



**THE UNIVERSITY OF ZAMBIA**  
**SCHOOL OF MEDICINE**  
**DEPARTMENT OF PUBLIC HEALTH**

**Factors That Influence Ownership and Use of  
Insecticide Treated Nets and the Role of Community  
Health Workers in Selected Districts of Southern  
Province**

By

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A Dissertation submitted in partial fulfillment of the requirements for the award of the degree of the Master of Science in Public Health (Population studies)

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**2015**

**DECLARATION**

This dissertation is the original work of **Julian Hachaambwa**

It has been done in accordance with the guidelines for MPH.in Population studies dissertations for the University of Zambia. It has not been submitted elsewhere for a degree at this or another University.

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## CERTIFICATION OF COMPLETION DISSERTATION

I, **Julian Hachaambwa**, do hereby certify that this dissertation is the product of my own work and in submitting it for my Master of Public Health (Population Studies) program, further attest that it has not been submitted in part or whole for the award of any program.

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I, **Dr Halwiindi**, having supervised and read this dissertation is satisfied that this is the original work of the author under whose name it is being presented. I confirm that the work has been completed satisfactorily and is ready for presentation to the examiners.

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# CERTIFICATE OF APPROVAL

The University of Zambia approves this dissertation of Julian Hachaambwa in partial fulfilment for the requirements for the award of the degree in Master of Public Health (Population Studies).

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## DEDICATION

This study is dedicated to my loving husband Dr L. Hachaambwa and my three beautiful daughters Tite, Lumba and Abigail Hachaambwa. Your love, patience and support throughout my studies have been of great inspiration to me. I love you all and may the good Lord continue to bless you abundantly in all you do.

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## Table of Contents

DECLARATION .....	ii
CERTIFICATION OF COMPLETION DISSERTATION .....	iii
CERTIFICATE OF APPROVAL .....	iv
DEDICATION .....	v
ACKNOWLEDGEMENTS .....	vi
LIST OF TABLES .....	ix
List of figures .....	ix
Operational Definition of Terms .....	x
ABSTRACT .....	xi
CHAPTER ONE .....	1
INTRODUCTION .....	1
Background .....	1
STATEMENT OF THE PROBLEM .....	3
STUDY JUSTIFICATION .....	7
CHAPTER TWO .....	9
LITERATURE REVIEW .....	9
Global perspective .....	9
Local perspective .....	13
CHAPTER THREE .....	18
OBJECTIVES .....	18
CHAPTER FOUR .....	19
RESEARCH METHODOLOGY .....	19
Study design .....	19
Study population .....	<b>Error! Bookmark not defined.</b>
Study tool .....	21
Inclusion .....	22
Exclusion criteria .....	22
Sample selection .....	22
Data processing and Analysis .....	24
Ethical consideration .....	25
CHAPTER 5 .....	25
RESULTS .....	25
Figure 1. ....	<b>Error! Bookmark not defined.</b>

CHAPTER SIX..... 37  
    Discussion..... 37  
References..... 45

Appendices

Appendices 1 (questionnaire)

Appendices 2 (research ethics approval)

Appendices 3 (Graduate Proposal Presentation Forum (GPPF) clearance)



## LIST OF TABLES

Table 1: Respondents' socio-demographic and household characteristics.....	23
Table 2: Association between different factors and ITN.....	26
Table 3: Association between source of ITN and ITN.....	28
Table 4: IEC messages heard from.....	29
Table 5: Association between malaria information heard and ITN use .....	30

## LIST OF FIGURES

Figure 1: Net ownership vs use.....	23
Figure 2: ITN use per age group.....	27

## ACRONYMS

<b>ITN</b>	- Insecticide Treated Nets
<b>IRS</b>	- Indoor Residual Spraying
<b>IPT</b>	- Intermittent Preventive Therapy
<b>GMDP</b>	- Global Malaria Action Plan
<b>ACT</b>	- Artemisinin Combination Therapy
<b>MDG</b>	- Millennium Development Goal
<b>CHW</b>	- Community Health Worker
<b>SSA</b>	- Sub-saharan Africa
<b>ANC</b>	- Antenatal Clinic
<b>NMCP</b>	- National Malaria Control Program
<b>NMCC</b>	- National Malaria Control Center
<b>IEC</b>	- Information Education and Communication
<b>MOH</b>	- Ministry of Health
<b>BCC</b>	- Behavioral Change Communication

