of Findings**

- In urban areas, net owners were easy to locate, but in most rural areas, they were difficult, if not impossible to find. Rural owners had to travel long distances to find nets. Baby nets were not encountered.<sup>9</sup>
- Most non-owners had used nets in the past and the majority of these said that economic reasons prevented them from current net ownership.
- Net owners often used nets only during rainy season, although some used them throughout the year.
- In about half the net-owning households, at least one child under five reportedly slept under a net the previous night, but in nearly half of all such households, at least one child under five did not sleep under a net the previous night. Of the four net-owning households where respondents reported there was a pregnant woman, all slept under a net the previous night.
- There were no major differences between net owners and non-owners regarding perceived benefits or barriers to having a child under five sleep under a net. The most commonly cited benefits were protection from illness, including malaria; protection from mosquitoes and other insects; and a good night's sleep. Most respondents said there were no disadvantages to having a child under five sleep under a net. The most commonly cited disadvantages were discomfort (feeling hot, sweaty, and restricted), becoming trapped in or suffocated by the net, and difficulty keeping the child under the net.
- Nets were perceived as a luxury item; net owners were perceived as people who are “well-to-do,” and “high class.” They were also perceived as “health conscious,” and “caring.”
- Fathers, either alone or with mothers often made the decision to purchase a net. Fathers often (but not exclusively) bought nets purchased from the commercial sector, whereas mothers often bought nets obtained from clinics or projects.

#### **Summary of Program and Product Implications**

- The fact that net owners were relatively easy to find in most urban areas suggests high demand for this product.
- The fact that many net owners had traveled long distances to obtain their nets and that net owners were very difficult (or impossible) to locate in rural areas where net projects were not operating suggest access problems (e.g., price, availability). A key challenge will be to make nets affordable and available.
- Promotional efforts can build on the already strong demand for and very positive perceptions of nets.
- Product development and promotional efforts should consider the fact that some net users feel hot and worry about child safety with regard to net use. Decisions about product modifications should take into consideration any potential increase in cost to the consumer.

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<sup>9</sup> Baby nets are very small, umbrella-shaped nets that stand alone and only fit an infant.

- Promotional and educational efforts are needed to ensure year-round net use, particularly by the most vulnerable groups. It will be important to highlight the need for children under five and pregnant women to sleep under nets. The perception of nets as a luxury item may have a negative impact, not only on net sales, but also on getting children under five to sleep under them. This perception must be countered in efforts to change net-use behavior.
- The image of net users as “health conscious,” and “caring” can be used in promotional campaigns.
- Net/ITM promotion is needed to emphasize that (treated) nets afford proven protection against malaria and are effective in protecting against being bitten and bothered by mosquitoes and other insects. ITM promotion 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.
- Promotional activities and point-of-sale materials should be directed at both men and women, with special emphasis on men (in the commercial sector) and women (at clinics and ITM projects).

## **Detailed Discussion of Findings**

### ***Net ownership and use***

Net ownership appears common in urban areas, as owners were easy to locate in most of the urban sites. Net ownership in rural areas was limited and owners were difficult to find in most rural locations, except rural Mansa, where a Unicef agent was actively promoting ITMs. No household included in this study had a baby net, but one owned a cot net. Of the 28 households owning nets, 15 owned just one net, 7 owned 2-3 nets, and 2 owned 6 nets. No rural household owned more than one net. (Quantitative data on net ownership and use is available through NetMark’s household survey.)

### ***Reasons for lack of use among non-owners***

The majority of respondents who did not own nets (17/22) had slept under a net in the past. Most of these individuals had done so when they lived in other locations, had stayed with relatives, or in their own homes in years past. The four respondents who had never used a net were from rural areas.

#### ***Non-owners’ previous experience with nets***

“[I used a net] in the late 1970s and early 1980s. I used to be a field worker. That’s the time when I used mosquito nets more often. Sometimes, I used to spend 2 to 3 months in the bush, so nets were very ideal.” (Choma urban male non-owner)

“I used a mosquito net a long time ago, and since then, I have never used one. I used one about 1995. I slept under a net at the village right here. I bought it from Kaloma. I can’t buy another one because I have no money. My family is growing much too fast, faster than my ability to provide for their needs, so I can’t afford one.” (Choma rural male non-owner)

“Yes, I have. I had one 10 years ago, right here in my home, but it was taken away by my ex-wife.” (Kaoma rural male non-owner)

“Yes [I have used a net before]. I don’t go along with mosquito nets because I suffocate, but they are good.” (Lusaka urban female non-owner)

### ***Reasons for lack of net use among non-owners***

By far the most common reason why non-owners said they did not own a net was lack of money and the expense of the net (mentioned by 15/22 non-owners). Other reasons given were that nets were unavailable, were needed only during rainy season, were “suffocating,” or still let mosquitoes inside.

