



**NetMark Formative
Qualitative Research on
Insecticide Treated
Materials (ITMs)
In Nigeria**

February 2001



NetMark Formative Qualitative Research on Insecticide Treated Materials (ITMs) in Nigeria 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.



NetMark Formative Qualitative Research on Insecticide Treated Materials (ITMs) in Nigeria is not copyrighted. Readers are free to duplicate and use all or part of the information contained in this publication, as long as it is not sold for profit. In accordance with accepted publishing standards, NetMark requests acknowledgment, in print, of any information reproduced in another publication.

CONTENTS

CONTENTS	i
LIST OF TABLES	ii
ACKNOWLEDGEMENTS	iii
ACRONYMS	iv
MAP OF NIGERIA	v
SUMMARY OF FINDINGS	vi
SECTION 1: INTRODUCTION	1
SECTION 2: CONNECTION BETWEEN MOSQUITOES AND ILLNESS	6
SECTION 3: COMPARISON OF MOSQUITO CONTROL MEASURES	11
SECTION 4: NET OWNERSHIP AND USE	17
SECTION 5: GENERAL SLEEPING PATTERNS	27
SECTION 6: NET WASHING PATTERNS	28
SECTION 7: NET ACCESS AND AVAILABILITY	30
SECTION 8: NET PREFERENCES	32
SECTION 9: NET TREATMENT PATTERNS, PREFERENCES AND PERCEPTIONS	33
SECTION 10: TRADE ISSUES RELATED TO NETS AND INSECTICIDE TREATMENTS FOR NETS	38
SECTION 11: INSECTICIDE TREATMENT PRODUCT PREFERENCES	45
REFERENCES	51

LIST OF TABLES

TABLE 1.1:	STUDY SITES, LOCATION AND MAIN ETHNIC/LANGUAGE GROUPS.....	2
TABLE 1.2:	BREAKDOWN OF DATA COLLECTION METHODS BY STUDY SITE	3
TABLE 1.3:	BREAKDOWN OF CONSUMER SAMPLE BY GENDER AND METHODS.....	4
TABLE 3.1:	AWARENESS AND PAST YEAR USAGE OF INSECT CONTROL METHODS (IN DECREASING ORDER).....	13
TABLE 3.2:	MAIN PERCEIVED POSITIVE AND NEGATIVE ATTRIBUTES OF COILS, AEROSOLS, AND MOSQUITO NETS.....	16
TABLE 4.1:	PERCEIVED BENEFITS AND BARRIERS TO HAVING A CHILD UNDER FIVE SLEEP UNDER A NET EVERY NIGHT (IN RANK ORDER)	23
TABLE 11.1:	CONSUMER PREFERENCE BETWEEN DIPPING AND SPRAYING METHODS OF TREATING NETS.....	46
TABLE 11.2:	CONSUMER REASONS FOR PREFERENCE OF AND CONCERNS ABOUT DIPPING AND SPRAYING METHODS OF TREATING NETS	47
TABLE 11.3:	CONSUMER PREFERENCES FROM AMONG THE DIPPING OPTIONS	47
TABLE 11.4:	CONSUMER LIKES AND DISLIKES ABOUT DIPPING PRODUCT PACKAGING	48
TABLE 11.5:	PRICE OF NET TREATMENT CONSUMERS SAID THEY ARE WILLING TO PAY	48
TABLE 11.6:	TRADERS' PRODUCT CHOICES OUT OF ALL DIPPING AND SPRAYING PRODUCTS.....	49
TABLE 11.7:	TRADERS' PRODUCT PREFERENCES AMONG DIPPING PRODUCTS ONLY.....	49
TABLE 11.8:	TRADER PRODUCT SELECTION AND REASON FOR CHOICE.....	50

ACKNOWLEDGEMENTS

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 took the lead role in analyzing the data and writing the report. Dr. Laurine Thomas led the fieldwork, which was conducted by local Nigerian data collectors affiliated with RI.

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
------------------------	-----------------

ACRONYMS

AED	Academy for Educational Development
ITM	Insecticide Treated Material
RBM	Roll Back Malaria
RI	Research International
SES	Socio-economic status
Unicef	United Nations Children’s Fund
USAID	United States Agency for International Development
WHO	World Health Organization

MAP OF NIGERIA



SUMMARY OF FINDINGS

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 that children (but not necessarily children between 0-5) are vulnerable to a serious case of the illness. Awareness that pregnant women are especially vulnerable appeared lower. Almost everyone knew that mosquitoes cause malaria, but some thought there were other causes as well.

Mosquitoes were perceived as a major problem, and almost everyone, even in rural areas, used some kind of mosquito control (mostly commercial products such as coils or aerosols). Respondents had both positive and negative perceptions of all mosquito control methods, including nets.

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,” “careful,” “people who want a healthy life” and also “clever.” Nets were also perceived as a luxury item, reserved for the rich and educated and some people viewed nets as products for use only by infants and students.

Nets were not universally liked. Most non-owners did not want to use a net themselves because they viewed nets as unnecessary or did not like them. Negative perceptions of nets were that they are hot; lack ventilation; are inconvenient to hang, put up and down, or to get in and out of; can feel restrictive; and that children may damage them or become trapped.

Baby net use appears relatively common, as baby-net owners were relatively easy to find.¹ However, there is strong evidence that adult-size net availability (i.e., student, single, double, king/family) is very limited. Adult-size net owners were very difficult to find in all areas and only 9 were ultimately found to participate in this study. Nets were obtained mostly in open-air markets, where most consumers reported buying their nets. 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, light-colored nets.

Rectangular, large-size nets (doubles and king/family) were the most commonly purchased net shape and sizes. These were also the most common shape and sizes found in trader outlets. Net prices varied widely and traders reported selling nets for less than consumers reported paying for them. Traders reported selling nets from about US\$1.05 for a student-size net to \$4.40 for a larger net. Consumers reported paying US\$4.40 for a single-size net to US\$6.65 for a family-size net. Traders in Lagos reported selling their nets for considerably less than did traders in all other areas. Both fathers and mothers made the decision to buy and purchased baby and adult-size nets.

Nets were not always used year-round or in all sleeping situations; some households with adult-size nets reported using them only in the rainy season and never when members slept outdoors. Vulnerable groups were not always given priority for sleeping under a net; some children under five in net-owning households had not slept under a net the prior night.

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

Nets were reportedly washed anywhere from twice a week to every two months, typically with water and soap (often lye-based), in a basin, separately from clothes and were hung in the sun to dry. Some respondents worried about how washing would affect treated nets.

The concept of treating nets was virtually unknown and no one had ever done so. 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 a range of credible sources that the treatment product was safe. Some respondents also thought the treatments would be ineffective or were unnecessary if other insect control products were used.

Insecticide treatments appeared to be unavailable in the commercial sector; no insecticide treatment traders were found. Although most traders interviewed were interested in selling the treatments, the insect control market is specialized; traders who sold nets generally did not sell other insect control products such as coils and aerosols. As a result, several traders said either that they could not sell nets or that they could not sell insecticide treatments. Traders of insect control products, including nets, often sold more expensive products. Net traders, who generally gave no advice to their customers, were motivated to sell nets because of the potential for profit. These and other traders said that they would be motivated to purchase goods from specific suppliers if they received special discounts and incentives.

Consumers and traders wanted net treatments that thoroughly covered/saturated the net, were easy to use, convenient, fast, required no mixing, had no bad odor, caused no irritation, and were not wasted in the air. Respondents were shown four dipping products (a tablet, granules in a sachet, liquid in a sachet, and liquid in a bottle) and two spraying options (an aerosol and a flit-gun sprayer). Consumers expressed no strong preference for spraying over dipping, while traders overwhelmingly preferred the aerosol spray to any other option. Among the dipping products, traders liked the liquid in a bottle. Consumers appeared to prefer the liquid and granule sachets. Consumers and traders liked dipping products that dissolved easily and came in waterproof bags with water demarcation lines. They had mixed reactions to the inclusion of gloves and worried about products that could spill, were in packaging perceived as insecure, or that children could easily swallow.

SECTION 1

INTRODUCTION

1.1 BACKGROUND

The Problem of Malaria

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

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

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

NetMark

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

1.2 OBJECTIVES OF THE FORMATIVE RESEARCH

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

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

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

1.3 SAMPLE AND METHODS

Five sites were selected to represent the geo-ethnic diversity of the country: Lagos, Ibadan, Nsukka, Kano, and Maiduguri. Unicef had active ITM projects operating in Ogun State (near Ibadan and Lagos) and in Ebonyi State (near Nsukka). Although other groups have plans for ITM promotion in several of the sites (e.g., The BASICS Project in Kano and Lagos States), it appears that these projects were not yet active at the time of data collection. Table 1.1 identifies the location and ethnic/linguistic make-up of each site. In each of the sites outside Lagos, the urban center plus a rural community were included in the study, for a total of nine communities in the study.

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

SITE	STATE	ETHNIC GROUP/LANGUAGE
Lagos	Lagos	Multi-ethnic
Ibadan	Oyo	Yoruba
Kano	Kano	Hausa
Maiduguri	Borno	Hausa
Nsukka	Enugu	Ibo, Pidgin English

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

- 51 interviews with parents (or guardians)² of children under five
- 10 focus group discussions with parents of children under five
- 30 treatment product demonstration observations with parents of children under five years of age; and
- 26 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
Lagos	11 (urban)	2 (urban)	6 (urban)	6 (urban)
Ibadan	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (3 urban; 2 rural)
Nsukka	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (3 urban; 2 rural)
Kano	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (3 urban; 2 rural)
Maiduguri	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)	6 (3 urban; 3 rural)	5 (3 urban; 2 rural)
TOTAL	51	10	30	26

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 51 individuals, nine of whom owned at least one adult-size net, 21 of whom owned at least one baby net and 28 of whom did not own any nets.³ Of the 51 interviews, 28 were conducted with men and 23 with women. On average, 7-8 individuals participated in each focus group discussion. Participants in the two focus groups in Lagos were all from urban Lagos; one group consisted of upper-middle class men and the other group of lower socio-economic status (SES) men. For the interviews, focus groups, and treatment product demonstration observations, researchers also sought to find both male and female parents or guardians of children under five years of age. However, in the Northern sites,

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

³ In Nigeria, the term “net” can also refer to window and door screens. In this report, “net” or “mosquito net” refers only to nets that cover sleeping spaces.

adherence to *sharia* law made recruitment of females exceptionally difficult, and in other areas, women were not always available to participate in group discussions. As a result, more fathers than mothers participated in the study. Eight of the 10 focus group discussions were held with men. Table 1.3 provides a breakdown of the study sample by gender.

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

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

Each participant was shown one dipping option (i.e., liquid in sachet, liquid in bottle, tablet, granule in sachet) and one spraying option (i.e., aerosol spray or the flit-gun sprayer), demonstrated on a white, single-size net. A total of 15 respondents were exposed to the aerosol spray and 15 were exposed to the flit-gun sprayer. Seven respondents were exposed to the bottle, eight 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

DATA COLLECTION METHOD	FATHERS	MOTHERS	TOTAL
Interviews	28	23	51
Focus Group Discussions	8	2	10
Product Demonstration Observations	24	6	30

Trade Component:

The purpose of the interviews with 26 traders was to learn about:

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

In locating traders to participate in interviews, researchers deliberately sought out net sellers, traders selling other insect control products (e.g., aerosols, coils), and those selling insecticide treatments for nets. The sample included traders from a range of outlets: general retail stores, including those in markets; wholesale shops, pharmacies, table-top vendors.

1.4 ORGANIZATION OF REPORT

This report presents results from Nigeria.⁴ 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.

⁴ Reports on formative qualitative research results for the other countries are also available from NetMark, as are research instruments used in all countries.

SECTION 2

CONNECTION BETWEEN MOSQUITOES AND ILLNESS

Summary of Findings

- There was nearly 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 parents and traders of insect control products 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.
- Respondents universally perceived mosquitoes to be a problem, although some differed in opinion regarding times of the year when mosquitoes are a concern. Mosquitoes were viewed as both a year-round and seasonal issue, typically worst during rainy season.
- Children were seen as especially susceptible to malaria. Young children were viewed as vulnerable to the consequences of the disease, but there was a misconception that once infancy ends, children have strong immune systems and no longer require special protection against mosquitoes. There was less awareness that pregnant women also need special protection against malaria.