**IEC** - Information Education Communication

#### OPERATIONS OF DEFINITION OF TERMS

**Household** - A household is a group of people who normally live and eat together and have one person as head of household

**IPT** - Intermittent preventive treatment Administration of an ant- malarial drug sulfadoxine-pyrimethamine at least twice during pregnancy, whether or not the woman has malaria

**ITN** - Insecticide-treated nets including:

- 1) Factory treated net that does not need further treatment.
- 2) Pre- treated net obtained within the past 12 months
- 3) Net soaked in insecticide within 12 months

**Universal coverage** - Ensuring that all sleeping spaces in all households are covered by an ITN

**CHW** - A community Health Worker is usually chosen by the community to provide some health services to the community and usually share ethnicity, language and economic status with the people they serve.

**Wealth quintiles** - Wealth quintile was based on the reported household ownership of household goods and assets and other household characteristics relating to socioeconomic status of household such as number of cattle one has. The factors were summed up for each household and ranked and subdivided into quintiles from one (lowest) to five (highest).

## **ABSTRACT**

Malaria remains a public health problem in Zambia and in the world as a whole. The use of Insecticide Treated Nets (ITNs), has been proven to be effective in the prevention against malaria. ITN use is the intended health behavior to affect the greatest impact on malaria burden, However, ITNs use lags behind ITN possession. .

This study looked at some of the factors that affect the use of ITNs. Many factors have been previously associated with low ITN use including lack of knowledge on malaria, its cause, transmission, and prevention as well as the use of ITNs as malaria prevention method.

Data stem from the cross-sectional, cluster randomized Malaria Indicator Survey specifically from four districts in Southern Province. The malaria indicator survey (MIS) took place between April and May 2013 as a follow-up evaluation survey for large-scale test and treat campaigns for malaria reduction.

Bi-variate analysis using cross tabulations and graphs were used to determine the association between independent and dependent variables, P values  $<0.05$  were considered significant. Descriptive analysis was used to determine frequencies using mean and standard deviation. Logistic regression was used to determine strength of associations between independent and dependent variables

Education of head of household was found to have an association with ITN use (OR= 0.67,  $p=0.001$ ). Other factors that showed strong association with ITN use are; age  $p=0.001$ , number of sleeping spaces (OR = 0.88,  $P=0.002$ ). Net characteristics such as condition of the net were associated with use (OR=0.56,  $p=0.001$ ), Color of the net (OR= 1.01,  $p <0.001$ ). Source of ITN and use OR= 0.99,  $p=0.001$ . Respondents who obtained ITNs from government hospital or clinic were more likely to use them as

opposed to those who obtained ITNs from CHWs. Respondents in the wealthiest households were more likely to use ITNs (52.8%) as opposed to respondents in the poorest households (41%). Wealth quartile was found to be strongly associated with ITN use OR= 1.28 p=0.001. Logistic regression showed an association between ITN use and where ITN /malaria information was heard, OR= 1.2, p = 0.006. Respondents who obtained malaria messages or information from CHWs were more likely to use ITNs as opposed to those who got malaria information from sources such as TV, or family. Study suggests that there are a number of factors that influence ITN use. It is therefore important to identify these factors and address them if the battle against malaria is to be won. Behavioral change is a huge component in increasing ITN use. People may be knowledgeable about malaria prevention but if they don't implement preventive measures the battle can never be won. Education to the communities should focus on ways in which people can be motivated or persuaded to use ITNs.

# CHAPTER ONE

## 1. INTRODUCTION

### 1.1 Background

Malaria is a devastating disease that has claimed a lot of lives in the past and continues to do so in the world as a whole. Globally it is estimated that there are about 700, 000 to 2.7 million malaria cases annually, with 75 percent of deaths occurring in Sub-Saharan Africa (SSA) children (Some, 2007). In SSA every minute a child dies from malaria (WHO, malaria fact, 2010).

