



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

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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. Mr. Johannes Cichorius led the fieldwork, which was conducted by local Senegalese data collectors affiliated with RI.

Net Mark Research Team

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

Research International

Mr. Johannes Cichorius	Account Manager
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ACRONYMS

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

MAP OF SENEGAL



SUMMARY OF FINDINGS

General knowledge about malaria was good. The French term for malaria, “palu” or “paludisme” 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 somewhat lower. Almost everyone knew that mosquitoes cause malaria, but some thought there were other causes as well.

Mosquitoes were generally perceived as a major problem (but mainly during rainy season) and everyone, even in rural areas, used some commercial method of mosquito control (e.g., coils, aerosols). Use of traditional methods was also common. Respondents had both positive and negative perceptions of all mosquito control methods, including nets.

The main reasons respondents liked nets were that nets protect against mosquito bites and keep mosquitoes out (of the sleeping space). Baby net owners¹ also used these nets so that their infants would be protected against flies. Some respondents viewed nets as the best possible protection and only a few mentioned any disadvantages of nets. Among those who did, the main disadvantages mentioned were feeling trapped/imprisoned in the net, feeling hot, and the inconvenience of putting nets up and taking them down. Net owners were described as “knowledgeable” and vulnerable to malaria. Nets were perceived simultaneously as a luxury item and as a sign of poverty; some respondents called net owners “rich” but others called them “poor.”

Most non-owners viewed nets as unnecessary, often because they used other commercial insect control products or because they did not think mosquitoes were especially prevalent in their area. Some wanted a net but said they could not afford one.

Net owners were found in almost all study sites, including rural ones. Baby net use also appears somewhat common, as baby-net owners were found in some sites. Nets were generally obtained from open-air markets in urban centers, and were mostly large (double- and king/family-size) and rectangular. Consumers preferred large nets and wanted them to come in a variety of shapes and colors. Conical nets were preferred for their ease of hanging, and rectangular nets were liked because they are roomier, familiar, and fit the shape of the bed. Consumers liked both dark and light colors.

Reported net prices varied widely. Consumers reported paying between US\$2.85 and US\$8.55 for double-size nets. Both fathers and mothers made the decision to buy nets and fathers often, but not always, made the purchase.

Nets were often used outdoors and were used mainly during the rainy and hot seasons. Most children under five in net-owning households slept under a net the prior night, as did two of the three pregnant women living in net-owning households.

Nets were reportedly washed at least once a month, typically with lye-based detergent and bleach and were hung in the sun to dry.

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

The concept of treating nets, while known to some respondents, was new to many. Two of the 15 adult-size net owners in this study had treated their nets and reported that the treatment made the net more effective. Consumers generally liked the idea of insecticide treated materials (ITMs), but 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, including the Ministry of Health and health personnel, that treatment products were safe.

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 insecticides) 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

Four sites were selected to represent the geo-ethnic diversity of the country: Dakar, Kaolack, Saint-Louis, and Tambacounda. The Casamance region was deliberately excluded from the study because of insecurity in the area. Kaolack and St. Louis have active ITM projects; Unicef and Plan International are operating in Kaolack, and World Vision and The European Development Fund (Luxembourg) work in St. Louis. These sites were selected in order to maximize the ability to obtain information from net owners regarding net purchase, use, and treatment. In each of the sites outside Dakar, the urban center plus a rural community were included in the study, for a total of seven communities in the study. Table 1.1 identifies the location and ethnic/linguistic make-up of each site.

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

SITE	PROVINCE/ DISTRICT	ETHNIC GROUP/LANGUAGE
Dakar	Dakar	Multi-ethnic/French
Kaolack	Kaolack	Wolof, Sérères
Saint-Louis	Saint-Louis	Toucouleur, Peuhl, Wolof
Tambacounda	Tambacounda	Multi-ethnic

The full formative research protocol utilized a variety of methods and included both consumers and traders. In Senegal, a partial research protocol was used, focusing only on consumers. The research consisted of:

- 51 interviews with parents (guardians) of children under five²
- 10 focus group discussions with parents of children under five

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
Dakar	10 (urban)	2 (urban)
Kaolack	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)
Saint-Louis	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)
Tambacounda	10 (5 urban; 5 rural)	2 (1 urban; 1 rural)
TOTAL	40	8

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

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

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 40 individuals, 15 of whom owned at least one adult-size net, nine of whom a baby net, and 20 of whom did not own any nets.³ Of the 40 interviews, 21 were conducted with men and 19 with women. On average, 10 individuals participated in each focus group discussion. Four focus group discussions were conducted with men and four with women. Table 1.3 provides a breakdown of the study sample by gender.