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 was 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 the malaria. Promotional efforts can build on the existing concept that babies have low immunity to emphasize that this low immunity extends through the first five years.

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 (46 of 51) of the parents interviewed spontaneously said the English word, “malaria” and 4 of the 5 remaining respondents knew the word when prompted. The English term, “malaria” (or its local equivalent, *iba*, *shawara*, or *zazzabin cizon sauro*) was also mentioned as a problem caused by mosquitoes in all 10 focus group discussions. In speaking of the problems caused by mosquitoes, all 26 traders of insect control products also knew the term “malaria.” A small minority of respondents erroneously believed that mosquitoes cause typhoid fever and cholera. Additionally, misperceptions that there are other causes of malaria (other than mosquito bites) exist. These include being in the sun, and overwork.

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, feeling hot and/or cold/shivering (31 of 51); headache (22 of 51); weakness, dizziness or fatigue (19 of 51). Fewer respondents mentioned other symptoms such as bitter taste in mouth, drinking a lot of water and loss of appetite. There were no major differences between urban and rural areas in awareness of symptoms, but in the Nsukka region (urban and rural), no respondent mentioned fever (or signs of fever), the key symptom of malaria. Almost no one mentioned convulsions, a symptom of severe malaria.

Study participants thought malaria is a serious illness that is potentially fatal. Indeed, only 3 of the 51 caregivers interviewed stated that malaria was not particularly serious or less serious than some other diseases (e.g., typhoid). The majority of traders of insect control products (20 of 26) also viewed malaria as a serious illness and only two said that it was not serious.

Perceived severity of malaria among parents and traders

“It is serious because the victims of malaria usually have general weakness of the body and very high temperature, which may result in death of the victim.” (Kano urban male baby-net owner)

“It is a serious illness because it lead to infant deaths.” (Ibadan rural male non-owner)

“It is serious. We sell a lot of Daraprim and Chloroquine because of malaria” (Lagos trader (pharmacist) not selling nets)

“At the time I was infected, about five people from my compound were infected. It is rampant, at least an alarming rate now.” (Kano urban trader selling bulk insecticide treatments for windows and doors)

“It is very serious in this town because most people suffer a lot from malaria. It is very expensive to treat it in the hospital.” (Kano urban trader selling nets)

“In 1999 it has reach to an alarming rate but now it is declining.” (Kano rural trader not selling nets)

“It is very serious and maybe that’s why the government are now doing something about it through the Roll Back Malaria program.” (Maiduguri rural trader not selling nets)

“It is very serious, because many people get admitted in the hospital because of malaria. If it is not serious these coils and flit [aerosols] will not move market.” (Nsukka urban trader not selling nets)

“It is not a serious illness.” (Nsukka urban female non-owner)

NB: Roll Back Malaria (RBM) is global initiative to control malaria. In April 2000, at a summit on RBM in Abuja, Nigeria, leaders of African governments reaffirmed their commitment to RBM.

Mosquitoes were viewed both as a seasonal and year-round problem. In most focus group discussions, respondents said that mosquitoes were most common during rainy season, but at the same time, in most groups some respondents stated that mosquitoes presented a year-round problem. In a minority of focus groups, one respondent said that mosquitoes were most troublesome in the dry season.

Perceived seasonality of mosquitoes

Kano urban female group

Respondent: “During the dry season, there are more mosquitoes. We use more aerosols in this season. Because the gutters are stagnant and in the rainy season, the rain washes them [mosquitoes] away.”

Respondent: “The rainy season has more mosquitoes than the dry. Mosquitoes don’t like cold weather so they don’t breed.”

Respondent: “In my area, I don’t experience mosquitoes during the dry season.”

Maiduguri urban female group

Respondent: “Mosquitoes are all around the year.”

Respondent: “Only during rainy season. They are many. In [name of area] they are only during the rainy season, but for areas where the masses are with gutters, they are all through.”

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

Although many respondents recognized that children under five and pregnant women generally require special attention and protection, it is not clear whether the community understood the special vulnerability of these groups to suffering the severe consequences of malaria.

Respondents 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 mosquito nets; all but one respondent chose the child under 3 years and most (38 of 51) selected the pregnant woman 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, only a few respondents (8 of 51) mentioned children or youth of any age and only two of these eight specifically stated children under five years of age. Only one respondent mentioned pregnant women. The vast majority of parents stated that everyone is vulnerable to the disease (15 of 51) or that those who do not take preventive measures are the ones to fall ill (20 of 51).

When asked who was most likely to die from the disease, about half the respondents (26 of 51) said it was people who do not get medical attention at the appropriate time. Only a handful (8 of 51) respondents cited children less than five or six years of age and only one respondent mentioned pregnant women.

Perceptions of who is most likely to die from malaria

“Anyone if you do not seek proper medical care, but mostly babies because their immunity is low and they can’t express themselves.” (Ibadan urban female adult and baby-net owner)

“Most children who are below five years who are not immunized against malaria may die if they contract the disease.” (Kano urban male non-owner)

“One who has contracted malaria without proper medical care may likely die from malaria.” (Kano urban male baby-net owner)

“Sickle cell patients and people who don’t take care of themselves.” (Ibadan rural female non-owner)

“It can kill anyone. It just depends on who treats himself. It can be anyone. It doesn’t matter the age.” (Ibadan rural female non-owner)

“Those who have malaria and do not treat it on time.” (Nsukka urban female non-owner)

“Only those infected but do not seek medical attention.” (Maiduguri male baby-net owner)

Although many respondents demonstrated an understanding of the concept of low immunity, they associated it with infants. When baby-net owners were asked how their children would be protected once the net was outgrown, three-quarters of the respondents said that the children would be protected in the same way as the rest of the family (e.g., with coils, aerosol sprays, window screens). A few of these respondents specifically stated that net use would cease because the child would have enough immunity so as not to require any special treatment. Only two of the seven respondents who owned both adult-size and baby nets said that the child would sleep under the larger net.

Examples of how baby-net owners will protect their children when they outgrow baby nets

“ [I] only use screen now. I believe she has matured enough...” (Ibadan urban male baby-net owner who has child of 3 years)

“Now the kids are older so they sleep in their room with the window net. They now have better immunity.” (Ibadan rural male baby-net owner who has children ages 2 and 4)

“He would be like the rest who are sleeping under the care of coils because I can’t afford buying nets for everybody in the family.” (Maiduguri male baby-net owner)

“Once he is big enough, the use of the net will be stopped. By then, he will have acquired some immunity. He will be left like his brothers and sisters [who are 2 and 4.5 years old].” (Kano rural male baby-net owner).

“We are likely to buy a bigger one to contain her size because her father said all his children would use nets up to at least primary 6. Maybe I think, that’ll reduce money to be spent on hospital bills or so.” (Maiduguri urban female baby-net owner)

“If the baby becomes big for the mosquito net, I will take off the net, thereby using mosquito coil and other insecticide to protect her from mosquito bite. Because, if she continue sleeping under the net, she will damage it.” (Kano urban male adult and baby-net owner)

“She will be part of the general family who use mosquito coils, flitting, and the screening nets, and by taking Diaprim. Maybe because there are no bigger sizes of nets, except the baby size and the student size.” (Kano urban male baby-net owner)

“In addition to the window net I have in the room, I will spray some insecticide in the room where she sleeps, in order to protect her from mosquitoes.” (Kano urban male baby-net owner)

“Since it will be too big for her, I will decide to start using flit or aerosol spray for the room.” (Lagos urban female baby-net owner)

“We use a preventive measure called Diaprim or Sunday-Sunday medicine.” (Lagos urban female baby-net owner)

SECTION 3

COMPARISON OF MOSQUITO CONTROL MEASURES

Summary of Findings

- Virtually everyone reported using some method of mosquito control. 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 traditional methods were used in both urban and rural areas.
- There was high awareness of mosquito coils, aerosols, window/door screens and mosquito nets as means to control mosquitoes. Except for mosquito nets, these were also the most commonly used methods in both urban and rural areas. There was medium awareness of flit gun sprayers and repellants, and although there was some use of flit guns, repellants were not commonly used. There was practically no awareness or use of electric mats.
- Although there was some awareness that pregnant women and children need special protection from mosquitoes, aside from use of baby nets, they were treated as any other family member vis-a-vis mosquito control.
- Respondents had both positive and negative perceptions about all insect control products. Participants liked coils because they perceived them as effective and affordable, but they strongly disliked their odor and the side-effects of the smoke. Consumers liked aerosols because they kill mosquitoes (and other insects) and are easy to use and control. However, consumers also perceived aerosols as expensive and some felt they are harmful to health. Nets were seen as providing good protection against mosquitoes and malaria, and as safe and effective. On the other hand, they were disliked because they were perceived as hard to hang, inconvenient to get in and out of, bothersome to put up and down, and expensive. Some respondents also said that nets were only for use by babies and students.

Summary of Program and Product Implications

- The fact that urban and rural dwellers commonly used commercial insect control products is favorable for net and insecticide promotion.
- The high awareness of mosquito nets as an insect control product and the perception that they afford good protection against mosquitoes and malaria is favorable for net promotion.
- The perception of nets as difficult to mount, inconvenient to get in and out of and put up and down, hot, 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.
- The perception of nets as expensive 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 a product only for babies and students will need to be countered. At the same time, the motivations for using nets for these groups can be expanded to other groups.

Detailed Discussion of Findings

Awareness and use of mosquito control methods and products

Mosquitoes were perceived to be a major problem, and there was high awareness and use of commercial mosquito control products in both urban and rural communities. Nearly all respondents, regardless of location, reported using a commercial form of mosquito control in the previous year. When window/door screens were included as a “mosquito control measure,” *all* respondents reported using some means of mosquito control in that same span of time. Respondents in all urban and rural areas reported using coils and aerosols in the previous year. Flit-gun sprayers were reportedly used in all urban areas and in four out of five rural ones. Repellants were reportedly used in five of the ten areas, including two rural sites.

Table 3.1 shows mosquito control measures that respondents were aware of and used. The commercial methods respondents were most aware of are aerosol sprays (48 of 51) window and door screens (45 of 51), mosquito coils (44 of 51), and mosquito nets (34 of 51).⁵ These same methods also were mentioned all but one focus group discussion. There was somewhat lower awareness of flit guns and repellants, with 27 of 51 respondents listing the former and 19 of 51 mentioning the latter as a form of mosquito control. None of the 51 caregivers spontaneously mentioned electric mats and only 4 of 51 reported having heard about the product when asked.

Those who were aware of a specific method were asked if they had used it in the past year. Respondents in both rural and urban areas used aerosols (35 of 47), coils (29 of 44), and window/door screens (29 of 45). Use of flit-gun sprayers was less common, but did occur among 14 of the 27 respondents mentioning this form of mosquito control. Eleven of the 34 respondents who mentioned nets as a mosquito control measure reported using this product in the past year and even fewer (9 of 34) owned an adult-size net. The low number of adult-size net owners occurred despite the fact that mosquito net owners were deliberately selected to participate in this study. Indeed, adult-size net owners were difficult to find.

Awareness of environmental management methods (e.g., clearing bushes or stagnant water, cutting grass) of mosquito control⁶ was moderate, with 18 of 50 respondents mentioning this approach. Traditional methods for repelling mosquitoes, such as burning things were also relatively well known with 20 of 50 respondents mentioning this method. However, few (5) of these respondents reported having burned things (e.g., orange peel) in the past year as a way to control mosquitoes.

⁵ About half of the 30 respondents who did not own any nets (baby or adult-size) mentioned mosquito nets as a way to control mosquitoes.

⁶ Clearing brush or stagnant water, while potentially useful in minimizing nuisance biting from certain mosquitoes, does not, in fact, have any effect on the anopheles mosquito that transmits malaria and breeds only in clean, clear water.

