NetMark
2004 Survey on Insecticide-Treated Nets (ITNs) in Ethiopia

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CREDITS

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Dr. Carol Baume was responsible for the household surveys in all NetMark countries, from the baselines in 2000 (Mozambique, Nigeria, Senegal, Uganda, Zambia, plus Mali in 2003) through the present series of 2004 surveys (Ethiopia, Ghana, Nigeria, Senegal, and Zambia).

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Research International (RI) of South Africa was contracted to implement the fieldwork in all five countries using their local affiliates, and to enter the data. Mr. Joe Boniaszczuk and Mr. Manas Misra were key personnel for those activities.

LIST OF ACRONYMS

AED	**Academy for Educational Development**
DHS	**Demographic and Health Surveys**
ITNs	**Insecticide treated nets**
LLINs	**Long-lasting insecticide treated nets**
PSI	**Population Services International**
RI	**Research International (South Africa)**
RBM	**Roll Back Malaria**
SES	**Socio-economic status**
UNICEF	**United Nations' Children's Fund**
USAID	**United States Agency for International Development**
US$	**U.S. Dollars**
WHO	**World Health Organization**
WRA	**Women of reproductive age**

MAP OF ETHIOPIA

NETMARK 2004 SURVEY OF ITNS IN ETHIOPIA
EXECUTIVE SUMMARY

PURPOSE: Provide measures of

- Ownership of mosquito nets and ITNs
- Use of nets and treated nets by vulnerable groups: children under five, pregnant women, and women of reproductive age
- Net treatment practices
- Characteristics of nets owned
- Knowledge and beliefs about mosquitoes and malaria
- Perceptions of treated and untreated mosquito nets
- Consumer preferences regarding mosquito nets
- Use of mosquito control products

METHODOLOGY: Survey

SAMPLE: 1000 Ethiopian households from five sites: Bahir Dar, Nazret, Dire Dawa, Dessie and Awassa. In each site, the target sample was 200: 80 respondents from the urban center, and 120 households from up to 200 kilometers from the urban center. Respondents were women aged 15-49 who were mothers/guardians of children under five years of age.

DATA COLLECTION: August – September 2004

STUDY FINDINGS

**** HIGHLIGHTS ****

70% of respondents had heard of mosquito nets
47% of respondents had heard of treated mosquito nets

25% of households owned a net
11% of households owned an ITN*

16% of children under five slept under a net the prior night
6% of children under five slept under an ITN the prior night*

9% of pregnant women slept under a net the prior night
6% of pregnant women slept under an ITN the prior night*

*Roll Back Malaria Core Indicator

Awareness of nets and insecticide-treated nets

- Although awareness of mosquito nets is nearly universal in many sub-Saharan countries, when asked if they had ever seen or heard of a mosquito net, 30% of respondents in Ethiopia said they had not. Awareness of mosquito nets was lowest in Dessie site at 50% and highest in Dire Dawa site at 86%.
- Awareness of nets was strongly associated with socioeconomic status (SES); 96% of respondents from the highest SES quintile had heard of nets, compared with 35% in the lowest quintile. Awareness was also much higher in urban (90%) than in rural areas (57%).
- When asked if they had ever seen or heard of mosquito nets treated with insecticide, less than half—47%—said they had. Awareness of treated nets was lowest in Dessie at 26% and highest in Bahir Dar at 58%.
- ITN awareness was strongly associated with SES; 13% in the lowest SES quintile had heard of ITNs, compared with 81% in the highest SES quintile. Awareness was also higher in urban (66%) than in rural areas (34%).

Net ownership

- The percent of households in the sample that owned a net was 25%, but varied considerably by site: Bahir Dar 40%, Awassa 25%, Nazret 24%, Dire Dawa 24%, and Dessie 13%.
- Net ownership was strongly associated with SES: 55% of households in the wealthiest SES quintile owned a net, in contrast to only 3% in the poorest SES quintile.
- Urban households were much more likely than rural households to own a net (40% vs. 15%).
- Net-owning households owned an average of 1.3 nets per household.
- Six percent (6%) of households owned a baby net (a non-hanging net with a built-in frame), with ownership heavily concentrated in the highest SES quintile. (Baby nets are not counted in net ownership figures.)
- Among respondents in non net-owning households who had heard of nets, reasons for not having a (hanging) net were cost (42%), lack of availability (23%), and the belief that nets are not necessary (19%).

ITN[1] ownership

- Eleven percent (11%) of households owned an ITN (a currently treated net), but ITN ownership varied greatly by site: Bahir Dar 24%, Awassa 9%, Nazret 9%, Dire Dawa 9%, and Dessie 4%.
- ITN ownership declined sharply with SES: 24% of households in the highest SES quintile owned an ITN, but only 2% of households in the lowest SES quintile did.
- Urban households were more likely than rural households to own an ITN (17% compared to 6%).
- ITN-owning households owned an average of 1.3 ITNs per household.

Net/ITN Use

Children under five

- Among all households, 16% of children under five slept under a *net* (*including baby nets*) the previous night. There was considerable variation by site, from a low of 7% in Dessie to a high of 34% in Bahir Dar. The

[1] An ITN or currently treated net is defined as a long-lasting net that does not require frequent treatment, a pretreated net obtained within the last 12 months inclusive, or a net that has been soaked with insecticide within the past 12 months inclusive. This definition corresponds with the Roll Back Malaria definition of an ITN.

percent of under-fives sleeping under a net dramatically increased with SES: 0.8% of under-fives in the lowest SES quintile and 40% of those in the highest slept under a net the prior night.

- Among all households, 6% of all children under five slept under an *ITN* the prior night, ranging from a low of 0.4% in Dessie to a high of 18% in Bahir Dar. The percentage of under-fives sleeping under an ITN was strongly associated with SES: 0.4% in the lowest quintile and 13% in the highest slept under an ITN the prior night.
- Within net-owning households, 57% of children under five in those households slept under some kind of net the prior night.

Pregnant women

- Among all households, 9% of pregnant women slept under a net the previous night. No pregnant women in the two lowest SES quintiles slept under a net the prior night, compared with 25% in the highest SES quintile who did.
- Among all households, 6% of pregnant women slept under an ITN net the prior night. No pregnant women in the two lowest SES quintiles slept under an ITN the prior night, compared with 19% in the highest SES quintile who did.
- Within net-owning households, 32% of pregnant women slept under a net/ITN the previous night.

Women of reproductive age (WRA)

- Among all households, 12% of WRA slept under a net the previous night, ranging from a low of 5% in Dire Dawa and Dessie to a high of 29% in Bahir Dar. Only 0.8% of WRA in the lowest SES quintile slept under a net, compared with 24% of WRA in the highest SES quintile who did.
- Among all households, 5% of WRA slept under an ITN the prior night, ranging from a low of 0.9% in Dessie to 15% in Bahir Dar. Only 0.4% of WRA in the lowest SES quintile slept under an ITN, compared with 12% of WRA in the highest SES quintile who did.
- Within net-owning households, 43% of WRA slept under a net/ITN the prior night.

General patterns

- Within net-owning households, children under five (57%), and especially those under one (69%), were more likely to sleep under a net than were other household members. Pregnant women were not given preference over other adults for sleeping under a net/ITN.
- Within net-owning households, older children—those aged 5-14—were the least likely household members to sleep under a net/ITN (25%).
- Among all nets owned, 61% had been used the prior night, but the proportion of nets used ranged from 34% in Dire Dawa to 83% in Bahir Dar. Urban residents were somewhat more likely to have used their net the previous night than were rural residents (65% compared to 53%).
- The average number of months per year a household used its net/ITN was 5.8, with households tending to use their net(s) either all year round or for only a few months of the year.

Characteristics of nets

Net treatment and washing

- Among all nets owned, 57% had ever been treated (before or after being obtained); 44% were already treated when they were acquired, and 27% had been treated since acquired.
- Forty-one percent (41%) of nets were currently treated (ITNs), with much variation by site: 60% in Bahir Dar were currently treated, compared to 22% in Dessie and 30% in Awassa.
- Seventeen percent (17%) of nets owned had come bundled (packaged) with an insecticide treatment.
- Among nets treated since acquired, 47% were treated at home by a family member and another 9% treated at home by someone who came to the house specifically to treat the net. Another 44% of nets treated since acquired were treated outside the home, usually by a health worker.
- Two-thirds (66%) of nets had been washed; 24% were washed about once every month; another 14% about once every 3 months; and another 22% about once every 6 months.

Net type, age, source, brand, price, and purchaser

- Most nets (86%) were factory-made; 11% were tailor-made; and 3% were originally factory-made but re-configured by a tailor (usually rectangular nets re-made into conical).
- Most nets were recently acquired: 56% had been acquired within the past two years; 79% had been acquired within the prior three years.
- Although there is a large influx of donor nets in Ethiopia, 69% of nets were purchased from commercial sources. The rest (31%) came from non-commercial sources such as clinics or government. Nets in urban areas were more likely than rural ones to come from a commercial source. Awassa site had the highest proportion of commercial nets (88%), while Bahir Dar site had the lowest (56%).
- The brand unknown for 44% of factory-made nets. UNICEF was by far the most common "brand" owned, at 30% of nets. Nets belonging to households in the highest SES category were as likely to be UNICEF nets as those in the lowest SES category. Nets belonging to rural households were more likely to be UNICEF nets than were those in urban households.
- Four percent (4%) of nets/ITNs were free. Among nets/ITNs paid for where the cost was known, the median price paid was 30 Birr (US$3.61), but ranged from 18 Birr in the lowest SES segments to 35 Birr in the highest. The median price was highest in Awassa site (45 Birr) and lowest in Dessie site (18 Birr).
- About one-quarter of the nets (27%) were acquired by the respondent, and 50% were acquired by the respondent's husband.

Net size, shape, and color

- Nets were fairly evenly distributed by size: 37% were single-sized, 34% were double and 29% king-sized.
- The majority of nets were rectangular (59%) but a sizeable proportion was conical (40%). Net shape varied by site: 70% of nets in Awassa were conical, compared to 28% in Dessie.
- The most common colors were green (43%) and white (28%). More than half the nets in Bahir Dar and Dessie were green, and one quarter of the nets in Awassa were dark blue. (Note that UNICEF nets are green and PSI nets are dark blue.)

Net Preferences

- Approximately half of respondents (54%) said they preferred king-sized nets, 24% preferred double and 18% preferred single.
- Conical nets were preferred by 52% of respondents, while 41% preferred rectangular. In urban areas, respondents preferred conical nets over rectangular by 60% to 34%.
- Green was the favorite net color for 20% of respondents (40% in Bahir Dar), followed by turquoise (13%) and white (11%). Black was the most disliked color (27%) followed by white (11%).

Net/ITN brand awareness

- There is very little brand awareness in Ethiopia: 4% could name a net/ITN brand unprompted, and only half (49%) claimed to recognize at least one brand after being shown a card with logos with associated brand names. "UNICEF" was by far the most recognized name, at 32% (prompted and unprompted combined).

Use of other insect control products

- Use of other mosquito control products is low. Coils are generally not known in Ethiopia and 64% had ever heard of aerosol insecticides. Of those, 34% (or 22% of entire sample) had used an aerosol in the past year.
- Aerosols were most commonly purchased in local kiosks (58%).

Knowledge of malaria and perceptions of nets

- Recognition of the Amharic term for malaria—*woba*—was nearly universal at 99%.
- Knowledge of the symptoms of *woba* was fair. The main symptoms named were chills (70%), fever (66%), and headache/body ache/pain (42%). Given that the defining symptom of malaria is fever, the proportion mentioning fever was rather low. Only 1% mentioned convulsions, a symptom of severe malaria.
- Knowledge of the cause of malaria is poor: 37% named mosquitoes as the cause. Other causes named were dirty surroundings (51%), cold or dirty food or water (21%) and the weather (13%).
- Knowledge of vulnerable groups was somewhat low: 58% correctly selected both the youngest child and pregnant woman as the most vulnerable family members when asked to select from drawings of a man, a woman, a pregnant woman, a child of three years and a child of six years.
- Among respondents who had heard of nets, 93% named advantages of a child under five sleeping under an untreated net. The main advantages mentioned were avoid mosquito bites (48%), avoid *woba* (39%) and avoid being bothered by other insects (29%). Most (73%) who had heard of nets said there were no disadvantages or they did not know of any for a child under five to sleep under an untreated net. Those who mentioned disadvantages said that mosquitoes can still bite through the net (14%) or still enter the net (10%).
- The most commonly named advantages of a child under five sleeping under a treated net were that they kill mosquitoes (46%) and work better than an untreated net (41%). Most respondents (81%) did not mention any disadvantages for a child under five to sleep under an ITN. The disadvantages mentioned by the others were that ITNs smell bad (11%) and chemical can be dangerous (5%) or cause cough or irritation (3%).
- The great majority (90%) of respondents who had heard of nets named advantages for pregnant woman to sleep under a treated net. The main advantages mentioned were that it kills mosquitoes (40%), works better than an untreated net (39%), and is better at preventing *woba* (19%). A minority (18%) named a disadvantage: 10% said an ITN would smell bad and 6% said it could be dangerous for the woman or fetus.

Communication

- Less than half (42%) of respondents said they had heard or seen information about treated nets in the last 12 months, ranging from a low of 23% in the Dessie site to a high of 52% in Bahir Dar site. A higher proportion of urban (59%) than rural (30%) respondents reported exposure to information about ITNs. There was a strong association with SES, with only 9% of those in the lowest category reporting exposure, compared to 74% of those in the highest.
- Those who had heard or seen information were more likely to own a net, and far more likely to own a *treated* net, than those who had not been exposed to information. Among those exposed to information, 19% owned an untreated net and 29% owned a treated net. Among those not exposed, 6% owned a net and 3% owned a treated net.
- Among those who had heard or seen information about treated nets in the last 12 months, mass media was the main source: 57% heard information on the radio and 41% saw something on TV. Interpersonal sources were far less common: 17% mentioned friends/family and 15% mentioned health staff.
- The main messages remembered were "mosquitoes kill" (23%); 15% mentioned prevent *woba*, kill mosquitoes, and/or protect against bites/*woba*.

CONCLUSIONS

There is not yet a culture of net use in Ethiopia, but the household survey data suggest opportunities and challenges for ITN supply, ownership, and use in Ethiopia.

Favorable factors include:

- Where nets and ITNs have been made available (e.g., Bahir Dar) they have been readily accepted.
- Although our sampling procedures differ from those of the DHS, our data suggest that net and ITN ownership and use are increasing from the time the DHS was implemented in 2000.
- The low level of familiarity with nets and especially with treated nets means that there may be fewer preconceptions to counter in order to encourage ownership. There may be an opportunity to position ITNs as a new and desirable product.
- The rather low awareness and use of alternative insect control products mean that nets/ITNs can fill the need for malaria and insect protection with little competition; there is no need to position ITNs against other mosquito control products.
- In net-owning households, the youngest children are given preference for sleeping under a net and it should be easy to reinforce and expand this practice.
- There is an extremely high level of perceived advantages of net and ITN use by vulnerable groups and extremely low level of perceived disadvantages; in particular few have concerns about the insecticide.
- Although nets in Ethiopia have been principally donor-supplied, most nets owned came from commercial sources, indicating that many people are willing to purchase nets at partially-subsidized or full-market prices.
- The Amharic term for malaria (*woba*) is universally recognized, and promotional messages can use this term and be widely understood.
- Since men are the main procurers of nets/ITNs, promotional efforts to encourage families to obtain ITNs must include them as a primary target group.

Challenges include:

- A substantial minority of people have not even heard of nets, so there is much basic work to be done just to initiate awareness.
- Perceived (and actual) high cost of nets means that ownership is currently concentrated in the highest SES households; targeted subsidy programs must be instituted for the poorest and most vulnerable, with safeguards to prevent leakage.
- Current efforts to deliver low-cost or free ITNs have helped increase coverage, but the poorest segments of the population have not benefited. Significant quantities of untargeted free and heavily subsidized nets are found in upper SES households. Efforts to better segment the market and target subsidized products are essential in order to ensure that subsidies reach those who need them most and are not wasted on those who can afford commercial prices, and to help the commercial sector—a sustainable source of ITNs—continue to develop.
- There is limited access to ITNs in some areas. Where the commercial market can fill this gap, it should be encouraged to do so. In contexts where the commercial sector is not well suited to fill the void, NGOs and the public sector should be encouraged to do so.
- There is lack of variety in net size, shape, and color; and mismatch between the size, shape and colors people have and what they prefer. With consumer price-point sensitivity in mind, efforts should be made to provide consumers with the type of product they prefer.
- The rather low education levels have implications for communication approaches and for comprehension of product use and treatment instructions.
- Net branding is weak. Commercial firms should be encouraged to develop and build their own brands.
- Pregnant women are not given preference for net net/ITN use. This should be addressed in behavior change communication campaigns.
- There is inadequate knowledge about the cause of malaria that may limit the perception of ITNs as a solution to malaria.

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 (WHO, 2005), with some estimates as high as 515 million (Snow et al., 2005). Of the more than one million people who die from malaria each year, 9 out of 10 live in sub-Saharan Africa (Bryce et al., 2005; WHO, 2003) and the vast majority are children less than five years of age. Pregnant women are also particularly susceptible to the disease. Malaria during pregnancy can cause severe anemia, miscarriage, stillbirth, and maternal death, and in endemic areas, may account for up to 40% of preventable low birth weight among newborns (Brabin, 1991; UNICEF, 1999), the single greatest risk factor for neonatal death (McCormick, 1985; Steketee, 2001). Malaria places a staggering economic burden on already strained national economies and on struggling families. The disease has been estimated to cost sub-Saharan African nations more than 12 billion dollars every year in lost gross domestic product (WHO, 2005) and to slow 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).

Malaria transmission can be reduced by up to 90% through the use of insecticide-treated nets (ITNs), according to efficacy trials (Gimnig, 2003). Nightly ITN 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 (Lengeler, 1998). Use of ITNs among pregnant women has been associated with lower prevalence of malaria infection, fewer premature births, and significant reductions in all-cause maternal anemia (D'Alessandro et al. 1996; Ter Kuile et al. 2003).

> In Ethiopia, malaria affects about 75% of the country and about 51 million people, or 68% of the population. In 2004, malaria was reported as the first cause of illness and death, accounting for approximately 15% of outpatient visits, 20% of admissions and 27% of deaths (WHO, 2005). Malaria transmission in Ethiopia may be perennial, seasonal or epidemic, depending on location (RBM, 2005). Aside from being a major public health problem, the disease hinders development of water conservation, irrigated agriculture and settlement in low land fertile areas that are critical in the effort to improve food security and household income (WHO, 2005).

In 2000 in most African countries, few households owned nets and even fewer owned ITNs. Now in many African countries the picture is beginning to change, with net and ITN ownership increasing. This positive change can be attributed to reductions in taxes and tariffs in many countries, commercial market development, social marketing activities, demand creation, and efforts to reach the most vulnerable populations with free or highly subsidized ITNs. Nevertheless, most African countries are struggling to attain the Abuja objectives of 60% of pregnant women and children under five years of age sleeping under an ITN.

NetMark

NetMark is an eight-year project funded by the United States Agency for International Development (USAID) to prevent malaria by increasing access to and appropriate use of ITNs in sub-Saharan Africa. NetMark addresses all three components of the Roll Back Malaria Strategic Framework for Scaling-up of ITNs: commercial expansion, short-term targeted subsidies or market priming activities, and long-term targeted subsidies to vulnerable groups in

order to achieve equity. NetMark aims both to develop a sustainable commercial market and to ensure that vulnerable groups have access to affordable ITNs. In addition to increasing the proportion of households that own ITNs, the project also seeks to increase nightly use of treated nets, especially by children under five years of age and pregnant women; and increase the proportion of net owners who (if not using a long-lasting ITN) regularly treat their nets with insecticide. NetMark is managed by the Academy for Educational Development (AED); its partners include over 40 national and international insecticide and net manufacturers, product distributors, and advertising companies. NetMark has programs in Ethiopia, Cameroon, Ghana, Mali, Nigeria, Senegal, Uganda, and Zambia.

1.2 SURVEY OBJECTIVES, SAMPLE AND SITES, AND IMPLEMENTATION

Objectives

As part of a comprehensive research agenda that includes both market and behavioral research, NetMark conducts periodic household surveys on ITN-related topics in selected countries. The survey provides quantitative information useful to the public health community as well as to the commercial sector. It covers:

- Awareness and ownership of mosquito nets and ITNs
- Use of nets and treated nets by vulnerable groups
- Net treatment practices
- Characteristics of nets owned
- Knowledge and beliefs about mosquitoes and malaria; exposure to information about ITNs
- Perceptions of treated and untreated mosquito nets
- Consumer preferences regarding mosquito nets
- Use of other mosquito control products

The data will serve as a point for monitoring changes in ITN indicators from 2004 until the end of the project. It will also lend a consumer perspective for commercial companies as they develop, produce, and distribute their net and insecticide products, and provide further input to the design of promotional activities encouraging the purchase and correct use of ITNs.

Another objective of the survey is to compare results across countries. NetMark has conducted household surveys in the following countries and years:

Country	2000	2003	2004
Mozambique	X		
Uganda	X		
Mali		X	
Zambia	X		X
Nigeria	X		X
Senegal	X		X
Ghana			X
Ethiopia			X

Survey reports as well as questionnaires for all countries are available from NetMark or on the web at *www.netmarkafrica.org/research*.

Sample and Sites

Procedure

This survey was conducted among 1000 Ethiopian households with women of reproductive age (15-49) who were mothers or guardians of children under five years of age.

The sample was drawn from five sites: Bahir Dar, Nazret, Dire Dawa, Awassa, and Dessie. In each site, the target sample was 200: 80 respondents from the site city, and 120 households from up to 200 kilometers from the site city. The following table depicts the actual distribution of urban and rural respondents by site.