Malaria has a great impact on individuals, families, communities as well as the economic development of the country. The impact of malaria on the economic development of the country can be due to hospital costs, absenteeism from work, (Beier *et al.*, 2008) or absenteeism from school especially for children 5 years and older. Most countries in the world, including Zambia, have however reported a reduction in the number of confirmed malaria cases and deaths since 2000. In Zambia the annual number of malaria deaths reduced by 60% between 2000 and 2008 (Chanda *et al.*, 2013).

Vector control and treatment are the key strategies in the fight against malaria. In Zambia several interventions have been put in place in the fight against malaria. Vector control interventions include the use of Insecticide Treated Nets (ITNs) and Indoor Residual Spraying (IRS). Treatment interventions include, Intermittent Preventive Treatment (IPT) of malaria in Pregnancy and early diagnosis and treatment with artemisinin-based combination therapy (ACT) (Eisele *et al.*, 2011, Rhee *et al.*, 2005). Use of ITNs is the most cost effective method in the prevention of malaria in places where there is still high prevalence (CSO, 2009.,WHO 2013). ITNs have been proved by

research to be effective in the prevention of malaria, hence reducing morbidity and mortality rate due to malaria worldwide (Lengeler, 2009 ; Atieli et al., 2011).

Utilization of ITNs by all age groups will help reduce the prevalence of malaria in communities and in the country as a whole. Utilization of ITNs by all ages will prevent infected vector mosquitoes from spreading the disease from one person to the other. It is therefore important to target ITN coverage at individual level as well as community level. ITN coverage by the entire community will protect the vulnerable groups such as pregnant women and children (Killeen et al., 2007). According to the study done by Killeen and coworkers, in order to reduce communal exposure to malaria by 80%, about 35 percent of the population must sleep under an ITN (2007).

In an effort to eliminate malaria in Zambia, National Malaria Strategic plan (NMSP) 2011- 2015 has called for more efforts in the fight against malaria.

One of the many efforts that are being implemented is to reinforce already existing levels and ways of promoting and implementing malaria prevention interventions that are already in place. Interventions such as utilization of health centers and other community based activities such as use of (CHWs) or agents. CHWs can be of great influence to communities in the implementation of several disease prevention interventions (Christopher J. B, 2011). CHWs are crucial in delivering messages that could lead to behavioral change promoting malaria preventions such as ITN use.

In Zambia, CHWs are selected by the communities they serve and usually these CHWs share ethnicity, language and economic status with the people of the community they serve (Roll back, 2011).

According to the diffusion of innovation theory, people are more likely to accept a commodity or idea from people that they know, relate with and trust (National cancer

institute, 2005). CHWs are therefore the best people to distribute ITNs and deliver key messages concerning proper and consistent use of ITNs. Door to door distribution helps CHWs to physically assess the condition of the nets and need for replacement as well. Baume and others conducted a survey in Ethiopia which was both qualitative and quantitative. During the survey the team actually went and physically inspected the nets as they were administering the questionnaire and discovered that some nets were not hang properly enough to protect someone from being bitten by mosquitoes. It was also discovered that in some areas new ITNs were stored so they do not get damaged and a number of ITNs were hang but not utilized. The team also discovered that a number of nets had several holes and needed to be replaced (2009).

Failure to execute malaria prevention interventions may lead to increase in malaria prevalence or resurgence in places that have made progress in reducing malaria cases. Between 2008 and 2010, Zambia experienced a resurgence of malaria in 3 provinces; Northern, Eastern and Luapula provinces. This was because of low ITN ownership and use in these provinces (RBM progress, focus on Zambia, 2011). This simply shows that progress made in the malaria prevention is fragile and must be sustained to eliminate or prevent malaria resurgence (Masaninga et al., 2013, WHO, 2011).

## **1.2 STATEMENT OF THE PROBLEM**

Zambia has made a lot of progress in the fight against malaria. Southern province in particular has seen a significant decline in malaria prevalence in the past decade.