#### ***Reasons for lack of net use among non-owners***

“I have no money. I can’t afford a net. I can’t buy a net instead of buying mealie meal. The nets are too expensive.” (Kitwe rural female non-owner)

“I just don’t have the financial capability to buy a mosquito net. I would, definitely, to protect myself from mosquitoes and avoid getting attacked by malaria.” (Mansa urban male non-owner)

“It was damaged and I failed to buy another one because it’s quite expensive for me, as it is now.” (Lusaka urban male non-owner)

“I do not have a net because the one I had got torn and became unusable. I can imagine using a net because here, where I am living, there are so many mosquitoes. At least, one needs to have a net to protect oneself and because of this, I’m actually trying hard to acquire one.” (Kaoma rural female non-owner)

“I do not have enough money to buy the net. I don’t think I’ll ever use a net. Where will I find the money, and also, where to find the net itself?” (Kaoma rural female non-owner)

“They were not readily available. When the ones I used to use got worn out, I could not replace it because they were not on the market and even now, one does not know of a reliable supply.” (Choma urban male non-owner)

“Lack of money. If I have money to buy a net, I would buy a net because I always think about it. It is close to my heart.” (Choma rural male non-owner)

### ***Seasonality of net use***

About half the net owners who mentioned the times of year in which they used nets (9/19) reported using nets throughout the year. The remainder said they used nets during rainy and/or hot season or when there were a lot of mosquitoes.

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

In most of the net-owning households (20/28), at least one child under five years of age reportedly slept under a net the previous night, however in some of these households (5/20), not all children under five slept under a net. In 4 of the 5 instances where not all children were covered, the youngest child slept with the parents under the net and the older children did not. In one case, the child who did not sleep under a net was the grandchild of the net owners. Four net-owning respondents reported that there was a pregnant woman living here and that all four slept under a net the previous night.

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

When parents were asked to name the benefits of a child under five sleeping under a mosquito net every night, the majority of respondents (29/50) mentioned protection from illness (including malaria), and half (25/50) mentioned protection from mosquito and other insect bites. Some respondents (9/50) said that having a more peaceful sleep was an advantage.

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

It will prevent him from mosquito bites, even if he does not cover himself with a blanket at night. (Choma urban female net owner)

He won't be bitten by mosquitoes. There are other insects that tend to bite people, and so, with the net, he might be protected from such other insects. There are those insects are most common during the rainy season that are attracted to the light and also flies. (Kaoma urban female net owner)

It protects her from mosquito bites even if, even Anopheles mosquito might not be there at that time, but the mosquitoes that would bite her would reduce the amount of blood in her body. (Kaoma urban female net owner)

He would not be bitten by mosquitoes. As a result, malaria would not be attacking him, or rather, he would not be having malaria frequently. (Choma urban female net owner)

Some respondents (14/50) said that certain people (i.e., husband, wife, self, everyone) would think having a child under five sleep under a net every night was a good idea. A few people (5/50) said that mothers, fathers, or those who are uninformed may think it is a bad idea for a child under five to sleep under a net.

Over half (28/50) of the respondents said that there were no disadvantages to having a child under five sleep under a net every night. The 22 parents who did cite disadvantages said that a child could feel uncomfortable (e.g., hot, sweaty, restricted) under a net (7/22), that the child might get trapped or suffocate (4/22), that it is difficult to keep a child under the net (4/22), that the net is inconvenient (2/22) or that the child might damage the net (2/22).

There were no major differences between net owners and non-owners regarding perceived benefits or barriers to having a child under five sleep under a net.

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

<b>BENEFITS/WHAT MAKES IT EASY (n = 50)</b>	<b>BARRIERS/WHAT MAKES IT HARD (n = 50)</b>
<ul style="list-style-type: none"> <li>▪ Protection from illness, including malaria (29)</li> <li>▪ Protection from mosquitoes and other insects (25)</li> <li>▪ Child sleeps well (9)</li> <li>▪ Net is safe/safer than other options (4)</li> <li>▪ Net is a lasting/cost-effective solution to mosquito problems (2)</li> <li>▪ Net provides warmth (2)</li> <li>▪ Net minimizes dust (2)</li> </ul>	<ul style="list-style-type: none"> <li>▪ None (28)</li> <li>▪ Child could feel uncomfortable (hot, sweaty, restricted) (7)</li> <li>▪ Difficulty keeping child under net (4)</li> <li>▪ Child may become trapped or suffocate (4)</li> <li>▪ Net is inconvenient (2)</li> <li>▪ Child might damage the net (2)</li> <li>▪ Lack of money to buy net (2)</li> <li>▪ Characteristics of the net (e.g., size) (2)</li> <li>▪ Child might get sick if net has chemicals on it (2)</li> </ul>

***Perceptions of net owners***

Both net owners and non-owners perceived people who own nets as “well-to-do,” “high class,” or having money to afford nets (29/50), despite the fact that several net owners who made this comment specifically stated that they were not “well-to-do” themselves. Both net owners and non-owners also think of people who own nets as responsible (i.e., “health conscious,” “caring,” “doing the right thing,” “thoughtful,” “clever” and desiring protection) (13/50). Two respondents (both non-owners living in urban areas) said that people who own nets are poor because their net ownership indicates an inability to use more expensive products, such as aerosols.