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

INSECT CONTROL MEASURE	# AWARE (n = 51)	# AWARE WHO ALSO USED METHOD
Aerosols	48	35
Window/door screens	45	29
Mosquito coils	44	29
Mosquito nets (including baby nets)	34	11
Flit gun sprayer	27	14
Burn things	20	5
Repellents	19	5
Keep environment clean*	18	NA
Electric mat**	4	0

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

**Four respondents reported having heard of electric mats only when asked. All other responses reported in this table were given without prompting.

Perceptions of insect control products, including nets

All insect control products are seen as having both positive and negative attributes. Table 3.2 summarizes the positive and negative attributes of nets, coils, and aerosols.

Coils

Respondents liked coils because they viewed them as effective and affordable, but the majority strongly disliked the odor or side-effects from the smoke (e.g., causes sneezing, congestion, catarrh, makes it hard to breathe). Some respondents also worried about the product's safety, including its potential to cause fires. These views are supported by data from the focus groups. The most common advantage cited in the majority of focus groups was that coils are inexpensive. Respondents in all but one group mentioned the same negative side effects of coils stated above and in half the groups, participants worried that coils were a fire hazard. (See text box and Table 3.2.)

Perceptions of mosquito coils

“It affects the babies, especially the smell. It causes cough.” (Lagos female baby-net owner)

“I like this method because it is very effective and at the same time, very cheap. What I hate is the smoke which comes from the coil. It is disturbing.” (Kano urban male adult and baby-net owner)

“It makes the mosquito so weak that it cannot bite. The odor of the smoke may be harmful to small babies.” (Kano urban male baby-net owner)

“Presently, I don't use this method anymore because the odor of the smoke of the coil can lead to health problems like coughing, stomach upset. It can also cause fire accidents.” (Kano urban male non-owner)

“What I dislike a lot about mosquito coil is its smoke because it at times makes it difficult for me to breathe. And, I like mosquito coil because it is very effective in killing mosquitoes and it is relatively cheap.” (Kano rural male non-owner).

“It drives away mosquitoes and it's economical. My daughter chokes at times because of the smoke, and coughs.” (Ibadan urban female baby-net owner).

“It is not good because you burn it while sleeping. It costs little money.” (Nsukka urban female non-owner)

Aerosols

Parents participating in the interviews liked aerosols because they kill mosquitoes (and other insects), are easy to use and can be controlled, but respondents also said aerosols are expensive. Some respondents complained that aerosols caused side effects. These findings are supported by information from focus group discussions. In the majority of focus group discussions, respondents said that aerosols were popular because they killed or kept away mosquitoes, but expressed concerns about the health effects of aerosols in general and also for children or people with asthma/allergies. (See text box and Table 3.2.)

Perceptions of aerosols

“It is good. You just spray it. When the smell comes down, you can sleep without mosquitoes.” (Nsukka rural male non-owner)

“They kill mosquitoes. It has good odor. [It] can cause cough and catarrh.” (Maiduguri rural female adult and baby-net owner).

“At least they’re strong and between 5-10 minutes, you can go to sleep, like Mobil, which I’m using. Stronger ones could cause cough and one could stay outside the room for over 30 minutes before you can enter the room.” (Maiduguri urban male non-owner)

“It is comfortable to use. You spray the room and sleep later. It is expensive.” (Nsukka urban female non-owner)

“Kills mosquitoes and all crawling insects within the vicinity but could be dangerous when inhaled too much.” (Maiduguri urban male non-owner)

“Kills all the mosquitoes and insects. It takes time before you can go to bed.” (Maiduguri rural male non-owner)

“This method is good because it kills mosquitoes instantly. But, I dislike the smell of the aerosols chemicals because it is very irritating to me. At times, it makes me vomit.” (Kano urban male non-owner)

“I like this method because it is convenient to use and if I want to get rid of mosquitoes faster. I honestly preferred the spray with aerosol and that is why at any point in time, you’ll surely find one in the house.” (Lagos male non-owner)

“This is very costly to afford. It is very effective.” (Kano urban male non-owner)

“It is effective. It is easily available. There are many brands. It is expensive.” (Nsukka urban female non-owner).

Nets

In interviews, the main reasons respondents said they liked nets were that they offer protection, and are safe and effective. The main reasons that respondents said they disliked nets were because they perceived nets as hot and inconvenient (e.g., they must be nailed to the wall, must be put up and taken down, are cumbersome when one has to go in and out). In less than half the focus groups discussions, participants stated that mosquito nets were either the “best protection” against mosquitoes or were very effective. A minority of focus groups mentioned that nets were “long-lasting” and “durable;” “danger free,” had no side effects or odors; and were economical. At the same time, in several groups, respondents said that nets did not protect the whole family, were costly, or were hot. Respondents also said that children might damage nets, that nets were outdated or for use only by elites, and that nets were ineffective against the noise of the mosquito, which was bothersome. (See text box and Table 3.2.)

Perceptions of nets (including baby nets)

“It’s effective. I like it because it’s simple and safe.” (Kano urban male baby-net owner)

“I like it because it is more protective than both the mosquito coil and insecticide because it is neither having smoke nor harmful to one’s life. I dislike because it is an obstacle to personal usage because when you want to ease yourself out, you need to take it off.” (Kano rural male adult and baby-net owner)

“I like it because it protects me from sporadic mosquito attacks. I dislike it because it is very difficult to be maintained as one has to put it up when the need arise as well as to take it up during the day time.” (Kano rural female adult and baby-net owner)

“It is a good method because it protects your body very well, but I think it disturbs me as an adult while going and coming out.” (Lagos urban male non-owner)

“It is much safer for babies because it covers the whole body.” (Lagos female baby-net owner)

“It helps avoid mosquito bites on my child.” (Lagos female baby-net owner)

“Good for when there’s no aerosol. It’s permanent.” (Lagos female adult and baby-net owner)

“For baby and the whole family. I prefer the baby nets because no matter how you spray, mosquitoes still come in. The quality is very low, which makes it easily damaged, but I prefer it for baby.” (Lagos female adult and baby-net owner)

“It attracts dust. You have to nail it to the wall.” (Nsukka rural male non owner)

Table 3.2: Main Perceived Positive and Negative Attributes of Coils, Aerosols, and Mosquito Nets

Method	Positive [+]	Negative [-]
<i>Coils</i>	<ul style="list-style-type: none"> ▪ Are affordable/cheap ▪ Keep away mosquitoes 	<ul style="list-style-type: none"> ▪ Are irritating ▪ Smell bad ▪ Cause coughing, difficulty breathing, and other health problems such as nausea ▪ Are a fire hazard
<i>Aerosols</i>	<ul style="list-style-type: none"> ▪ Kill mosquitoes instantly ▪ Kill other insects ▪ Are easy to use ▪ Are cheap 	<ul style="list-style-type: none"> ▪ Are expensive ▪ Smell bad/smell causes coughing, irritation, vomiting
<i>Mosquito nets</i>	<ul style="list-style-type: none"> ▪ Protect against mosquitoes/bites ▪ Last long/are durable ▪ Are economical ▪ Have no smell or irritating effect ▪ Are good/safe (especially for babies/children) 	<ul style="list-style-type: none"> ▪ Are unnecessary if other insect control products are used ▪ Are expensive ▪ Are inconvenient to get in and out of ▪ Are hot/lack air ▪ Do not protect whole family ▪ Mosquitoes can still bite through the net ▪ Are hard to use around children because of potential for damage ▪ Are outdated ▪ Are for use only by babies and school children

SECTION 4

NET OWNERSHIP AND USE

Summary of Findings

- Owners of adult-size nets were very difficult to find, despite the fact that interviewers deliberately sought to them out. Given the difficulty in locating net owners, it appears that use of nets (other than for babies and for students in boarding schools) is low.
- About half of the respondents who did not own an adult-size net had slept under a mosquito net in the past, often at boarding school.
- Most non-owners did not necessarily want to buy or use nets themselves; they perceived nets as unnecessary when other commercial products (e.g., coils, aerosols) were used, as inconvenient, and as hot and lacking air. They also perceived nets as expensive.
- Use of baby nets was fairly common; interviewers easily found baby-net owners in all but one study location (urban Nsukka). Overall, baby-net owners were easier to locate in urban areas than in rural ones. These owners reported using baby nets at night or whenever their infant was sleeping.
- The few adult-size net owners queried did not necessarily use nets throughout the year.
- In households with adult-size nets, not all children under five were covered the previous night. In households with baby nets, only those with children less than 10 months of age used the nets the previous night.
- The primary reason that people purchased and used nets (baby-size or adult-size) was to protect against mosquitoes. Protection against malaria was also important, but was mentioned less often than protection against mosquitoes. Protection against mosquitoes and malaria were the main benefits respondents named of having a child under five sleep under a mosquito net every night. Getting a good night's sleep was also viewed as a benefit.
- Less than half of all parents interviewed said there were any disadvantages to having their child under five sleep under a net every night. Of those who did, the most common were that the child could feel uncomfortable (e.g., hot, restricted), or that nets were too expensive/not affordable.
- Net owners were perceived as people who are health conscious, informed and want good health. Some people also perceived net owners as rich and educated, and viewed nets as a luxury item.
- Both mothers and fathers made decisions about net purchase and bought the nets (including in Northern Nigeria).

Summary of Program and Product Implications

- The fact that adult-size net owners were very difficult to find and that nets were perceived as unnecessary, expensive, inconvenient and hot suggests problems of both access (e.g., price, availability) and demand.
- Product development and promotional efforts should take into consideration the fact that net users feel hot and should address the general perception that nets are inconvenient. Decisions about product modifications should take into consideration any potential increase in cost to the consumer.
- A key challenge will be to make nets affordable and available.
- Significant promotional efforts will be required to stimulate demand, with special attention given to countering the perception of nets as unnecessary (particularly when other insect control products are used). Additional attention should be directed to countering the perception that nets are a product only for babies, boarding school children, and the rich/educated.
- The fact that net use by students is considered a norm (and to a lesser extent, so is baby net use) can be built upon in promotional efforts geared toward ITM purchase and use by pregnant women and children under five.
- Promotional and educational efforts are needed to ensure year-round net use, particularly by the most vulnerable groups. It will also be important to highlight the need for pregnant women and children under five 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 owners as “health conscious”, “informed”, and “wanting good health” can be used in promotional campaigns.
- Net 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. Net 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 communication/education must be directed at both women and men.

Detailed Discussion of Findings

Net ownership and use (including baby nets)

Owners of baby nets were commonly encountered but owners of adult-size nets difficult to find. Out of 51 parents interviewed, only nine had adult-size nets. Eight of these nine participants also owned baby nets. Of the nine households owning adult-size nets, five had only one net, two had two such nets, and one household had three. One household had “at least one net.” Baby-net owners were interviewed in both low- and middle-income neighborhoods of Lagos, and in both urban and rural communities of all other sites, with the exception of urban Nsukka. Of the

households with baby nets, 19 had only one such net and two households owned two baby nets. Owners of baby nets were easier to find in urban sites than in rural areas.

Nearly half the respondents who did not own any adult-size nets (20/42) had used one in the past. Most (14) of these 20 respondents came from urban areas; most (14) reported using nets in boarding school, per school regulations. Indeed, it appears to be accepted that even today, boarding school students must use nets. This is evidenced not only by comments from respondents (see below) but by the fact that net traders reported selling student-size nets and that students and parents purchased these items. (See also Section 10.)

“My son needed to go to school. He had to have a net.” (Ibadan urban female respondent explaining how she decided that her son should sleep under the net).

With very few exceptions, most of the adults interviewed who slept under nets in boarding school did not continue using mosquito nets after finishing their studies.

Reasons for lack of use among non-owners

Although, in the abstract, nets are viewed favorably, respondents did not necessarily want to use nets themselves. When the 42 non-owners were asked about their interest in using a net and about the reasons they were not currently doing so, few respondents indicated any desire to sleep under a net. About one-third (15 of 42) felt that nets were unnecessary because they currently used aerosols, flit-gun sprayers, coils, and/or had window screens. About the same number of parents did not anticipate using nets because they did not like them, found them inconvenient, or perceived them to be hot and lacking air. Some respondents (9 of 42) viewed nets as beyond their means, stating that they were too expensive. A few respondents also associated nets only with infants and school children, stating that they could no longer use nets because they were too old.