Table 1.3: Breakdown of consumer sample by gender and methods

DATA COLLECTION METHOD	FATHERS	MOTHERS	TOTAL
Interviews	21	19	40
Focus Group Discussions	4	4	8

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

³ In Senegal, 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.

1.4 ORGANIZATION OF REPORT

This report presents results from Senegal.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.

Readers wishing to focus only on the main findings and implications may read the “Summary of Findings” section (p. vi-vii) and the “Summary of Program and Product Implications” bullets that appear at the end of each section.

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

SECTION 2

CONNECTION BETWEEN MOSQUITOES AND ILLNESS

Findings

Beliefs about mosquitoes and malaria, and knowledge of the French term, “paludisme” or “palu.”

When asked what illnesses are caused by mosquitoes, most of the parents interviewed (32/40) spontaneously said the French equivalent of the English word, “malaria” (“palu” or “paludisme”) and 7 respondents spontaneously said the local equivalent of palu (“sibarou”). The French term, “palu” was also mentioned as a problem caused by mosquitoes in all but one focus group discussion.

Although interviewers did not ask respondents “what causes malaria?” a few parents spontaneously mentioned other causes of the disease, other than mosquitoes (e.g., being in the sun, drinking dirty water). A small minority of respondents erroneously believe that mosquitoes cause other illnesses (e.g., influenza, polio, tuberculosis).

Beliefs about the symptoms and severity of malaria

When describing malaria, most respondents mentioned symptoms matching clinical descriptions of mild malaria, such as fever/“hot body,” feeling hot and/or cold/shivering (34/40), vomiting (29/40), weakness, dizziness, or fatigue (21/40), loss of appetite (13/40), and headache (12/40). Fewer respondents mentioned other symptoms such as painful joints, red eyes, and diarrhea. Only 2 respondents mentioned fits/convulsions, a symptom of severe malaria.

Parents thought malaria is a deadly disease, especially if not cared for promptly and treated appropriately. When asked how serious malaria is, nearly all (36/40) respondents interviewed spontaneously said that malaria could kill. Only one participant said that it was not particularly serious because it could be treated.

Perceived severity of malaria

“Malaria is a very serious illness because it causes a lot of deaths every year.” (Tambacounda urban female adult-size net owner)

“It can be serious if it reaches the brain. Cerebral malaria, for example. And, when you don’t eat, you get weak. Death can follow.” (Kaolack urban male baby net owner)

“it’s serious because malaria can destroy the bones. It can bring about other illnesses, like yellow fever, skin problems, and it can even kill.” (Dakar male non-owner)

Perceived seasonality of mosquitoes/malaria

Mosquitoes were viewed as a problem mainly during rainy season, but in several focus groups, participants said mosquitoes had become a year-round problem.

Beliefs about the vulnerability of children under 5 and pregnant women to malaria

There was good understanding of the special vulnerability of children to suffering from malaria, and that young children (but not necessarily under five) are most at risk. There was some understanding of the special vulnerability of pregnant women to suffering from malaria.

Parents were shown a drawing of five family members [a child of 3 years, a child of 6 years, a man, a woman (not pregnant), and a pregnant woman] and were asked who should sleep under mosquito nets. Almost all respondents (38/40) chose the child under 3 and the same number selected pregnant women as either the first or second choice. When asked a more specific question about who is most likely to catch malaria, the vast majority (34/40) mentioned children (e.g., 0-10, 3-10), but only 7/30 specifically stated children under five. When asked who is most likely to die from malaria most respondents (29/40) said children of various ages, with 4/40 specifically mentioning children under five.

There was some understanding that pregnant women are also particularly vulnerable to catching and dying from malaria. Some respondents (11/40) mentioned that pregnant women were likely to catch malaria and 9/40 said that pregnant women were among those most likely to die from 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 illness 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 French terms “palu” or “paludisme” (malaria) can be used in health promotion activities and will be widely understood. Use of a single term around which educational efforts can build a common understanding will be very important in efforts to promote behavior change.
- Educational efforts should promote the perception of malaria as a year-round problem, stressing that although the number of mosquitoes (and malaria cases) may rise and fall at different times, protective measures should be taken throughout the year.
- Efforts to promote behavior change must emphasize the special vulnerability of children under five and pregnant women to suffering severe consequences of malaria. Promotional efforts can build on the existing concept that children are vulnerable to emphasize that *children under five* are particularly at risk.