### *Perceptions of net owners*

“They understand health matters. They are thoughtful people.” (Choma rural male non-owner)

“I can term such a person as one who does the right thing. He understands his needs.” (Choma rural male non-owner)

“I think they are well-to-do (*bahubi*). They want to protect themselves from malaria.” (Choma rural female non-owner)

“The people who are self-reliant rich and they that easily afford to buy things.” (Lusaka urban male non-owner)

“They are very clever people since their aim is to keep away from mosquito bites. People with money (*Ba finondo*). (Mansa urban male non-owner)

“These people who use nets are the caring people, healthwise. Looking at the people in the area, they are high class.” (Kitwe rural male non-owner)

“Me, I can't manage because I have to think of mealie meal and something to eat. Those people have money. High class.” (Kitwe rural female non-owner)

“I'd say that they are doing the right thing because they protect themselves from malaria and are conscious of the cost of medication for malaria. They don't want to catch malaria.” (Choma urban male owner)

“Those people who don't want to use a net have no brains. Those people who want to use a net are alright.” (Choma urban male owner)

“I guess they are rich, since they can afford to buy a net. Though I am not rich, I can afford to buy a net.” (Kaoma urban male owner)

“They are lucky people because mosquito nets are not easy to find or even afford.” (Kaoma urban male owner)

“They are poor people since they can't afford to buy insect killer everyday.” (Lusaka urban female owner)

“Everyone wants to use nets in this area but because of being poor, they can't afford. At least us, we have managed.” (Mansa rural female owner)

“People like us who are concerned about illness and who want to prevent diseases in the house.” (Kitwe urban female owner)

“People concerned with their health and know that mosquitoes cause malaria.” (Kitwe rural female owner)

***Net purchase and decision making about net purchase***

Net owners reported that fathers (alone or together with mothers) generally made the decision to purchase a net. In a minority of cases, respondents reported that mothers made the decision alone. Women typically bought the nets that were obtained from health clinics, hospitals, or Unicef agents. Those that were purchased at retail outlets (e.g., stores, town markets) were typically bought by men, especially in cases where nets were acquired at great distances from the respondent's home (e.g., 200 km away). In half the instances where the husband had purchased the net, he had traveled outside of his immediate community to do so.

## **SECTION 5**

### **GENERAL SLEEPING PATTERNS**

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#### **Summary of Findings**

- Focus group data indicate that husbands and wives generally sleep together, although women in advanced stages of pregnancy sometimes sleep separately. Infants and toddlers reportedly sleep in the same bed with their parents, but older children (e.g., over 2 years of age) sleep in a separate sleeping space, often on the floor. When mothers are pregnant, infants/toddlers may also be moved to a separate sleeping space. Spaces used for sleeping include beds, floors, mats, etc.

#### **Summary of Program and Product Implications**

- Nets must be made available (or designed) so that they can be used on a variety of sleeping surfaces (e.g., beds, floor) and accommodate multiple persons together in one sleeping space, as well as individuals.
- Promotional efforts designed to get children under five sleeping under nets may need to specifically target households with only one net (because children often sleep separately from adults).

#### **Detailed Discussion of Findings**

##### *Sleeping patterns*

Data from the focus group discussions show that husbands and wives generally sleep together. Older children reportedly sleep separately from their parents (in a separate room if the household has one, but more commonly on the floor, with more than one person in a sleeping space). Young children (i.e., infants and toddlers), often sleep with their mothers or parents. In several focus groups, respondents stated that when a woman is pregnant she sleeps with her husband, although some pregnant women move to a separate sleeping space late in pregnancy. In several focus groups participants also said that pregnant women often do not sleep in the same bed with their children, even if they are still infants/toddlers, for fear that the child will kick.

“Pregnant woman will share [the bed] with the husband. The baby will be given a ‘red card’ and shifted to the other bedroom with the others.”  
(Kitwe urban male focus group)

Focus group participants said that the kinds of spaces used for sleeping include beds, reed mats, the floor, sofa cushions or couch seats placed on the floor.

## SECTION 6

### NET WASHING PATTERNS

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#### Summary of Findings

- Generally, nets were reportedly washed every 3-6 months, although some respondents had never washed their nets (because they were new or treated) and others said they washed their nets at least once a week.
- Nets were typically washed with water and soap, separately from clothes in a basin reserved for washing. A few nets were washed in the same basin used for bathing. Some respondents hung their nets in the sun and others did so in the shade.

#### Summary of Program and Product Implications

- The practice of drying nets in the sun is not compatible with current product 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.

#### Detailed Discussion of Findings

##### *Net washing*

Some net owners said they had never washed their nets because their nets were new or treated, but most net owners had washed their nets and reported doing so anywhere from every three days to less than every six months. Most nets were reportedly washed every 3-6 months. Population-based data on the frequency of net washing is available through the NetMark's quantitative baseline evaluation survey. The few net owners who had not washed their nets because of treatment expressed confusion and concern about net washing.

##### *Beliefs about washing treated nets among treated net owners*

"If I want to wash it, I have to go and ask the malaria control officer for the area, because it's a treated green net." (Mansa rural female net owner)

"I will wash it when it gets dirty. I don't know how, but I will take it to Power Net. Aren't they supposed to wash it for me since they put the medicine for me?" (Mansa urban female net owner)

"No! [I don't wash the net]. We treat it using chemicals provided by the supply." (Kitwe urban female net owner)

Nets were reportedly washed separately from clothes, with just water and detergent. Although most respondents said the nets were washed in basins reserved for washing clothes, a few respondents said they washed the nets in basins or bathtubs used for bathing. Only one respondent said she added bleach to the wash. About half the net owners who gave information on net drying hung their nets in the sun and the other half in the shade. Few net owners had any complaints about washing their nets, but those who did said that the ring of the conical net was difficult to wash (some removed the ring in order to do so) and that the border of the net often got dirty and was difficult to wash. Few net owners had any suggestions for improving net washing, but those who did said that adding “Stay Soft” (a branded fabric softener) would make it easier, as would manufacturing nets so that there was no non-netting “material at the edges.”