Reasons non-owners did not own/use a net

“Because I have nets [screens] all over the windows, which are very functional. Maybe if my child goes to a boarding house.” (Lagos male non-owner)

“I don’t find it necessary once you keep a neat environment.” (Maiduguri rural male non-owner)

“I don’t normally use the net because it’s not my habit to sleep with a bed net, in as much as my room is flitted with insecticide. In addition to this, I also have screen nets on my windows and doors. I also find it inconvenient to put up the net and take it down everyday. In fact, I am not used to it at all. I don’t think I can use bed nets at this stage now, unless it becomes compulsory, because I don’t just have the patience to use it everyday.” (Kano urban male non-owner)

“I don’t like it. So far, I have a window net (screen) and I don’t think a bed net is necessary. It makes me hot.” (Ibadan urban female baby-net owner who also purchased adult-size net for son in boarding school.)

“I don’t like it because the fan won’t blow on me.” (Ibadan urban female baby-net owner)

“Because I believe that sleeping under a net is highly inconvenient and hampers ones free movement in and out of bed. I don’t think [that I’ll ever use a net] except if I have to go to a place where I would be strongly advised to do so. Because I don’t like seeing things around me that’ll make me feel as if I’m in a prison yard.” (Lagos male non-owner)

“It was a must for all students in the school [reason used net in past] but I will not [use a net in the future]. I do not think it is necessary.” (Nsukka urban female non-owner).

“When you have a net in your home, it can only protect you when you’re in bed. Out of bed, it’s of no use. I could use one if I go somewhere with lots of mosquitoes, a mosquito-infested area.” (Ibadan urban male non-owner)

“I cannot imagine sleeping under a net. It is no longer in vogue. It makes homes look clumsy. I do not think I would use a net because I do not like it.” (Nsukka urban female non-owner).

“I don’t think it’s necessary. It’s too local, primitive for my taste. I can never use it.” (Ibadan urban male baby-net owner)

“Actually, I don’t have any interest in using a net, that’s why. Lack of interest. Yes, if it happens that one of my wives says she is interested in using a net, I have to buy it. Family influence. Most of the time, they are the ones who dictate to me. They want this, they want that.” (Kano urban male baby-net owner)

“I’m too old for that now. I can’t really say [if I would use one in the future]. It depends on the environment where I found myself.” (Maiduguri urban male non-owner)

“I can use it if given free. I can’t buy. I’ll use it so that mosquitoes don’t bite me.” (Ibadan rural female non-owner)

“I couldn’t get one because I can’t afford it.” (Maiduguri urban male baby-net owner)

“To use a bed net, you need a bed with poles and my bed has no poles.” (Maiduguri urban male non-owner)

“I may use them when they are cheap and durable. They are costly for the size of my family.” (Kano rural male non-owner)

Seasonality of net use and outdoor net use

A few adult-size net owners also reported using nets mainly during rainy season, whereas others say they use the nets nightly. Among the 21 baby-net owners interviewed, half (14) reported that their infants used the net only at night, a few (4) said they used it whenever their baby was sleeping and one said they used it only during the day. A few net owners reported that they sometimes sleep outside and when they do, they do not use nets.

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

Because there were only nine adult-size net owners in the study, information on who sleeps under nets is limited. Quantitative data on net coverage and use is available via the NetMark baseline survey. Respondents reported that although the youngest member of a household may have his own bed/cot and be covered by a net, others often share a sleeping space or bed. As mentioned previously, the majority of parents selected the youngest child in the household and the pregnant woman as priority candidates for sleeping under a net. However, it is not clear whether this “knowledge” is translated into “practice.” Among the nine owners of adult-size nets (eight of whom also had baby nets and all of whom, by design, had at least one child under five), most put at least one of their children less than 5 years of age under some net (baby or adult) during the previous night. However, some of the nine net owners also had children under five who remained uncovered.

Only infants can sleep under baby nets. Among the 11 baby-net owners who did not also own adult-size nets (and for whom information on net use the previous night was obtained), only six reported that a child under five years of age slept under the net the previous night. In these six cases, the child was less than one year of age and in all five cases where the net was not used, the child was over 10 months of age (and therefore, was likely to have outgrown the net). None of the women living in the households with adult-size nets were pregnant, so no data on net use by pregnant women were obtained.

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 vast majority of respondents (44 of 51) mentioned protection from mosquitoes or illness, including malaria. (See Table 4.1.) About half of the respondents (23 of 51) cited protection against mosquitoes and biting as a benefit in itself, and even more mentioned it in connection with protection from malaria/illness (32 of 51), or with getting a good night’s sleep (18 of 51). Of note, some of those who spoke of protection against malaria thought that a child who slept under mosquito nets would never get malaria. (See text box.) A few respondents (9 of 51), seven of whom were from Nsukka, said that having money makes it easier for a child under five to sleep under a net. Only three respondents, all from Nsukka, mentioned that nets helped household save money on illness. Three respondents also stated that if nets were bigger, the right size, or more colorful, it would be make it easier for a child under five to sleep under it. About two-thirds (33 of 51) stated that certain people would think it is a good idea for a child under five to sleep under a net. Some respondents (9) said that they thought so themselves and many (21) said that their spouses thought so.

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

“The advantage is that the child is protected from mosquito bites.” (Kano urban male non-owner)

“After flitting (spraying with aerosol) the house, mosquitoes can still come in, so if you have the net, it can protect you from mosquitoes.” (Lagos urban female non-owner)

“My child would be protected of mosquitoes and other insects and I think myself and my wife would feel relaxed of cries at night in case our child is bitten by an insect (Lagos urban male non-owner)

“He would keep on being healthy because without the mosquito bites, he’ll be healthy, no malaria. Nothing.” (Maiduguri urban male baby-net owner)

“It will prevent mosquito bites and reduce instances of malaria. The child may be prevented against malaria, provided they are not bitten by mosquitoes before going to bed.” (Nsukka urban female non-owner)

“It protects one from malaria which is caused by mosquito infection. He will be very healthy and free from malaria.” (Kano rural female baby net and adult-size net owner)

“If there’s a net, she’ll have a sound sleep. She won’t have mosquito bites.” (Ibadan urban female baby-net owner)

“As a decision-maker in this house, I will bring the suggestion that the child sleep under a net to prevent him from malaria attacks.” (Kano urban male non-owner)

“If the mother is convinced, she will easily put her child under the net. But, she must have the money.” (Nsukka rural male non-owner)

“The child may not be bitten by mosquito and the parent may spend less on malaria drugs.” (Nsukka urban female non-owner)

About half of the respondents (23 of 51) said that there were no disadvantages to having a child under five sleep under a net every night. Yet, some caregivers (15 of 51) did cite negative attributes of nets, stating that a child could feel uncomfortable (e.g., hot, sweaty, restricted, frightened) under a net. Some caregivers (11 of 51) also said that poverty and the expense of nets discouraged their use by a child under five. Some caregivers (15 of 51) also felt that mothers or fathers (including themselves) simply believed it was a bad idea for a child under five to sleep under a net. A few (6 of 51) worried that a child might damage or dirty the net and the same number expressed concern about becoming trapped or suffocating, and about separation of the child from the mother. A few respondents (7 of 51) also commented that a child could not sleep under a net because s/he would outgrow it (a reference to baby nets). A few respondents (4) also worried that a child would become used to sleeping under the net and become unable to sleep without it. Three respondents also complained that mosquitoes could still bite through the net or become trapped inside.

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

“It is only a fool will think is not good for a child to sleep under a net every night because it protects him from mosquito bites.” (Kano rural female baby and adult-size net owner)

“Nothing. If the mother puts the baby under the net, the baby will sleep there. I don’t think it has any disadvantage...” (Nsukka rural male non-owner)

“My child could get frightened and think I want to keep him in a cage.” (Lagos urban male non-owner)

“Most of them are nylon material and they cause heat at night.” (Nuskka urban female non-owner)

“The net is lacking enough ventilation. When he sleeps every day under a net, there is the possibility of him to have rashes over the body due to lack of enough ventilation. The rashes that occurred on his body may likely leads to his ill health.” (Kano urban male baby net and adult-size net owner)

“When there’s no light and it’s hot, she may feel hot and when there’s no fan or electricity. It can be hazardous if the baby is left alone under the net. The net can collapse and suffocate the child. It’s a big net.” (Ibadan urban female baby-net owner)

“They usually sleep by the mother. If the mother do not sleep under the net, they will not sleep under the net.” (Nsukka rural female non-owner)

“The more children you have, the more net you need. That means more space and money.” (Nsukka urban female non-owner)

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

BENEFITS/WHAT MAKES IT EASY (N = 51 respondents)	BARRIERS/WHAT MAKES IT HARD (N = 51 respondents)
<ul style="list-style-type: none"> ▪ Protection from illness, including malaria (32) ▪ Protection from mosquitoes and other insects (23) ▪ Child sleeps well (18) ▪ Having money makes it easier to have nets (9) ▪ Less money is spent on drugs (3) ▪ Characteristics of net (if it is bigger, more colorful) (3) 	<ul style="list-style-type: none"> ▪ Net is uncomfortable (hot, lacks ventilation, makes child feel restricted) (15) ▪ Not having enough money/expense of nets (11) ▪ Child outgrows baby net (7) ▪ Child may damage net (6) ▪ Child separated from mother (6) ▪ Child may become trapped or suffocate (6) ▪ Child will get become spoiled/unable to sleep without it (4) ▪ Mosquitoes can still bite (3)

Perceptions of net owners

Despite non-owners' reluctance to use mosquito nets, they (along with net owners) perceived net owners quite positively. Only two respondents viewed net owners in a negative light, stating that they are, "rich government top workers who use government money for everything they need" and "people that still live in colonial days." Some individuals (11 of 51) perceived of nets as a luxury item, stating that nets use is reserved for the rich and educated. Overall, respondents thought net owners are responsible, informed, and want good health. Indeed, net owners were commonly referred to as "careful," "health conscious," and as people who "want a healthy life" (23 of 51). A couple of respondents also suggested that net owners were "clever" and "know what to do."

Perceptions of net owners

People who are informed about nets, either rich or poor.” (Nsukka urban female non-owner)

“Rich people. Government top workers who use government money for everything they need.” (Nsukka urban female non-owner)

“People who are rich use it, not people like me. I’m poor. They’re not extravagant but because they have the money and like themselves.” (Ibadan rural female non-owner)

“It’s common among educated people, people that know what to do at a particular or right time.” (Ibadan urban female baby-net owner)

“Caring parents. People that are really scared of malaria.” (Nsukka rural male non-owner)

“A person who wants good health and does not want to have cause to go to the hospital.” (Lagos urban male non-owner)

“Wise people. Those who love good health.” (Ibadan rural male non-owner)

“A careful and health conscious person.” (Ibadan female baby net and adult-size net owner)

“Anybody that is health conscious, keeps his environment clean, uses net and makes sure there’s no mosquito around him. It can be anybody. It’s not really expensive to use a net.” (Ibadan urban male non-owner)

“I’ll say he’s a man of great concern to his health because to me, anybody who uses any kind of protection on his health is a man of his words.” (Maiduguri urban male baby-net owner)

“I will describe as reasonable people who know how to take care of themselves. He is an efficient human being who knows what to do to become disease free.” (Kano urban male baby and adult-size net owner)

“Those who are clever and as such, want to protect themselves from malaria. A person who wants to protect himself from all forms of foreign bodies that can endanger his life.” (Kano urban male baby and adult-size net owner)

“I can describe those who use net always as those who believe that health is wealth.” (Kano urban male non-owner)

“They are people who look at themselves as the modern people. As such, they consider themselves to be clever, as it protects them from mosquito attack.” (Kano rural male non-owner)

Prevention is better than cure, as the saying goes. They are people who want to be healthy and fit.” (Kano rural male baby-net owner)

“I describe those kind of people who uses net as “Masu Dabara,” meaning those with a plan, for they are making their times to be worthwhile and at the same time, free from malaria.” (Kano rural female baby and adult-size net owner)

Net purchase and decision-making about net purchase

Among net owners (including those with baby nets), the majority of respondents reported that either mothers or fathers were the ones who decided to buy the net and who made the purchase. A few respondents stated that the decision was made jointly. These findings are corroborated by statements from net traders who said that mothers, fathers and expectant mothers (in the case of baby nets) purchased nets in their outlets.