	TOTAL	Urban	Rural
Bahir Dar (Amhara Region)	201	81	120
Nazret (Oromia Region)	202	80	122
Dire Dawa (Harar Region)	198	80	118
Dessie (Amhara Region)	199	79	120
Awassa (Southern Nations, Nationalities, and Peoples Region)	200	80	120
TOTAL	**1000**	**400**	**600**

This sampling plan was designed to meet the purposes of this study. In the interest of comparability, the same overall plan was used in all countries surveyed. Annex A describes the sample and procedure in more detail, and lists the reasons why results from this survey may differ from those obtained from national random sample surveys such as the Demographic and Health Surveys (DHS).

Annex B contains descriptive data on the Ethiopia sample and information on how the socio-economic status (SES) indicator was calculated.

Net/ITN activities in sites

Mosquito nets were first introduced on a large scale in Ethiopia in 1997 through the health care system and were sold at a subsidized price of 40 Birr. An estimated 45,000 nets were distributed in Oromiya, Amhara, and SNNPR (Southern Nations and Nationalities, and Peoples Region).

During 2000-2003, UNICEF donated 1.42 million nets and treatment packets to Ethiopia. It is estimated that as of 2004, approximately 950,000 nets were delivered to the regions and of these, about 750,000 were distributed. Regions set up revolving fund schemes and sold nets at a subsidized price of 18 Birr through health facilities and *kabeles* (local community governments). Rates at which ITNs sold vary from 95% in Tigray to less than 5% in Dire Dawa, as of February 2004. Rates in other regions range from around 45% to 85%.

In February 2004, Population Services International (PSI) began operations in Ethiopia. PSI works nationally but focuses on the Southern region of Ethiopia (SNPPR), particularly the Awassa area. PSI began by selling a bundled net (Safe Nite) at a subsidized price of 30 Birr. This product is a dark blue conical net. It also sold a bundled product, *Woba Gasha,* to NGOs that distribute them to their beneficiaries for free. These were the only PSI nets on the market at the time of data collection. At the time of the survey, PSI, in collaboration with UNICEF, was

promoting ITNs through radio and was also providing training to health facilities and institutions in various parts of the country. The Safe Nite brand was also being promoted via billboards in major towns in the South.

Since that time, PSI stopped selling bundled products and began selling PermaNet 2.0 in Addis Ababa and a co-branded net, Safe Nite/PermaNet 2.0 for a subsidized price of 40 Birr in major urban areas. PSI introduced PermaNet 2.0 in Addis Ababa by launching a media campaign (TV, print and radio) paid for by Vestergaard, PermaNet's manufacturer. PermaNet 2.0 is currently being sold in high end supermarkets for 97 Birr and in pharmacies for 40 Birr.

The Global Fund will provide very large quantities of long-lasting ITNs to Ethiopia over the next few years with the aim of covering 70% of rural households in malarious areas.

NetMark launched its program in November 2004, just following the survey. NetMark is focusing on building the commercial sector to create a sustainable supply of ITNs, on ensuring that biologically and economically vulnerable groups have access to ITNs, and on creating demand for ITNs through a variety of promotional activities, including use of mass media and mobile promotional teams. To ensure uninterrupted availability of ITNs at a national scale, NetMark is working with suppliers and distributors to improve stock management and expand the number of outlets carrying ITNs. NetMark, in collaboration with the Amhara Regional Health Bureau is running a targeted subsidy voucher program that allows pregnant women to purchase ITNs at significantly reduced prices, while simultaneously engaging the commercial sector and building a sustainable source of ITN supply.

Implementation

The data were collected from August 20 to September 13, 2004, during the rainy season and just prior to the period of peak malaria transmission. The Ethiopia questionnaire was based on that used in initial surveys conducted during the year 2000. Most of the questions are the same as those used in other countries, in order to enable comparability of data. However, the questionnaire was pre-tested in Ethiopia, and minor adjustments made as a result.

The research was designed and carried out by NetMark, which contracted with Research International South Africa to organize and manage the fieldwork, and to enter the data and produce preliminary tables. NetMark staff conducted further analyses and wrote the report.

1.3 ORGANIZATION OF REPORT AND TABLES

This report intends to serve the data needs of both the public health community and the commercial sector for nets and insecticide treatments. The report attempts to present a large amount of data in a standard and accessible way. It includes a complete set of tables to serve as a data resource, and each table is accompanied by statements summarizing the main results.

In most of the tables in this report, data are broken down in the following way:

- By **site**: the five primary sampling areas (Bahir Dar, Nazret, Dire Dawa, Dessie, Awassa), *each of which includes both urban and rural areas*
- By **urban-rural**: all urban respondents across sites compared with all rural respondents across sites
- By **socio-economic status (SES):** a scale broken into quintiles. In some sub-analyses resulting in small denominators, the two lowest quintiles are combined.

These breakdowns are combined in one table, set up as follows:

Table X Percent of…[variable]
Among [description of base/denominator]

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	Urban	Rural	1 Low	2	3	4	5 High
BASE													

Sections 2 through 6 of this report present the data without interpretation. Section 7 summarizes the favorable factors and the challenges to sustained ITN supply, ownership, and public health impact; and also outlines program and product implications of the data.

SECTION 2
NET AND ITN AWARENESS, OWNERSHIP, AND USE

2.1 AWARENESS AND OWNERSHIP OF NETS AND TREATED NETS

The survey examined the extent as well as pattern of net and ITN ownership and use, in terms of household location and socio-economic status (SES). A series of questions was asked to determine whether each net owned was ever treated and whether it was currently treated—thereby qualifying it as an ITN. Baby nets were asked about separately. Because there has not been a tradition of net use in Ethiopia, a question was added to the Ethiopia survey that was not included in other countries asking whether the respondent had heard of nets, before asking about net ownership and use.

The data in this Section describe the proportion of *households* owning nets of different treatment status. If a household owned more than one net, the household was categorized according to the most recently treated net. Section 3 shows the proportion of *nets* falling into each treatment category.

DEFINITIONS

Net: any hanging net for use while sleeping regardless of whether it has ever been treated; excludes baby nets but includes cot nets which are hung or draped over a crib

Ever treated: a net that has ever been treated, either when acquired (pre-treated) or since acquired, regardless of when the treatment was put on the net

ITN or currently-treated net: a net that is long-lasting ("permanently treated") or has had insecticide put on it up to and including the last 12 months. This is equivalent to the Roll Back Malaria (RBM) definition of an ITN.

Baby net: a small umbrella-type net that is not hung but is placed over an infant. It is often used to keep flies off a sleeping infant during the day. Baby nets are rarely treated, and the umbrella frame precludes dipping the netting in an insecticide solution. Baby nets are not counted in these net coverage figures, but are reported here separately.

Net awareness and ownership

- Although awareness of mosquito nets is nearly universal in many sub-Saharan countries, when asked if they had ever seen or heard of a mosquito net, 30% of respondents in Ethiopia said they had not. Overall awareness of mosquito nets was 70% but was lowest in Dessie, where 50% had heard of them, and highest in Dire Dawa at 86%.
- Awareness was strongly associated with socioeconomic status (SES); 96% of respondents in the highest SES quintile had heard of nets, compared with 35% in the lowest quintile. Awareness was also much higher in urban (90%) than in rural areas (57%).
- The percent of households owning at least one net was 25%, but varied considerably by site, with ownership lowest in Dessie site (13%) and highest in Bahir Dar site (40%).
- Net ownership decreased sharply by SES, with 55% of households in the highest quintile and 3% of those in the lowest quintile owning at least one net.
- Urban households were much more likely than rural households to own a net: 40% versus 15%.
- Net-owning households owned an average of 1.3 nets per household.
- Most (78%) of the nets claimed to be owned were verified by the interviewer (data not shown). Some nets were not verified because the respondent did not want the interviewer to enter the bedroom or to see a torn or dirty net.

ITN awareness and ownership

- When asked if they had ever seen or heard of mosquito nets treated with insecticide, less than half (47%) of respondents said they had. Awareness of ITNs was lowest in Dessie at 26% and highest in Bahir Dar at 58%.
- ITN awareness was strongly associated with SES; 81% of the highest SES quintile had heard of ITNs, compared with 13% in the lowest quintile. Awareness was also higher in urban (66%) than in rural areas (34%).
- Fourteen percent (14%) of households owned a net that had ever been treated (i.e., already treated when acquired or treated after acquired), ranging from a low of 6% in Dessie site to a high of 31% in Bahir Dar.
- Eleven percent (11%) owned a currently-treated net (an ITN), but ownership varied widely by site, ranging from a low of 4% in Dessie site to a high of 24% in Bahir Dar.
- ITN ownership declined sharply as SES declined: 24% of households in the highest SES quintile owned a net, but only 2% of households in the lowest SES quintile did.
- ITNs were more common in urban (17%) than rural (6%) households.
- ITN-owning households owned an average of 1.3 ITNs per household.

Detailed information on net treatment patterns, such as proportion of nets pre-treated and treated since acquired, place where net was treated, and other net treatment information is found in Section 3.

Figure 2.1

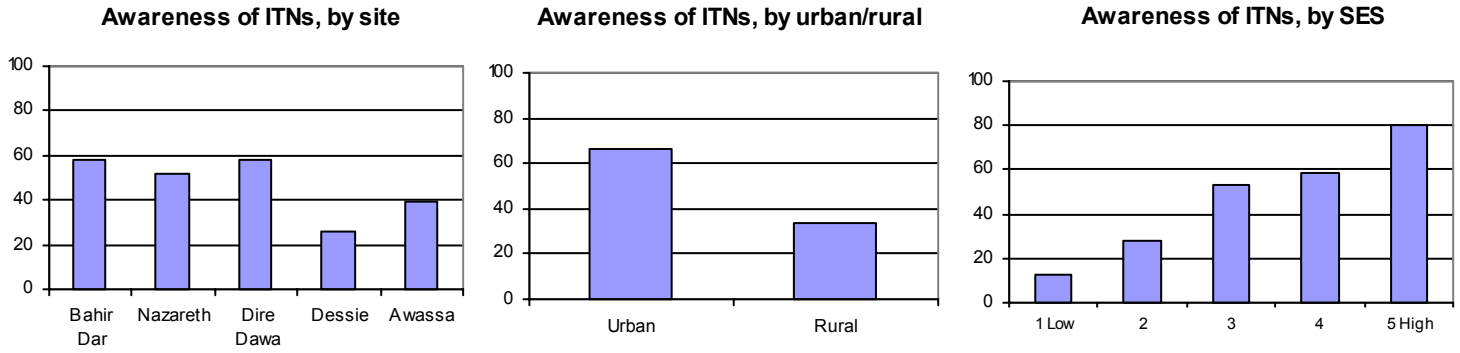


Table 2.1 Awareness of nets and insecticide treated mosquito nets
Among all households

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Aware of mosquito nets	70.2	71.6	78.2	86.4	49.7	65.0	89.5	57.3	35.0	54.5	76.5	89.0	96.0
Aware of treated nets	46.6	58.2	51.5	58.1	25.6	39.5	66.0	33.7	12.5	28.0	53.5	58.5	80.5
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

Table 2.2 Percent of households owning mosquito nets and insecticide-treated nets

Among all households

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Own a net	25.3	40.3	23.8	24.2	13.1	25.0	40.3	15.3	3.0	8.5	22.5	37.5	55.0
Own ever treated net	14.1	30.8	11.4	11.6	6.0	10.5	21.8	9.0	2.5	4.5	15.5	18.5	29.5
Own ITN (12 months)	10.7	23.9	8.9	8.6	3.5	8.5	17.3	6.3	2.0	2.0	10.0	15.5	24.0
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

Table 2.3 Number of mosquito nets owned

Among households owning each type of mosquito net

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low*	3	4	5 High
1	73.9	64.2	72.9	85.4	76.9	78.0	72.7	76.1	95.7	77.8	86.7	59.1
2	19.4	25.9	20.8	12.5	23.1	12.0	19.9	18.5	4.3	20.0	10.7	28.2
3	4.7	8.6	4.2	2.1	.0	4.0	6.2	2.2	.0	2.2	1.3	9.1
4	2.0	1.2	2.1	.0	.0	6.0	1.2	3.3	.0	.0	1.3	3.6
BASE	253	81	48	48	26	50	161	92	23	45	75	110

* SES categories 1 and 2 have been combined because of low denominators

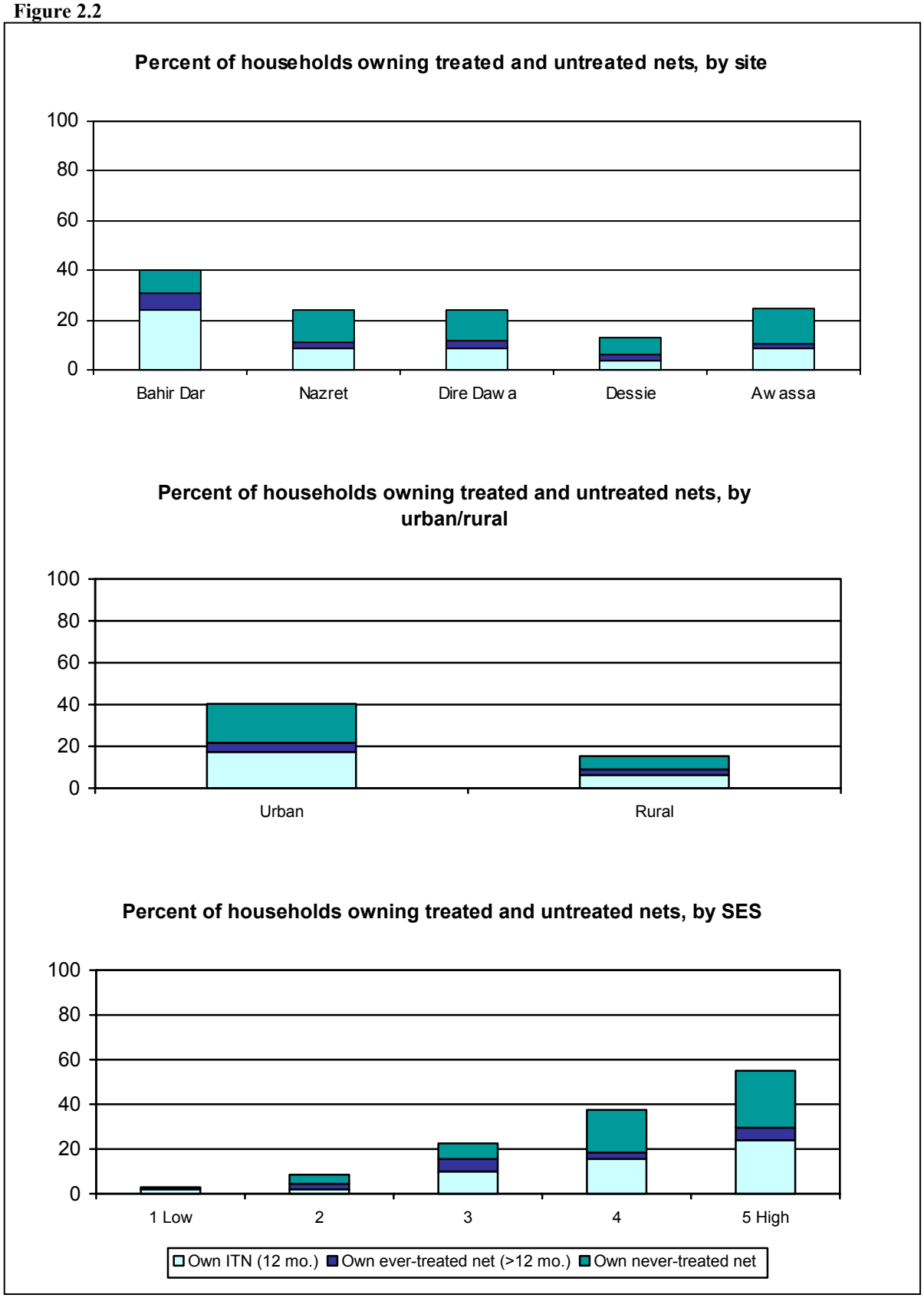
Table 2.4 Mean number of mosquito nets owned

Among households owning each type of mosquito net

		TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic status			
			Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low*	3	4	5 High
Number of nets in household	Mean	1.3	1.5	1.4	1.2	1.2	1.4	1.4	1.3	1.0	1.2	1.2	1.6
	BASE	253	81	48	48	26	50	161	92	23	45	75	110
Number of ever treated nets in household	Mean	1.4	1.5	1.3	1.2	1.3	1.3	1.4	1.3	1.1	1.3	1.1	1.6
	BASE	141	62	23	23	12	21	87	54	14	31	37	59
Number of ITNs in household	Mean	1.3	1.5	1.2	1.1	1.0	1.2	1.4	1.2	1.0	1.2	1.1	1.5
	BASE	107	48	18	17	7	17	69	38	8	20	31	48

* SES categories 1 and 2 have been combined because of low denominators

Figure 2.2


Percent of households owning treated and untreated nets, by site
100
80
60
40
20
0
Bahir Dar
Nazret
Dire Daw a
Dessie
Aw assa
Percent of households owning treated and untreated nets, by urban/rural
100
80
60
40
20
0
Urban
Rural
Percent of households owning treated and untreated nets, by SES
100
80
60
40
20
0
1 Low
2
3
4
5 High
Own ITN (12 mo.)
Own ever-treated net (>12 mo.)
Own never-treated net

Baby net ownership patterns

- Six percent (6%) of households in the sample owned a baby net[2] (a non-hanging net with a built-in frame).
- Ownership of baby nets was almost exclusively concentrated in the highest SES quintile.
- Of those who owned a baby net, just over half (3.6% of respondents) owned a hanging net as while, while the rest (2.5% of respondents) owned only a baby net.

Table 2.5 Ownership of baby nets (non-hanging)
Among all households

		Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
	TOTAL	Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Own a baby net	6.1	3.5	6.4	14.6	1.0	5.0	11.0	2.8	.0	.0	1.0	6.0	23.5
Own only a baby net (no hanging net)	2.5	.5	2.5	8.1	.5	1.0	4.8	1.0	.0	.0	.5	3.0	9.0
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

2.2 NET AND ITN USE BY VULNERABLE AND OTHER HOUSEHOLD MEMBERS

Although it is beneficial for any household member to sleep under a net, it is particularly important for those vulnerable to severe malaria — children under five (and especially children under one) and pregnant women — to do so. This section reports on the proportions of various household members sleeping under nets and ITNs—in all households as well as in net-owning households. The proportion in all households shows status of the sample with regard to Abuja targets[3]. The proportion within net-owning households shows allocation of net use when nets are present. Note that the proportions under a net/ITN in all households are highly affected by net ownership rates, while the proportions under a net in net-owning households are not affected at all by ownership rates.

The sample was limited to women of reproductive age (WRA) — age 15 to 49 — so that net use by WRA could be calculated in addition to net use by pregnant women. The greatest health benefits for women and neonates are achieved when treated nets are used from the beginning of the pregnancy; however, many women do not realize they are pregnant, or do not wish to make their pregnancy public, for several months or more. Therefore, it is advisable for women of reproductive age to sleep under treated nets nightly, and we report data to track net use by this group.

Data were collected during the rainy season (August 20 to September 13), when malaria transmission and therefore net use is typically higher than in the dry season.

[2] Baby nets are not counted in net ownership figures. Baby nets are common in some countries, so NetMark is monitoring baby net ownership and use, as this may affect household decisions to buy hanging nets/ITNs. NetMark is not necessarily encouraging the use of baby nets, since the resources used to buy a baby net could be used for a larger hanging net that would serve the child for a longer period than infancy, allow other family members to sleep under it, and be treated.

[3] The African Summit on Roll Back Malaria held in Abuja, Nigeria on April 25, 2000, set the target of having at least 60% of children under five years of age and pregnant women sleep under insecticide treated mosquito nets.

Net/ITN use by children under age five

There were 1127 children under five in all households in the sample, including 293 in net-owning households. (Note that in order to be included in the sample, a child under five had to reside in the household.)

- Among all households, 13% of children under five slept under a *hanging net* the prior night. This ranged from a low of 6% in Dire Dawa and Dessie sites, to a high of 31% in Bahir Dar site. Urban under-fives were more likely than rural ones to have slept under a net: 21% versus 8%. The percent of under-fives sleeping under a hanging net increased sharply with SES: from 0.8% of under-fives in the lowest SES quintile to 27% of those in the highest.
- When baby nets were included, 16% of children under five in all households slept under *some type of net* the prior night, ranging from a low of 7% in Dessie site to a high of 34% in Bahir Dar site. The percent of under-fives sleeping under some type of net increased dramatically with SES: from 0.8% in the lowest SES quintile to 40% in the highest.
- Among all households, 6% of children under five slept under an *ITN* the prior night, ranging from a low of 0.4% in Dessie to a high of 18% in Bahir Dar site. The percent of under-fives sleeping under an ITN was strongly associated with SES: 0.4% in the lowest quintile and 13% in the highest slept under an ITN the prior night.
- Within net-owning households, 50% of children under five slept under a hanging net/ITN the prior night. When those sleeping under baby nets are included, 57% of children under five in net-owning households slept under some type of net the prior night.
- Within net-owning households, a somewhat higher proportion of female than male under-fives had slept under a net/ITN the prior night: 55% versus 44%.

Net/ITN use by pregnant women and women of reproductive age

The total number of women of reproductive age in all households sampled was 1395; of these, 390 were from net-owning households. The total number of pregnant women in the households sampled was 81 and of these, 22 were from net-owning households. The results for pregnant women should be interpreted in light of these small sample sizes.