## **SECTION 7**

### **NET ACCESS AND AVAILABILITY**

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#### **Summary of Findings**

- Net traders were located in most urban areas, but only in one rural area where an ITM project was operating.<sup>10</sup> There appears to be a limited selection of nets on the market (vis-à-vis shape, size, and color). Net branding does not appear to be strong. The two brands found were Mbu and Safinet.
- Net traders reported difficulty in maintaining their supply and were frequently out of stock.
- Double-size nets were the most commonly owned sizes, although some people also owned king-size nets and a few owned single or three-quarters size nets.
- Nets were purchased in the commercial market (i.e., general shops, open-air markets) or from clinics and ITM projects.
- Nets were sold for between K10,000 (US\$3.60) for a single net to K34,000 (US\$12.25) for a double-size net.<sup>11</sup> Double nets purchased between 1998 and 2000 were reportedly bought for between K5,000 (US\$1.80) and K25,000 (US\$8.90), with the median price being K15,000 (US\$5.40).

#### **Summary of Program and Product Implications**

- Nets need to be made more widely available, especially in rural areas.
- The supply of nets to traders needs to be made more consistent.
- Nets are currently too expensive for many Zambians 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***

Of the 28 households owning nets, most (18/28) owned double-size nets. Some (7/28) owned king-size nets and a few owned single (3/28) or three-quarters-size nets (2/28). Respondents reported getting their nets from general shops, Indian shops, open-air markets, clinics, and from a Unicef agent. When asked where a net could be obtained, most non-owners (12/21) said they could do so in shops located in town. A few (4/21) said that nets were either unavailable or that they did not know where they could be obtained and a few (3/21) said that they could get nets from a clinic or health department. No one mentioned open-air markets.

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<sup>10</sup> Indeed, traders of any kind of insect control products were difficult to find in rural areas.

<sup>11</sup> The figures given on the cost of nets owned by respondents give a general idea of price, but it should be noted that because of potential problems with price recall for older nets, and because of currency devaluations over time, these figures should be taken as very general estimates.

Net availability appeared to be a problem, especially in rural areas. Net traders, although sometimes difficult to find, were located in all urban areas except Choma (although respondents indicated that one store, which was closed at the time the research team was in the field, sold nets). Only one net trader, a Unicef agent, was located in any rural area (Mansa). In fact, insect control product traders of any kind were difficult or impossible to find in the rural sites.

All eight traders sold double-size nets, with three selling only this size. Only one net trader sold king-size nets. A few traders sold single- and three-quarter-size nets. White and green were the only colors net traders reported selling. Most net traders did not mention the brand of net sold, but one said he sold Mbu nets and the other said he sold Safinet.

Net traders reported difficulty maintaining their supply. Most were either out of stock at the time of the interview or reported problems with maintaining stock. In Kitwe, the one net trader located stated he was frequently out of stock and said the only reliable place to get supplies was through cross-border trading with Tanzania.

Traders reported selling nets for between K10,000 (US\$3.60) for single- or three-quarter-size nets to K34,000 (US\$12.25) for double-size nets. These prices are consistent with what non-owners thought nets cost but are higher than what respondents reported paying. Most respondents in the study obtained their nets between 1998 and 2000. Those who did reported spending between K5,000 (US\$1.80) and K25,000 (US\$8.90) for a double-size nets, with the median price being K15,000 (US\$5.40)

In Lusaka, traders reported selling nets at prices below what traders in other sites reported.

***Responses from non-net owners who perceive nets as unavailable or who do not know where to obtain them***

“I don’t even know where to get it. Jean goes to Tanzania and buys because in that country, they use a lot of this [nets].” (Lusaka urban female non-owner)

“It is very difficult to know [where to buy a net] because, like, the health department only gets nets when there is a major outbreak of malaria and that’s the only department I know that can have such items. When my daughter was sick of malaria at boarding school, I only managed to get one impregnated mosquito net at K10,000 (US\$3.60) from the health department. I actually asked for more but they could not sell me more than one net. You can see how serious the distribution of these vital nets is. You cannot easily acquire mosquito nets.” (Choma urban male non-owner)

“Maybe in Kaoma [town], but I don’t see any nets. Probably in Lusaka.” (Kaoma rural male non-owner)

## **SECTION 8**

### **NET PREFERENCES**

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#### **Summary of Findings**

- Consumers wanted nets to come in a variety of sizes, shapes, and colors, though they generally prefer large, white nets.
- There was no consensus on net shape preferences. Conical nets were liked for their ease of hanging, whereas rectangular nets were liked for being roomier.

#### **Summary of Program and Product Implications**

- NetMark should strive to bring a variety of net shapes, colors, and sizes to market, with particular attention to ensuring that large nets are widely available.
- Net product development should take into consideration the fact that rectangular nets are perceived as difficult to hang because they must be tied at four points. However, any decisions regarding product modification must be weighed against any potential increase in the cost to the consumer.
- Promotional activities for conical nets can emphasize their ease in hanging; rectangular net promotion can emphasize their roominess.

#### **Detailed Discussion of Findings**

##### *Net size, shape and color preferences*

Respondents wanted nets to come in a variety of shapes, colors, and sizes. In all focus groups, respondents expressed preference for a wide variety of net sizes or they expressed preference for double- and king-size nets. There was no consensus on net shape preferences. Focus group participants were shown drawings of rectangular and conical shaped nets and asked their preferences. In about half the focus groups, some respondents preferred rectangular nets and in about half the groups some respondents opted for conical nets. Rectangular nets were liked because they were perceived as being roomier, whereas conical nets were liked because they were seen as easier to handle and hang.