SECTION 3

COMPARISON OF MOSQUITO CONTROL MEASURES

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 methods of mosquito control products in both urban and rural communities. All respondents, regardless of location, reported using at least one commercial form of mosquito control in the previous year.

Table 3.1 shows mosquito control measures that respondents were aware of and reported using. The commercial methods respondents were most aware of (unprompted mention) were aerosol sprays (33/40), coils (31/40). Over half the sample (26/40), including 6 non-owners mentioned nets.⁵ Most respondents (24/40) also said “burning things” (e.g., eucalyptus, incense, *neem* and acacia tree leaves, *santan* tree bark) was a way to control mosquitoes. Some people also mentioned screens (11/40) and environmental management methods, such as clearing brush or stagnant water (10/40).⁶ There was much lower awareness of flit guns (8/40), repellants (4/40), and electric mats (6/40). Aerosols, coils, burning things, and mosquito nets were mentioned in the majority of focus groups as ways to control mosquitoes.

Interviewees 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 (29/33), coils (26/31), burning things (18/24), and window screens (10/11). Use of flit-gun sprayers, electric mats, and repellants was uncommon, with five or fewer respondents reporting using these methods.

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	33	29
Mosquito coils	31	26
Mosquito nets (including baby nets)	26	22
Burning things	24	18
Window screens	11	10
Flit gun sprayer	8	5
Electric mat	6	5
Repellents	4	2
Keep environment clean*	10	NA

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

⁵ Deliberate sampling of net owners meant that the likelihood of locating someone who was aware of and who used nets was likely to be higher in this study than in the general population.

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.

Perceptions of insect control products, including mosquito nets

All insect control products were seen as having positive and negative attributes. Table 3.2 lists the main positive and negative attributes of coils, aerosols, and nets.

Coils

Respondents liked coils because they viewed them as good at chasing away mosquitoes, and as available and affordable. But, the majority of respondents strongly disliked the odor and perceived side-effects of the smoke (e.g., causes colds, coughing, dizziness). Many respondents also said coils were ineffective and complained that mosquitoes returned once the smoke dissipated. In the majority of focus groups, participants had mostly negative things to say regarding coils, echoing the remarks of participants in interviews.

Perceptions of coils

“It’s a good quality product, but not particularly effective in killing mosquitoes. Each time the product is used up, the mosquitoes come back.” (Kaolack urban female adult-size net owner)

“Doesn’t kill mosquitoes but makes them inactive but only for a little while. When the coil is finished, the mosquitoes become active again.” (Dakar female non-owner)

“Can give the person who’s sleeping a cold, but if not, they’re less expensive [than other insect control products]” (Kaolack rural female non-owner)

Aerosols

Parents participating in interviews liked aerosols because they viewed them as very effective and like the fact that aerosol insecticides kill mosquitoes (and other insects). However, respondents also complained that aerosols are expensive and are used up. Some respondents also said aerosols have side-effects (e.g., cause colds, coughing). Respondents had mixed reactions to the smell of aerosol insecticides, with some liking the odor and others disliking the scent. Respondents in the majority of focus groups had similar complaints regarding aerosol sprays.

Perceptions of aerosols

“These aerosols are effective. They eliminate all mosquitoes, flies and insects. The contents are too little and they’re expensive. The odor they leave is sometimes not so nice.” (Saint-Louis urban female baby net owner)

“Aerosols kill the mosquitoes, but makes you cough and you have to leave the room, but the smell clears out quickly.” (Dakar female adult-size and baby net owner)

“It’s very effective. It doesn’t give you a cold. It smells good. It kills flies, roaches, insects.” (Dakar female non-owner)

Nets

In interviews, the main reasons respondents said they liked nets were that they offer good protection against mosquitoes/bites, and that mosquitoes cannot enter the net. Some respondents said nets were the best possible method. The main reasons respondents disliked nets were that

they felt trapped/imprisoned in the net, and perceived nets as hot and/or inconvenient to put up and take down. Very few respondents mentioned these negative attributes. These same benefits and disadvantages came up in the many focus group discussions, as well. Additionally, in a few focus groups and interviews, respondents complained that the net sizes typically available were too small to accommodate several household members, who often sleep together in one bed or sleeping space.