According to MIS 2006, in Southern province malaria prevalence in children under 5 was 13.7% and declined to 7.9% in 2008 and in 2010 declined to 5.7% (Mharakurwa et al, 2012). This makes Southern province one of the provinces with the lowest prevalence of

malaria. There are however, some areas of southern province that are still experiencing significant cases of malaria. Some of the places affected are; Siavonga, Sinazongwe, Gwembe and Kalomo. The prevalence of malaria in some of these areas is a huge threat to malaria resurgence in the whole province. Zambia has adopted a number of malaria prevention measures in the fight against malaria through the ministry of health (MOH) in collaboration with national malaria control center (NMCC). One of the measures adopted in Zambia in the malaria strategic plan to reduce malaria is the use of ITNs. Over six million ITNs were distributed between 2007 and 2010. (Roll Back Malaria, 2011).

According to 2012 malaria indicator survey (MIS) more than half of Zambia's households have at least one ITN. About 63.7% of households in southern province reported owning at least one ITN. According to MIS 2012 southern province was one of the provinces with the lowest use of ITNs in children under five at 43%. According to a number of studies conducted in SSA, there is a gap between ITN ownership and use. A number of people who own ITNs may not use them due to several factors.

Health education is an important aspect in an effort to promote malaria prevention interventions such as ITN use. IEC allows CHWs to deliver health messages on a one on one basis that may lead to behavioral change as far as health practices are concerned hence increase in the ITN uptake. One on one interaction with CHWs allows people of the community to express their concerns and clear the misconceptions or misunderstandings that they might have regarding health issues such as malaria and ITN use.

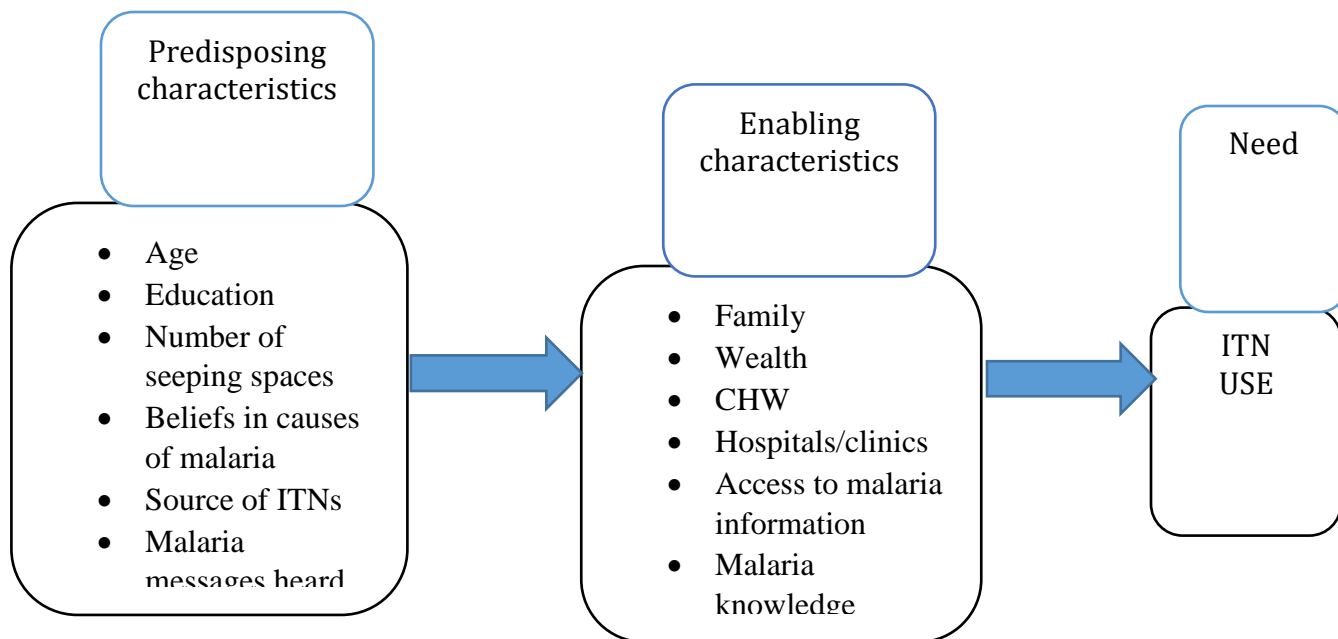
CHWs are a key factor in promoting ITN use. Zambia is promoting door to door distribution of ITNs through CHWs to promote ITN ownership and use. CHWs play an



important role in the distribution of ITNS and their use. Not many studies have been done in Zambia to evaluate the role CHWs play in the promotion of ITN use.