In most focus groups, at least some respondents preferred white nets over all colored nets, but in the majority of focus groups, at least some respondents also preferred colored nets (i.e., light blue, pink, dark green, dark blue). Lighter colors, especially white, were liked because they showed dirt and were viewed as more “hygienic.” On the other hand, some people liked darker colors because they did not show dirt.

## **SECTION 9**

### **NET TREATMENT PATTERNS, PREFERENCES AND PERCEPTIONS**

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#### **Summary of Findings**

- The concept of net treatment was relatively well known in urban areas and was known also in rural areas in which ITM projects are operating. Reactions to this concept were generally positive, although many respondents were also concerned about the potential harm or danger of ITMs, especially to pregnant women or children under five (via inhalation and, in the case of children, sucking/chewing on the net).
- Parents said they would be reassured about ITMs if credible sources (e.g., manufacturers, Ministry of Health) told them the product was safe.
- A few net owners had treated their nets or had their nets treated by projects, clinics, or hospitals. Some of these respondents were dissatisfied with the treatment, saying the treated nets did not kill mosquitoes or keep them from entering the home.
- Consumers wanted net treatments that thoroughly cover/saturate the net, are easy to use, convenient, and fast. They did not like net treatment products that have a bad smell, are wasted in the air, or cause stress or skin irritation.

#### **Summary of Program and Product Implications**

- ITM promotional efforts are needed to increase awareness, particularly in rural areas. These promotional efforts can build on existing knowledge of insecticide treatments.
- The positive reaction to the benefits of insecticide treatment is favorable for treatment promotion.
- Product safety concerns must be addressed and should specifically counter worries regarding use, and especially by pregnant women and children under five years of age. Concerns related to chemical inhalation and (in the case of young children) ingestion through sucking on the net should receive particular attention.
- Any future net treatment product testing should explore whether specific products deliver the different benefits cited by consumers as important.

#### **Detailed Discussion of Findings**

The concept of net treatment was fairly well-known in urban areas and was known to some respondents in rural areas, particularly in those sites where ITM projects are operating. Twenty-eight of 46 respondents had heard of net treatment.

Among parents, reactions to the idea of treating nets were extremely positive (44/45 respondents liked the idea), but some respondents (19/49) also expressed concern that an insecticide treated net would be dangerous for a child under five and/or a pregnant woman. Others (11/50) said that only in certain circumstances (e.g., if the insecticide was too powerful), might insecticide

treatments be dangerous. Some respondents (9/50) were unsure whether the chemical might be dangerous.

Parents who were concerned about the effects of the chemical on children worried about inhalation and about ingestion as a result of chewing or sucking on the net. Respondents who were worried about the effects of the chemical on pregnant women were concerned that the smell might make pregnant women vomit and that the chemical might cause them to miscarry.

At the same time that some respondents raised these concerns, others (13/50) said that they trusted the manufacturer not to make a chemical that was dangerous, or that getting bitten by mosquitoes or getting malaria was more dangerous than ITMs and that treated nets protect against mosquitoes and malaria.

Some participants in all focus group discussions were willing to use insecticide treated nets. Although, in most focus groups, at least some participants expressed concern about potential side effects of the chemicals, especially to young children and pregnant women. Some respondents also expressed skepticism about the efficacy of the chemical.

#### ***Credibility of information sources for countering ITM safety concerns***

In a few focus groups, respondents discussed how their ITM safety concerns might be assuaged. In these groups, respondents said that if Ministry of Health officials told them the product was safe, they would believe it.

#### ***Treatment/retreatment experience***

Six of the 28 net owners had experience with net treatment. At least two of the six respondents had done the treatment themselves and at least three had their net treated at a clinic, hospital, or project. Of note, although respondents were not asked their perceptions of product efficacy, three spontaneously said that the product did not perform as expected (specifically, that it did not kill mosquitoes or keep mosquitoes from entering the home).

#### ***Examples of negative perceptions of insecticide treatment product performance***

“If the insecticide is able to kill the mosquitoes, then it would be a very good idea. Though, I had taken the nets to the clinic for treatment, but I feel it was a sheer waste of time and resources because the insecticide did not work, did not kill mosquitoes....I expected that mosquitoes would not be entering my house and if they did, they would die, but this was not so. The treatment was just here in Choma. I feel they were just after raising money for themselves. (Choma urban female net owner who had her net treated)

“According to what we’re told, the chemical kills the mosquito on the net, but what I have seen is that they don’t die, but continue making noise, meaning they are just chased.” (Mansa rural female net owner who had her net treated)

***Treatment product preferences (generic reactions)***

After being exposed to a range of net treatment product options, parents and traders preferred products that thoroughly cover/saturate the net (thereby ensuring lasting protection), do not get wasted (e.g., in the air), and that do not have a bad smell or cause irritation. They also wanted products that are easy to use and convenient, and that do not take a lot of time to use or cause stress. (See Section 11 for more details.)