Pregnant women

- Among all households, 9% of pregnant women slept under a net the previous night. No pregnant women in the two lowest SES quintiles slept under a net the prior night, compared with 25% in the highest SES quintile who did.
- Among all households, 6% of pregnant women slept under an ITN net the prior night. No pregnant women in the two lowest SES quintiles slept under an ITN the prior night, compared with 19% in the highest SES quintile who did.
- Within net-owning households, 32% of pregnant women slept under a net/ITN the previous night. Pregnant women were less likely than other women of reproductive age to sleep under a net. (The number of pregnant women in net-owning households was small, so we cannot draw firm conclusions.)

Women of reproductive age (WRA)

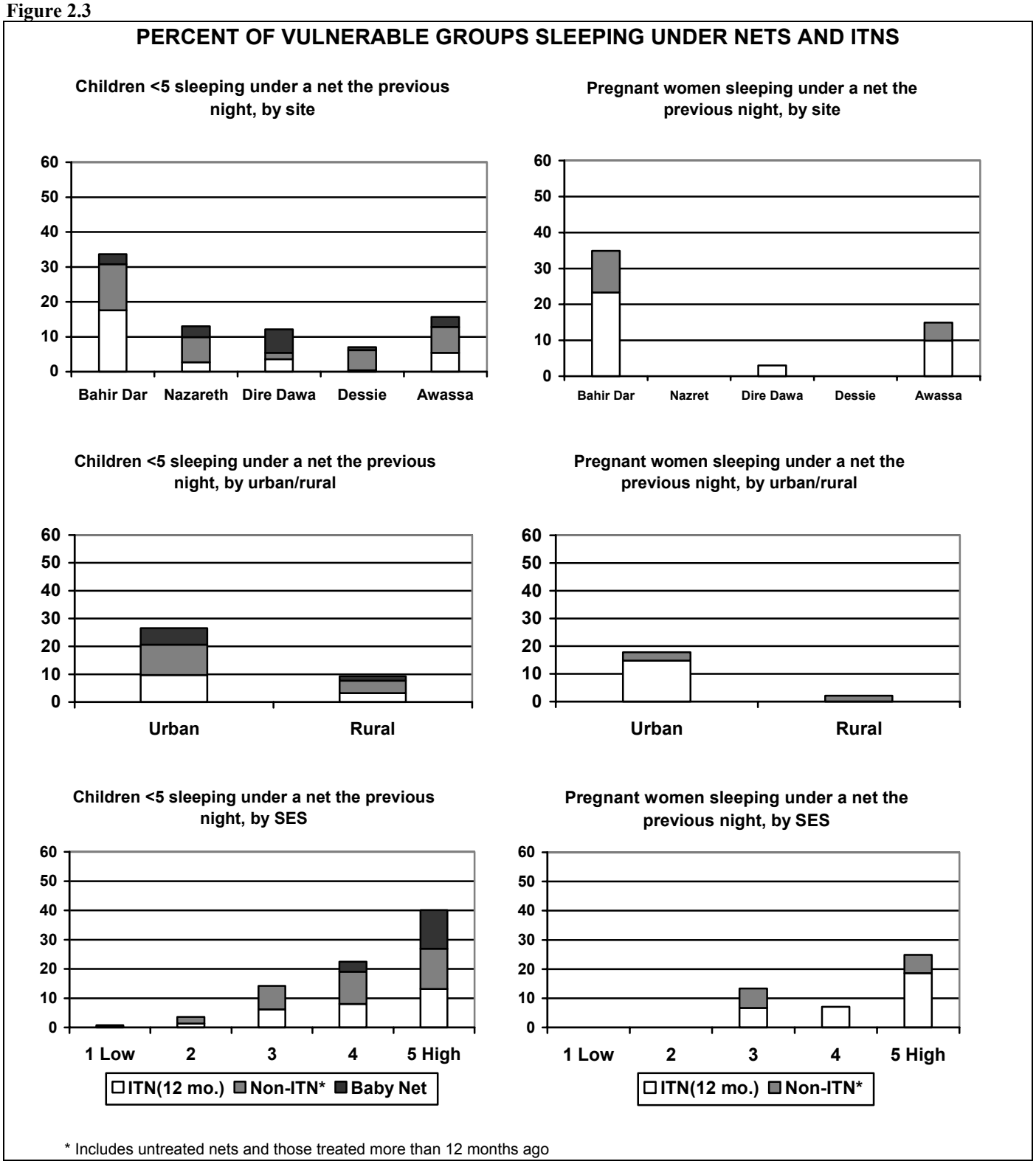
- Among all households, 12% of WRA slept under a net the previous night, ranging from a low of 5% in Dire Dawa and Dessie to a high of 29% in Bahir Dar. Only 0.8% of WRA in the lowest SES quintile slept under a net, compared with 24% of WRA in the highest SES quintile who did.
- Among all households, 5% of WRA slept under an ITN the prior night, ranging from a low of 0.9% in Dessie to 15% in Bahir Dar. Only 0.4% of WRA in the lowest SES quintile slept under an ITN, compared with 12% of WRA in the highest SES quintile who did.
- Within net-owning households, 43% of WRA slept under a net/ITN the prior night.

Overall household use

There were 4894 people in all households in the sample, including 1244 in net-owning households.

- Among all households, 10% of household members slept under a net the previous night.
- Among all households, 5% of household members slept under an ITN the previous night.
- Within net-owning households, 39% of household members slept under a net/ITN the prior night.
- Children under five, and especially those under one, were more likely to sleep under a net/ITN than were other household members. Older children—those aged 5-14—were the least likely household members to sleep under a net/ITN; only 25% did so.

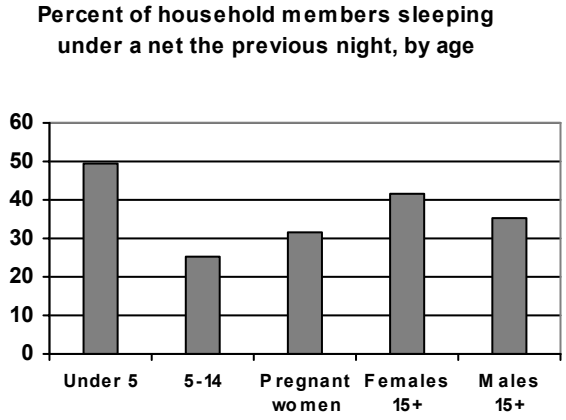
Figure 2.3



* Includes untreated nets and those treated more than 12 months ago

Figure 2.4

INTRA-HOUSEHOLD NET/ITN ALLOCATION:
Percent of household members sleeping under a net/ITN in net-owning households



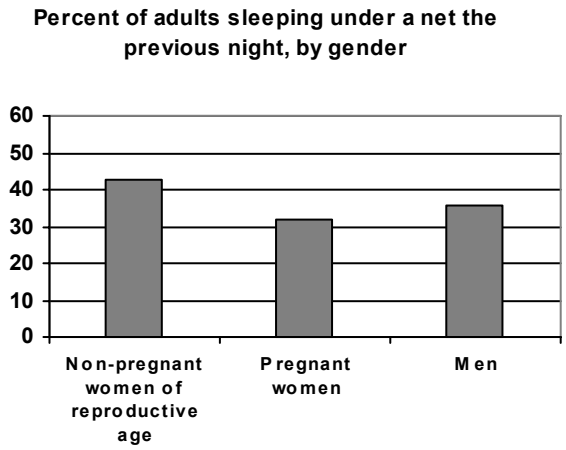


Table 2.6 Percent of vulnerable groups who slept under a net and under ITN last night
Among **all** households

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 low	2	3	4	5 high
Children <5													
Hanging net	12.9	30.8	9.9	5.8	6.1	12.8	20.6	7.9	0.8	3.6	14.2	19.5	26.9
Hanging or baby net	16.1	33.7	13.0	12.1	7.0	15.7	26.5	9.3	0.8	3.6	14.2	22.5	40.1
ITN (12 mo.)	5.8	17.6	2.7	3.6	0.4	5.4	9.7	3.2	0.4	1.4	6.2	8.0	13.2
BASE	1127	211	223	223	229	242	442	685	237	219	225	226	219
Pregnant women													
Any net	8.6	34.9	0.0	3.0	0.0	14.9	17.8	2.1	0.0	0.0	13.4	7.1	24.9
ITN (12 mo.)	6.2	23.3	0.0	3.0	0.0	9.9	14.8	0.0	0.0	0.0	6.7	7.1	18.6
BASE	81	9	17	33	2	20	34	47	18	18	15	14	16
WRA/Females 15-49													
Any net	12.0	29.0	8.2	5.2	5.2	12.0	18.8	7.1	0.8	4.5	12.4	15.8	23.9
ITN (12 mo.)	5.2	15.2	2.2	3.5	0.9	3.9	8.4	2.8	0.4	1.1	5.1	6.3	11.6
BASE	1395	276	317	290	230	282	580	815	260	266	275	285	310

Table 2.7 Percent of vulnerable groups who slept under a net and under ITN last night
Within **net-owning** households

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 low	2	3	4	5 high
Children <5													
Hanging net	49.5	74.7	38.6	23.6	40.0	52.5	49.2	50.0	33.3	47.1	61.5	47.8	46.8
Hanging or baby net	57.3	79.3	47.4	38.2	42.9	61.0	58.4	55.6	33.3	47.1	61.5	52.2	61.9
BASE	293	87	57	55	35	59	185	108	6	17	52	92	126
WRA / Females 15-49													
Any net	42.8	64.5	32.9	21.1	32.4	43.0	44.1	40.6	28.6	44.4	50.7	39.5	42.3
BASE	390	124	79	71	37	79	247	143	7	27	67	114	175
Pregnant women													
Any net	31.8	*	*	*	*	*	*	*	*	*	*	*	*
BASE	22	3	3	10	0	6	16	6	0	1	4	7	10

*Denominator too small to permit meaningful calculations

Table 2.8 Percent of household members who slept under net last night
Among all households and within net-owning households

	Household members in ALL HOUSEHOLDS			Household members in NET-OWNING HOUSEHOLDS: Intra-household net allocation	
	BASE	% sleeping under a net (n)	% sleeping under an ITN (n)	BASE	% sleeping under a net (n)
ALL	**4894**	**9.8 (480)**	**4.5 (218)**	**1244**	**38.6 (480)**
Younger children (under 5)					
Excluding baby nets*	**1127**	**12.9 (145)**	**5.8 (65)**	**293**	**49.5 (145)**
Including baby nets*	**1127**	**16.1(181)**		**293**	**57.3 (168)**
Males	608	11.5 (70)	4.8 (29)	158	44.3 (70)
Females	519	14.5 (75)	6.9 (36)	135	55.6 (75)
Age 0 - <1					
*Excluding baby nets**	162	16.7 (27)	7.4 (12)	48	56.3 (27)
*Including baby nets**	162	22.2 (36)			68.8 (33)
Age 1 - <2					
*Excluding baby nets**	184	15.8 (29)	8.2 (15)	58	50.0 (29)
*Including baby nets**	184	19.6 (36)			55.2 (32)
Age 2 - <3					
*Excluding baby nets**	253	10.7 (27)	5.5 (14)	55	49.1 (27)
*Including baby nets**	253	14.2 (36)			58.2 (32)
Age 3 - <4	243	11.1 (27)	3.3 (8)	55	49.1 (27)
Age 4 - <5	286	12.2 (35)	5.6 (16)	77	45.5 (35)
Older children (ages 5-14)	**1232**	**5.3 (65)**	**2.5 (31)**	**257**	**25.3 (65)**
Males	557	5.2 (29)	2.5 (14)	123	23.6 (29)
Females	675	5.3 (36)	2.5 (17)	134	26.9 (36)
Adults (age 15+)	**2535**	**10.7 (271)**	**4.8 (122)**	**694**	**39.0 (271)**
Males	1060	9.8 (104)	4.7 (50)	293	35.5 (104)
Females	1475	11.3 (167)	4.9 (72)	401	41.6 (167)
Females ages 15-49	1395	12.0 (167)	5.2 (72)	390	42.8 (167)
Non-Pregnant females ages 15-49	1314	12.2 (160)	5.1 (67)	368	43.5 (160)
Pregnant women	81	8.6 (7)	6.2 (5)	22	31.8 (7)

2.3 REGULARITY OF NET USE

Ideally, nets should be used throughout the year to afford maximum malaria protection.

- Sixty-one percent (61%) of nets owned were used the prior night, but the proportion of nets used ranged widely from 34% in Dire Dawa to 83% in Bahir Dar. Urban residents were somewhat more likely to have used their net the previous night than were rural residents (65% compared to 53%).
- The average number of months per year a household used its net(s) was 5.8, but households tended to use their net(s) either all year round or for only a few months of the year.

Figure 2.5:

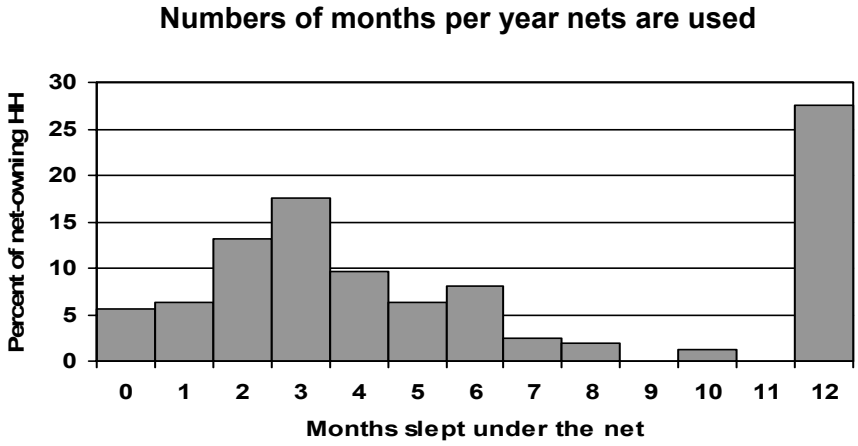


Table 2.9 Nets used (had someone sleeping under) the prior night
Among all nets owned

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low*	3	4	5 High
Yes	60.7	83.2	44.6	33.9	50.0	63.8	64.8	53.3	62.5	69.6	52.3	61.8
No	39.3	16.8	55.4	66.1	50.0	36.2	35.2	46.7	37.5	30.4	47.7	38.2
BASE	341	119	65	56	32	69	219	122	24	56	88	173

* SES categories 1 & 2 have been combined because of low denominators

Table 2.10 Number of months per year people in household sleep under a net
Among net-owning households

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low*	3	4	5 High
0	5.6	1.3	.0	14.9	15.4	4.0	4.4	7.7	13.6	6.8	4.0	4.6
1	6.4	13.8	4.3	2.1	7.7	.0	6.9	5.5	.0	15.9	4.0	5.5
2	13.2	15.0	12.8	8.5	15.4	14.0	13.8	12.1	4.5	13.6	18.7	11.0
3	17.6	21.3	8.5	21.3	11.5	20.0	21.4	11.0	13.6	18.2	17.3	18.3
4	9.6	8.8	12.8	8.5	7.7	10.0	9.4	9.9	4.5	6.8	9.3	11.9
5	6.4	7.5	6.4	6.4	3.8	6.0	6.3	6.6	9.1	9.1	4.0	6.4
6	8.0	7.5	12.8	10.6	7.7	2.0	6.9	9.9	9.1	6.8	10.7	6.4
7	2.4	1.3	2.1	4.3	.0	4.0	3.1	1.1	.0	.0	2.7	3.7
8	2.0	2.5	4.3	.0	3.8	.0	.6	4.4	13.6	.0	.0	1.8
9	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
10	1.2	.0	2.1	2.1	.0	2.0	.0	3.3	4.5	.0	2.7	.0
11	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
12	27.6	21.3	34.0	21.3	26.9	38.0	27.0	28.6	27.3	22.7	26.7	30.3
Mean # of months	5.8	5.1	6.9	5.2	5.2	6.7	5.6	6.1	6.5	4.8	5.8	6.0
Standard deviation	4.2	4.0	4.1	4.2	4.6	4.5	4.2	4.3	4.3	4.2	4.2	4.3
BASE	250	80	47	47	26	50	159	91	22	44	75	109

* SES categories 1 & 2 have been combined because of low denominators

SECTION 3
MOSQUITO NET TREATMENT AND WASHING PATTERNS

Nets that are treated with an insecticide are much more effective than untreated nets. Nets that are "pretreated" (i.e., already have insecticide on them when purchased) are available in some areas, but unless these nets are "long-lasting" ITNs, even these nets need to be re-treated regularly ("post-treated") to remain effective.

For each net owned, respondents were asked whether it was bought pre-treated, whether it came bundled with an insecticide treatment, whether it had been treated since purchase ("post-treated"), how many months it had been since the last treatment, and where the net was treated. Because some of the sub-analyses involve small numbers of nets—for example analyses on post-treated nets—the denominators become especially small when further analyzed by site, urban-rural, and SES. We have excluded data where denominators are too small to produce meaningful conclusions.

Note that the base of the following tables is *nets*, not *households*, and all figures are based on the proportion of nets. The proportion of *households* owning a treated net is shown in Section 2.

DEFINITIONS OF NET TREATMENT STATUS

Ever treated: a net that has ever been treated, either when acquired (pre-treated) or since acquired, regardless of when the treatment was put on the net

Currently-treated (ITN): a net that is long-lasting ("permanently treated"), or is pre-treated and has been purchased within the last 12 months, or has had insecticide put on it up to and including the last 12 months. This is the Roll Back Malaria (RBM) definition of an ITN.

Pre-treated: a net that had treatment on it when it was acquired, regardless if it was a long-lasting ("permanently treated") net or one that needs periodic re-treatment.

Post-treated: a net that has had treatment put on it at some point since it was acquired. The net may have been treated by the consumer or via an organized treatment effort.

3.1 PERCENT OF NETS TREATED

- *Ever treated*: 57% of nets owned had ever been treated, ranging from a low of 39% in the Awassa site to a high of 81% in the Bahir Dar site. There was little difference by urban-rural. A higher proportion of nets from the middle and lower SES quintiles were ever treated than those from the two upper quintiles.
- *Currently treated (ITN)*: 41% percent of nets were currently treated (i.e., qualified as an ITN), ranging from a low of 22% in the Dessie site to a high of 60% in the Bahir Dar site. There was little difference by urban-rural. A higher proportion of nets from the middle and upper SES quintiles were ITNs than those from the two lower quintiles.
- *Pre-treated*: 44% of nets were already treated when they were acquired, ranging from a low of 22% in the Awassa site to a high of 63% in the Bahir Dar site. There was little difference by urban-rural. Nets from the lower and middle SES quintiles were somewhat more likely to be pre-treated than those from the two upper quintiles.
- *Post-treated*: 27% of nets were treated since they were acquired. Nets from Dire Dawa site (6%) were least likely to have been treated since acquired, and those in the Bahir Dar site (45%) were most likely to have been.

Figure 3.1

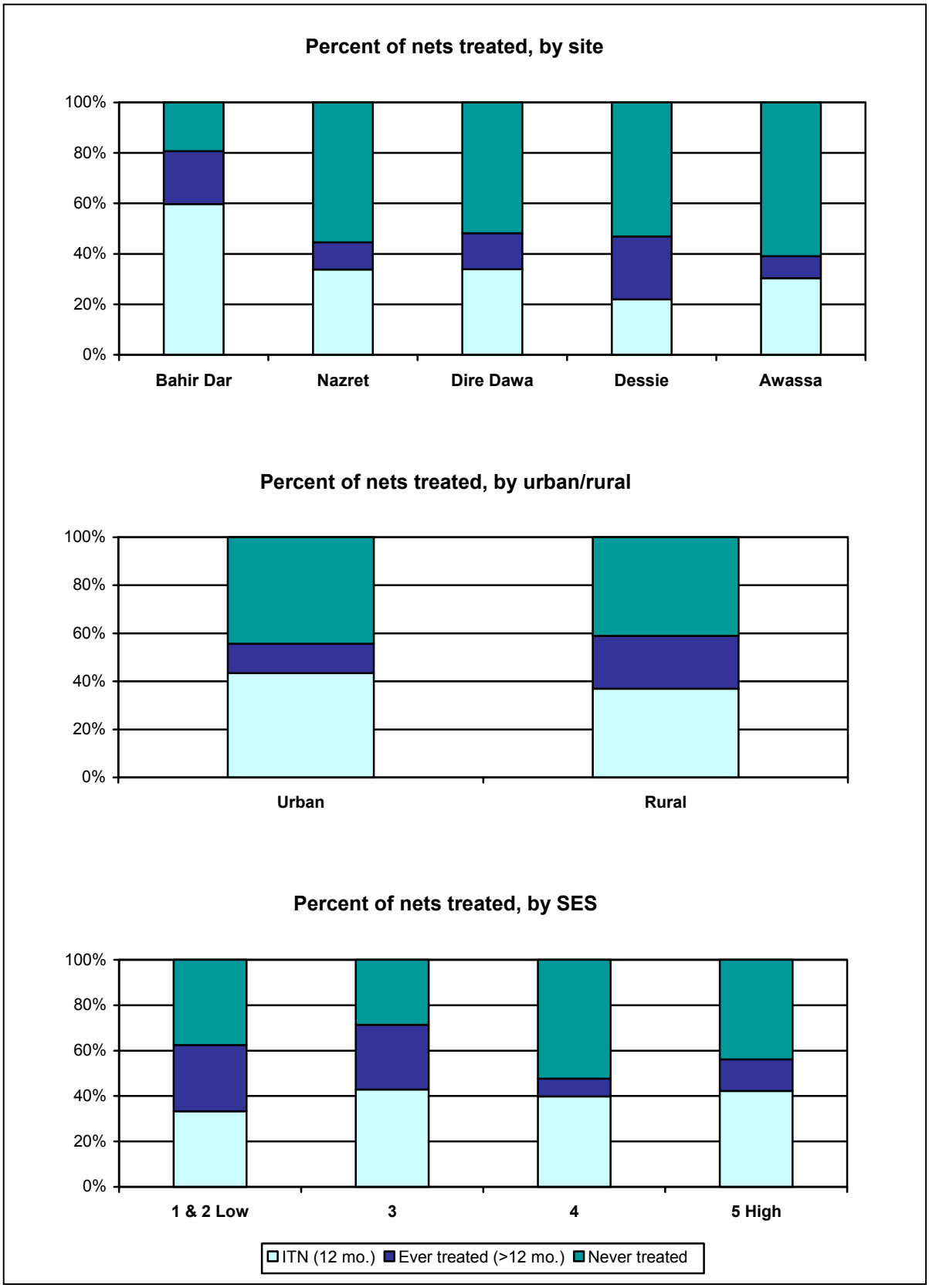

Percent of nets treated, by site
100%
80%
60%
40%
20%
0%
Bahir Dar
Nazret
Dire Dawa
Dessie
Awassa
Percent of nets treated, by urban/rural
100%
80%
60%
40%
20%
0%
Urban
Rural
Percent of nets treated, by SES
100%
80%
60%
40%
20%
0%
1 & 2 Low
3
4
5 High
ITN (12 mo.)
Ever treated (>12 mo.)
Never treated

Table 3.1 Percent of nets treated
Among total number of nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
Bought pretreated	43.7	63.0	30.8	42.9	46.9	21.7	41.6	47.5	45.8	64.3	38.6	39.3
Post-treated	27.0	45.4	23.8	5.5	10.3	22.4	32.2	17.6	20.8	21.8	19.8	33.3
Ever treated (pre-treated and/or post-treated)	56.9	80.7	44.6	48.2	46.9	39.1	55.7	59.0	62.5	71.4	47.7	56.1
Currently treated (within past 12 months)	41.1	59.7	33.8	33.9	21.9	30.4	43.4	36.9	33.3	42.9	39.8	42.2
BASE	341	119	65	56	32	69	219	122	24	56	88	173

*Includes pretreated and post-treated nets

- Seventeen percent (17%) of nets owned had come bundled (packaged) with an insecticide treatment so that the owner could treat the net.
- Almost all nets that were "post-treated" had been treated recently: 72% within the prior six months; 96% within the prior year.
- Among post-treated nets, 47% were treated at home by a family member and another 9% treated at home by someone who came to the house specifically to treat the net. The remaining 44% of nets treated since acquired were treated outside the home in a place such as a health facility.