Perceptions of nets

“Me, I find mosquito nets very effective because, on the one hand, it doesn’t allow mosquitoes to come into direct contact with your body. With mosquito nets, there aren’t any disadvantages. People don’t use them because often, in families, there’s a big [bed], 2, 3, 4 people sometimes while the mosquito nets are made in small sizes. In general, they’re only made for babies, as if adults don’t need to be protected.” (Tambacounda male focus group participant)

“It’s the best method because mosquitoes don’t enter.” (Kaolack rural female baby net owner)

“Having to put up and take down the net is annoying, but with help, there aren’t any disadvantages and nets are best, after electric mats.” (Kaolack urban male baby net owner)

Table 3.2: Main positive and negative attributes of coils, aerosols, and mosquito nets

Method	Positive [+]	Negative [-]
<i>Coils</i>	<ul style="list-style-type: none"> ▪ Chase away mosquitoes ▪ Are affordable ▪ Are available 	<ul style="list-style-type: none"> ▪ Smell bad ▪ Cause colds, coughing, difficulty breathing ▪ Are not effective/mosquitoes come back
<i>Aerosols</i>	<ul style="list-style-type: none"> ▪ Are effective ▪ Kill mosquitoes instantly ▪ Kill other insects 	<ul style="list-style-type: none"> ▪ Are expensive ▪ Get used up quickly ▪ Smell bad/smell causes coughing, colds
<i>Mosquito nets</i>	<ul style="list-style-type: none"> ▪ Protect against mosquitoes/bites ▪ Mosquitoes cannot enter ▪ Are best/one of best methods 	<ul style="list-style-type: none"> ▪ Are inconvenient to get in and out of ▪ Are hot/lack air ▪ Make you feel trapped/imprisoned

Summary of Program and Product Implications

- The fact that urban and rural dwellers commonly use commercial insect control products is favorable for net and insecticide promotion.
- The awareness of nets as a mosquito control product and the perception that they afford good protection against mosquitoes is favorable for net promotion.
- The perception of nets as inconvenient to get in and out of and hot should be taken into consideration in any promotional activities. These perceptions should also be addressed in product formulation and doing so will help ensure that commercial players develop strong net branding. However, the need for any product modifications must be balanced against any added product cost that such modifications will yield.

SECTION 4 NET OWNERSHIP AND USE

Findings

Net ownership and use

Owners of adult-size nets were encountered in all areas except urban Saint-Louis and rural Kaolack. Owners of baby nets were encountered only in urban Dakar and Saint-Louis and in urban and rural Kaolack. Of the 15 households owning adult-size nets, 9 had only 1 such nets and the remainder had between 2-4 nets. Of the 9 households with baby nets, 4 also had adult-size nets.

Most (14/19) respondents who did not own any kind of net had slept under one in the past, often while living in another area of the country or outside of Senegal (e.g., Mali, The Gambia).

Reasons for lack of net use among non-owners

The main reason non-owners gave for their lack of net use was that they did not need to because there were not many mosquitoes where they were living (9/19). Some respondents (5/19) said they wanted nets but did not have the means to get one. Fewer respondents said they did not need to use nets because they used other means of protection (i.e., air conditioning, fans, aerosol sprays, and electric mats), or because nets made them feel hot or like they were suffocating.

Reasons that non-owners do not own a net

“[I used one] in Dakar and in our house in Kaolack also, where there were a lot of mosquitoes. [I don’t use one now] because there aren’t any problems with mosquitoes anymore. The day that I can’t sleep here in Sibassor because of mosquitoes is when I’d buy a net. It’s a method that allows for self-protection.” (Kaolack rural female non-owner)

“I was hot and I couldn’t get to sleep. The baby was sweating enormously and had a rash because of the net.” (Kaolack rural female non-owner who slept under net at parent’s home after delivery)

Seasonality of net use and outdoor net use

Net owners reported using their nets primarily during the hot and rainy seasons, and often use their nets outdoors during that time. Indeed, some respondents used nets specifically because they were sleeping outdoors owing to the heat. Baby net owners reported that their infants used the net night and day throughout the year, so they would be protected from flies (especially during the day), mosquitoes, and even dust and wind.