## **SECTION 10**

### **TRADE ISSUES RELATED TO NETS AND INSECTICIDE TREATMENTS FOR NETS**

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#### **Summary of Findings**

- Insecticide treatments for nets appear to be virtually unavailable in the commercial sector, but the vast majority of traders were enthusiastic about net treatments and expressed willingness and desire to sell the treatments with the nets.
- To promote the purchase and use of ITMs, traders suggested lowering the price of nets and educating people about ITMs via media, public meetings, drama groups and product demonstrations.
- The insect control market does not appear to be specialized; that is, nets and other insect control products (e.g., aerosols, coils) were often sold in the same location.
- Traders reported that the fastest selling brands were Target, Ridsect, Baygon, Sleepvel (coils only), and Vaseline (repellant only). They also reported that coils were the fastest selling insect control product.
- Traders of insect control products, including nets, often sold other more expensive products.
- Most insect control product traders obtained their products by collecting them from wholesalers about 1-2 times per month.
- Traders said they would be motivated to purchase goods from a specific supplier or manufacturer if the products were high quality and affordable, and if the relationship with the supplier was good. Other suggestions included product delivery, retro deals, and payment on consignment
- Net traders said that consumer demand led them to start selling nets.
- Most net traders said they did not give their customers any advice regarding nets.
- Common ways traders reported using to get consumers to buy insect control products from them were selling reasonably priced products and talking to their customers.

#### **Summary of Program and Product Implications**

- Traders' generally positive reaction to insecticide treatment and their willingness to sell nets and insecticides together is favorable for ITM promotion and sales.
- The fact that the insect control market is not specialized means that commercial players can distribute nets/insecticides through traditional insect control product channels.
- A large-scale mass media campaign to promote the purchase and use of ITMs is acceptable and should involve participation of the Ministry of Health and other key figures (possibly including ITM manufacturers).
- Alternatives to a large-scale mass media campaign (e.g., public meetings, dramatizations, product demonstrations) will likely be needed and are acceptable.

- ITMs need to be made more widely available and affordable.
- ITM products will need to be positioned to compete with the most common brands of insect control products.
- Efforts should be made to work with traders and determine whether they can actively promote and provide advice about ITMs.

## **Detailed Discussion of Findings**

### ***Availability of insecticide treatments for nets and traders' interest in future sales***

Insecticide treatments for nets appeared to be virtually unavailable. The researchers located only one net treatment trader (a pharmacist in Kitwe) who had only one PowerNet tablet (K-O Tab) left in stock. He stated that his supply had moved very fast and that people were still asking for them, but that the wholesaler from whom he had obtained the original supply had not had any tablets in stock for the last 8 months.

### ***Openness to selling insecticide treatments with nets***

The vast majority of insect control product traders (21/24) expressed willingness to sell net treatments together with nets. Among these, most stated that doing so would be more convenient for the customer and some said that packaging the insecticide treatment with the net would make the product a “complete package” and would make the kit look like a bargain.

### ***Trader recommendations regarding promotion of nets and treatments***

The most common recommendations from traders regarding how to encourage the purchase and use of nets and net treatments were to lower the price/make the price affordable and to educate people about the advantages of ITMs and their effectiveness. The most common recommendations for how to educate people included using media (e.g., radio, television, posters); organizing meetings or dramas in villages, clinics, or public places; and holding product demonstrations in public settings or at clinics and schools. A few traders (4/25) specifically suggested that nets and net treatment be made more widely available and the same number stated that nets should be heavily subsidized.

### ***Insect control product categories and brands sold by traders***

The insect control market does not appear to be specialized. That is, net traders typically sold other insect control products (e.g., aerosols and coils).

The most common brands found among the insect control product traders visited were Target, Ridsect, Baygon, Sleepvel (coils only), and Vaseline (repellant only). Both traders and consumers used the Target brand name alike as a generic reference to aerosols.

Other brands found were Doom, ABC (coils only), Fumakilla (Coils only), Uno (coils only), Double Rabbit (coils only), Dyroach (aerosol only), Boom (aerosol only), and Aeroguard (repellant only). Coils were the fastest selling product category because traders said it was “affordable” or “cheap.” A few traders (3/22) said that Target aerosol was their fastest selling product because it worked fast and was effective.

Traders of insect control products (including nets) often sold other products that were more expensive than the nets, coils, aerosols, or other insect control products. Examples include rice (K78,000 or US\$28.05), cooking oil (K10,500-11,000 or US\$3.80-3.95), clocks (K18,000 or US\$6.50), blankets (K45,000-57,000 or US\$16.20-20.50), cattle sprayers (K280,000 or US\$100.70), bicycles (K165,000-276,000 or US\$59.35-99.30), perfume (K24,000-25,000 or US\$8.65-9.00), medicine (K60,000 or US\$21.60).

#### ***How traders obtain their products***

With few exceptions, most traders got their products from wholesalers, not from suppliers/manufacturers. Almost all traders collected their products from the wholesaler, but a few (especially pharmacists) got deliveries. Most traders reported obtaining their insect control products between 1-2 times per month.

#### ***Traders' motivation to buy from specific suppliers/manufacturers***

When traders were asked what would motivate them to buy from specific suppliers or manufacturers, the most common responses were: low price/affordability, high quality products, and a good relationship. A few respondents said that they would be motivated to buy from a specific supplier if that supplier delivered their products and a few said they would like payment on consignment (after goods are sold) or retro deals (bonuses for achieving a certain level of sales)

#### ***Reasons for selling nets and typical purchase situations***

The main motivation for selling nets, mentioned by 6 of 8 net traders was that they were responding to demand. Traders reported that customers (men, women and couples) generally came into the store asking for nets.