This study therefore sought to determine the factors that affect ITN ownership and use in the districts under study. The study also sought to determine the role of CHWs in promoting ITN use. According to a number of studies CHWs are crucial in influencing people or communities to take part in health practices that are beneficial to their health. CHWs contribute to the communities by being a part of ITN distribution and health education.

## HEALTH SERVICES UTILIZATION MODEL



The conceptual framework above shows several factors that influence ITN use. Malaria knowledge has a huge impact on ITN ownership and use. People need to understand the importance of ITNs for them to utilize them. CHWs are crucial in promoting ITN ownership and use. CHWs distribute ITNs and educate communities on the malaria prevention. Net characteristics also play a role in ITN use. ITNs in bad shape are less likely to be utilized and are not effective, it is therefore important for ITNs to be replaced when necessary. Other factors that result in low ITN use are number of people in a household and number of ITNs in a household.

### **1.3 STUDY JUSTIFICATION**

Malaria is still a number one cause of morbidity and mortality especially among under-five children, pregnant women and other groups of people that are immune compromised.

There are lots of ITNs in communities distributed by NMCC on a regular basis according to the need. It is therefore important to ensure that these nets are utilized effectively. In order to maximize ITN effectiveness there is need to assess ownership, use and the need to replace these nets over time.

Places along Lake Kariba such as Siavonga, Sinazongwe, and Gwembe have reported high prevalence of malaria in Southern province (Eisle, 2012). According to MIS 2012, Lusaka and Southern provinces reported lowest percentage of ITN use among children under five at 40.5 percent and 43.0 percent, respectively.

It is therefore important to explore and try to determine the implementation of malaria prevention interventions such as ITN use in some areas that are still affected by malaria.

CHWs are crucial in ITN distribution and delivery of interpersonal communication (IPC). IPC has been shown to be effective in behavior change. (Keating et al, 2012., Amoran et al, 20120). If CHWs spend time explaining the importance of ITN use and where necessary assist in hanging ITNs, people in the community will be more likely to respond positively to what they hear hence change their behavior towards health practice. One of the WHO recommendations in vector control interventions in the world report is to take behavioral change campaigns such as community based interventions such as IEC seriously if we are to succeed in eliminating malaria (WHO, 2010b). Findings of this research will help determine the best way to distribute ITNs to areas that are still affected by malaria to promote ITN use. The study will determine the extent to which CHWs are involved in the promotion of ITN use via ITN distribution and delivery of health education in the districts under study.

The research findings will guide policy makers in supporting community based interventions in the prevention against malaria by promoting use of CHWs and how to best tackle the factors that influence ITN use, hence yielding the best results in the prevention against malaria in the districts under study as well as in the country as a whole. The people in the districts will benefit from the study, in that malaria prevention interventions will be reinforced hence preventing a resurgence of malaria that could potentially affect the whole Province.

## CHAPTER TWO

### 2. LITERATURE REVIEW

Malaria is a life threatening parasitic disease transmitted through an infected anopheles mosquito and can be transmitted from person to person through a bite (CDC, 2012). In Zambia, the major malaria vectors are *Anopheles gambiae*, *Anopheles arabiensis* and *Anopheles funestus* (Chanda, 2013).

Use of ITN is one of the major and most cost effective ways of preventing the transmission of malaria (Chanda, 2013). If used properly and effectively, ITNs can reduce mortality due to malaria by 90 percent or more (Beier et al., 2008). For ITNs to be effective, they require a consistent use by those that are exposed to mosquito vector (Mendis et al., 2009). With the progress made in the prevention and transmission of malaria, WHO recommends universal coverage of ITNS of all people at risk of malaria not only the groups at greatest risk (WHO, 2010). The aim of the universal coverage strategy is to cover all households by distributing free ITNs nationwide for all ages. In order to achieve universal coverage it is important to identify the communities that are lagging behind in the ITN ownership and use (Noor et al., 2009).