Table 3.2 Nets came bundled with insecticide package
Among all nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
No	83.5	90.3	68.3	82.7	100.0	80.3	84.4	81.9	*	100.0	90.6	82.1	81.0
Yes	16.5	9.7	31.7	17.3	.0	19.7	15.6	18.1	*	.0	9.4	17.9	19.0
BASE	321	113	63	52	27	66	205	116	6	16	53	78	168

*Denominator too small to permit meaningful calculations

Table 3.3 Number of months ago net was last treated
Among nets that were post-treated

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Within past 6 months	71.9	70.4	*	*	*	*	76.8	55.0	*	*	*	*	76.8
7-12 months ago	23.6	25.9	*	*	*	*	20.3	35.0	*	*	*	*	17.9
1 - 2 years ago	2.2	.0	*	*	*	*	.0	10.0	*	*	*	*	1.8
More than 2 years ago	2.2	3.7	*	*	*	*	2.9	.0	*	*	*	*	3.6
BASE	89	54	14	3	3	15	69	20	2	2	12	17	56

*Denominator too small to permit meaningful calculations

Table 3.4 Who treated the net
Among nets that were post-treated

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Member of the family, in the household	47.1	19.6	*	*	*	*	47.0	47.6	*	*	*	*	45.5
Someone came to house to treat net	9.2	9.8	*	*	*	*	7.6	14.3	*	*	*	*	7.3
Another place (e.g. health center)	43.7	70.6	*	*	*	*	45.5	38.1	*	*	*	*	47.3
BASE	87	51	15	3	3	15	66	21	3	2	12	15	55

3.2 NET WASHING PATTERNS

Respondents were asked if the net was washed and, if so, how often. Since effectiveness of the treatment diminishes with washing, frequency of washing will affect decisions about educational messages.

- Two-thirds (66%) of nets had been washed at least once.
- One-quarter (24%) of all nets were reportedly washed at least once a month, and 60% of all nets were washed at least once every six months.

Table 3.5 Net washing patterns
Among total number of nets owned, where washing patterns were known

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low*	3	4	5 High
Never washed	34.0	25.9	35.4	60.0	37.5	23.9	25.2	49.6	56.5	44.4	36.4	26.5
About once a week	5.1	4.3	7.7	.0	3.1	9.0	7.5	.8	4.3	3.7	9.1	3.5
About every two weeks	6.0	4.3	.0	10.9	.0	13.4	5.1	7.4	.0	1.9	5.7	8.2
About once a month	13.1	11.2	12.3	.0	12.5	28.4	15.4	9.1	8.7	9.3	14.8	14.1
About every three months	14.3	6.9	23.1	18.2	18.8	13.4	18.2	7.4	4.3	9.3	10.2	19.4
About every six months	21.8	38.8	16.9	7.3	15.6	11.9	21.5	22.3	21.7	22.2	18.2	23.5
About once a year	5.7	8.6	4.6	3.6	12.5	.0	7.0	3.3	4.3	9.3	5.7	4.7
BASE	335	116	65	55	32	67	214	121	23	54	88	170

* SES categories 1 & 2 have been combined because of low denominators

SECTION 4
CHARACTERISTICS OF NETS OWNED

Respondents in net-owning households were asked, for each net owned, when and where the net was acquired and what type, brand, price, size, shape, and color it was. They were also asked who obtained the net.

Because few nets came from the households in the two lowest SES quintiles, the data are combined for those two segments.

4.1 AGE OF NETS

- Most nets were fairly new: 27% were obtained within the prior year and a total of 56% had been obtained within the prior 2 years.
- Dire Dawa had the highest proportion of nets acquired during the previous year (43%) and Dessie the lowest (16%). Nets from rural households were more likely to be new than those from urban households: 37% versus 21%.

Figure 4.1

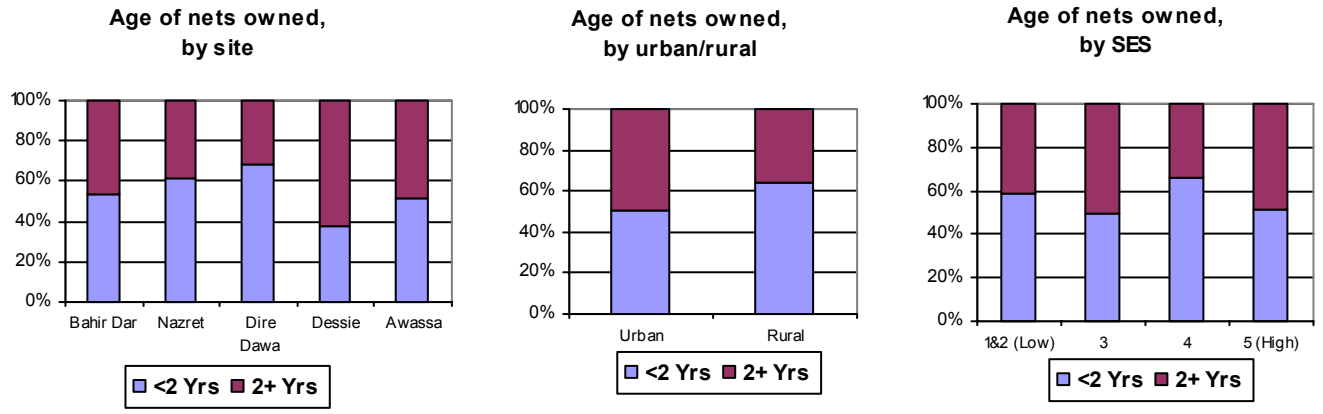


Table 4.1 Age of nets
Among total number of nets where respondents knew age

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low*	3	4	5 High
0 years (less than 1 year)	26.7	21.0	35.4	43.4	15.6	20.6	21.1	37.0	29.2	25.5	37.2	21.5
1 year	28.8	32.8	26.2	24.5	21.9	30.9	29.8	26.9	29.2	23.6	29.1	30.2
2 years	23.4	27.7	24.6	20.8	31.3	13.2	23.9	22.7	29.2	27.3	14.0	26.2
3 years	8.3	9.2	3.1	7.5	9.4	11.8	10.1	5.0	.0	10.9	7.0	9.3
4 years	5.0	1.7	3.1	1.9	12.5	11.8	7.3	.8	.0	3.6	5.8	5.8
5 years or more	7.7	7.6	7.7	1.9	9.4	11.8	7.8	7.6	12.5	9.1	7.0	7.0
BASE	337	119	65	53	32	68	218	119	24	55	86	172

* SES categories 1 & 2 have been combined because of low denominators

4.2 SOURCE OF NETS

- Most nets (69%) were obtained from a commercial source, most often from a general shop or kiosk. The highest proportion of commercial nets came from Awassa (88%); the lowest from Bahir Dar (56%). More nets from urban than rural household had come from a commercial source: 77% compared with 55%.
- Thirty-one percent (31%) of nets were obtained from a non-commercial source, most often a health facility. This source was highest in Bahir Dar site (44%) and lowest in Awassa site (13%). It was also higher in rural areas (46%) compared to urban (23%) areas.

Figure 4.2

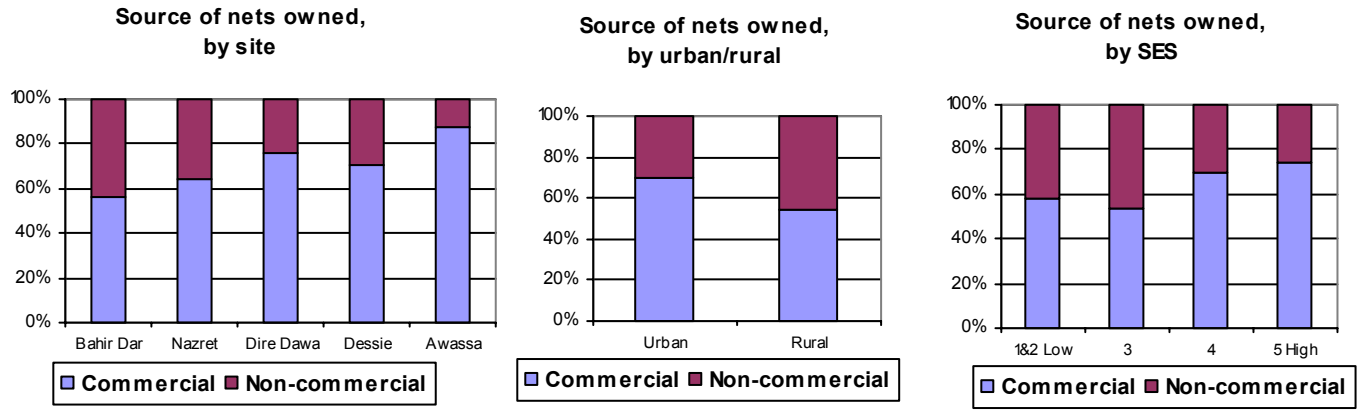


Table 4.2 Place where net was obtained
Among total number of nets owned, where respondent knew source of net

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
COMMERCIAL	**68.7**	**56.1**	**63.9**	**75.9**	**70.4**	**87.5**	**76.6**	**54.5**	**58.3**	**53.8**	**70.0**	**74.5**
Market	4.5	1.9	3.3	1.9	14.8	7.8	5.0	3.6	4.2	5.8	3.8	4.5
Kiosk/ Street vendor	13.7	15.0	9.8	.0	14.8	26.6	16.9	8.0	4.2	5.8	17.5	15.9
Itinerant vendor	1.9	.0	6.6	1.9	.0	1.6	2.0	1.8	4.2	1.9	3.8	.6
Pharmacy/ Drug store	5.8	3.7	4.9	16.7	.0	3.1	6.5	4.5	8.3	.0	2.5	8.9
General shop	17.9	7.5	23.0	24.1	3.7	31.3	18.9	16.1	8.3	13.5	17.5	21.0
Textile shop	3.5	2.8	3.3	5.6	3.7	3.1	4.0	2.7	4.2	5.8	3.8	2.5
Wholesaler	5.8	14.0	1.6	.0	7.4	.0	7.0	3.6	12.5	3.8	6.3	5.1
Supermarket	2.2	2.8	1.6	.0	.0	4.7	3.5	.0	.0	3.8	1.3	2.5
Minimart	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Tailor	2.2	.0	1.6	11.1	.0	.0	1.5	3.6	4.2	1.9	2.5	1.9
Petrol station	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Mothercare/ Baby shop	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Gift	8.0	4.7	6.6	14.8	11.1	7.8	8.0	8.0	4.2	7.7	7.5	8.9
Employer	3.2	3.7	1.6	.0	14.8	1.6	3.5	2.7	4.2	3.8	3.8	2.5
NON-COMMERCIAL	**31.3**	**43.9**	**36.1**	**24.1**	**29.6**	**12.5**	**23.4**	**45.5**	**41.7**	**46.2**	**30.0**	**25.5**
Clinic	17.3	25.2	18.0	13.0	18.5	6.3	9.5	31.3	12.5	34.6	20.0	10.8
Project	5.1	7.5	8.2	1.9	.0	3.1	3.0	8.9	12.5	7.7	3.8	3.8
School	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Women's group	.3	.9	.0	.0	.0	.0	.0	.9	.0	1.9	.0	.0
Government offices	7.3	10.3	8.2	7.4	11.1	.0	9.0	4.5	16.7	1.9	3.8	9.6
Other non-commercial	1.3	.0	1.6	1.9	.0	3.1	2.0	.0	.0	.0	2.5	1.3
BASE	313	107	61	54	27	64	201	112	24	52	80	157

4.3 FACTORY-MADE VS. TAILOR-MADE NETS

- The great majority of nets owned were factory-made: 89%, including 3% that were subsequently modified by a tailor (usually rectangular nets re-made into conical). Eleven percent (11%) of nets were tailor-made (21% in Nazret).

Table 4.3 Factory-made vs. tailor-made nets
Among all nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
Factory-made	86.4	94.0	73.2	82.0	93.5	83.9	84.8	89.2	85.7	92.3	92.1	81.9
Tailor-made	10.7	1.7	21.4	18.0	3.2	16.1	11.1	9.9	9.5	7.7	5.3	14.4
Factory-made then modified by tailor	2.9	4.3	5.4	.0	3.2	.0	4.0	.9	4.8	.0	2.6	3.8
BASE	309	116	56	50	31	56	198	111	21	52	76	160

4.4 BRAND OF NETS OWNED

Respondents were asked the brand of each factory-made net owned, and shown a card with the logos of various net brands available in Ethiopia to help them identify brand. The card included the NetMark logo. NetMark is not a brand, but the NetMark logo will appear on nets supplied by partners, and it was included to serve as a baseline. UNICEF, whose logo also appears on a variety of nets, was also included among the brands. Interviewers were instructed that if they had the opportunity to look at the net, they were to see if there are any labels sewn in that identified brand.

- The brand was unknown and unidentifiable for 44% of nets.
- The single most common "brand" identified was "UNICEF" (30%). Nets belonging to households in the highest SES category were as likely to be UNICEF nets as those in the lowest SES category. Nets belonging to rural households were more likely to be UNICEF nets than were those in urban households (40% vs. 24%).

Table 4.4 Net brands owned
Among commercially-made (non tailor-made) nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
UNICEF	29.7	29.8	31.8	46.3	23.3	17.0	23.9	40.0	26.3	41.7	27.8	27.0
SafeNite	9.4	7.0	2.3	0.0	6.7	31.9	11.9	5.0	5.3	4.2	12.5	10.2
NetMark	6.2	9.6	2.3	4.9	3.3	4.3	8.0	3.0	5.3	2.1	2.8	9.5
Moss Net	6.2	2.6	11.4	19.5	0.0	2.1	6.3	6.0	0.0	4.2	4.2	8.8
777	2.9	0.9	4.5	9.8	0.0	2.1	4.5	0.0	0.0	2.1	2.8	3.6
Peaceful Sleep	1.1	1.8	0.0	2.4	0.0	0.0	1.1	1.0	0.0	0.0	1.4	1.5
Other	1.1	.0	2.3	4.9	.0	.0	.6	2.0	.0	.0	.0	2.2
Don't know	43.5	48.2	45.5	12.2	66.7	42.6	43.8	43.0	63.2	45.8	48.6	37.2
BASE	276	114	44	41	30	47	176	100	19	48	72	137

4.5 COST OF NETS

Many nets in Ethiopia have been supplied by donors and sold in health facilities and local governments for 18 Birr. There are also nets sold in commercial outlets at a range of prices. Note that for nearly one-quarter of nets, the price was unknown by the respondent. Further, because of potential problems with recall, these prices should be taken as very general estimates.

- The median reported cost of a net was 30 Birr (US$3.61, using the exchange rate at the time of fieldwork).
- There was a considerable range in reported cost by site, urban-rural, and SES. The median cost was lowest in Dessie at 18 Birr (US$2.16) and highest in Awassa at 45 Birr (US$5.41). The median cost was higher for urban households (33 Birr, or US$3.97) than for rural (18 Birr, or US$2.16). There was a direct relationship between SES and price paid for a net: the higher the SES, the higher the price paid for a net. The median price paid by those in the lowest SES segment was 18 Birr (US$2.16) and for those in the highest it was 35 Birr (US$4.21).

Table 4.5 Cost of nets owned
Among nets bought

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio economic status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	2	3	4
Birr												
Mean*	35.19	34.66	30.72	27.97	25.80	48.31	38.92	28.20	24.18	29.61	29.69	41.33
Standard deviation*	23.65	23.72	15.98	14.40	11.93	31.30	20.88	26.89	9.95	21.14	16.63	27.05
Median*	30.00	24.00	20.00	20.00	18.00	45.00	33.00	18.00	18.00	18.00	20.00	35.00
US$												
Mean*	4.23	4.17	3.69	3.36	3.10	5.81	4.68	3.39	2.90	3.56	3.57	4.97
Standard deviation*	2.84	2.85	1.92	1.73	1.44	3.76	2.51	3.23	1.20	2.54	2.00	3.25
Median*	3.61	2.89	2.40	2.40	2.16	5.41	3.97	2.16	2.16	2.16	2.40	4.21
% Paid	72.4	83.2	70.8	55.4	62.5	73.9	73.5	70.5	70.8	73.2	72.7	72.3
% Free	3.8	.8	6.2	3.6	9.4	4.3	4.1	3.3	8.3	3.6	4.5	2.9
% Don't know cost	23.8	16.0	23.1	41.1	28.1	21.7	22.4	26.2	20.8	23.2	22.7	24.9
BASE	341	119	65	56	32	69	219	122	24	56	88	173

*Based on price reported for 247 nets; excludes free nets

4.6 SIZE, SHAPE, AND COLOR OF NETS OWNED

- Nets were fairly evenly distributed by size: 37% were single-sized, 34% were double and 29% king-sized (triple). (See Net Preferences section that shows that most prefer triple-size nets, suggesting a lack of affordability or availability of this size.)
- The majority of nets were rectangular (59%) but a sizeable proportion was conical (40%). This was reversed in Awassa site (70% conical and 30% rectangular). (See Net Preferences section showing more respondents prefer conical nets than rectangular—suggesting some lack of availability or affordability of the preferred shape.) Conical nets are more common in urban areas; rectangular nets are more common in rural areas.
- The most common colors were green (51% various shades of green) and white (28%). (Questions on net preference show that only 11% of respondents preferred white and 20% preferred green, suggesting unavailability of alternative colors.) More than half the nets in Bahir Dar and Dessie sites were green, and one quarter of the nets in Awassa sites were dark blue. (Note that UNICEF nets were green and PSI nets were dark blue.) Nets were more likely to be white in urban areas and more likely to be green in rural areas.

Table 4.6 Size of nets owned
Among total number of nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
Single	36.5	47.9	52.3	10.7	40.6	20.6	39.0	32.0	37.5	51.8	44.8	27.2
Double	33.5	20.2	29.2	51.8	21.9	51.5	33.5	33.6	29.2	25.0	24.1	41.6
Triple/King	28.5	31.9	18.5	32.1	37.5	25.0	26.1	32.8	33.3	23.2	29.9	28.9
Cot net	1.5	.0	.0	5.4	.0	2.9	1.4	1.6	.0	.0	1.1	2.3
BASE	340	119	65	56	32	68	218	122	24	56	87	173

Table 4.7 Shape of nets owned
Among total number of nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
Rectangular	58.7	71.4	64.6	57.1	62.5	30.4	50.7	73.0	79.2	73.2	61.4	49.7
Round/conical	40.2	28.6	33.8	42.9	28.1	69.6	47.5	27.0	20.8	25.0	37.5	49.1
Triangle/pyramid	1.2	.0	1.5	.0	9.4	.0	1.8	.0	.0	1.8	1.1	1.2
BASE	341	119	65	56	32	69	219	122	24	56	88	173

Table 4.8 Color of nets owned
Among the total number of nets owned

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
Green	42.5	61.3	36.9	39.3	56.3	11.6	40.2	46.7	58.3	57.1	37.5	38.2
White	27.9	21.8	35.4	30.4	3.1	40.6	30.6	23.0	16.7	16.1	27.3	33.5
Dark blue	7.0	0.8	3.1	5.4	3.1	24.6	8.7	4.1	0.0	1.8	9.1	8.7
Olive Green	5.9	5.9	9.2	1.8	3.1	7.2	7.3	3.3	8.3	8.9	2.3	6.4
Light blue	4.1	3.4	4.6	0.0	9.4	5.8	3.2	5.7	0.0	3.6	10.2	1.7
Black	2.6	5.0	0.0	1.8	6.3	0.0	0.9	5.7	8.3	3.6	0.0	2.9
Sea Green	2.6	0.8	4.6	1.8	3.1	4.3	2.7	2.5	4.2	1.8	5.7	1.2
Pink	1.8	0.0	1.5	7.1	3.1	0.0	1.8	1.6	0.0	0.0	2.3	2.3
Multi-colored	1.8	0.0	0.0	3.6	3.1	4.3	2.3	0.8	0.0	1.8	0.0	2.9
Gray	1.2	0.0	1.5	1.8	6.3	0.0	0.9	1.6	0.0	3.6	1.1	0.6
Turquoise	1.2	0.8	3.1	1.8	0.0	0.0	0.5	2.5	4.2	0.0	3.4	0.0
Yellow	0.9	0.0	0.0	1.8	3.1	1.4	0.5	1.6	0.0	1.8	1.1	0.6
Peach	0.3	0.0	0.0	1.8	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.6
Orange	0.3	0.0	0.0	1.8	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.6
BASE	341	119	65	56	32	69	219	122	24	56	88	173

4.7 WHO OBTAINED THE NET/ITN

- Just over one-fourth (27%) of the nets were acquired by the respondent and one-half (50%) by the respondent's husband. The remaining nets were acquired by another family member (14%) or received as gifts (8%).