#### ***Giving advice***

Most net traders (5 of 8) said they did not give their customers any advice on nets. Of the three that did, only the Unicef agent gave any information on the importance of children under five sleeping under nets and only one retail trader discussed malaria with his customers.

#### ***How traders encourage customers to buy insect control products***

The most common ways traders said they used to encourage their customers to buy insect control products from them (including nets) were to talk to their customers about the importance and effectiveness of the product and to offer the product at a reasonable price. A few traders said that they also displayed posters about the product or put the product in a special place for display.

## **SECTION 11**

### **INSECTICIDE TREATMENT PRODUCT PREFERENCES**

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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 only when the flit gun sprayer was included in the analysis. Consumers showed no strong preference for dipping over the aerosol spray product.
- The reasons consumers preferred dipping (net saturation, duration of chemical, perceived effectiveness) are different from the reasons consumers preferred spraying (premixed, easy, fast, not wasted in the air). Consumers wanted a product that is affordable.
- Consumers did not prefer one dipping product to another.
- Consumers strongly preferred the aerosol to the flit gun sprayer.
- Consumers liked dipping products to be packaged with a plastic bag containing a water demarcation line and with gloves.
- Data on consumer willingness to pay for each of the tested options must be interpreted with caution. Some consumers may be willing to pay more for the liquid bottle than the aerosol.
- Traders liked the liquid bottle, tablet, and aerosol better than the other products. There was no clear preference among these better-liked options.
- The reasons traders liked one dipping product over another were not distinct. The reasons traders disliked one dipping product over another had to do with packaging (e.g., lack of gloves) and perceived strength of the treatment (e.g., tablet is too small)
- Reasons traders liked and disliked the aerosol (e.g., ease of use) differed from reasons they liked and disliked the flit gun sprayer (e.g., fun to use).

#### **Summary of Program and Product Implications**

- Product development should take into consideration consumer likes and dislikes. To meet consumer preferences, sprays would need to operate in such a way to ensure the net is fully covered and that the product is not wasted in the air. Dipping products would need to dissolve easily in water, contain gloves, and come in secure packaging with measurement indicators.
- Sprays can be promoted as easy to use, fast, premixed, and as eliminating measurement error. They should also be promoted as able to fully cover the net.

## Detailed Discussion of Findings

Below are tables summarizing product demonstration observations with consumers and the product explanation portion of interviews with traders:

**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 = 14)	Product choice among those exposed to a dipping product and the flit gun sprayer (n=15)
Dipping 22	Dipping 8	Dipping 14
Spraying 7	Aerosol 6	Flit gun sprayer 1

\* 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.

**Interpretation of Table 11.1:** Consumers appear to strongly prefer dipping over spraying when all dipping methods were compared to all spraying methods. However, this difference disappears when dipping methods were compared only to the aerosol. The flit gun is disliked.

**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"> <li>▪ Fully saturates and covers net</li> <li>▪ Seems long-lasting and effective (because of net saturation)</li> <li>▪ Product is not wasted in air</li> <li>▪ Is less expensive than spraying</li> <li>▪ Can tell how much chemical is used</li> <li>▪ Dipping is like washing and is familiar</li> </ul>	<ul style="list-style-type: none"> <li>▪ Takes time</li> <li>▪ Requires patience</li> </ul>
Spraying	<ul style="list-style-type: none"> <li>▪ Is easy and convenient</li> <li>▪ Is already prepared</li> <li>▪ Saves time</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chemical is wasted in air</li> <li>▪ Does not fully saturate net (so not sure of effectiveness)</li> <li>▪ Cannot tell how much chemical is used</li> <li>▪ Is expensive</li> </ul>

**Interpretation of Table 11.2:** The reasons consumers liked dipping are different from the reasons they liked spraying. Consumers wanted a product that fully saturates the net, is long lasting and effective. Consumers also wanted a product that is easy to use, is not time consuming, is already mixed, is not wasted in the air, is affordable, and that allows them to see how much was used.

**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
Granule sachet	4 of 5
Liquid sachet	6 of 9
Tablet	6 of 9
Liquid bottle	6 of 6

*Interpretation of Table 11.3:* There was no clear preference among consumers for one dipping product over another (the numbers are too small to determine if any differences between these numbers are meaningful).

**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"><li>▪ Plastic bags for mixing and demarcation line for seeing how much to use</li><li>▪ Gloves (gives protection)</li></ul>	<ul style="list-style-type: none"><li>▪ Fear of puncture, leakage, spillage (for liquid products)</li></ul>

\*Products that came with gloves include the liquid bottle, tablet, and liquid sachet. Products that came with plastic bags with demarcation lines include the liquid bottle and tablet.

*Interpretation of Table 11.4:* Consumers liked having a plastic measuring bag in which to mix the insecticide treatment with water. They also liked the demarcation line, indicating how much water to place in the bag. Consumers liked the gloves because they perceived that gloves offer protection. Consumers worried about the packaging of liquid products (the bottle and the liquid sachet) and the potential for harm or loss of chemical resulting from puncture, leakage, and spillage.