When asked why they purchased the baby net, the vast majority of the baby-net owners who discussed the topic (16 of 20) said they wanted to protect the baby from mosquito bites. Some respondents (7 of 20) also mentioned that they wanted to protect their baby from malaria. Protection against other insects, which was mentioned by only one parent, was not an important reason for using baby nets. Five of the nine respondents who owned adult-size nets discussed why they purchased this item, with four of the five caregivers stating that they wanted to prevent mosquito bites and none specifically mentioning malaria prevention.

SECTION 5

GENERAL SLEEPING PATTERNS

Summary of Findings

- Various patterns of family sleeping arrangements emerged in focus group discussions. Where multiple rooms exist, adults and children may sleep separately, but where there is only one sleeping room, they sleep together. Husbands and wives generally sleep together, but not always. Male and female children typically sleep separately from each other. Babies usually sleep with their parents or in cots and older children generally sleep on mats, foam or on the floor.

Summary of Program and Product Implications

- Nets must be made available (or designed) so that they are adaptable to the range of sleeping patterns found in this research. Specifically, nets will need to work on a variety of sleeping surfaces (e.g., beds, mats, etc.) 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 some children sleep separately from adults).

Detailed Discussion of Findings

Sleeping patterns

Data from the focus group discussions shows that family members sleep in separate rooms where they can afford it, but where this is not possible, children and adults sleep together in one room. Focus group participants stated that it was not uncommon to have 4-8 people sharing a room. In most focus group discussions, participants said that husbands and wives generally sleep together (regardless of socioeconomic status), although in some focus groups, there was mention of separate sleeping arrangements for spouses. Male and female children are generally separated. Except in wealthier families, where infants may sleep in cots, babies usually sleep with their parents (often on beds), whereas older children generally sleep on mats or foam on the floor. In one focus group discussion, respondents discussed the sleeping habits of pregnant women and said that husbands and pregnant women sleep together in the same bed.

SECTION 6

NET WASHING PATTERNS

Summary of Findings

- Respondents reported that nets were generally washed anywhere from twice a week to once every two months. During Harmattan (when the winds create a lot of dust), nets were reportedly washed more frequently than at other times.
- Nets were typically washed with water and soap (often Omo, a lye-based soap) and appeared to be hung in the sun to dry.
- Some respondents had questions about how net washing would work in conjunction with net treatment. In particular, respondents worried that they would need to wash their nets more frequently than treatment would permit and that the chemical for treating nets would react with products used for washing.

Summary of Program and Product Implications

- Net treatment product development and pricing should consider current consumer practices regarding the frequency of net washing. Promotional efforts should address the process involved in treating nets (particularly in relation to washing) and emphasize that the effectiveness of the net treatment is dependent on the frequency of washing the nets
- Since lye-based soap is commonly used in net washing, any potential chemical reactions between this product and insecticide treatments must be addressed in product formulation, instructions on use, and in promotional efforts.
- The apparent practice of drying nets in the sun is not compatible with recommendations that ITMs be dried in the shade. Product formulation should take into consideration current consumer drying practices. If the product recommendation of shade drying remains, promotional efforts will need to address the inconsistency between product guidelines and current practice.
- Net treatment product development and product unit cost should consider current consumer practices regarding the frequency of net washing. Promotional efforts should address the process involved in treating nets (particularly in relation to washing) and emphasize that the effectiveness of the net treatment is dependent on the frequency of net washing.

Detailed Discussion of Findings

Net washing

Owners of adult-size nets generally reported washing their nets anywhere from twice a week to every two months, with others simply stating that they washed their nets “very often.” Population-based data on the frequency of net washing is available through the NetMark baseline survey. Additionally, in one focus group discussion, respondents stated that the frequency of washing depended on the season. During the Harmattan, nets were reportedly washed more

frequently because of dust. A respondent who washed her net every two weeks said she did so because the aerosol spray sticks to the net and could potentially harm the child.

Nets were reportedly washed with water and soap (often Omo, a lye-based detergent soap). Only a few respondents discussed how they dried their net and those that did hung it on a line in the sun. Two respondents said that the heaviness of the net made washing/drying difficult, and one said that it was difficult to remove the blood stains of mosquitoes. However, most net owners did not have many complaints about washing/drying the net, nor did they have many suggestions for how the process could be made easier.

Beliefs regarding washing and treatment effects

In one focus group discussion respondents spontaneously raised concerns about washing a treated net. They worried that washing a treated net would affect the net, that they would not be able to wash a treated net as much as needed and that contact with the chemical during washing would be harmful.

Comments from focus group discussion regarding washing a treated net

Nsukka rural male focus group discussion

- Respondent: What if you wash it within 6 months?
Respondent: Won't the water and detergent affect it?
Respondent: The detergent may react with the chemicals and with the hands of the women.
Respondent: It lasts 6-12 months. You can't wash it during that time.
Respondent: I wash my nets every 3 months. I can't wait that long to wash my nets.

SECTION 7

NET ACCESS AND AVAILABILITY

Summary of Findings

- Net traders were located in all urban areas except Nsukka, but in only one rural area (Kano). Open-air markets were the most common source of baby and adult-size nets. 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 three adult-size net brands found were Sunflag, Franoil, and Sleeping Beauty. The two baby net brands found were Mothercare and Globe.
- Conical and rectangular nets were the two sizes found for sale. In homes, rectangular nets were more commonly found. White nets were more commonly available than other colors.
- Student-, double-, family-size and baby nets were the most commonly sold net sizes. Most of the adult-size nets owned were doubles.
- Nets were sold for between N120 and N500 (US\$1.05 - \$4.40), depending on the size and the region of the country. Net prices, as reported by consumers, were somewhat higher than what traders reported. Non-owners generally overestimated the cost of nets (when their estimates were compared to trader reports).

Summary of Program and Product Implications

- Nets need to be made more widely available in all areas, including rural ones.
- Nets are currently too expensive for many Nigerians and need to be made more affordable. Net promotion efforts must also counter any perception that nets cost more than they actually do.
- 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 and sold, their cost and place of purchase

Of the nine households owning adult-size nets, all but one had rectangular nets. Most nets were doubles, but one was a single and two were family-size. No respondent mentioned the net brand. “Mothercare” and “Globe” were the only baby net brands mentioned by just one respondent each. Open-air markets were the most common source of baby and adult-size nets. Of the 14 baby-net owners who reported where they purchased their net, all but three did so in such a market. The other three respondents purchased their baby nets in a mothercare shop, a “store” and from a table top vendor. The five adult-size net owners who reported where they purchased their nets did so in an open-air market. When asked where a net could be obtained, 22 of the 29 non-owners who replied said “market” or named a specific market. One respondent each said nets could be obtained from a “store,” “the government,” a “hospital,” from “those selling bedding and toiletries,” and from a “supermarket.” Only two respondents did not know where to obtain a net.

Net traders were located in four of the five study areas (excluding Nsukka), but only in one rural community (near Kano). A total of eight net traders were interviewed for this study. Not all traders gave information on the size, shape, color or brand of their net. Of those that did, two sold both rectangular and conical nets and two sold only rectangular ones. No other net shapes were recorded. Two traders sold only white nets and one sold both blue and white ones. Another trader sold white and black nets. No other net colors were recorded. The three net brands found were Sunflag, Franoil, and Sleeping Beauty. Most nets were sold in their plastic packaging, although a few were displayed hanging.

The one trader interviewed who clearly sold baby nets (in urban Kano) did so for N270 (US\$2.40), which was also the median price that consumers reported paying. (The range was from N150 to N1000, or US\$1.35-\$8.85.) All three traders interviewed in Lagos who sold student-size nets did so for N120 (US\$1.05) and the trader in Kano sold these for N220 (US\$1.95).

Traders reported selling adult-size nets for between N120 and N500 (US\$1.05-\$4.40), depending on the type of net. In Lagos, all three traders sold their student nets for N120 (US\$1.05) and their family size nets for N180 (US\$1.60). Net prices were higher in all other areas. In Maiduguri, the one net trader sold his products for between N230 and N270 (US\$2.05-\$2.40). The trader in urban Kano, sold baby nets for N270 (US\$2.40), student-size nets for N220 (US\$1.95) and family-size nets for N350 (US\$3.10). The trader in rural Kano sold his nets (of unknown sizes) for N250 and N500 (US\$2.20-\$4.40). In Ibadan, the urban net trader sold his Sleeping Beauty net (of unknown size) for between N350 and N400 (US\$3.10-\$3.50).

Traders reported selling nets for less money than consumers reported spending and for less money than non-owners thought nets cost. The one owner of a single-size net in urban Maiduguri reported paying N500 (US\$4.40); the three owners of double-size nets in urban Kano and Lagos reported spending N500-N580 (US\$4.40-\$5.15); and the two owners of family-size nets in Lagos and urban Maiduguri reported paying N700-N750 (US\$6.10-\$6.65) respectively. When non-owners were asked how much they thought nets cost, a few people (4) said they did not know, but most estimated the cost to be between N50 (US\$0.45) and N3000 (US\$26.55), with the median estimate falling at N550 (US\$4.85). These are higher than prices reported by traders.

SECTION 8

NET PREFERENCES

Summary of Findings

- Consumers wanted nets to come in a variety of sizes, shapes and colors, though they generally preferred large nets.
- There was no consensus on net shape preferences. Some respondents preferred rectangular nets and others preferred conical ones. Some people perceived rectangular nets as very difficult to hang—a reason some consumers preferred conical nets, which hang from one central point.
- Consumers generally preferred light colors but some also liked dark ones. Respondents say they like light colors because they will reveal the mosquitoes or even drive them away.

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 (if not impossible) to hang because they must be tied to four points. Decisions about product modifications should take into consideration any potential increase in cost to the consumer.
- Promotional activities for conical nets can emphasize their ease in hanging.

Detailed Discussion of Findings

Net size, shape and color preferences

In all focus group discussions, parents expressed a strong desire for large nets that can be used by multiple family members at the same time. Participants also wanted variety, asking that nets come in different sizes, for different-size beds, including cots.

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 four groups, respondents either did not discuss the shape of the net or stated that they had no preference. In all but one of the remaining groups, some respondents preferred the rectangular nets and others preferred the conical ones. In one group, all respondents selected the conical net, stating that any net that required poles for hanging (i.e., the rectangular one) could not be used.

Regarding color, respondents generally preferred lighter colors (e.g., white, light blue, light yellow), although in 3 of the 10 focus groups, some respondents opted for darker colors (e.g., dark blue and dark green). As with size preferences, focus group participants wanted nets to come in a variety of colors. In a few focus groups, participants explained their preference for lighter colors, stating that they would reveal the mosquitoes or even drive them away.

SECTION 9

NET TREATMENT PATTERNS, PREFERENCES AND PERCEPTIONS

Summary of Findings

- The concept of net treatment was virtually unknown and none of the respondents with adult-size or baby nets had ever treated their net. Although there were generally positive reactions to this concept, consumers also were concerned about the potential harm or danger of ITMs, especially to pregnant women or children under five (via inhalation or, in the case of children, ingestion from sucking/chewing on the net). Some respondents were also worried that the treatment chemicals would be ineffective. (See Section 11 for more details.)
- Traders were generally receptive to the concept of net treatments. (See Sections 10 and 11 for more details.)
- Parents said they would be reassured about ITMs if credible sources told them the products were safe. Not all sources were considered credible, nor was there consensus on which sources could be believed.