Net use patterns

“It’s my grandfather who bought it (the adult-size net) because with this climate, hot season, people prefer to sleep outside in the fresh air and be protected at the same time...we use the net during winter, the period during which one sleeps outside because of the heat.” (Tambacounda urban male adult-size net owner)

“[We use it] during rainy season, but only when there are a lot of mosquitoes. You put it outside as soon as it gets hot out.” (Tambacounda rural male adult-size net owner)

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

Population-based data on net coverage and use are available via NetMark's baseline survey. In most of the households with either baby or adult-size nets, at least one child under five slept under a net the previous night. In 11/20 households, all children under five did so, in 4/20 households at least one child under five did so, and in 5/20 households, no child under five did so. The main reason not all children under five slept under a net were that adult-size nets were used only at certain times of the year (e.g., hot season, rainy season, August only)⁷, or that the household owned a baby net and that the baby net was being used for the youngest child.

There were 7 pregnant women in this study, 3 of whom lived in net owning households. Of these 3 women, 2 (living in the same household) reportedly slept under a mosquito net the previous night (but the child under five living in that household did not). The third pregnant woman did not sleep under a net, but one of her 4 children under five did.

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

Parents were asked to name the benefits of a child under five sleeping under a mosquito net every night. The main benefit mentioned by the greatest number of respondents was protection against mosquitoes, flies and their bites. Protection against malaria and having a peaceful sleep were the next most salient benefits. Some respondents also said that protection against scars and pimples/rashes was another benefit and some noted that improving the quality/variety of nets (e.g., making them bigger and stronger) would make it easy for their child under five to sleep under them. There were no major differences between net owners and non-owners in their responses.

Most respondents also named at least one disadvantage to having a child under five sleep under a net every night. For non-owners, the main disadvantage mentioned was risk of injury or suffocation to the child. For net owners, no one disadvantage stood out. A few respondents said that separation from the mother would be a problem, a few said that the mosquito net was too small and narrow, a few said watching over the child would be hard, a few complained about putting up and taking down the net or about the expense of the net, and a few worried about their child suffocating or getting injured.

Respondents were also asked who might approve or disapprove of nightly net use by children under five. Family members, especially mothers (and some fathers) were named as those who would want their child under a net every night. Only a few respondents said that mothers or fathers would not approve of this practice.

⁷ Note that this reason was given, despite the fact that the study took place during the time period when many of the same respondents said they used nets regularly (i.e., July).

Table 4.1: Perceived benefits and barriers to having a child under five sleep under a net every night

BENEFITS/WHAT MAKES IT EASY (N = 51 respondents)	BARRIERS/WHAT MAKES IT HARD (N = 51 respondents)
<ul style="list-style-type: none"> ▪ Protection from mosquitoes/flies and their bites ▪ Protection against malaria ▪ Peaceful sleep ▪ Having a better net (bigger, stronger) 	<ul style="list-style-type: none"> ▪ Risk of injury/suffocation to child (mainly non-owner) ▪ Separation from mother ▪ Problems with net (size) ▪ Problems watching over child ▪ Putting up and taking down net ▪ Expense of net

Perceptions of net owners

Net owners were perceived as people who live in mosquito-infested (or dirty) areas, and as people who know about or have experienced malaria (and so, understand its severity and want to protect themselves).⁸ Net owners were also perceived as individuals most vulnerable to malaria (e.g., young children, old people, pregnant women). Some people perceived net owners as rich, but others viewed them as poor—people who lack the means to use other methods of insect control such as aerosol sprays or window screens.

Perceptions of net owners

“[People who own nets] are people without a lot of means who can’t buy sprays and creams; poor people.” (Dakar male non-owner)

“People who’ve already confronted malaria and know its seriousness.” (Saint-Louis urban male baby net owner)

“People who live in a dirty environment who think to use them because they’re exposed to a lot of mosquitoes.” (Kaolack rural female baby net owner)

Net purchase and decision making about net purchase

Both mothers and fathers, often independently, but sometimes together made the decision to purchase a net. Fathers purchased most, but not all nets. The remaining nets were bought by mothers or were given by relatives as gifts. Protection against mosquitoes (and often also against flies) was the main reason net owners gave for making their purchase. Protection against malaria was mentioned by only 2/15 respondents. Two respondents also specifically stated that they bought their nets for use outdoors.