Table 4.9 Who acquired the net
Among all nets

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-economic Status			
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 & 2 Low	3	4	5 High
Myself	27.2	35.3	27.4	17.9	28.1	20.3	28.0	25.8	25.0	35.7	31.4	22.7
Husband	50.3	47.9	45.2	51.8	46.9	59.4	50.5	50.0	58.3	46.4	41.9	54.7
Mother	2.1	1.7	1.6	.0	3.1	4.3	2.3	1.7	4.2	.0	1.2	2.9
Mother-in-law	.3	.0	1.6	.0	.0	.0	.5	.0	.0	.0	1.2	.0
Another family member	11.8	9.2	14.5	8.9	18.8	13.0	11.9	11.7	4.2	7.1	16.3	12.2
Given by someone	8.3	5.9	9.7	21.4	3.1	2.9	6.9	10.8	8.3	10.7	8.1	7.6
BASE	338	119	62	56	32	69	218	120	24	56	86	172

SECTION 5
KNOWLEDGE, BELIEFS AND SOURCES OF INFORMATION ABOUT MALARIA AND NETS

This section contains information on awareness, perceptions, and knowledge about malaria and ITNs, as well as exposure to information on ITNs. We report on:

1. Recognition of the Amharic term *woba* (malaria)
2. Perceived symptoms and causes of *woba*
3. Knowledge of vulnerable groups
4. Awareness of treated nets, or ITNs
5. Perceived advantages and disadvantages of net and ITN use by vulnerable groups
6. Reasons for not owning a net
7. Exposure to information on ITNs, source of information, and recall of content

5.1 RECOGNITION OF TERM "WOBA"

Respondents were asked whether they had heard of the Amharic term *woba* (malaria) in order to find out the extent to which the term can be used in promotion activities. Use of a single term around which promotion activities could take place would be important in building common understanding of the term and the illness.

- Recognition of the Amharic term *woba* was nearly universal at 99%.

Table 5.1 Recognition of term "woba"
Among all respondents

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
No	1.0	.0	1.5	.0	2.0	1.5	.0	1.7	3.0	1.5	.5	.0	.0
Yes	99.0	100.0	98.5	100.0	98.0	98.5	100.0	98.3	97.0	98.5	99.5	100.0	100.0
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

5.2 PERCEIVED SYMPTOMS AND CAUSES OF "WOBA"

Malaria can exhibit a diverse set of symptoms, but fever is common to all symptomatic cases. In order to determine the extent to which respondent perceptions of malaria coincide with the biomedical ones, those who had heard of malaria were asked what the symptoms and causes were.

- Given that fever is the defining symptom of malaria, a lower than desired proportion overall — 66% of those who had heard of *woba*— mentioned this symptom. There was wide variation among sites, from a low of 49% in Dire Dawa to a high of 75%-79% in Bahir Dar and Dessie mentioning fever. Most (70%) did mention cold/chills, a manifestation of fever. Only 1% mentioned convulsions/fits, a symptom of severe malaria.
- Knowledge of the link between mosquitoes and *woba* was low: 37% of respondents who had heard of *woba* said that it was caused by mosquitoes, and many mentioned other causes as well: dirty surroundings/standing water (51%), dirty food or water or cold food (21%), and exposure to the weather (rain, cold, or sun) (13%).
- Six percent (6%) did not name any cause, with a higher percentage in Nazret (9%) and Awassa (10%), in rural areas (8%), and in the lowest SES group (14%).

Table 5.2 Perceived symptoms of "woba"
Among respondents who have heard of malaria (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Chills	69.6	77.6	63.3	65.7	71.8	69.5	73.0	67.3	64.9	67.5	73.4	71.0	71.0
Fever	65.5	78.6	60.8	48.5	75.4	64.0	71.5	61.4	57.7	63.5	68.3	66.0	71.5
Headache/ body ache/ pain	41.6	34.8	41.7	50.0	28.7	52.8	41.3	41.9	35.6	42.6	37.2	44.5	48.0
Loss of appetite	24.9	26.4	21.6	19.7	35.9	21.3	31.0	20.8	13.4	22.8	29.1	26.0	33.0
Nausea	24.5	32.8	18.6	27.8	26.2	17.3	29.0	21.5	21.1	21.3	26.1	25.5	28.5
Weakness	13.2	17.4	10.1	9.1	9.2	20.3	13.0	13.4	13.9	15.2	12.1	16.5	8.5
Diarrhea	5.2	8.5	3.5	5.1	6.2	2.5	5.0	5.3	5.2	5.1	5.5	5.5	4.5
Thirst	3.6	3.0	5.5	1.5	3.1	5.1	2.5	4.4	4.6	5.6	4.0	2.5	1.5
Cough	1.6	1.0	1.5	0.5	2.1	3.0	1.8	1.5	2.1	1.0	1.5	1.0	2.5
Pale eyes/ palms	1.5	0.0	0.0	5.6	2.1	0.0	2.3	1.0	0.0	0.5	1.0	2.5	3.5
Convulsions	0.9	0.5	2.0	0.5	1.5	0.0	1.3	0.7	1.0	0.5	1.0	1.0	1.0
Anemia/ lack of blood	0.3	0.5	1.0	0.0	0.0	0.0	0.0	0.5	1.0	0.0	0.0	0.0	0.5
Rash	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	1.0	1.0	.5	.0	3.6	.0	1.0	1.0	1.0	1.0	2.0	1.0	.0
Don't know any symptoms	3.2	.0	5.5	2.0	2.1	6.6	1.8	4.2	7.7	5.1	1.0	1.0	1.5
BASE	990	201	199	198	195	197	400	590	194	197	199	200	200

Table 5.3 Perceived causes of "woba"
Among respondents who have heard of malaria (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Dirty surroundings/ standing water	51.4	67.7	38.2	48.0	64.1	39.1	58.3	46.8	37.1	47.7	53.8	58.5	59.5
Mosquitoes	36.6	24.9	45.7	39.4	30.8	42.1	39.5	34.6	32.0	31.5	38.2	42.0	39.0
Cold or dirty food or water	20.5	19.4	22.6	27.8	10.8	21.8	20.0	20.8	19.6	20.8	20.6	16.0	25.5
Weather	12.5	13.4	13.6	13.6	14.9	7.1	10.5	13.9	16.0	14.7	10.6	10.0	11.5
Specific type of food	2.5	2.5	2.5	1.0	2.6	4.1	2.5	2.5	2.1	5.1	3.0	1.0	1.5
Another person with malaria	1.7	2.5	0.5	1.0	2.6	2.0	1.8	1.7	2.1	2.0	2.0	1.0	1.5
Overwork	0.9	2.0	1.0	0.5	1.0	0.0	1.5	0.5	1.0	1.5	0.5	1.0	0.5
God/Allah	0.5	1.0	0.5	0.5	0.0	0.5	0.3	0.7	1.5	0.5	0.0	0.5	0.0
Other	3.4	5.5	3.0	1.5	2.1	5.1	5.0	2.4	4.6	3.6	4.0	2.0	3.0
Don't know any cause	5.5	4.0	9.0	2.0	2.1	10.2	1.8	8.0	13.9	9.6	1.5	2.0	.5
BASE	990	201	199	198	195	197	400	590	194	197	199	200	200

5.3 KNOWLEDGE OF VULNERABLE GROUPS

In order to measure knowledge of vulnerable groups — children under five and pregnant women — interviewers showed respondents who recognized the term *woba* a card with drawings of five household members and identified each: a man, a woman (not pregnant), a pregnant woman, a child of age 3, and a child of age 6. Respondents were asked to select the person most vulnerable to a serious case of malaria and to then select, among the remaining, who else was most vulnerable.

- Respondents were more likely to know that the youngest child was among the most vulnerable (87%) than that the pregnant woman was (66%).

- Over half (58%) selected both the young child and the pregnant woman from the drawings. Urban respondents (62%) were more likely than rural ones (55%) to know both vulnerable groups, and knowledge of both vulnerable groups increased with SES. It was highest in Dire Dawa (66%) and Nazret (68%) and lowest in Awassa (50%).
- Forty-two percent (42%) included in their selection a household member who was not among the most vulnerable: 27% selected the child of 6 years; 10% selected the man, and 6% selected the non-pregnant woman.

Figure 5.1

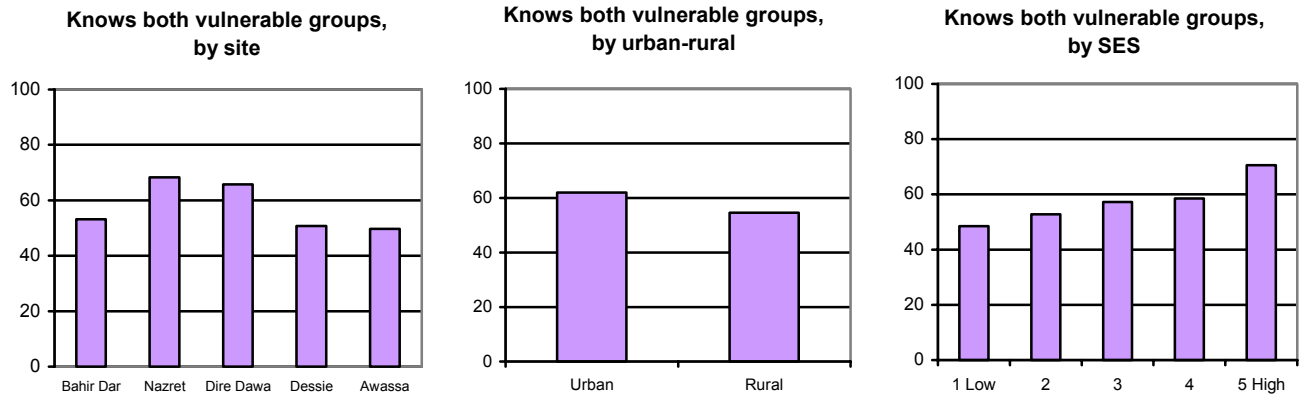


Table 5.4 Selection of vulnerable groups
Among respondents who have heard of malaria (two responses per person)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Man	9.9	11.9	8.0	10.6	12.3	6.6	7.3	11.7	17.0	9.6	7.5	10.5	5.0
Woman	5.8	4.0	4.5	7.6	7.2	5.6	3.5	7.3	10.3	4.6	6.5	4.0	3.5
Pregnant Women	65.6	60.2	76.9	77.8	56.9	55.8	68.5	63.6	58.8	60.9	64.3	65.5	78.0
Child of 6 years	26.7	29.4	20.1	15.7	31.8	36.5	26.8	26.6	25.3	31.5	29.6	27.5	19.5
Child of 3 years	87.1	86.6	87.4	83.8	89.7	87.8	91.0	84.4	78.9	87.3	87.4	90.5	91.0
Don't know	1.7	3.0	.5	.5	1.0	3.6	.8	2.4	4.1	2.5	1.0	.5	.5
BASE	990	201	199	198	195	197	400	590	194	197	199	200	200

Table 5.5 Knowledge of vulnerable groups
Among respondents who have heard of malaria

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Knows no group	4.9	6.5	4.0	4.0	4.1	6.1	2.5	6.6	10.8	4.6	5.5	2.5	1.5
Knows 1 group	37.5	40.3	27.6	30.3	45.1	44.2	35.5	38.8	40.7	42.6	37.2	39.0	28.0
Knows both groups	57.6	53.2	68.3	65.7	50.8	49.7	62.0	54.6	48.5	52.8	57.3	58.5	70.5
BASE	990	201	199	198	195	197	400	590	194	197	199	200	200

5.4 PERCEIVED ADVANTAGES AND DISADVANTAGES OF NET AND ITN USE BY VULNERABLE GROUPS

Respondents who had heard of mosquito nets were asked the advantages and disadvantages they saw in
(1) a child under five sleeping under a net,
(2) a child under five sleeping under a *treated* net, and
(3) a pregnant woman sleeping under a *treated* net.

Before asking about the latter two, respondents were told, "Just to clarify, a treated mosquito net is one that has a special insecticide for nets on it."

Overall, respondents saw many advantages, and few disadvantages of ITN use. They viewed treated nets as more effective than untreated ones, and there was little fear about having the insecticide on the net.

Advantages of sleeping under a mosquito net (untreated) for child under five

- Nearly all respondents (93%) named at least one advantage for a child under five sleeping under a mosquito net.
- The most commonly mentioned advantage was to "avoid getting bitten by mosquitoes" (48%). The other two most frequently mentioned advantages were to "avoid malaria" (39%) and "won't get bothered by other insects" (29%).
- All three of these advantages were mentioned more by urban than rural respondents.

Table 5.6 Advantages of a child under five sleeping under a mosquito net (untreated)
Among all respondents who have heard of nets (multiple responses possible)

		Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
	Total	Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Avoid bites	47.6	49.3	56.3	46.2	41.4	41.5	50.0	45.1	50.0	43.1	43.1	46.1	54.2
Avoid "woba"	39.2	43.1	32.3	28.7	44.4	53.1	41.6	36.6	32.9	41.3	39.2	41.0	38.5
Not bothered by insects	28.8	38.2	25.3	24.0	37.4	22.3	32.7	24.7	17.1	30.3	28.1	29.2	32.3
Better health	6.3	6.3	1.9	9.9	9.1	4.6	4.2	8.4	5.7	11.9	7.2	5.6	3.1
Protects from dirt	4.7	5.6	5.7	3.5	7.1	2.3	5.3	4.1	2.9	6.4	2.6	5.1	5.7
Sleep better	4.3	4.2	3.2	6.4	7.1	0.8	3.6	4.9	10.0	1.8	6.5	3.4	2.6
Gives warmth	1.7	0.7	2.5	2.3	3.0	0.0	0.6	2.9	7.1	0.9	1.3	2.2	0.0
Gives privacy	0.7	1.4	0.0	0.0	2.0	0.8	1.4	0.0	0.0	0.9	1.3	0.0	1.0
Saves money because child not sick	0.3	0.7	0.0	0.6	0.0	0.0	0.3	0.3	0.0	0.0	0.7	0.0	0.5
Avoid other illness	0.1	0.0	0.0	0.6	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.6	0.0
Economical/ lasting solution	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
None	4.0	3.5	3.2	4.7	2.0	6.2	4.2	3.8	1.4	3.7	4.6	4.5	4.2
Don't know	3.4	.7	6.3	4.1	2.0	3.1	1.7	5.2	5.7	3.7	7.2	2.8	.0
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Disadvantages of sleeping under a mosquito net for child under five

- Almost three-fourths (73%) of respondents did not cite any disadvantages ("none" or "don't know any") for a child under five to sleep under a net: 65% said that there were no disadvantages for a child under five sleeping under a net; another 8% said they did not know of a disadvantage.
- The most commonly mentioned disadvantages were that mosquitoes can bite through the net (14%) or can still get in the net (10%). No others were mentioned by more than 1%.

Table 5.7 Disadvantages of a child under five sleeping under a mosquito net (untreated)
Among all respondents who have heard of nets (multiple responses possible)

		Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
	Total	Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Mosquitoes bite through net	14.0	17.4	14.6	21.1	6.1	6.2	16.2	11.6	5.7	7.3	13.1	12.4	22.9
Mosquitoes still enter the net	10.4	15.3	13.3	7.6	9.1	6.2	11.5	9.3	7.1	7.3	11.8	11.8	10.9
Too little air/ child might suffocate	2.0	2.1	2.5	2.3	1.0	1.5	2.0	2.0	2.9	1.8	.7	2.8	2.1
Mosquitoes still make noise	1.4	1.4	.6	2.9	.0	1.5	.8	2.0	1.4	.9	.0	2.2	2.1
Inconvenient if child gets up at night	1.1	1.4	.6	2.9	.0	.0	.8	1.5	1.4	.9	1.3	1.7	.5
Child might get caught/trapped in net	.6	.7	.6	.0	2.0	.0	.8	.3	1.4	.0	1.3	.0	.5
Too hot	.4	.0	.0	1.8	.0	.0	.3	.6	1.4	.9	.0	.6	.0
Expensive	.3	.0	.6	.0	1.0	.0	.6	.0	.0	.0	.7	.0	.5
Child gets used to net and can't sleep without it	.3	.0	.0	.6	1.0	.0	.0	.6	2.9	.0	.0	.0	.0
Takes time to tuck in	.1	.7	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.5
Child might tear net	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
None	64.7	61.8	60.8	57.3	74.7	74.6	65.9	63.4	60.0	71.6	64.7	66.3	60.9
Don't know	8.3	4.9	12.0	7.0	7.1	10.0	4.7	11.9	18.6	11.9	9.8	6.2	3.1
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Advantages of sleeping under a *treated* net for child under five

- The great majority of respondents (90%) named at least one advantage for a child under five sleeping under a treated net. Overall, 10% didn't know any advantage; this figure was 20% in Dessie.
- Most advantages cited for a child under five sleeping under a treated net had to do with its greater efficacy: "kills mosquitoes" (46%), "works better/fewer bites than untreated net" (41%), "repels mosquitoes" (13%), "is better at preventing malaria" (13%), and "kills/repels other insects" (10%).
- Respondents from Bahir Dar (68%) were most likely to mention "kills mosquitoes" and those from Awassa (29%) and Nazret (27%) least likely to do so. Those in the highest SES group were also more likely than others to mention killing mosquitoes.

Table 5.8 Advantages of a child under five sleeping under an ITN
Among all respondents who have heard of nets (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Kills mosquitoes	46.4	67.4	27.2	50.9	62.6	28.5	48.0	44.8	34.3	42.2	47.7	43.8	54.7
Works better/ fewer bites than untreated net	41.2	41.0	48.1	45.6	29.3	36.2	39.7	42.7	37.1	49.5	35.9	40.4	42.7
Repels mosquitoes	13.2	11.1	19.0	8.8	4.0	21.5	15.9	10.5	10.0	11.9	12.4	12.9	16.1
Better at preventing "woba"	13.0	6.3	15.8	15.8	7.1	17.7	13.1	12.8	10.0	13.8	11.1	10.1	17.7
Repels other insects	10.3	16.7	11.4	4.7	9.1	10.0	10.1	10.5	12.9	11.0	7.8	7.9	13.0
Child more protected/ healthier	3.3	1.4	5.1	5.3	1.0	2.3	2.8	3.8	7.1	2.8	1.3	3.4	3.6
Better at preventing other illness	1.4	.7	1.3	1.8	1.0	2.3	2.5	.3	.0	.9	1.3	1.7	2.1
Child sleeps better	1.3	.0	1.9	.0	1.0	3.8	1.1	1.5	7.1	.0	.0	.6	1.6
Saves money/,time because child not sick	.1	.0	.0	.0	1.0	.0	.0	.3	.0	.0	.7	.0	.0
None	.6	1.4	.6	.0	.0	.8	.3	.9	2.9	.9	.7	.0	.0
Don't know	9.7	8.3	7.6	4.7	20.2	12.3	10.6	8.7	12.9	9.2	11.1	14.0	3.6
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Disadvantages of sleeping under a *treated* net for child under five

- The great majority of respondents – 81% – said there was no disadvantage or that they did not know of a disadvantage for a child under five to sleep under a *treated* mosquito net.
- Among the few who cited disadvantages, the most common were concerns about the effects of the chemical (smell can be bad – 11%, chemical could be dangerous – 5%, and cause irritation/cough – 3%).

Table 5.9 Disadvantages of a child under five sleeping under an ITN
Among all respondents (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Smells bad	11.0	11.1	10.1	17.0	6.1	7.7	11.2	10.8	4.3	9.2	9.8	10.7	15.6
Chemical may be dangerous, child may suck net	5.3	2.8	8.2	5.8	3.0	5.4	5.6	4.9	2.9	1.8	4.6	5.6	8.3
Causes irritation/ cough/ illness	3.1	3.5	1.9	5.8	4.0	0.0	3.4	2.9	2.9	1.8	4.6	3.4	2.6
Can't wash treated net	0.7	1.4	0.0	1.2	1.0	0.0	0.8	0.6	2.9	0.0	0.0	0.0	1.6
Insecticide not effective	0.3	0.7	0.0	0.0	1.0	0.0	0.3	0.3	0.0	0.0	0.0	0.0	1.0
More expensive than regular net	1.1	2.8	1.9	0.0	0.0	0.8	0.6	1.7	4.3	1.8	0.7	0.0	1.0
None	65.8	66.7	67.7	62.6	64.6	67.7	66.2	65.4	60.0	68.8	69.3	61.2	67.7
Don't know	15.2	14.6	12.0	11.7	23.2	18.5	13.7	16.9	25.7	18.3	14.4	20.2	5.7
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Advantages of sleeping under a *treated* net for pregnant woman

- The vast majority of respondents (90%) named at least one advantage for a pregnant woman to sleep under a *treated* net. While 10% of respondents overall did not mention an advantage, 19% of those in Dessie did not mention any.
- The most commonly mentioned advantages for a pregnant woman sleeping under a treated net had to do, as with for the child, with its greater protective effect: “kills mosquitoes” (40%), “works better/fewer bites than untreated net” (39%), “is better at preventing malaria” (19%), “repels mosquitoes” (12%), and “repels other insects” (9%).