Summary of Program and Product Implications

- Since the concept of net treatments is virtually unknown, major ITM promotional and communication efforts are required.
- The positive reaction to the benefits of insecticide treatment is favorable for treatment promotion.
- Promotional efforts should emphasize the effectiveness of net treatment in preventing malaria and in killing/repelling mosquitoes and other insects.
- 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 that specific products deliver the different benefits cited by consumers as important.
- Care must be taken when selecting who will give assurances of treatment product safety.
- Since people use insecticides (e.g., aerosols) very regularly—even daily—their misconceptions about insecticide treatments for nets must be corrected. Consumers need to know how often to treat the net and that the chemical smell/irritation disappears shortly after treatment, but that the treatment remains powerful against mosquitoes.

Detailed Discussion of Findings

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

Net treatment is a new concept that was virtually unheard of among parents. Only 6 of the 51 parents interviewed knew of this procedure and none was a net owner. In the Nsukka area, some focus group participants had heard of and used treated nets provided by a Unicef project operating in the area, but these respondents were in the clear minority of study participants.

Among parents, reactions to the idea of treating nets with insecticide were generally positive, with over half (20) of the 33 parents who expressed an opinion about treating nets reacting favorably. But when asked whether they thought it would be dangerous for a young child and/or pregnant woman to sleep under a treated net, the majority of respondents (39 of 51—including net owners and those who liked the idea of insecticide treatment for nets) agreed that it would. Respondents were most concerned that pregnant women would react adversely to the odor and that the chemical could cause miscarriage. Some respondents who had negative reactions to the idea of insecticide treatments also believed the chemical would be ineffective and lack staying power. (See text boxes that follow.)

In general, participants in all focus groups were willing to use insecticide treated nets as long as they were assured of the safety of this product. In half of the focus groups, participants even explicitly stated that insecticide-treated nets were the best prevention option or that treated nets were more effective than untreated ones. In several focus groups, respondents liked insecticide treated nets because they felt they would be cheaper than spraying with aerosols or than treating malaria. In most focus groups, however, at least one respondent raised some safety concerns regarding treated nets—specifically the anticipated odor and fumes. These concerns related to the potentially adverse health effects of resulting from the odor and fumes of the insecticide, particularly for those with allergies or asthma. In one focus group (Nsukka rural males) one participant expressed fear that the hot weather would cause the chemicals to “evaporate into the air.” Another worried that upon washing the detergent “may react with the chemicals and with the hands of the woman.”

Reactions to the concept of insecticide treatments for nets

“It would be fine if that treated net can be introduced, but only if it is not too expensive.” (Ibadan rural male non-owner)

“I’ve not heard of it, but if I’m taught, I’ll use it, even if I have to buy it to use it. Definitely, it’s a good idea or white people won’t make it, but money can be the problem.” (Lagos urban female non-owner)

“Yes, I think my parents used to say something like that to me (about insecticide treated nets) and I think that was why they bought two nets, so that when one gets dirty, they come to collect it for washing and when they bring it back it used to smell of insecticides and I think even my roommate used to say they’re not being disturbed by mosquitoes, especially when the nets have just been treated.” (Maiduguri urban male non-owner)

“I think it is very good. It will be one of the most effective methods to control malaria disease in our society.” (Kano urban male non-owner)

“Well, it is a good idea. I think it will be more effective than use of ordinary net without insecticide.” (Kano rural male baby-net owner)

“It will kill mosquitoes, ants or insects that comes near the net, so it is a good idea.” (Lagos urban female baby-net owner)

“It is good. I think that people that uses net will welcome it because people that use net also buy and use flits (aerosols) occasionally.” (Nsukka urban female non-owner)

“The net will smell, smell like insecticide that you put on it. It will be good after the smell had gone.” (Nsukka rural female non-owner)

“I think it’s a bad idea because it’ll be harmful to the kids. They touch nets and at times put edibles on it before eating, so it might cause problems.” (Ibadan urban male non-owner)

“I think it will affect the person or baby sleeping under it since it’s chemical. The person can react to the chemical, probably by coughing.” (Ibadan urban female baby-net owner)

“Some people used to put Shelltox on their net. It is a waste of money because the flit could be used for the whole room to protect everybody. But, if it is used for a net, it protects one or two people.” (Nsukka urban female non-owner)

“It is not necessary, provided you have flitted your house (sprayed with aerosol) (Lagos urban female non-owner)

“It will be just like spraying your net with flit. The spray will not last a long period on the net.” (Nsukka rural male non-owner)

“No, no, no. Why should I do that? It could be dangerous for babies.” (Maiduguri urban female baby-net owner)

“It’s good for adult net but not for children, because of the powerful chemical.” (Kano urban male adult-size and baby-net owner)

Beliefs regarding danger of pregnant women sleeping under a treated net

“[It’s not dangerous.] If it’s good for the mother then it’s good for the baby. If the mother doesn’t have malaria, then the baby will not have it.” (Ibadan urban female non-owner)

“It’s not dangerous. It’s good. Mosquitoes can cause bad things, like malaria.” (Lagos urban female non-owner)

“The odor will be inhaled and it can affect her and her baby, leading to cough or anything.” (Ibadan urban female adult-size and baby-net owner)

“It can be harmful when inhaled. Anything inhaled will affect one’s inside and will cause illnesses of all sorts, chest pains, liver, etc.” (Ibadan rural male baby-net owner)

“...because of her condition, the chemical can kill the baby in her womb, even if it doesn’t affect her.” (Ibadan rural female non-owner)

“I think so [that it is dangerous] because a pregnant woman is in a fragile position, so effect of insecticide on her health could lead to health problems.” (Maiduguri urban male non-owner)

“It is medically dangerous for a pregnant woman to use a net that is treated with insecticide because the odor of the chemicals will make the woman miscarry.” (Kano urban male non-owner)

“Sometimes insecticide are dangerous and a pregnant woman need all sort of protection from anything that can cause illness.” (Kano rural male baby-net owner)

“[It is dangerous], since most of these insecticides contain some chemicals, which may be carcinogenic or can be harmful to the unborn baby.” (Kano urban male baby-net owner)

Beliefs regarding danger of young children sleeping under a treated net

“If the net is used in an open place, it may not harm the child at all.” (Kano urban male non-owner)

“[It is not dangerous.] It is a good idea because it will kill mosquitoes. Once an adult can use it, a child can also use it.” (Lagos urban female baby-net owner)

“The child should not inhale the insecticide because it can be harmful to his health.” (Ibadan urban female adult-size and baby-net owner)

“The chemicals can choke the child or even put the net in their mouth and can destroy their insides. Chemicals basically are used to destroy insects and might destroy the child.” (Ibadan urban female baby-net owner)

“[It is dangerous] because of the odor. The child cannot breathe in the odor. It is too harmful because when you flit, you go out for the odor.” (Lagos urban female non-owner)

“Of course [it is dangerous], because of health hazards that might result from inhalation of the insecticide.” (Maiduguri urban male non-owner)

“Because of the chemical, the power of the chemical. Maybe it’s poisonous. We don’t know, but it may affect the child.” (Kano urban male adult-size and baby-net owner)

“If the insecticide has side effect, it will be more dangerous than the mosquito bite.” (Kano rural male baby-net owner)

Credibility of information sources for countering ITM safety concerns

In the majority of focus groups, participants were asked whose word they would trust on the safety of treated nets. In some focus groups, respondents said they would trust the word of Ministry of Health officials, the World Health Organization, manufacturers, or health providers. However, in the urban Kano focus group with men, some respondents said they would not accept the word of the Ministry of Health or of any organization. In a minority of focus groups, respondents said they would feel reassured by testimony from users. Men participating in the rural Kano focus group said they would also trust the word of their village chief.

Treatment/retreatment experience

No net owner had any experience with a treated net or with having a net treated/treating a net themselves. Indeed, as mentioned above, no adult-size net owner had ever heard of treating a net with insecticide.

Treatment product preferences (generic reactions)

After being exposed to a range of product options, parents preferred net treatment products that thoroughly cover 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.)

Traders expressed strong preference for products that are easy to use, convenient, take little time, and cause little stress. (See Section 11 for more details.)

SECTION 10

TRADE ISSUES RELATED TO NETS AND INSECTICIDE TREATMENTS FOR NETS

Summary of Findings

- The insect control market appears to be specialized; generally, net traders did not sell other insect control products and those who sold items such as aerosols and coils did not sell nets. A few traders could not imagine selling nets and insecticide treatments together in their outlet because of market specialization.
- Net treatments were essentially unavailable in the market, but most traders of insect control products were enthusiastic about net treatments and expressed willingness (and desire) to sell the treatments (either separately from or in conjunction with) the nets. Parents of children under five also thought the treatments should be sold with nets.
- Consumers and traders mentioned the importance of assuring that the insecticide treatments are not fake.
- To promote the purchase and use of ITMs, traders suggested launch of a national-level campaign with government/Ministry of Health involvement, and use of mass media (e.g., radio, television). Some traders also suggested targeting institutions, such as hospitals and boarding schools. Traders pointed out that nets must be made affordable and available. Some also said that nets and treatments should be sold together.
- Traders reported that the fastest selling brands are Raid, Baygon, Mobil, Cock, and Rambo. They also reported that aerosols and coils are the fastest selling insect control products, with no one brand dominating.
- Traders of insect control products, including nets often sold other more expensive products
- Wholesalers generally obtained their products via delivery from suppliers or manufacturers, whereas retailers generally went to wholesalers to procure their products.
- Net branding does not appear to be strong. Most net traders did not mention that they sold a particular brand of net. Net brands observed (including baby nets) were Sunflag, Sleeping Beauty, Globe, Mothercare, and Franoil.
- Traders said they would be motivated to purchase goods from a particular supplier/manufacturer if allowed to pay on consignment, (after goods are sold), at least in part; to have discounts/reasonable prices; or to have retro deals (bonuses for achieving a certain level of sales).
- Net traders were primarily motivated to sell nets because they believed they would make a profit. Some were also motivated by a desire to prevent malaria and help people.
- Traders stated that both men and women purchase nets, as do expectant parents, boarding school students and people entering the hospital. Traders reported that customers enter the shop requesting nets.
- Net traders generally did not give advice to their customers and most believe that doing so is either unnecessary or impossible.

- Most traders said they did not use any particular means for getting customers to buy insect control products from them. A few said they offered competitively priced or discounted goods.

Summary of Program and Product Implications

- Traders' generally positive reaction to insecticide treatments and their to sell nets and insecticides together is favorable for ITM promotion and sales.
- The fact that there may be some market specialization may mean that certain types of outlets (e.g., bedding or "family" shops) may need to be matched with certain products/product packaging (e.g., the net packaged together with insecticide) and not others (e.g., the insecticide alone). On the otherhand, there will be instances where the same trader can sell both nets and treatments. The fact that some traders believe that nets and insecticides should be sold together in order to increase ITM sales indicates a willingness to overcome market specialization. Selling ITMs in domestic shops might help to reassure customers that insecticides are safe.
- To encourage traders to carry both nets and insecticide treatments, promotional efforts should highlight (where appropriate) high demand for these products and the potential to make a profit. Such efforts should also highlight the fact that by selling these products, traders can help their customers reduce their chance of getting malaria and of mosquito (and other insect) bites.
- Even though only a few consumers mentioned the importance of assuring that ITMs and treatments are not fake, this concern is likely to be important and should be addressed in promotional efforts.
- 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 key public figures. Targeting institutions, such as hospitals and boarding schools is also appropriate. It will be especially critical to make ITMs affordable and widely available.
- ITMs will need to be positioned to compete with the most common brands of insect control products. Insecticides and ITMs should be promoted as effective, and as working against other insects, in addition to mosquitoes.
- To attract business and maintain good relations with traders, NetMark manufacturers/suppliers could consider delivering their products to traders and providing incentives that traders like (e.g., discounts, retro deals).
- Promotional efforts and behavior change communication (including those at the point of sale) should target both men and women. They may need to counter the perception that only "rich" and "educated" people buy nets.
- Efforts should also 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 unavailable. The researchers were unable to locate any such traders of these products for inclusion in this study.

Trader openness to selling insecticide treatments with nets

The majority of retailers interviewed expressed willingness to sell ITMs and/or the treatments (19 of 25). Parents and guardians participating in observations of product demonstrations also believed that nets should be sold along with insecticide. A few consumers and traders mentioned the importance of assuring that ITMs and treatments are not fake.