⁸ The perception of net owners as those who live in dirty areas is consistent with other comments made by respondents during interviews and focus groups, indicating their association of malaria with lack of hygiene, unclean surroundings, and poverty.

Summary of Program and Product Implications

- The fact that net owners were encountered in almost all sites suggests high demand for this product.
- Promotional efforts can build on the already strong demand for nets, but will need to counter the perception that nets are unnecessary when other insect control products are used or when mosquitoes are not perceived to be a problem.
- Product development and promotional efforts should take into consideration the fact that nets are frequently used outside. The special vulnerability respondents feel in sleeping outdoors, and their use of nets in this context can be built upon in promotional campaigns designed to encourage nightly use of nets indoors and outdoors.
- Promotional and educational efforts are needed to ensure year-round net use. The fact that many people already place their young children under nets at certain times of the year can be built upon to extend this practice to nightly use.
- The perception of nets as both a luxury item and one used by poor people may have a negative impact on sales. This perception must be countered in efforts to change net acquisition behavior.
- The image of net users as “knowledgeable” about malaria and as vulnerable to malaria can be built upon in promotional campaigns.
- Net/ITM promotion is needed to emphasize that (treated) nets afford proven protection against malaria and are effective in protecting against being bitten and bothered by mosquitoes and flies. 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 and flies, treated nets afford some protection to family members not under the net.
- Promotional activities and point-of-sale materials should be directed at both men and women, with special emphasis on men in commercial outlets.

SECTION 5

GENERAL SLEEPING PATTERNS

Findings

Sleeping patterns

Data from focus group discussions and from interviews with parents show that husbands and wives often sleep in the same bed, along with their infants or toddlers. Older children (e.g., those 3 and older) often sleep separately in a different sleeping space (on the floor, on a bed). Pregnant women are said to sleep with their husbands. Children of different genders generally do not sleep together. Of note, some focus group participants and respondents said they often sleep outdoors, particularly during the hot season.

Summary of Program and Product Implications

- Nets must be available (or designed) so that they can be used on a variety of sleeping surfaces, so that they accommodate multiple persons in one sleeping space, and so that they can be used inside and outside of homes. (However, the need for any product modifications must be balanced against any added product cost that such modifications will yield.)

SECTION 6

NET WASHING PATTERNS

Findings

Net washing

Owners of adult-size nets generally reported washing their nets at least once a month. Some owners washed their nets weekly or every 2 weeks. Some owners washed their nets 3-4 times a year.

Nets were reportedly washed in basins with water and soap (often “Omo,” a lye-based detergent soap). Many respondents also added liquid bleach. Almost all respondents said they hung their nets in the sun to dry. Few respondents had any complaints about difficulties in washing the net, although one said it would be easier to do so if she did not have to remove the rods.

Summary of Program and Product Implications

- The practice of drying nets in the sun is not compatible with current product recommendations that ITMs be dried in the shade. Product formulation should take into consideration current consumer drying practices. If the product recommendation of shade drying remains, promotional efforts will need to address the inconsistency between product guidelines and current practice.

SECTION 7

TYPES OF NETS OWNED, COST AND PLACES OF PURCHASE

Findings

Eleven of the 15 households owning adult-size nets had rectangular-shaped nets, most of which were doubles and a few of which were family/king-size. Two respondents owned single nets. No information on net brands was obtained, and many respondents remarked that they did not know the brand (for either baby or adult-size nets). All net owners who knew where their nets were purchased said they were obtained “in town” or “in the market.” In some instances, “the market” was located in the study site and in others it was “far away” (e.g., 15-18 km). Population-based data on net prices is available through the NetMark quantitative baseline evaluation survey. Baby nets were reportedly purchased for 1,300-3,500 CFA (US\$1.85 - \$5.00), double-size nets for 2,000-6,000 CFA (US\$2.85 - \$8.55). The one family-size net for which purchase price information was provided was reportedly obtained for 2,500CFA (US\$3.55).

Summary of Program and Product Implications

- Nets need to be made more widely available in rural areas.
- The lack of variety of net types found in this study could indicate strong demand for large rectangular nets or a lack of other options. The net variety that traders offer may need to be expanded.
- Commercial players in the ITM market need to develop strong net branding.