- Respondents from Bahir Dar (56%) and Dessie (54%) were more likely to mention "kills mosquitoes" than those in the other three sites. Those in the highest SES group were also more likely than others to mention killing mosquitoes.

Table 5.10 Advantages of pregnant woman sleeping under an ITN
Among all respondents (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Kills mosquitoes	39.9	56.3	22.2	40.9	53.5	31.5	41.3	38.4	34.3	33.0	43.1	37.1	45.8
Works better/ fewer bites than untreated net	39.0	38.9	46.8	33.9	34.3	40.0	39.1	39.0	27.1	45.0	33.3	38.2	45.3
Better at preventing "woba"	19.1	6.3	28.5	22.8	10.1	23.8	19.0	19.2	12.9	19.3	16.3	19.7	22.9
Repels mosquitoes	12.4	14.6	17.7	8.2	4.0	15.4	13.1	11.6	11.4	18.3	11.8	9.0	13.0
Repels other insects	8.5	17.4	7.0	4.7	7.1	6.9	10.1	7.0	11.4	8.3	8.5	9.6	6.8
Woman/fetus more protected	3.1	4.2	1.3	2.9	6.1	2.3	2.8	3.5	8.6	0.9	3.3	3.9	1.6
Woman sleeps better	2.3	2.1	1.3	2.9	2.0	3.1	2.2	2.3	5.7	0.0	2.6	1.7	2.6
Prevents miscarriage/ stillbirth	1.0	0.7	0.6	1.2	2.0	0.8	1.1	0.9	0.0	0.9	1.3	1.1	1.0
Better at preventing other illness	0.4	0.7	1.3	0.0	0.0	0.0	0.3	0.6	0.0	0.9	0.0	1.1	0.0
Saves money because woman not sick	0.3	0.0	0.6	0.0	1.0	0.0	0.0	0.6	0.0	0.0	0.7	0.6	0.0
None	.4	.7	.6	.0	1.0	.0	.6	.3	1.4	.0	.7	.0	.5
Don't know	9.4	9.7	7.0	4.7	19.2	10.8	9.8	9.0	17.1	7.3	11.1	12.4	3.6
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Disadvantages of sleeping under a *treated* net for pregnant woman

- The great majority (82%) of respondents did not cite or know any disadvantage of a pregnant woman sleeping under a *treated* net.
- The single most common disadvantage for a pregnant woman to sleep under a *treated* net was the odor, but that was mentioned by only 10% of respondents. The other disadvantages most mentioned were the same as for children and were mentioned by few respondents: chemical could be dangerous (6%), and could cause irritation/illness (3%).

Table 5.11 Disadvantages of pregnant woman sleeping under an ITN
Among all respondents (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Smells bad	10.3	13.9	10.1	11.7	8.1	6.2	10.9	9.6	8.6	6.4	10.5	10.1	13.0
Chemical could cause nausea/vomiting, harm fetus	5.7	2.1	6.3	9.4	7.1	3.1	6.4	4.9	4.3	3.7	4.6	5.6	8.3
Causes irritation/ cough/ illness	3.0	2.1	3.8	5.8	2.0	0.0	2.2	3.8	4.3	2.8	3.3	1.7	3.6
More expensive than regular net	1.1	1.4	1.3	0.0	3.0	0.8	0.3	2.0	1.4	2.8	2.6	0.0	0.0
Can't wash treated net	0.3	0.7	0.0	0.6	0.0	0.0	0.0	0.6	2.9	0.0	0.0	0.0	0.0
Insecticide not effective	0.1	0.0	0.0	0.0	1.0	0.0	0.3	0.0	0.0	0.0	0.7	0.0	0.0
None	68.7	67.4	70.9	68.4	61.6	73.1	69.0	68.3	58.6	71.6	70.6	65.7	71.9
Don't know	13.7	14.6	10.1	8.8	22.2	16.9	12.6	14.8	24.3	13.8	13.7	19.1	4.7
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

5.5 REASONS FOR NON-OWNERSHIP

- Among those who had heard of nets but did not own one, the most common reason cited for not owning a net was the expense (42%). Over half in Awassa (54%) and Bahir Dar (65%) gave this answer.
- Urban non-owners more often cited cost than rural ones (53% vs. 34%).
- Non-owners from the highest SES quintile were less likely to cite cost than the others, but 26% of them did so.
- Another 23% of non-owners cited lack of availability, with 30% in Dire Dawa naming this reason. Rural non-owners were about as likely to cite lack of availability as cost. Lack of availability was more of a problem in rural areas than urban ones (32% vs. 10%).
- Another 19% (33% in Dessie) said they did not need a net. The lack of need for nets was cited by more in the highest SES groups (where aerosol use is the highest) than those in the lowest two.

Figure 5.2

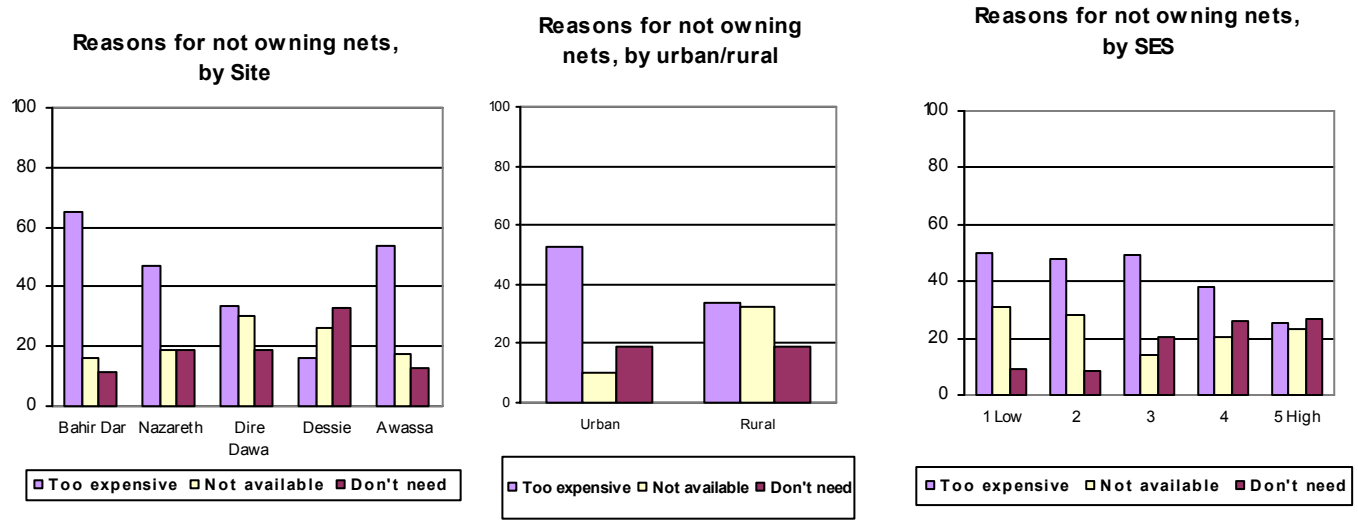


Table 5.12 Reasons why household does not own any mosquito nets
Among households that have heard of nets and do not own any (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
No money/ nets too expensive	42.1	65.1	47.3	33.3	16.4	53.8	52.8	33.7	50.0	47.8	49.1	37.9	25.6
Nets not available/ don't know where to get them	22.5	15.9	19.1	30.1	26.0	17.5	10.2	32.1	31.3	28.3	13.9	20.4	23.2
Don't need nets/use something else	18.9	11.1	19.1	18.7	32.9	12.5	18.8	19.0	9.4	8.7	20.4	26.2	26.8
Don't like nets	4.2	0.0	0.9	9.8	8.2	0.0	7.1	2.0	1.6	1.1	4.6	4.9	8.5
Places to get nets are too far/ too expensive to get to	2.9	6.3	0.0	3.3	1.4	5.0	1.5	4.0	3.1	4.3	3.7	1.0	2.4
Net cannot fit on sleeping space	2.7	3.2	1.8	5.7	1.4	0.0	3.0	2.4	1.6	4.3	2.8	1.9	2.4
Other	5.6	7.9	5.5	3.3	9.6	3.8	3.0	7.5	4.7	8.7	7.4	3.9	2.4
Don't know	6.0	1.6	10.0	4.1	4.1	8.8	7.6	4.8	6.3	2.2	2.8	7.8	12.2
BASE	449	63	110	123	73	80	197	252	64	92	108	103	82

5.6 EXPOSURE TO INFORMATION ON ITNS

Respondents who had heard of nets were asked whether they had heard or seen any information about ITNs in the last 12 months, and where they had heard/seen the information.

- Less than half of respondents — 42% — had heard or seen something about nets treated with insecticide in the last twelve months. (Those who had never heard of nets were assumed not to have heard/seen information and were not asked the question.) Exposure to information varied by site and was lowest in Dessie (23%) and highest in Bahir Dar (52%) and Dire Dawa (53%). Urban respondents were more likely than rural respondents (59% vs. 30%) to have heard/seen something on ITNs. There was a strong association between SES and exposure, with exposure increasing with SES.
- Those who had heard or seen information were more likely to own a net, and far more likely to own a *treated* net, than those who had not been exposed to information. Among those exposed to information, 19% owned a net (untreated) and 29% owned a treated net. Among those not exposed, 6% owned a net and 3% owned a treated net.

Figure 5.3

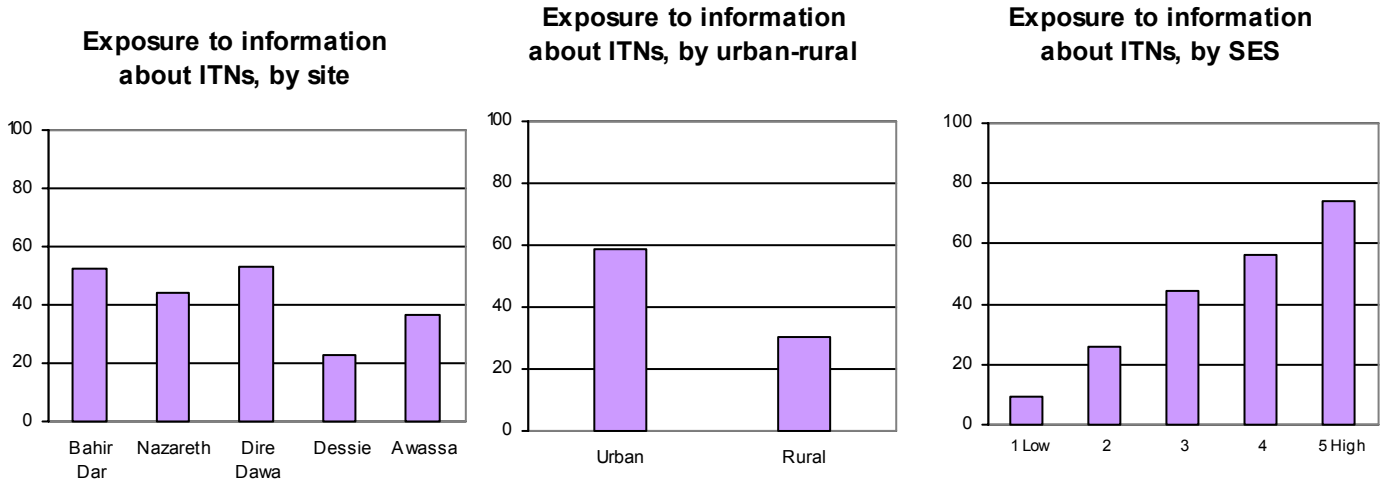
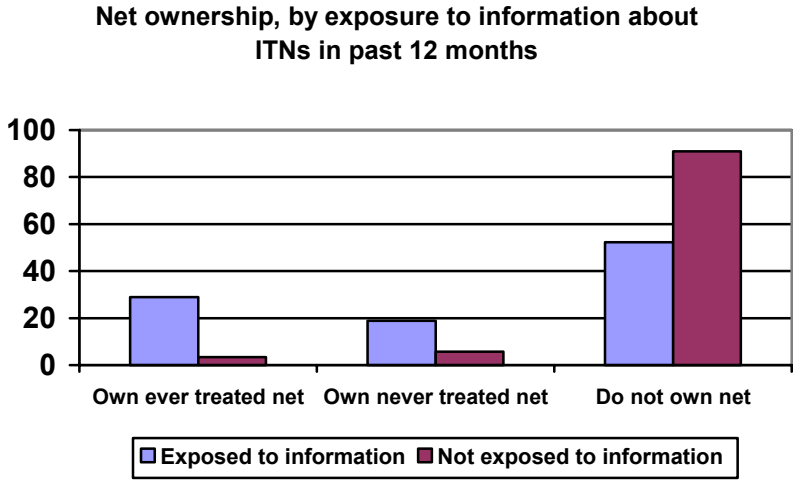


Figure 5.4



- The main sources of information for those who had heard/seen information on ITNs in the last 12 months were were radio (57%) and TV (41%). Interpersonal sources—friends/neighbors/family and health staff—were far less common, at 17% and 15% respectively.
- Exposure to information on ITNs via radio was approximately equal in urban and rural areas, but exposure via TV was much higher in urban (55%) than in rural areas (23%). However, it was still the second highest information source in rural areas.

Table 5.13 Seen or head anything about mosquito nets treated with insecticide in past 12 months
Among all respondents

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
No	58.2	47.8	55.9	47.0	76.9	63.5	41.0	69.7	91.0	74.5	55.5	44.0	26.0
Yes	41.8	52.2	44.1	53.0	23.1	36.5	59.0	30.3	9.0	25.5	44.5	56.0	74.0
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

Table 5.14 Percent who own a net, ever-treated net, and no net, by exposure to communication in last 12 months
Among all respondents

	Has heard information about ITNs in past 12 months		
	No	Yes	Total
Own an ever treated net	3.4	28.9	14.1
Own an untreated (never treated) net	5.7	18.9	11.2
Do not own a net	90.9	52.2	74.7

Table 5.15 Source of message on ITNs
Among those who saw/heard information on treated nets (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Radio	56.5	70.5	47.2	49.5	63.0	53.4	53.8	59.9	27.8	51.0	74.2	57.1	50.7
TV	40.9	28.6	37.1	62.9	28.3	39.7	55.1	22.5	22.2	13.7	25.8	39.3	62.8
Friends	17.2	12.4	19.1	13.3	26.1	21.9	16.1	18.7	33.3	23.5	13.5	22.3	11.5
Health staff	14.8	22.9	16.9	8.6	10.9	12.3	12.7	17.6	27.8	17.6	13.5	9.8	16.9
Staff in shop	2.6	6.7	1.1	.0	4.3	1.4	2.5	2.7	.0	5.9	1.1	3.6	2.0
Organization	2.6	4.8	1.1	3.8	2.2	.0	3.4	1.6	.0	5.9	.0	3.6	2.7
Poster in health facility	1.4	1.9	1.1	.0	2.2	2.7	1.7	1.1	.0	.0	2.2	1.8	1.4
Poster in shop	1.0	1.0	2.2	.0	.0	1.4	1.7	.0	.0	.0	.0	.0	2.7
School	1.0	2.9	.0	.0	2.2	.0	1.3	.5	.0	2.0	3.4	.0	.0
Newspaper	.7	1.9	.0	1.0	.0	.0	1.3	.0	.0	.0	.0	.0	2.0
Women's group	.2	.0	.0	1.0	.0	.0	.0	.5	.0	2.0	.0	.0	.0
Church	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Drama group	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Billboards	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Other	.7	2.9	.0	.0	.0	.0	1.3	.0	11.1	.0	.0	.9	.0
BASE	418	105	89	105	46	73	236	182	18	51	89	112	148

Table 5.16 Content of message about ITNs in the last 12 months

Among those who had heard/seen something in the last 12 months (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	Urban	Rural	1 Low	2	3	4	5 High
Mosquitoes kill	23.2	28.6	29.2	21.0	15.2	16.4	23.7	22.5	16.7	23.5	20.2	21.4	27.0
Kill mosquitoes	15.3	24.8	14.6	4.8	17.4	16.4	14.0	17.0	27.8	15.7	15.7	16.1	12.8
Prevent woba	15.3	14.3	20.2	18.1	21.7	2.7	11.4	20.3	22.2	21.6	14.6	18.8	10.1
Protect against mosquitoes/bites	14.6	16.2	4.5	15.2	32.6	12.3	17.4	11.0	11.1	15.7	18.0	13.4	13.5
Good to use	12.4	19.0	2.2	14.3	21.7	6.8	13.6	11.0	5.6	7.8	16.9	11.6	12.8
Person hitting/ slapping/ trying to kill mosquito	11.7	10.5	9.0	19.0	0.0	13.7	9.7	14.3	11.1	9.8	10.1	10.7	14.2
Treat net	6.5	13.3	2.2	8.6	4.3	0.0	7.6	4.9	0.0	3.9	7.9	3.6	9.5
Mosquitoes/ woba dangerous for pregnant women	4.8	7.6	2.2	1.9	13.0	2.7	5.1	4.4	0.0	5.9	4.5	8.0	2.7
Mosquito that falls/dies	3.8	4.8	1.1	5.7	4.3	2.7	4.7	2.7	0.0	2.0	2.2	2.7	6.8
Demonstration on how to use a net	3.6	1.9	4.5	2.9	8.7	2.7	2.5	4.9	0.0	2.0	2.2	3.6	5.4
Mosquitoes/ woba dangerous for young children	3.1	5.7	2.2	1.9	2.2	2.7	3.8	2.2	0.0	5.9	1.1	4.5	2.7
Prevent illnesses	1.7	2.9	0.0	1.9	0.0	2.7	0.8	2.7	0.0	3.9	1.1	1.8	1.4
NetMark	1.4	0.0	5.6	0.0	2.2	0.0	1.7	1.1	0.0	0.0	1.1	0.9	2.7
Mosquito flying	1.2	2.9	0.0	1.0	2.2	0.0	1.3	1.1	0.0	2.0	0.0	3.6	0.0
Saw a treated net	0.7	1.0	1.1	1.0	0.0	0.0	0.8	0.5	0.0	2.0	0.0	0.0	1.4
Dawa	0.5	1.0	0.0	0.0	2.2	0.0	0.4	0.5	0.0	0.0	1.1	0.0	0.7
Someone sleeping well	0.5	0.0	0.0	0.0	0.0	2.7	0.8	0.0	0.0	0.0	0.0	1.8	0.0
Economical	0.5	0.0	1.1	0.0	0.0	1.4	0.4	0.5	0.0	0.0	1.1	0.0	0.7
Where to get a net	0.2	0.0	1.1	0.0	0.0	0.0	0.0	0.5	0.0	0.0	1.1	0.0	0.0
Other	1.4	1.0	2.2	2.9	.0	.0	.0	3.3	.0	3.9	1.1	1.8	.7
Don't know	11.7	6.7	15.7	9.5	.0	24.7	14.0	8.8	22.2	9.8	6.7	10.7	14.9
BASE	418	105	89	105	46	73	236	182	18	51	89	112	148

SECTION 6
OTHER CONSUMER PREFERENCES AND PERCEPTIONS

This section contains information of particular interest to the commercial sector. It covers

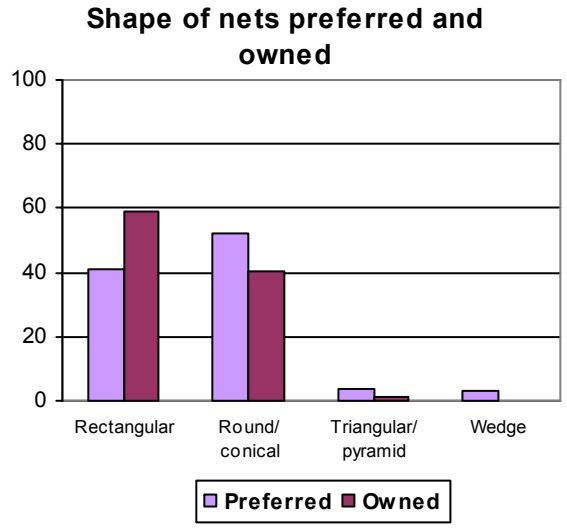
1. consumers' preferred size, shape, and color for a net
2. unprompted, prompted, and total awareness of mosquito net brands
3. awareness and use of other mosquito control products

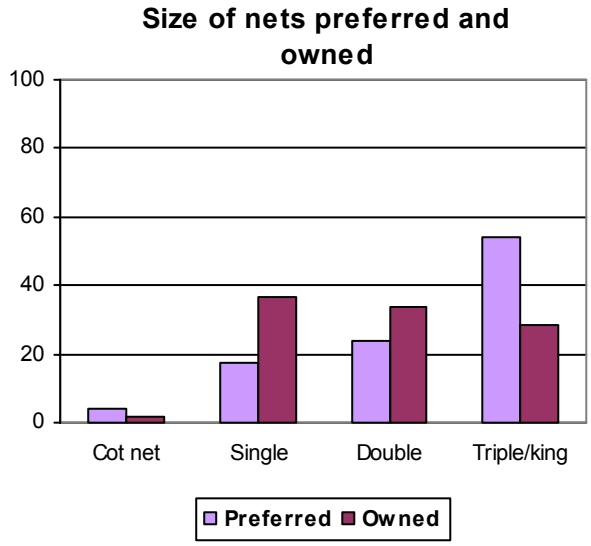
In Ethiopia there is rather low awareness and use of consumer products, and we omitted questions on attributes associated with various mosquito control products that were asked in other countries.