Although most traders could imagine selling insecticide treatments packaged together or along with nets, three said they could not do so because selling the two products together would make nets too expensive. Two traders said that the market for nets was specialized and so they could not sell both insecticide treatments and nets. One also stated that he would require training before being able to sell ITMs.

Sample responses to the question of whether traders can imagine selling nets together with insecticide treatments

“It would be a very good thing, thereby creating awareness for everybody to know about insecticide treatments for sleeping nets.” (Lagos retailer selling mosquito nets but no other insect control products)

“For now, we are not selling nets. But, maybe we would start to sell them with this new product.” (Lagos pharmacist selling insect control products but not nets)

“Yes. I will sell it. I will convince people that when they buy the net, to buy it as well, so that the net will work better.” (Ibadan retailer selling nets but no other insect control products)

“I can sell both. Sprays and mosquito nets are going to be friends. They will be easy selling.” (Kano urban retailer selling industrial insecticides but no other insect control products or nets)

“People do not use the net presently. The selling option of them together will increase the price. That will further affect the sales of nets.” (Nsukka rural table top vendor selling insect control products but not nets)

“I can't sell nets. It's a specialized market. People in Ogunpa market sell nets. It's their business.” [During the interview the respondent called over several traders in her area and began to explain the merits of ITMs, even informing them that in addition to killing and repelling insects, it would scare away rodents. Despite her earlier comment, she expressed interest in becoming a distributor, particularly if she received ITMs on partial consignment. (Ibadan wholesaler and retailer selling insect control products but not nets)

Trader recommendations regarding the promotion of nets and treatments

The most common recommendation from traders regarding how to encourage the use of and purchase of nets and net treatments was to educate people about the problem of malaria and the benefits of nets and insecticide treatments, including how to use them. Most traders (16) urged an intensive media campaign utilizing radio, television, newspapers, posters, miniseries and documentaries. Some traders (8) specifically stated that the government, especially the Ministry of Health should be involved in or lead the campaign. In urging such a campaign, two traders

referred to the recently held Roll Back Malaria meeting in Abuja, stating that nets and treatments should be launched in a similar manner. A couple of traders also said key public figures (e.g, Reverend Father, Olalomi Amole and Komolage Olaiya) should become involved.

A couple of traders also stated that nets needed to be reintroduced to the public since they were not associated with modern times or with use by anyone other than babies. Promotion in institutions and purchasing outlets (e.g., clinics, hospitals, schools, chemists' shops) was suggested by some traders (7), with several urging that schools and hospitals require use of treated nets.

Making nets and treatments available at reasonable prices was another theme mentioned by many traders (10), although some of these called for these products to be subsidized or free. In order to encourage consumers to purchase insecticides for nets some traders (6) specifically stated that traders should sell both products together—a suggestion indicating willingness to overcome apparent market specialization.

Trader recommendations regarding the promotion of nets and treatments

“They should make announcements and encourage chemist shops to sell net. Make nets common. People do not remember nets as a means of preventing malaria. They should be told that nets are good to prevent malaria. (Nsukka urban pharmacy trader selling insect control products).

“[the way to get people to buy insecticides for nets is] by talking to people like us selling mosquito nets to sell insecticide with the nets they sell. By doing so, people would ask for the insecticide immediately when they buy the net.” (Lagos retail trader selling nets).

“Actually, I think some people are not aware of it (nets) and even those that are aware, they believe it is highly unnecessary for them to use. So, the Ministry of Health should create intensive awareness and make the nets available in every corner of the country, even in the remote areas and at prices that people could easily afford. (Maiduguri rural retail trader selling insect control products)

The prices should be affordable. It should be well broadcast and information should be enough and people will be encouraged. Teachers who give the list of required items to students should include treatments along with nets. Doctors should be educated on it and if it's effective, then fine. (Ibadan urban retail trader selling nets).

“Price. Also, hospitals do the majority of the advertising. Whatever they tell their patients to buy and use is what they buy. This is most important. At hospitals, they should lecture medical personnel and patients. Even if advertised on radio and TV, if the price is still not affordable, then the advertising is not worth it.” (Ibadan urban retail trader selling nets).

“In my own opinion, I think what should be done is to let people know that these products are very good for their health. It can be announced in the TV, radio, and even newspaper by so doing and I think people would really purchase these nets.” (Lagos retail trader selling nets).

Insect control product categories and brands sold by traders

With few exceptions, traders who sold nets did not sell other insect control products and those who sold products such as coils, aerosols, and repellants do not sell nets. No traders of individual insecticide treatments were located for inclusion in this study. Of the two traders who sold industrial insecticides, one also sold insect control products (e.g., aerosols).

Raid, Baygon, Mobil, Cock, and Rambo were the most common brands found among the 14 traders of insect control products (not including traders of nets or industrial insecticides). Other brands sold include Swan, Shelltox, and Nuvan. Fastest selling products were either coils or aerosols, but no one brand was dominant. When traders were asked why a particular product category or brand was fastest selling, the most common reason mentioned (by 8 of the 14 traders) was that the product or brand was effective or “works better.” Other reasons were that the product or brand was cheap, that customers simply “like it,” or that it is always available, and comes in different sizes. Insect control products, such as aerosols, coils, and repellants were sold by a range of traders, from wholesalers and retailers to table top-vendors and pharmacists.

Traders of insect control products, including nets often sold other products, which were more expensive than the nets, coils, aerosols or other insect control products. Examples include clocks and radios sold for N800 (US\$7.10) and N4500 (US\$40) respectively and vitamins or inhalers sold for between N1200 and N2000 (US\$10.60-\$17.70). Traders of mosquito nets often sold other bedding products and these ranged from bed sheets at N600 (US\$5.30) to mattresses at N18000 (US\$160.30). In rare cases, the nets or insect control products were the most expensive items a particular trader sold.

How traders obtain their products

Traders got their products by different means, depending on the kind of outlet they ran. Wholesalers procured their products directly from suppliers or manufacturers, and these products were generally delivered anywhere from several times each week to once every two months. Retailers, pharmacists and table-top vendors generally procured their products from wholesalers by going to the wholesaler anywhere from every day to once a month.

Mosquito net traders typically got their nets from wholesalers, although a few also got them directly from suppliers. Some traders collected the nets themselves and others had them delivered by the supplier/wholesaler. Collection and delivery times ranged from nearly daily to three times per year, but most traders received or procured their products between once a week and once every two months. Most net traders did not specifically mention that they sold a particular brand of net, although researchers observed Sunflag in two outlets. Other brands observed (including baby nets) were Sleeping Beauty, Globe, Mothercare, and Franoil.

Traders' motivation to buy from specific suppliers/manufacturers

When traders were asked to explain what would motivate them to buy from specific suppliers/manufacturers, payment on consignment (after goods are sold) and discounts/reasonable prices were mentioned by 13 of 25 and 12 of 25 respondents respectively. Other popular reasons to buy from a specific supplier were: if offered cash retro deals (bonuses for achieving a certain level of sales) (8 of 25), and if given gifts (6 of 25). Three respondents also said that if certain distributors gave them “luck” they would return.

Traders' motivation to buy from specific suppliers

“My supplier gives me cash bonus and a variety of gifts at the end of the year and also discount, whenever I am short of money.” (Lagos urban retail trader selling nets)

“What do motivate me is that he used to sell me at very low prices so that I can also gain something from the products and also, whenever I sell much, there is a special amount of money in form of bonus that would be given me.” (Kano rural retail trader selling nets and other insect control products)

“If you allow me to sell in my market before you collect your money.” (Maiduguri rural retail trader selling insect control products.)

“Someone who brings me luck and there's credit facility on consignment. Also, someone who gives bonuses at the end of the year, like color TVs, wall clocks or products.” (Ibadan urban wholesale/retail trader selling insect control products)

If his goods are not too costly. If he allow me to buy on credit when I do not have money....” (Nsukka rural table top vendor selling insect control products)

Reasons for selling nets and typical purchase situations

Of the 10 net traders interviewed, 6 began selling nets because they believed nets would move fast and that they would make a profit. A few were also motivated by the desire to help people and prevent malaria, or by the fact that they inherited the business from their family. Only a few traders discussed who typically comes to purchase nets, stating that parents come to buy them for their children in boarding schools, and that expectant mothers (and sometimes expectant fathers) also purchase nets (probably baby nets), as do students and patients going into hospitals. A few traders also referred to typical customers as health conscious, wanting to prevent bites, rich, or educated. Traders said that consumers typically asked for the nets when they came to the outlet.

Reasons net traders began selling mosquito nets

“To make a profit, because by selling nets and other bedroom materials, you can make a lot of money.” (Lagos wholesaler)

“I decided to sell mosquito nets because I believe it will really help people to protect themselves from malaria and other kinds of insect bites. And, I also thought I could make profit by selling it with some other bedroom products.” (Lagos retailer)

“I sell nets because many people used to ask for it, due to the fact that the place I am living is a slum area and as such, it is very prone to mosquitoes. They buy something that protect them from mosquitoes more, especially net.” (Kano rural retailer)

“To make money. It's been a tradition. I took over from my father who is now late [deceased]. Yes, because I want to be successful, like my father.” (Maiduguri retailer)

Traders' comments about typical purchase situations

“When parents are sending their children to boarding house, they normally ask for mosquito nets to protect them from malaria.” (Lagos retailer)

“Both pregnant women and mothers do [come in to buy nets]. Also, men do come buy as well. Nets are particularly requested. Basically, people with babies and expectant women or fathers do the buying. Educated people use bed nets and cot nets. Illiterates use the flat baby bed to put on mothers' bed and then use the foldable net on it.” (Ibadan retailer)

“Consumers normally ask for net. And to me, such consumer are people who are conscious of their health, who wants to protect themselves from mosquitoes.” (Lagos wholesaler).

“Most of our purchase situations are usually directed by our customer. This is because customers know what they are looking for and ask us and we give it to them.” (Kano retailer)

Giving advice

Only three of the 10 mosquito net traders interviewed (all in Lagos) reported giving their customers any advice regarding their net purchase and some traders who did not give advice said that doing so was either unnecessary or impossible.

Net traders' descriptions of the kind of advice they give or the reason they do not give advice to potential purchasers

Advice given

“They should always use it [the net] when they want to sleep. That is, every night.” (Lagos wholesaler)

“If there is any damage, you can return it or if the wrong size has been mistakenly chosen. (Lagos retailer)

“It's a better alternative to door and window nets. I let them know that mosquito net is very durable and easy to wash whenever it is dirty.” (Lagos retailer)

Reason no advice given

“Customers do not need advice. They know what they want.” (Ibadan retailer)

“You can't advise them because they have individual characters and tastes.” (Ibadan retailer)

How traders encourage consumers to buy insect control products from them

No particular means stood out as a way that traders encouraged customers to buy insect control products from them. A few traders (7) said either that they offered products at good prices, or that they gave discounts. Other things that at least three traders said they did were to: explain the product, offer quality/genuine (not fake) products, and give out free items (e.g., empty cartons).

SECTION 11

INSECTICIDE TREATMENT PRODUCT PREFERENCES

As discussed in Section 1, both consumers and traders were asked to express their likes and dislikes and preferences for various net treatment methods and products. For consumers, researchers conducted a demonstration of net treatment on a single-size, white net. The demonstration was performed with one of four dipping 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 expressed no strong preference for spraying over dipping products, even when just the aerosol spray was compared to a dipping product. Traders expressed overwhelming preference for the aerosol spray over any other product.
- Consumers liked dipping products because dipping fully saturated the net, no product was wasted in the air and the dipping products did not smell or irritate like the aerosol spray. However, some consumers found dipping to be time consuming and a few worried that the chemical could be harmful to children or to the user's skin.
- Consumers liked spraying products because they were easy, convenient, quick and required no mixing. The main dislikes were that the product was "wasted" in the air, that the net was not fully covered, and (in the case of the aerosol) that the spray had an odor or "irritating" effect.
- Consumers did not like the liquid bottle and the granule sachet and liquid sachet appeared to be liked more than the tablet. However, results should be interpreted with caution because of the small numbers of respondents.
- Between the two spraying products, consumers strongly preferred the aerosol.
- Regarding dipping product packaging, consumers liked the waterproof bags and water demarcation lines found in the liquid bottle and tablet kits. Consumers had mixed reactions to the gloves.
- Both consumers and traders said they would be willing to pay for and sell the aerosol for an average price of US\$1.35. Consumers said they would spend US\$1.35 for the tablet, US\$0.90 for the liquid sachet, US\$1.00 for the granule sachet, and between US\$0.90 - \$1.60 for the liquid bottle. The one trader giving a price for the bottle said he could sell it for US\$0.60.