**Table 11.5: Price of net treatment consumers said they were willing to pay**

<b>Product</b>	<b>Price</b>
Aerosol spray (n = 15)	US\$1.80 (median) US\$0.90 - .US\$3.60 (range)
Flit gun sprayer (n = 13)	US\$ 1.80 (median derived from data that sometimes includes both sprayer and treatment) US\$0.20 - \$5.40 (range, sometimes including sprayer and treatment)
Liquid bottle (n = 5)*	US\$3.60 (median) US\$0.35 - \$4.30 (range)
Tablet (n = 8)	US\$1.55 (median) US\$0.35 - \$5.40 (range)
Liquid sachet (n = 9)	US\$0.80 (median) US\$0.20 - \$3.60 (range)
Granule sachet (n = 4)	US\$0.50 (median) US\$0.20 - \$3.60 (range)*

\* These samples are especially small, so data may not be meaningful.

**Interpretation of Table 11.5:** Although it seemed that consumers were willing to pay more for the liquid bottle than for other products, data must be interpreted with caution because of the small number of respondents reporting acceptable prices for any given product. Consumers appeared willing to pay more for the liquid bottle, table, and spray options than for the granule sachet or liquid sachet. Data from the MicroTest™ (volumetrics and pricing study) provides more information on acceptable pricing for net treatment products.

**Table 11.6: Trader product choices out of all dipping and spraying products**

Product	Traders' favorite overall product out of 6 products shown (N=25)	Acceptable price for favorite product
Aerosol	7	US\$1.70 (median) US\$1.10 – \$2.50 (range)
Tablet	5	US\$0.20 (median) US\$0.20 – \$0.70 (range)*
Flit gun sprayer	4	US\$1.60 - \$2.50 (range)*
Liquid bottle	4	US\$0.90 - \$2.35 (range)*
Liquid sachet	3	US\$1.80 *
Granule sachet	2	US\$0.15 - \$0.20 (range)*
<b>Total</b>	<b>25</b>	

\*These samples are especially small, so these data may not be meaningful

**Table 11.7: Trader product preferences among dipping products only**

Dipping Product	Number of traders who selected product as favorite out of the four dipping options (N=25)	Number of traders who selected product as least favorite (N=25)
Liquid bottle	7	2
Tablet	7	4
Liquid sachet	6	5
Granule sachet	5	7

**Interpretation of Tables 11.6 and 11.7:** Traders liked the liquid bottle, the tablet, and the aerosol more than the flit gun sprayer, liquid sachet, or granule sachet. Among the liquid bottle, tablet and aerosol options, there was no clear preference.

**Table 11.8: Trader likes and dislikes/concerns about dipping and spraying methods for treating nets**

Method	Likes	Dislikes or concerns
Aerosol	<ul style="list-style-type: none"> <li>▪ Already prepared and requires no mixing</li> <li>▪ Easy</li> <li>▪ No chance of measurement error</li> <li>▪ Saves time</li> </ul>	<ul style="list-style-type: none"> <li>▪ Expensive</li> <li>▪ Don't know contents since can't mix it yourself</li> <li>▪ Not reusable or multipurpose (compared to flit)</li> </ul>
Flit gun sprayer	<ul style="list-style-type: none"> <li>▪ Less expensive than aerosol</li> <li>▪ Reusable and multipurpose</li> <li>▪ Fun to use</li> </ul>	<ul style="list-style-type: none"> <li>▪ Hard to use</li> <li>▪ Takes time</li> <li>▪ Requires preparation and mixing</li> <li>▪ Too much work</li> </ul>
Liquid bottle	<ul style="list-style-type: none"> <li>▪ Saturates whole net</li> <li>▪ Dissolves easily</li> <li>▪ Seems long-lasting and strong</li> <li>▪ Comes with measuring plastic</li> </ul>	<ul style="list-style-type: none"> <li>▪ Packaging may be dangerous to children</li> <li>▪ Can spill</li> </ul>
Tablet	<ul style="list-style-type: none"> <li>▪ Saturates whole net</li> <li>▪ Convenient</li> </ul>	<ul style="list-style-type: none"> <li>▪ Can be mistaken for medicine and consumed</li> <li>▪ Is too small to be powerful</li> </ul>
Liquid sachet	<ul style="list-style-type: none"> <li>▪ Saturates whole net</li> <li>▪ Dissolves quickly</li> <li>▪ Has gloves and clear instructions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Does not have measuring plastic</li> <li>▪ Can spill</li> <li>▪ Too small to be powerful</li> </ul>
Granule sachet	<ul style="list-style-type: none"> <li>▪ Is inexpensive</li> </ul>	<ul style="list-style-type: none"> <li>▪ Does not have gloves</li> <li>▪ Has unattractive packaging</li> <li>▪ Does not have measuring plastic</li> <li>▪ Will not dissolve easily</li> <li>▪ Does not look powerful</li> </ul>

\* Products that come with gloves include the liquid bottle, tablet, and liquid sachet. Products that come with plastic bags with demarcation lines include the liquid bottle and tablet. Products that come with written and pictorial instructions include the liquid bottle, tablet, and liquid sachet.

**Interpretation of Table 11.8:** There was little that distinguished traders' preferences for various dipping products. The factors distinguishing traders' dislike of various dipping products were largely related to packaging (e.g., lack of plastic measure, lack of gloves, fear of leakage or spillage) and the size/perceived strength of the insecticide treatment (e.g., tablet is too small).

The reasons traders liked and disliked the aerosol differed from the reasons they liked and disliked the flit gun sprayer (e.g., ease of use versus fun to use, perceived expense, etc).

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