6.1 PREFERRED NET SIZE, SHAPE, AND COLOR

Section 4 described the size, shape and color of nets *owned*, which largely reflects characteristics of nets currently available. This section reports on the characteristics of nets that consumers *prefer*. Questions on preferences were asked of all respondents, whether or not their household owned a net. This information can be used to develop and supply nets with features that consumers want.

Figure 6.1





Size

Respondents were shown a card depicting different sized nets and asked which one they preferred.

- Large nets are preferred: 54% preferred king-sized (triple) nets and 24% doubles.
- The preference for triple/king nets, especially in rural and low SES households contrasts with the fact that only 29% of nets owned are this size, suggesting a potential market for the largest size nets, if reasonably priced.

Shape

Respondents were also shown a card with different shaped nets on it, and were asked which one they preferred.

- Conical nets were preferred by just over half (52%) and rectangular by 41% of respondents. Conical nets were especially preferred in urban areas (60%) and in the highest SES quintile (58%).
- Few preferred triangle/pyramid (4%) or wedge (3%) shaped nets, though these shapes may not be known or available.
- Although 52% preferred a conical net, fewer (40%) owned this shape, suggesting that conical nets would sell well if reasonably priced.

Color

Respondents were shown a card with samples of netting in different colors.

- Colored nets were preferred by 89% of respondents, white nets by 11%. The preferred colors were green (20%, plus 4% who preferred sea green and 8% who preferred olive green) and turquoise (13%).
- Turquoise and greens were equally popular in urban and rural areas, while white was more popular in urban and upper SES levels.
- Twenty-seven percent (27%) disliked black and 11% disliked white. No other color shown was disliked by more than 5% of the overall sample.

Table 6.1 Net size preferences
Among all respondents who have heard of nets

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Single	17.6	27.1	15.4	12.4	25.3	10.9	17.9	17.4	10.0	16.8	24.3	15.2	17.8
Double	24.1	21.5	26.3	26.5	24.2	20.9	26.3	21.8	21.4	22.4	21.1	26.4	26.2
Triple/ King	54.2	50.0	57.1	54.7	42.4	63.6	52.5	55.9	65.7	57.0	48.7	55.1	51.8
Cot-net	4.2	1.4	1.3	6.5	8.1	4.7	3.4	5.0	2.9	3.7	5.9	3.4	4.2
BASE	698	144	156	170	99	129	358	340	70	107	152	178	191

Table 6.2 Net shape preferences
Among all respondents who have heard of nets

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Rectangular	40.8	48.6	38.7	42.6	48.5	26.2	34.1	47.9	42.6	44.3	42.1	41.0	37.0
Conical	52.4	48.6	54.8	47.9	45.5	65.1	59.7	44.7	48.5	50.0	49.3	51.7	58.2
Triangle	3.5	.7	3.9	3.6	5.1	4.8	3.1	3.8	8.8	1.9	4.6	2.8	2.1
Wedge	3.3	2.1	2.6	5.9	1.0	4.0	3.1	3.6	.0	3.8	3.9	4.5	2.6
BASE	693	144	155	169	99	126	355	338	68	106	152	178	189

Table 6.3 Net color preferences

Among all respondents who have heard of nets and had a preference

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Green	20.2	40.3	14.6	13.5	24.5	10.1	20.7	19.6	27.1	20.2	21.7	14.7	21.5
Turquoise	12.9	15.3	16.5	7.1	11.2	14.7	12.0	13.7	15.7	16.5	13.2	12.4	9.9
White	11.3	9.0	11.4	12.4	6.1	16.3	13.7	8.8	5.7	7.3	10.5	11.9	15.7
Olive Green	7.6	5.6	8.2	7.1	9.2	8.5	7.6	7.6	2.9	7.3	6.6	7.9	9.9
Pink	7.3	1.4	9.5	10.6	7.1	7.0	7.3	7.3	0.0	5.5	5.3	10.7	9.4
Dark blue	6.2	4.2	3.8	4.1	9.2	11.6	6.2	6.1	4.3	6.4	7.9	7.3	4.2
Black	5.6	6.9	5.1	7.1	6.1	2.3	5.3	5.8	5.7	7.3	4.6	5.6	5.2
Gray	5.3	1.4	5.7	6.5	3.1	9.3	5.6	5.0	5.7	8.3	2.6	6.2	4.7
Multi-colored	5.0	2.8	4.4	5.3	10.2	3.9	4.8	5.3	5.7	5.5	9.2	4.0	2.1
Orange	4.7	2.1	8.2	6.5	1.0	3.9	2.5	7.0	10.0	4.6	5.3	4.5	2.6
Light blue	4.3	0.7	6.3	5.9	5.1	3.1	4.5	4.1	5.7	2.8	3.9	2.8	6.3
Sea Green	3.9	3.5	4.4	2.9	5.1	3.9	4.2	3.5	5.7	2.8	3.3	5.6	2.6
Peach	3.1	4.2	1.9	4.1	1.0	3.9	3.4	2.9	1.4	2.8	4.6	3.4	2.6
Yellow	2.7	2.8	0.0	7.1	1.0	1.6	2.2	3.2	4.3	2.8	1.3	2.8	3.1
Light green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dark green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BASE	699	144	158	170	98	129	357	342	70	109	152	177	191

Table 6.4 Net color dislikes

Among all respondents who have heard of nets.

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Black	27.2	22.9	28.5	31.6	20.2	30.0	26.5	27.9	28.6	22.0	24.2	34.3	25.5
White	10.7	12.5	7.6	11.1	17.2	6.9	10.6	10.8	7.1	10.1	10.5	9.6	13.5
Gray	7.0	2.1	9.5	5.8	3.0	13.8	6.4	7.6	7.1	10.1	6.5	5.1	7.3
Yellow	6.8	11.1	6.3	5.8	8.1	3.1	5.9	7.8	5.7	7.3	7.8	3.4	9.4
Pink	5.8	6.9	5.1	5.8	7.1	4.6	8.1	3.5	2.9	5.5	5.2	9.0	4.7
Peach	5.4	4.2	7.0	5.3	4.0	6.2	3.9	7.0	7.1	2.8	5.2	5.1	6.8
Dark blue	5.0	2.8	7.6	5.8	4.0	3.8	6.1	3.8	1.4	3.7	5.9	6.2	5.2
Orange	4.1	8.3	2.5	1.8	5.1	3.8	4.7	3.5	4.3	4.6	5.2	2.8	4.2
Olive Green	4.1	1.4	5.1	4.7	3.0	6.2	4.7	3.5	1.4	6.4	2.6	5.6	3.6
Multi-colored	4.1	5.6	5.7	2.3	1.0	5.4	5.0	3.2	4.3	5.5	3.3	2.8	5.2
Light blue	2.8	2.1	3.2	1.8	2.0	5.4	1.1	4.7	4.3	6.4	2.0	2.2	1.6
Green	2.3	0.7	3.8	2.9	0.0	3.1	2.2	2.3	5.7	2.8	2.0	1.1	2.1
Sea Green	1.4	1.4	1.9	1.8	2.0	0.0	2.0	0.9	0.0	0.0	2.0	1.7	2.1
Turquoise	1.1	0.7	1.9	1.2	2.0	0.0	0.8	1.5	2.9	0.9	1.3	0.6	1.0
Light green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dark green	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Don't know	12.0	17.4	4.4	12.3	21.2	7.7	11.7	12.2	17.1	11.9	16.3	10.7	7.8
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

6.2 AWARENESS OF MOSQUITO NET BRANDS

Respondents were asked to name the brands of mosquito nets and ITNs they were aware of, even if they did not use them (unprompted awareness). Then they were shown a card with the name and logo of different brands. The interviewer read aloud each name/brand and asked the respondent to indicate which other brands, apart from any already mentioned, they recognized (prompted awareness). Since "NetMark" will be used in promotional ads, it was included on the card, even though it is not a brand. UNICEF was also included, since subsidized nets are from UNICEF. The following tables show respondent unprompted, prompted, and total brand awareness.

- Very few (4%) could name a brand of net or ITN spontaneously (unprompted).
- Total awareness, as calculated by the addition of unprompted and prompted responses, was highest for UNICEF (32%) and MossNet (12%).
- Half of respondents did not recognize any brand even after being shown the pictures and told the names.

Table 6.5 Awareness of mosquito net brand names, unprompted
Among all respondents who have heard of nets (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
NetMark	1.6	6.3	0.0	0.6	0.0	0.8	2.8	0.3	0.0	0.0	1.3	0.6	4.2
SafeNite	1.1	2.1	0.0	0.0	1.0	3.1	2.0	0.3	0.0	0.9	0.7	1.1	2.1
UNICEF	1.0	4.2	0.0	0.6	0.0	0.0	1.1	0.9	0.0	0.0	2.0	0.0	2.1
MossNet	0.7	2.8	0.0	0.6	0.0	0.0	1.1	0.3	0.0	0.0	0.0	0.0	2.6
Peaceful Sleep	0.7	3.5	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	2.6
777	0.3	0.7	0.0	0.0	0.0	0.8	0.6	0.0	0.0	0.0	0.7	0.0	0.5
Other	.1	.0	.0	.6	.0	.0	.0	.3	.0	.0	.0	.0	.5
No brand mentioned	96.2	88.2	100.0	98.2	99.0	95.4	94.1	98.3	100.0	99.1	96.1	98.3	91.1
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Table 6.6 Awareness of mosquito net brand names, prompted
Among all respondents who have heard of nets (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
UNICEF	30.5	30.6	34.8	41.5	18.2	20.0	31.6	29.4	22.9	22.0	25.5	33.1	39.6
MossNet	11.4	6.9	14.6	18.1	2.0	10.8	12.8	9.9	4.3	9.2	7.2	13.5	16.7
SafeNite	4.6	5.6	0.6	1.8	6.1	10.8	6.7	2.3	0.0	0.9	4.6	7.3	5.7
NetMark	3.8	4.9	2.5	4.7	2.0	4.6	3.4	4.4	4.3	2.8	3.3	2.2	6.3
777	3.7	0.7	7.0	4.7	1.0	3.8	4.5	2.9	0.0	1.8	4.6	2.2	6.8
Peaceful Sleep	3.4	2.8	2.5	2.9	3.0	6.2	4.5	2.3	0.0	4.6	2.0	2.8	5.7
No brand known	51.1	57.6	44.3	39.8	72.7	50.8	46.4	56.1	72.9	59.6	56.9	50.0	34.9
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

Table 6.7 Awareness of mosquito net brand names, total unprompted and prompted
Among all respondents who have heard of nets (multiple responses possible)

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
UNICEF	31.5	34.7	34.8	42.1	18.2	20.0	32.7	30.2	22.9	22.0	27.5	33.1	41.7
Moss Net	12.1	9.7	14.6	18.7	2.0	10.8	14.0	10.2	4.3	9.2	7.2	13.5	19.3
SafeNite	5.7	7.6	0.6	1.8	7.1	13.8	8.7	2.6	0.0	1.8	5.2	8.4	7.8
NetMark	5.4	11.1	2.5	5.3	2.0	5.4	6.1	4.7	4.3	2.8	4.6	2.8	10.4
Peaceful Sleep	4.1	6.3	2.5	2.9	3.0	6.2	5.9	2.3	0.0	4.6	2.0	2.8	8.3
777	4.0	1.4	7.0	4.7	1.0	4.6	5.0	2.9	0.0	1.8	5.2	2.2	7.3
Other	.1	.0	.0	.6	.0	.0	.0	.3	.0	.0	.0	.0	.5
No brand known	50.0	56.3	44.3	38.0	72.7	48.5	45.5	54.7	72.9	59.6	55.6	48.9	32.8
BASE	702	144	158	171	99	130	358	344	70	109	153	178	192

6.3 AWARENESS AND USE OF OTHER MOSQUITO CONTROL PRODUCTS

In order to understand the role of nets in the larger context of mosquito control products, respondents were asked whether they were aware of aerosol insecticides, and if so, whether they used them in the past year and how often, and where they last purchased them. In other countries surveyed, respondents were also asked about mosquito coils as well. However, coils are not commonly known or available in Ethiopia, so were not asked about. Respondents were also asked if they had door or window screens in their homes.

- About two-thirds (64%) of respondents were aware of aerosols. Urban respondents were more likely to be aware of them (77% versus 56%), and awareness increased with SES.
- Among respondents aware of aerosols, 34% (or 22% of all respondents) had used them in the past year.
- Among those who had used an aerosol during the past year, 40% (or 9% of all respondents) said they used them at least several times a week during mosquito season.
- Aerosols were most commonly purchased in local kiosks (58%). Another 16% obtained them from a pharmacy or chemist.
- Few households had door or window screens, but they were more common in the highest SES quintile. Fewer than 3% had screens in four sites, but 16% had screens in Dire Dawa, the site with lowest use of aerosols.

Figure 6.2

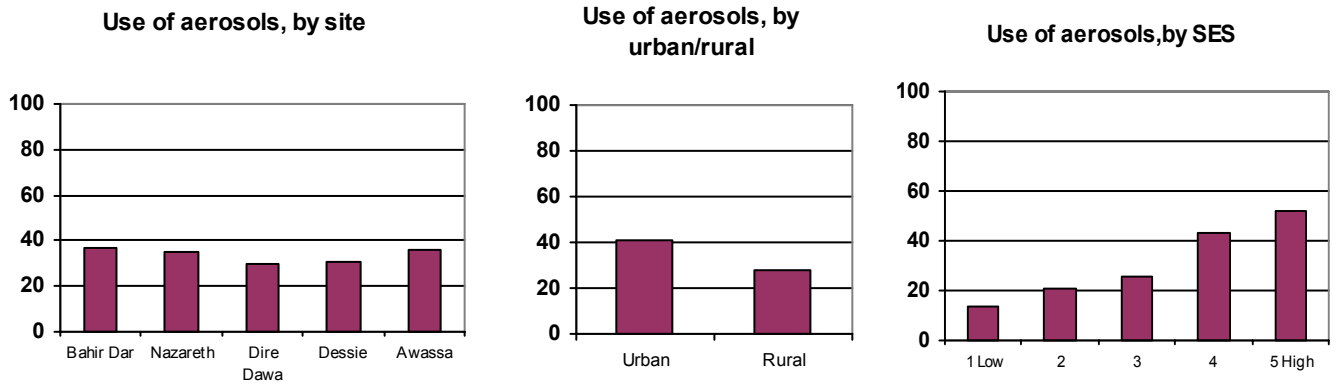


Table 6.8 Awareness of aerosol insecticides
Among all respondents

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
No	35.7	29.9	29.7	48.0	41.2	30.0	23.0	44.2	57.0	45.0	30.5	29.0	17.0
Yes	64.3	70.1	70.3	52.0	58.8	70.0	77.0	55.8	43.0	55.0	69.5	71.0	83.0
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

Table 6.9 Use of aerosol insecticides in last 12 months
Among respondents aware of aerosols

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
No	65.9	63.1	64.8	69.9	69.2	64.3	59.1	72.2	86.0	79.1	74.1	57.0	47.6
Yes	34.1	36.9	35.2	30.1	30.8	35.7	40.9	27.8	14.0	20.9	25.9	43.0	52.4
BASE	643	141	142	103	117	140	308	335	86	110	139	142	166

Table 6.10 Frequency of aerosol insecticide use

Among households that used aerosol insecticides in the 12 months before the interview

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Every day	15.7	15.4	18.0	25.8	13.9	8.3	16.8	14.1	8.3	8.7	11.4	14.8	20.9
Several times (2 to 6) a week	24.4	32.7	14.0	16.1	30.6	27.1	27.2	20.7	16.7	13.0	20.0	26.2	29.1
Once a week/ Several times a month	21.2	26.9	16.0	22.6	27.8	14.6	18.4	25.0	16.7	30.4	28.6	21.3	16.3
Once a month	19.8	13.5	24.0	16.1	19.4	25.0	19.2	20.7	16.7	26.1	22.9	16.4	19.8
Less than once a month	18.4	9.6	28.0	19.4	8.3	25.0	17.6	19.6	41.7	17.4	17.1	21.3	14.0
Other	.5	1.9	.0	.0	.0	.0	.8	.0	.0	4.3	.0	.0	.0
BASE	217	52	50	31	36	48	125	92	12	23	35	61	86

Table 6.11 Place where aerosol insecticides were purchased

Among households that used aerosol insecticides in the 12 months before the interview

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Market	1.9	.0	2.1	3.2	3.0	2.0	1.7	2.2	.0	4.5	.0	3.6	1.1
Local kiosk	57.8	80.0	52.1	9.7	72.7	61.2	62.0	52.2	33.3	63.6	71.4	56.4	55.2
Street / table top vendor	.5	.0	.0	3.2	.0	.0	.8	.0	.0	.0	.0	.0	1.1
Itinerant vendor	.5	.0	.0	.0	3.0	.0	.8	.0	.0	.0	.0	.0	1.1
Wholesaler	3.8	.0	4.2	12.9	.0	4.1	3.3	4.4	8.3	.0	.0	5.5	4.6
Pharmacy / chemist	15.6	14.0	12.5	41.9	6.1	10.2	15.7	15.6	33.3	9.1	5.7	18.2	17.2
Drug store	1.4	.0	2.1	3.2	.0	2.0	.8	2.2	.0	9.1	2.9	.0	.0
Petrol station / Mobil mart	1.9	.0	4.2	.0	3.0	2.0	.8	3.3	.0	4.5	5.7	.0	1.1
Minimart / Convenience Store / Supermarket	2.8	.0	2.1	.0	3.0	8.2	5.0	.0	.0	.0	.0	5.5	3.4
General shop	12.3	4.0	18.8	22.6	9.1	10.2	8.3	17.8	16.7	4.5	14.3	10.9	13.8
Other	1.4	2.0	2.1	3.2	.0	.0	.8	2.2	8.3	4.5	.0	.0	1.1
BASE	211	50	48	31	33	49	121	90	12	22	35	55	87

Table 6.12 Percent of households with window or door screens

Among all respondents

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
Yes	4.0	.0	3.0	16.2	.5	.5	5.3	3.2	1.0	2.5	3.5	4.0	9.0
No	96.0	100.0	97.0	83.8	99.5	99.5	94.8	96.8	99.0	97.5	96.5	96.0	91.0
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

SECTION 7
PROGRAM AND PRODUCT IMPLICATIONS

GENERAL

There is not yet a culture of net use in Ethiopia, but the household survey data suggest opportunities and challenges for ITN supply, ownership, and use in Ethiopia.

Favorable factors include:

- Where nets and ITNs have been made available (e.g., Bahir Dar) they have been readily accepted.
- Although our sampling procedures differ from those of the DHS, our data suggest that net and ITN ownership and use are increasing from the time the DHS was implemented in 2000.
- The low level of familiarity with nets and especially with treated nets means that there may be fewer preconceptions to counter in order to encourage ownership. There may be an opportunity to position ITNs as a new and desirable product.
- The rather low awareness and use of alternative insect control products mean that nets/ITNs can fill the need for malaria and insect protection with little competition; there is no need to position ITNs against other mosquito control products.
- In net-owning households, the youngest children are given preference for sleeping under a net and it should be easy to reinforce and expand this practice.
- There is an extremely high level of perceived advantages of net and ITN use by vulnerable groups and extremely low level of perceived disadvantages; in particular few have concerns about the insecticide.
- Although nets in Ethiopia have been principally donor-supplied, most nets owned came from commercial sources, indicating that many people are willing to purchase nets at partially-subsidized or full-market prices.
- The Amharic term for malaria (*woba*) is universally recognized, and promotional messages can use this term and be widely understood.
- Since men are the main procurers of nets/ITNs, promotional efforts to encourage families to obtain ITNs must include them as a primary target group.

Challenges include:

- A substantial minority of people have not even heard of nets, so there is much basic work to be done just to initiate awareness.
- Perceived (and actual) high cost of nets means that ownership is currently concentrated in the highest SES households; targeted subsidy programs must be instituted for the poorest and most vulnerable, with safeguards to prevent leakage.
- Current efforts to deliver low-cost or free ITNs have helped increase coverage, but the poorest segments of the population have not benefited. Significant quantities of untargeted free and heavily subsidized nets are found in upper SES households. Efforts to better segment the market and target subsidized products are essential in order to ensure that subsidies reach those who need them most, are not wasted on those who can afford commercial prices, and to help the commercial sector—a sustainable source of ITNs—continue to develop.

- There is limited access to ITNs in some areas. Where the commercial market can fill this gap, it should be encouraged to do so. In contexts where the commercial sector is not well suited to fill the void, NGOs and the public sector should be encouraged to do so.
- There is lack of variety in net size, shape, and color; and mismatch between the size, shape and colors people have and what they prefer. With consumer price-point sensitivity in mind, efforts should be made to provide consumers with the type of product they prefer.
- The rather low education levels have implications for communication approaches and for comprehension of product use and treatment instructions.
- Net branding is weak. Commercial firms should be encouraged to develop and build their own brands.
- Pregnant women are not given preference for net net/ITN use. This should be addressed in behavior change communication campaigns.
- There is inadequate knowledge about the cause of malaria that may limit the perception of ITNs as a solution to malaria.

Specific program and product implications from the baseline study presented in this report are outlined below. (See also *NetMark Qualitative Research on Insecticide-Treated Nets in Ethiopia* at www.netmarkafrica.org for other product and program implications that were derived from that study.)