#### 2.1 Global perspective

Malaria is a worldwide problem, about 3.3 billion people are at risk of malaria (CDC, 2012, WHO, 2010b) and nearly 10 percent of the global population will be affected by malaria a year. World Health Organization recommended ITN use worldwide in the

prevention against malaria however acceptance and implementation has been slow (Rhee, 2005).

Outside Africa about 60 million ITNs were distributed between 2008 and 2011 (WHO, 2010).

## **2.2 Regional perspective**

Malaria is a number one leading cause of morbidity and mortality in SSA (Chanda, 2013). Over 90 percent of malaria cases reported worldwide are recorded in Africa (Cyrille Ndo, 2011., CDC, 2012). There is a loss of about 12 billion dollars per year due to malaria illness, treatment and death (GMAP, 2010). Malaria mostly affects the poor and vulnerable populations (WHO, 2010b ; Cyrille Ndo, 2011) such as developing countries, therefore the focus of malaria prevention is to provide the best health for the poor (Killeen et al., 2007). There has been an increase in malaria cases in urban areas across Africa due to different factors linked to uncontrolled urbanization (Cyrille Ndo, 2011). Children and pregnant women are especially vulnerable to malaria. In Sub-Saharan alone, approximately 25 million pregnant women are at risk of plasmodium falciparum infection every year (Okeibunor and Rawlins, 2011).

In SSA mortality has been reduced by 18 percent due to use of ITNs, saving 5.5 lives a day, reducing the episodes of *Plasmodium falciparum* and *P. vivax* by 50 percent (WHO, 2010b). Studies have shown that use of ITNs in pregnancy helps reduce low birth weight by increasing birth weight by 55g (WHO, 2010b). According to millennium development goals (MDG) roll back, most children's lives have been saved since 2006 when scale up of ITNs accelerated across Africa (2010). Insecticide on the nets kill mosquitos that that come in contact with treated nets (Welch Kevin, 2012, Takken, 2002), therefore reducing the density of the vector. Basically ITNs act as physical

barriers from malaria carrying vectors and also have an insecticidal effect (WHO, 2012). This phenomenon helps protect a larger number of people in community including those that do not use ITNs (WHO, 2010b., Killeen et al., 2007., Chanda 2013). This efficacy of ITNs needs to be communicated at household, individual as well as community level to increase uptake of ITNs.

Progress has been made in many SSA countries in the distribution of ITNs. In SSA between 2008 and 2010, nearly 289 million ITN s were distributed to cover more than 578 million people at risk of malaria. Ownership of ITN in SSA has risen from 3% in 2000 to 50% in 2011 (WHO, 2010b)

There are however, gaps to be field in the actual use of ITNs by individuals who actually own them. ITN distribution or possession does not guarantee ITN use (Rhee et al., 2005). A number of surveys conducted in Zambia and other countries show that a number of people who own ITNs do not actually use them (Ankomah *et al.*, 2012). A number of studies done have confirmed that in many countries ITN ownership is much higher than use. A study done In 5 countries Niger, Sierra Leon, Togo, Kenya and Madagascar, households were surveyed to determine ownership and use of ITNs. In the same study about 3 groups were discovered, there were those who owned ITNs but did not hang them, those who owned ITNs, hang them but did not sleep under them, and those who did not own ITNs. Overall ITN ownership was much higher than use in all five countries (Vanden Eng et al., 2010). Another study done in Ethiopia where a survey of 857 households showed that 91 percent owned ITNs but only 65 percent slept under an ITN the night before the survey (Baume et al., 2009).