Summary of Program and 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 and potentially come with measurement indicators.
- Sprays can be promoted as effective, easy to use, quick, already mixed, and able to cover the net. Dipping products could be promoted as ensuring complete net coverage and effective.
- Effort must be directed to promoting sprays and dipping products as safe. The particular concerns about use around children, inhalation or skin contact should be addressed.

Detailed Discussion of Findings

Overall, consumers expressed no real preference for dipping products (17 of 30) over spraying products (13 of 30) when the spraying products included both the flit gun sprayer and the aerosol. When only the aerosol spray was compared to a dipping product, 9 of 15 respondents chose the dipping product. When only the flit-gun sprayer was compared to a dipping product, 7 respondents opted for the dipping option and 8 for the flit-gun sprayer. (See Table 11.1.)

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

Product choice among those exposed to a dipping product and a spraying product (N = 30)		Product choice among those exposed to a dipping product and the aerosol (N = 15)		Product choice among those exposed to a dipping product and the flit gun sprayer (N=15)	
Dipping	17	Dipping	9	Dipping	7
Spraying	13	Aerosol	6	Flit gun sprayer	8

* Because of the relatively small sample size, the difference between any of these numbers (e.g., 17 and 13) is too small to be considered meaningful.

Consumers liked dipping products because they felt certain that by soaking the net, it would be fully saturated and covered by the chemical. Thus, respondents were sure of the product's effectiveness and felt it might last longer than by spraying. Consumers also liked the fact that by dipping, no product was wasted in the air and that the dipping products did not smell or irritate like the aerosol spray. Some consumers who chose spraying over dipping did so because they found dipping hard to do and time consuming. Fear of contamination through contact with the chemical was not a major concern, but a few respondents did express some worry that the chemical could be harmful if used by children or upon coming into contact with skin. (See Table 11.2.)

Consumers liked spraying products because they were easy and convenient, were not time consuming and because no mixing was required, which was seen as a way to prevent mistakes and ensure the chemical's effectiveness. The main dislikes regarding spraying were that the chemical was wasted in the air (and hence, did not fully cover the net, calling into question the product's effectiveness), and the odor or "irritating" effect of the aerosol spray. Several respondents who were shown the flit gun worried that the apparatus would "spoil" easily. A couple of respondents also worried about inhaling the chemical in the aerosol and about polluting the environment through its use. (See Table 11.2.)

Table 11.2: Consumer reasons for preference of and concerns about dipping and spraying methods of treating nets

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

Among the dipping products, the bottle was not liked and the granule sachet and liquid sachet received a more favorable reaction than the tablet. However, since small numbers of consumers were exposed to each dipping product, results should be interpreted with caution. (See Table 11.3.) Indeed, there were few remarks (favorable or unfavorable) that really distinguished consumer perceptions of the different dipping product forms. For example, respondents generally liked the packaging and form of the various dipping products, but each product also received a few negative comments regarding form or packaging, as well.

Table 11.3: Consumer preferences from among the dipping options

Method	Number selecting this option over the spraying option out of number exposed
Granule sachet	5 of 6
Liquid sachet	6 of 8
Tablet	5 of 9
Liquid Bottle	1 of 7

Overall, consumers liked the strong, waterproof bags and water demarcation lines found in the tablet and liquid bottle kits. They liked clear instructions on products (e.g., with drawings of mosquitoes). Five respondents commented on the use of gloves (which came with all dipping products except the granule sachet); three liked them and two did not. Those who liked the gloves saw them as protective and those who did not saw them as unnecessary or as an indication of the poisonous nature of the chemical. (See Table 11.4.)

Table 11.4: Consumer likes and dislikes about dipping product packaging

Dipping product packaging likes	Dipping product packaging dislikes
<ul style="list-style-type: none"> ▪ Strong, waterproof bags and water demarcation (i.e., as found in bottle and tablet) ▪ Clear instructions (e.g., with drawings of mosquitoes) ▪ Gloves (gives protection) 	<ul style="list-style-type: none"> ▪ Gloves (indicates danger of chemical) ▪ Unattractive packaging (Granule)

Among the spraying products, consumers strongly preferred the aerosol to the flit gun sprayer. When the 13 respondents who chose any spray product (aerosol or flit-gun sprayer) over a dipping product, were asked whether they would rather use the aerosol spray or the flit-gun sprayer, all but one opted for the aerosol and the remaining respondent had no preference.

Respondents said they would be willing to pay between N80-500 (\$0.70 – \$4.45) for the aerosol spray, with the median price being N150 (US\$1.35). Those respondents exposed to the flit gun said they would pay between N40 and N300 (US\$0.35 - \$2.65) for the flit gun (although many respondents also included the cost of the chemical in their assessments). The four respondents who offered a suggested price for the bottle alone said they would pay between N100-175 (US\$0.90- \$1.60) for it. Respondents exposed to the tablet said they would be willing to pay between N10 and N500 (US\$0.10- US\$4.40) for it, with the median price being N150 (US\$1.35). For the liquid sachet, respondents were willing to pay between N10-220 (\$0.10 - \$2.00) and the median suggested price was N100 (\$0.90). Consumers said they would pay between US\$0.20 - \$2.70 for the granule sachet (median price US\$1.00). (See Table 11.5.)

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

Product	Price
Aerosol spray	US\$1.35 (median) US\$0.70 - \$4.45 (range)
Flit gun sprayer	US\$0.35 - \$2.65 (range, sometimes including sprayer and treatment)
Liquid bottle	US\$0.90 - \$1.60 (range)
Tablet	US\$1.35 (median) US\$0.10 – US\$4.40 (range)
Liquid sachet	US\$0.90 (median) US\$0.10 - \$2.00 (range)
Granule sachet	US\$1.00 (median) US\$0.20 - \$2.70 (range)

Trader product choices and recommendations regarding their price

Twenty of the 26 traders selected the aerosol over the other 5 insecticide products they were shown. Only two traders opted for the flit gun sprayer, one for a dipping product (unspecified) and one for the liquid in bottle form. (See Table 11.6.) The remaining two traders did not reveal their preference. When asked to choose among only the dipping products (tablet, liquid bottle, liquid sachet, granule sachet), 10 of 26 traders chose the bottle. When asked to select their “least

preferred” option among all six dipping and spraying options, no trader chose the bottle. In contrast, although seven of 26 traders chose the tablet as their favorite dipping product, six of the 26 traders selected the tablet as their least favorite option among all products. Traders did not like the liquid sachet and granule sachet. Only one of 26 traders selected either option as their favorite dipping product and four chose the granule sachet as their least preferred product. (See Table 11.7.)

Traders said that they can sell the aerosol for between N50 and N1000 (US\$0.45 – US\$8.85), with the median price being N150 (\$1.35). This median price is exactly that which respondents said they were willing to pay. Of note, in all areas other than Nsukka (where traders suggested aerosol prices ranging from N200 – N1000, or US\$1.80 - \$8.85), only one retailer offered a price above N250 (\$2.20). The one retailer opting for the liquid bottle said it could be sold for N70 (\$0.60), slightly below the N100 the one respondent choosing this option said would be acceptable. The two retailers choosing the flit gun sprayer said the product could be sold for N80-N150 (US\$0.70 - \$1.35). (See Table 11.6.) This is also slightly less than what respondents said they would pay.

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

Product	Traders’ favorite overall product (out of 6 products shown) (N=26)	Acceptable price for favorite product
Aerosol	20	US\$1.35 (range US\$0.45 - \$8.85)
Flit gun sprayer	2	US\$0.70 - \$1.35
Liquid bottle	1	US\$0.60
Unspecified dipping product	1	NA
Unspecified	2	NA
Total	26	NA

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

Table 11.7: Traders’ product preferences among dipping products only

Dipping Product	Number of traders who selected product as favorite out of the four dipping options (N=26)	Number of traders who selected product as least favorite out of the four dipping options (N=26)
Liquid bottle	10	0
Tablet	7	6
Liquid sachet	1	0
Granule sachet	1	4

Nearly all (17) of the 20 traders who chose the aerosol over the other product options did so because they felt the aerosol was easy to use, convenient, caused less stress, and took less time. Many (8 of 20) also liked the fact that the form was familiar, stating that it was “like Raid” or “like flitting [spraying a room with aerosol].” Other reasons the aerosol was liked included that it was already prepared and required no mixing (6 of 20) and did not demand dipping or drying (3 of 20). Among the 10 traders who opted for the bottle as their favorite dipping option, reasons ranged from packaging (e.g., “safe in home because has protective gloves,” “more hygienic,” “attractive design,” “container is better) to product form (“dissolves faster so you don’t waste time,” and “mixes easily.”) The seven traders who preferred the tablet to other dipping products

did so because of the product form, giving comments such as, “I like the tablet because it’s a tablet,” and “the tablet looks more healthful and strong. Strong medicine comes in tablet form.” (See Table 11.8.)

Among the six traders selecting the tablet as the least preferred option, reasons were because it required time to dissolve and because the traders thought the tablet children could easily consume the product. The four traders who disliked the granule sachet did so because it did not come with gloves or attractive packaging and because it looked like salt or regular soap. (See Table 11.8.)

Table 11.8: Trader product selection and reason for choice

Product	Reasons for choice
Aerosol*	<ul style="list-style-type: none"> ▪ Is easy to use, convenient, caused less stress, took less time ▪ Is in a familiar form, “like Raid”, “like flitting [spraying room with aerosol]” ▪ Does not require mixing, is already prepared ▪ Does not require dipping or drying
Flit gun**	<ul style="list-style-type: none"> ▪ Reuseable ▪ Has handle and so is easier to use
Bottle***	<ul style="list-style-type: none"> ▪ Has good packaging (gloves, attractive design, good container, hygienic) ▪ Has good form (dissolves and mixes easily)
Tablet***	<ul style="list-style-type: none"> ▪ Has good form (looks like strong medicine, looks healthful and strong, is a tablet)
Liquid sachet***	<ul style="list-style-type: none"> ▪ Leaves nothing leftover, so no reduces risk of harm from contact with chemical
Granule sachet***	<ul style="list-style-type: none"> ▪ Does not contain gloves, so indicates chemical is not dangerous

*Responses are listed in rank order and are taken from traders’ ultimate product preference (from among all 6 dipping and spraying options)

**Responses are not listed in rank order and are taken from traders’ product preference from among the aerosol and flit gun sprayer only

REFERENCES

Brabin, B. (1991). An assessment of low birthweight risk in primiparae as an indicator of malaria control in pregnancy. *International Journal of Epidemiology*, 20(1), 276-83.

Gallup and Sachs (2000). *The Economic Burden of Malaria*. Cambridge, MA: Center for International Development Working (No. 52), Harvard University.

Global Forum for Health Research (2000). *Economic analysis of malaria control in sub-Saharan Africa*. Geneva, Switzerland: Global Forum for Health Research.

Lengeler, C. (1998). *Insecticide treated bednets and curtains for malaria control: A Cochrane review*. Basel, Switzerland: Swiss Tropical Institute, Department of Public Health and Epidemiology.

Unicef (1999). *Rolling back malaria*. New York, NY: United Nations Children's Fund.

WHO (1998). *Malaria*. Fact Sheet No. 94 October, 1998. Geneva, Switzerland: World Health Organization.

WHO (1999). *The World Health Report 1999*. Geneva, Switzerland: World Health Organization.

WHO (2000). *Overcoming antimicrobial resistance*. Geneva, Switzerland: World Health Organization