MOSQUITO NET/ITN OWNERSHIP

- ITN ownership is low and needs to be raised significantly to achieve substantive public health impact.
- There is great variation in awareness, ownership and use of nets and treated nets by site. Different strategies are needed on a site by site basis, depending on what the site data say the specific focus of efforts should be.
- Availability of ITNs is a problem, particularly in Dire Dawa and Dessie, and in rural and lower SES areas. The commercial, NGO, and public sectors are needed, working in a coordinated fashion and segmenting the market, to make ITNs more widely available and used.
- ITNs need to be made more affordable for lowest SES households, and special strategies that allow these households to acquire free or highly subsidized nets should be implemented.
- Although cost is cited as the top barrier to net/ITN ownership (even among the highest SES level), the fact that one-quarter of households own a net and that most of those nets are from the commercial sector indicates that nets/ITNs are valued enough to warrant purchase. Furthermore, lack of availability and lack of perceived need were significant reasons for non-ownership, as well. Indeed, cost may not in fact be the major barrier, except at the lowest SES levels.
- Half of all nets were acquired by the husband and about one-quarter by the female respondent. ITN purchase messages may need to be targeted differently to various household members. Alternatively, an attempt to include the woman and husband in the same communication materials might be useful.

NET TREATMENT

- Some consumers are unsure whether their nets are treated. Ideally a visible indicator on the net to show whether it has been treated, and whether the treatment is still effective, could be found.
- Most people have not even heard of treated nets. An essential first step to promoting ITN ownership is to raise awareness of ITNs. Mass treatment campaigns also should be considered and ITNs (pre-treated and bundled),

as well as treatment kits should be more widely available in the commercial sector. Promotional and communication strategies can position ITNs as a new product that kills or repels mosquitoes and other insects.

- The methods and approaches to communicating about treatment, including treatments that convert nets to ITNs, must take into account the relatively low levels of literacy and education, which will make it difficult for many to understand instructions included in packaging, even in pictorial form. Commercial partners selling treatment kits will likely need to include significant person-to person communication and product demonstrations in their marketing plans.

APPROPRIATE USE

- There should be messages regarding the special need for women of reproductive age, and especially pregnant women, to sleep under an ITN. It will be important to increase knowledge as well as understand any non-knowledge related barriers to pregnant women sleeping under an ITN.
- Given that many families use their nets only part of the year, once ownership levels in the country are satisfactory, a second stage of behavior change strategies will be needed to encourage year-round net use in areas of stable transmission and address any barriers to doing so. It would be important to have a better understanding of the barriers to year-round use in order to inform the behavior change communication strategy and content.

CONSUMER PREFERENCES AND PERCEPTIONS

- The characteristics of nets owned do not match consumer preferences. Product distribution should take into consideration consumer preferences for king-sized nets, (rectangular and especially conical nets), and more variety of color to raise sales and enhance strength of brand. Distribution plans should be adjusted to shape and color preferences by geographical location (site, urban-rural). Brand owners and distributors who specialize in colored, conical, or king-size nets could distinguish their brand on the basis of these characteristics to gain market share. Decisions to promote colored nets should be balanced with scientific evidence of the efficacy and duration of treatment products on colored fabric.
- There is very low brand recognition, even among net-owners. Commercial manufacturers and distributors should be encouraged to invest in brand promotion. Brand owners and distributors will need to more actively build their brands through a range of above-the-line and below-the-line activities, such as point-of-purchase promotions, television, radio, and point-of-sale materials. Brand-specific advertising is likely to be most effective if it is associated with the benefits and features that consumers want.

KNOWLEDGE AND BELIEFS ABOUT MALARIA AND MOSQUITOES

- A substantial minority are unaware that mosquito nets—much less treated nets—exist. Radio promotion will not be effective unless people also have the opportunity to see the product, for example if it becomes readily available in new areas.
- Recognition of the Amharic term for malaria was very high, meaning that the term will be understood by the majority of people when used in promotion. Use of a single term around which educational efforts can build a common understanding is important in efforts to promote behavior change.
- There is rather low association of mosquitoes with malaria. Messages emphasizing that night-biting mosquitoes are the only cause of malaria are needed and could further increase the value of ITNs for the consumer.

ANNEX A:
SAMPLING PLAN AND PROCEDURE

The following is a description of the sampling plan, as well as a comparison of this sample with national random samples.

A1. PLAN AND PROCEDURE

The sample was composed of 1000 Ethiopian households. Respondents were women of reproductive age (15-49) who were mothers or guardians of children under five years of age.

In the interest of comparability, the same procedure was used in all countries surveyed. A multistage sampling procedure was used to select respondents, as follows.

1- Selection of primary sampling units: Purposive sampling was used to select the five primary sites: Bahir Dar, Nazret, Dire Dawa, Dessie and Awassa. Only sites in malarious areas were selected. In all other countries surveyed, the capital city was included; however, since malaria is not a significant problem in Addis Ababa, the capital was not included for the Ethiopia survey. Further criteria included geo-ethnic diversity and the potential for NetMark to be active in product distribution and/or programs to provide targeted subsidies for vulnerable groups.

In each site, the target sample was 200: 80 respondents from the urban center, and 120 households from up to 200 kilometers from the urban center. Therefore, the sample has an urban-rural ratio of 40:60. The sample is proportionately more urban than that of the country as a whole. The 1994 census was 14% urban and the Demographic and Health Survey of 2000 was 26% urban.

2- Selection of sampling points: Within each of the five sites, 20 sampling points (villages or urban neighborhoods) were randomly selected from electoral lists using quota sampling: 8 from within the city (urban) and 12 from within 200 kilometer radius from the city (rural). Ten households per sampling point were selected for inclusion.

This stratification scheme was designed to meet the purposes of the evaluation. Since a key objective of NetMark is to increase ownership of ITNs across the socio-economic spectrum, it was essential to include urban centers with the potential to be reached by product distribution systems, as well as include households located at varying distances from the urban center where lower socio-economic status (SES) individuals typically reside.

3- Selection of households: Ten interviews were conducted per sampling point, each in a different household. For each sampling point, a starting point (a fixed landmark or address) and the direction from which to start the data collection were chosen. Interviewers were instructed to go to the starting point and walk in the chosen direction until they located a residence with a qualified respondent. After a successful interview, interviewers were instructed to skip five residences (or less if residences were far apart) and seek another qualified respondent.

4- Selection of eligible respondents: An eligible respondent for the evaluation was a female 15-49 years old who was the parent or guardian of a child less than five years old, i.e., aged 0-4. Females aged 15-49 were selected to maximize the sample size for calculating the proportion of females of reproductive age sleeping under a net. Similarly, only those women who had a child under five were included, to maximize the sample size for calculating the proportion of children under five sleeping under a net.

A2. HOW THE SAMPLE MAY DIFFER FROM NATIONALLY RANDOM SAMPLES

This sampling procedure was designed to meet the purposes of this study. This procedure may result in findings that would differ from those obtained from a true national random sample (which was neither desirable nor feasible for this study):

a) Only households with children under five were included in the sample, and households with young children are more likely than others to own a net.

b) The sample was drawn only from areas where malaria is a problem. Net ownership will be higher in areas where malaria is a problem.

c) The sample contains a higher proportion of urban respondents that does the country as a whole. Since net ownership is higher in urban areas, net ownership in this sample will be higher than that obtained by a true random sample.

d) Various organizations have had net/ITN promotional activities in areas in Ethiopia included in the study. (See introduction for description.) Because there are five primary sites rather than a randomly distributed sample, if a site is unusually high or low in coverage, it will have a disproportionate impact on the overall ownership and use figures. For example, if a donor or project were particularly active in a site and coverage is very high, that high coverage will count as 20% of the entire sample, even though the site does not account for 20% of the population nationally.

e) Only women of reproductive age were selected as respondents. Responses from men or from older women may differ from those of the women in the sample.

ANNEX B
CHARACTERISTICS OF THE SAMPLE AND SES SCALE

This Annex provides tables of variables describing respondents and households in the sample, as well as a description of how variables were combined to construct a socio-economic status (SES) scale.

B1. CHARACTERISTICS OF RESPONDENTS

Table B.1 Characteristics of respondents

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
AGE GROUP													
15-19 years	8.4	11.8	7.6	4.1	10.1	10.0	7.8	9.0	11.4	12.8	7.8	10.1	3.6
20-29 years	50.0	44.4	55.7	44.4	51.5	55.4	50.0	50.0	42.9	45.9	45.8	58.4	50.5
30+ years	41.6	43.8	36.7	51.5	38.4	34.6	42.2	41.0	45.7	41.3	46.4	31.5	45.8
MEAN	29	28	28	31	27	27	29	29	29	29	29	27	29
EDUCATION													
None	35.9	46.3	36.1	32.3	34.2	30.5	21.8	45.3	77.5	55.0	24.5	14.0	8.5
1-6 years	19.4	12.9	20.3	18.7	19.1	26.0	14.3	22.8	16.5	26.5	29.0	17.5	7.5
7-8 years	12.3	8.5	16.3	13.1	12.1	11.5	13.0	11.8	4.0	6.0	21.5	18.5	11.5
9-12 years	28.1	26.4	23.8	33.8	30.2	26.5	43.0	18.2	2.0	11.5	23.5	46.5	57.0
13+ years	4.3	6.0	3.5	2.0	4.5	5.5	8.0	1.8	.0	1.0	1.5	3.5	15.5
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

B2. CHARACTERISTICS OF HOUSEHOLDS

Table B.2 Characteristics of households

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	Urban	Rural	1 Low	2	3	4	5 High
Number of households with complete family enumeration data*	702	144	158	171	99	130	358	344	70	109	153	178	192
Average number of people in HH	4.8	4.3	5.2	4.8	4.6	5.3	4.6	5.1	5.2	4.8	4.7	4.7	4.9
Average number of women of reproductive age in HH	1.5	1.4	1.6	1.5	1.3	1.5	1.5	1.4	1.3	1.4	1.4	1.5	1.6
Average number of children under 5 in HH	1.1	1.1	1.1	1.1	1.2	1.2	1.1	1.2	1.2	1.1	1.2	1.1	1.1

*See section B5

B3. SOCIOECONOMIC CHARACTERISTICS OF HOUSEHOLDS

Table B.3 Socio-economic status (SES) indicators

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
HEAD OF HOUSEHOLD													
Respondent	20.2	25.4	17.3	32.8	17.1	8.5	20.0	20.3	28.0	25.0	21.5	13.5	13.0
Husband	71.6	66.2	73.3	60.1	77.4	81.0	69.3	73.2	66.5	66.0	72.5	78.5	74.5
Father	2.6	2.5	1.5	2.0	2.0	5.0	2.3	2.8	2.0	3.0	2.0	3.0	3.0
Brother	.5	.0	1.5	.0	.0	1.0	.5	.5	.0	.5	.0	.5	1.5
Mother	3.8	5.0	4.5	3.0	2.5	4.0	5.5	2.7	2.5	5.0	3.5	2.5	5.5
Sister	.6	.0	1.0	1.0	.5	.5	1.3	.2	.5	.0	.0	1.5	1.0
Other	.7	1.0	1.0	1.0	.5	.0	1.3	.3	.5	.5	.5	.5	1.5
INCOME REGULARITY													
Regular	34.7	39.3	27.7	34.3	38.7	33.5	49.0	25.2	2.0	11.5	37.0	56.5	66.5
Occasional	42.5	46.3	47.0	48.5	42.2	28.5	45.5	40.5	36.5	57.0	52.5	36.0	30.5
Seasonal	22.6	14.4	24.3	17.2	19.1	38.0	5.0	34.3	61.5	31.0	10.5	7.0	3.0
Don't know	.2	.0	1.0	.0	.0	.0	.5	.0	.0	.5	.0	.5	.0
HEAD OF HOUSEHOLD'S YEARS OF SCHOOLING													
None	9.8	18.4	6.4	10.6	8.5	5.0	7.3	11.5	25.0	14.5	5.5	2.0	2.0
1-6 years	16.3	10.9	20.3	18.2	10.6	21.5	10.3	20.3	19.5	29.0	19.0	11.0	3.0
7-8 years	11.8	5.5	11.9	11.6	15.6	14.5	10.8	12.5	7.5	15.0	19.0	12.0	5.5
9-12 years	30.8	26.9	33.7	37.9	32.7	23.0	40.0	24.7	4.0	12.0	38.0	56.5	43.5
13+ years	12.8	15.9	8.9	9.1	11.1	19.0	22.0	6.7	.0	2.0	6.0	13.0	43.0
Don't know	18.5	22.4	18.8	12.6	21.6	17.0	9.8	24.3	44.0	27.5	12.5	5.5	3.0
HOUSEHOLD ASSETS													
Electricity	84.4	84.4	88.2	89.6	90.3	68.9	99.5	73.0	29.3	81.6	94.0	98.5	100.0
Working radio	80.9	82.6	79.5	90.7	74.1	77.6	88.4	75.3	35.3	71.1	89.0	95.0	98.5
Working TV	35.1	24.6	34.9	58.5	26.5	29.0	54.4	20.5	.0	.5	12.0	55.5	94.0
Working telephone	22.3	18.6	25.1	33.2	15.7	18.0	36.5	11.6	.0	1.1	3.0	21.5	77.5
Working refrigerator	14.1	9.6	14.9	28.0	4.3	12.6	25.7	5.3	.0	.0	.5	10.0	54.5
Working bicycle	12.4	16.8	11.8	8.8	1.1	24.0	20.2	6.5	.0	2.6	4.0	16.5	34.0
Working motorcycle	1.0	.6	.5	1.6	.5	1.6	2.0	.2	.0	.0	.0	1.0	3.5
Working automobile	4.0	3.0	3.6	5.7	3.2	4.4	6.3	2.3	.0	.0	.0	2.0	16.5
Cart	4.2	.0	4.6	8.8	.5	6.6	.8	6.8	11.3	7.4	2.5	2.0	.5
Plough	15.4	7.8	23.1	5.7	9.2	30.6	1.3	26.0	63.9	17.4	7.5	3.0	1.5
SOURCE OF DRINKING WATER													
Faucet in the house	31.5	25.9	32.7	41.4	27.1	30.5	49.5	19.5	.5	6.0	29.0	50.0	72.0
Public tap	49.4	49.8	52.0	30.3	70.9	44.0	45.5	52.0	45.5	69.0	62.0	46.0	24.5
Well in the household area	1.4	.5	2.0	4.5	.0	.0	1.3	1.5	.5	1.5	3.0	1.5	.5
Public well	2.3	1.5	3.0	6.6	.0	.5	.8	3.3	6.0	2.5	.5	2.0	.5
Bore hole, pump	3.7	2.5	4.5	10.6	.0	1.0	.5	5.8	8.5	7.5	2.0	.0	.5
Spring	3.6	2.0	4.0	1.5	.5	10.0	.0	6.0	12.0	4.0	1.0	.5	.5
River	6.7	15.4	1.5	2.0	.5	14.0	2.3	9.7	24.5	8.0	1.0	.0	.0
Pond/lake	.7	2.5	.0	.5	.5	.0	.0	1.2	2.5	.5	.5	.0	.0
Tanker truck	.5	.0	.0	2.5	.0	.0	.0	.8	.0	.5	.5	.0	1.5
Rainwater	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Bottled water	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Other	.2	.0	.5	.0	.5	.0	.3	.2	.0	.5	.5	.0	.0

	Total	Site (city plus surrounding rural areas)					Urban/Rural		Socio-Economic Status				
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural	1 Low	2	3	4	5 High
SANITARY FACILITIES													
Flush toilet in household	6.0	7.0	6.4	8.1	.5	8.0	12.8	1.5	.0	.5	.5	2.0	27.0
Flush toilet – shared	2.2	.0	1.5	5.6	1.5	2.5	3.0	1.7	.0	.0	2.0	3.0	6.0
Traditional pit latrine	64.9	62.7	65.8	61.1	66.3	68.5	63.8	65.7	38.5	77.0	81.5	80.0	47.5
Modernized pit latrine	9.2	4.0	10.4	16.2	11.6	4.0	13.8	6.2	2.0	2.0	10.0	13.5	18.5
Other	.2	.5	.0	.5	.0	.0	.5	.0	.0	.0	.5	.0	.5
No facility	17.5	25.9	15.8	8.6	20.1	17.0	6.3	25.0	59.5	20.5	5.5	1.5	.5
ENERGY SOURCE FOR COOKING													
Electricity	.7	.0	.5	2.5	.0	.5	.8	.7	.0	.0	.0	.0	3.5
LPG	12.2	3.0	19.8	16.7	9.0	12.5	23.3	4.8	.0	.5	6.0	20.0	34.5
Biogas	.5	.0	.0	.0	2.5	.0	1.3	.0	.0	.0	.5	1.0	1.0
Kerosene	11.1	6.5	10.9	19.2	16.6	2.5	19.5	5.5	.0	.0	8.5	18.5	28.5
Coal	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
Charcoal	19.0	26.4	11.4	29.3	17.6	10.5	28.8	12.5	3.0	10.5	29.0	31.5	21.0
Firewood	53.0	60.7	51.5	29.8	50.8	72.0	25.5	71.3	87.5	84.5	54.0	28.0	11.0
Dung	3.2	3.5	5.9	2.5	3.0	1.0	.5	5.0	9.5	4.0	2.0	.5	.0
Other	.3	.0	.0	.0	.5	1.0	.5	.2	.0	.5	.0	.5	.5
MAIN FLOORING													
Earth	35.1	36.3	33.2	20.7	37.2	48.0	27.8	40.0	55.5	55.0	44.5	18.5	2.0
Dung	23.8	47.8	22.3	7.6	31.7	9.5	10.5	32.7	43.5	38.0	26.5	9.5	1.5
Wood planks	2.1	.0	1.5	1.5	2.5	5.0	1.8	2.3	.0	2.0	4.0	3.5	1.0
Palm	.7	.5	1.0	.0	1.0	1.0	.8	.7	1.0	.0	1.0	1.0	.5
Parquet	.1	.0	.0	.0	.0	.5	.0	.2	.0	.0	.5	.0	.0
Vinyl	4.3	.5	3.0	15.7	.0	2.5	5.5	3.5	.0	1.0	3.0	6.0	11.5
Ceramic tiles	1.4	3.5	1.0	.5	.5	1.5	3.0	.3	.0	.0	.0	.0	7.0
Cement	30.5	11.4	37.6	44.4	27.1	32.0	48.8	18.3	.0	3.5	19.5	60.5	69.0
Fully carpeted	2.0	.0	.5	9.6	.0	.0	2.0	2.0	.0	.5	1.0	1.0	7.5
BASE	1000	201	202	198	199	200	400	600	200	200	200	200	200

B3. CALCULATION OF SOCIO-ECONOMIC STATUS (SES)

The socio-economic status (SES) scale was developed from the above questions on ownership of assets, household characteristics, and level of education. Most of these variables were drawn from the DHS. Principal components analysis was used to extract the main, single factor that accounted for the largest amount of variance in the data. Using the factor scores from the principal component analysis, respondents were divided into quintiles based on their factor scores.

Table B.4 Distribution of SES levels by site and urban-rural

	TOTAL	Site (city plus surrounding rural areas)					Urban/Rural	
		Bahir Dar	Nazret	Dire Dawa	Dessie	Awassa	All Urban	All Rural
1 Low	20.0	26.9	16.3	9.6	17.1	30.0	2.0	32.0
2	20.0	23.9	22.8	12.1	19.6	21.5	10.5	26.3
3	20.0	24.9	18.3	15.2	27.6	14.0	19.3	20.5
4	20.0	10.0	21.8	26.3	27.1	15.0	31.0	12.7
5 High	20.0	14.4	20.8	36.9	8.5	19.5	37.3	8.5
BASE	1000	201	202	198	199	200	400	600

B5. CALCULATION OF NUMBER OF HOUSEHOLD MEMBERS

Due to a problem in the skip pattern in the Ethiopia questionnaire, family members from households where the respondent had not heard of a net were not enumerated. That is, there was no listing of family members and their associated gender and age for the 298 respondents who had not heard of nets. Even though these families did not own a net—and we can therefore assume that no family member was sleeping under a net—these families should have been enumerated since they need to be counted as part of the denominator for calculating percent of different family members sleeping under a net/ITN.

In order to solve this problem, we extrapolated household size and composition based on the rest of the sample. We used two approaches (described below) for doing this: one at the aggregate level, and one at the household level. The results from each method were nearly identical; the percent of each age and gender group sleeping under a net differed by no more than one percentage point. We therefore feel confident that we have generated a valid family member data set. We used the household-level estimate in order to make it possible to report breakdowns by site, urban-rural, and socioeconomic status.

Approach 1: Household Level

Step 1: Compare groups of households who had and had not heard of mosquito nets to decide what variables to match on.

- *Socio-economic status (SES):* The great majority of respondents who had not heard of nets were in lowest two (of five) SES segments.
- *Urban/rural:* Respondents who had not heard of mosquito nets were mainly in rural households. However, since urban-rural and SES were correlated, matching on urban-rural would not refine the analysis.
- *Site:* A site-by-site comparison of respondents from the 2 lowest SES quintiles who had and had not heard of nets showed no significant difference except in Awassa, where more households who had not heard of a net were in the lowest quintile.

Conclusion: Only SES level was used to impute household members, but calculations would be conducted on a site by site basis.

Step 2: Impute the number of household members for each group.

- The imputation was based only on households who heard of a net and belonged to the two lowest SES quintiles.
- In each site, the average number of household members in each of the two lowest quintiles was calculated.
- The average number of household members was applied to households of respondents from that site who had not heard of a net, also stratified by quintile: the lowest quintile took the same value as the lowest quintile in the other group, while all other SES quintiles took the same value as the second lowest quintile.
- This was done for each site, and each age/gender group and pregnant women.

Approach 2 Aggregate Level

Based on Step 1, above, only SES was used to impute household composition, but rather than matching each household, calculations were done for the aggregate age/gender group.

- Calculate the mean number of people for each age/gender segment using the 702 respondents for whom we had full data, by the ten-level SES variable.
- Apply the mean for each age/gender segment of each SES decile for the 298 households lacking enumeration of family members.

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