SECTION 8

NET PREFERENCES

Findings

Net size, shape and color preferences

Focus group participants expressed a strong desire for large nets and wanted a variety of shapes and colors. In a minority of focus groups, conical nets were preferred, but in most focus groups, some participants wanted both conical and rectangular nets. Respondents who chose conical ones liked them because they appeared easier to hang and were unfamiliar. Respondents who chose rectangular ones liked them because they were familiar, roomier, fit the shape of the bed, and were perceived as letting more air in.

Respondents expressed a wide range of net color preferences. In a minority of focus groups, respondents preferred white nets, but in most focus groups, respondents liked dark colors (i.e., blue, black, and green) and in some focus groups, respondents liked light colors (e.g., yellow, pink, light blue). In one focus group, respondents said they specifically did not like white and in a minority of focus groups, respondents said they specifically did not like black. Respondents who opted for lighter colors, especially white, did so because they felt these would show dirt and indicate when washing was required and because they believed lighter nets would not attract mosquitoes. Respondents who chose darker colors did so because they felt these would be less likely to show dirt and to become stained with mosquitoes and their blood.

Summary of Program and Product Implications

- NetMark should strive to bring a variety of net shapes, colors, and sizes to market, with particular attention to ensuring that large nets are widely available.
- Net product development should take into consideration the fact that rectangular nets are perceived as difficult to hang because they must be tied at four points. (However, the need for any product modifications must be balanced against any added product cost that such modifications will yield.)
- Promotional activities for conical nets can emphasize their ease in hanging; rectangular net promotion can emphasize that they are spacious and airy.

SECTION 9

NET TREATMENT PATTERNS AND PREFERENCES

Findings

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

Net treatment was known to some respondents, but was a new concept to many. Among parents, reactions to the idea of treating nets with insecticide were positive, with all 19 respondents who expressed an opinion about treating nets reacting favorably. Although most respondents felt confident that the chemical used in the treatment was not toxic to humans, some believed that it was. When asked whether they thought it would be dangerous for a young child and/or pregnant woman to sleep under a treated net some respondents (16/40) agreed that it would (including net owners and some of those who liked the idea of insecticide treatment for nets). Regarding pregnant women, parents were most concerned that the odor would cause the woman to have an adverse reaction and that inhaling it could cause miscarriage or damage to the developing fetus. Regarding young children, parents worried that the smell would disturb the child and that since children might put the net in their mouths, the chemical would cause them harm or lead to illness.

In general, focus group participants had either positive or mixed reactions to the concept of treating nets with insecticide. In the majority of groups, at least some participants expressed concerns about the safety of ITMs, particularly in relation to the odor of the insecticide and dangers of inhalation. In one group, participants spontaneously raised concerns about the effects of ITMs on pregnant women and young children. As one focus group participant stated,

“If there’s no problem with breathing, it [a treated net] wouldn’t be a problem. Maybe adults wouldn’t have to many worries, but for a child, it’s not so clear. Same for a pregnant woman, she couldn’t tolerate it.”
(Dakar female focus group participant)

Credibility of information sources for countering ITM safety concerns

In the majority of focus group discussions, participants were asked whose word they would trust on the safety of treated nets. Responses included: the Ministry of Health, the public health services, doctors, nurses, and individuals who had used ITMs. No one mentioned religious or community leaders as credible sources of information countering net treatment safety concerns and in one focus group, respondents specifically stated that these individuals would hold no influence on such a topic. In a few focus groups, respondents mentioned the importance of having a widespread promotional effort, including advertising on radio and television.

Treatment/retreatment experience

Two of the 15 adult-size net owners had experience with net treatment. Both had taken their nets to health services for treatment and felt that as a result, the nets were more effective in killing and repelling mosquitoes. The one respondent reporting the cost of treatment said it was between 2,000-3,000 CFA (US\$2.85 - \$4.30).

Summary of Program and Product Implications

- ITM promotional efforts are needed to increase awareness. These promotional efforts can build on existing knowledge of insecticide treatments.
- The positive reaction to the benefits of insecticide treatment is favorable for treatment promotion.
- Product safety concerns must be addressed and should specifically counter worries regarding use, and especially by pregnant women and children under five years of age. Concerns related to odor, chemical inhalation and (in the case of young children) ingestion through sucking on the net should receive particular attention.

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