Due to a huge gap in ITN possession and use, most SSA countries are developing different ways to promote ITN possession and use. Community directed interventions

such as IEC by CHWs to promote behavior change have been implemented in many SSA countries. IEC is believed to play an important role in behavior change as far as health practices are concerned. There are people who don't use ITNs because they lack knowledge on ITNs and malaria. ( Rhee et al., 2005). Rhee and co-workers conducted a controlled intervention study in Piron Mali. The Study found that people or participants who were given some education or information on malaria and importance of impregnating their nets were more likely to impregnate their nets with insecticide and use them than participants who did not receive any information at all (2005). A study done in Nigeria to determine ITN ownership and use among pregnant women suggest that ITN distribution without necessary health education will not result in health behavior change. The study enrolled a total of 2,348 pregnant women. A structured interview schedule was used to elicit information on socio demographic characteristics, ITN ownership, use, knowledge, and behavior and health practices. The study found that ITN ownership was low. Out of the total number of people surveyed 28.8 % owned ITNs and 7.5 % of participants slept under an ITN the night before the survey. The study found that, those women who had knowledge that ITNs prevent transmission of malaria and not holding any misconceptions about causes of malaria were more likely to use ITNs (Ankomah et al., 2012). The fact that people who owned ITNs did not utilize them, indicates that people might obtain ITNs from antenatal clinics and via CHWs but if ITN acquisition is not accompanied by messages that stress the importance of using ITNs, causes of malaria and messages that address people's misconceptions about malaria, it may not lead to ITN utilization (Ankomah et al., 2012).



### **2.3 Local perspective**

In Zambia, malaria is endemic throughout the country though the largest burden is in rural areas (Masaninga et al., 2013), which could be due to unavailability of health services. Zambia has a population of 13.6 million, according to CSO, 61 percent live in rural areas and 39 percent in urban areas (2010). ). In Zambia alone there are about 4 million clinically diagnosed cases of malaria per year. According to Central Statistical Office (CSO), in 2007 there were about 4.3 million cases reported throughout the country with 6,149 deaths (2009). Twenty percent of deaths occur among children under the age of 5 (Roll Back Malaria (RBM) 2011). (Larson *et al.*, 2012).

In Zambia, several interventions have been put in place in the fight against malaria. Interventions such as use of ITNs, IRS, IPT, early diagnosis and treatment with ACT (Eisle et al., 2011; Rhee et al., 2005). Evidence in the efficacy of these interventions is overwhelming. A study done by Chizema and co-workers explored the progress or impact of malaria prevention interventions. The study compared the results from MIS 2006 and MIS 2008, which showed a tremendous improvement in the prevention of malaria especially among children. The study showed that malaria prevalence in children had reduced by 53 percent. Malaria cases reduced from 21.8 percent in 2006 to 4.3 percent in 2008. Moderate to severe anemia due to malaria had reduced by 69 percent, from 13.8 percent to 4.3 percent in 2008 (Chizema *et al.*, 2010).

Zambia however like many African countries has reported a reduction in malaria cases by 50 percent. According to 2005 Zambia Irish Aid report, Zambia was one of the only 9 countries to report evidence in decrease of malaria cases by over 50 percent between 2000 and 2008 (Irish Aid). Between 2000 and 2008, Zambia reported a 66 percent reduction in in-patient cases and deaths due to malaria (Masaninga et al., 2013, WHO

2009), after introduction of IRS up to 90 percent, increasing ITNs to 70 percent and the use of ACT (Masaninga et al., 2013).

Despite the reduction in the malaria cases in Zambia, malaria still remains a public health problem and a major cause of morbidity and mortality in the country. Zambia like many other African countries set the disease control as a priority like many African countries. ITN use is the key and most practical intervention in the prevention against malaria in Zambia (Killeen, 2007). A number of approaches have been used to deliver ITNs to African communities in different settings. The distribution of ITNs in Zambia and many countries is achieved through different programs such as community based malaria prevention and control programs through CHWs, school health programs, malaria in pregnancy prevention programs such as antenatal care (ANC) and many other programs (CSO,2009). Mass distribution of ITNs throughout the country has helped lessen the malaria burden in rural areas of Zambia (Masaninga et al., 2013). ITN distribution in Zambia has been rapidly scaled up through mass distribution, mainly focused on door to door distribution. The door to door distribution strategy is based on diffusion of innovation theory which states that people are more likely to access a new commodity, idea or innovation if delivered by someone they relate with or trust. In Zambia CHWs are selected by the communities they serve and usually these CHWs share ethnicity, language and economic status with the people of the community they serve (Roll Back Malaria, 2011).

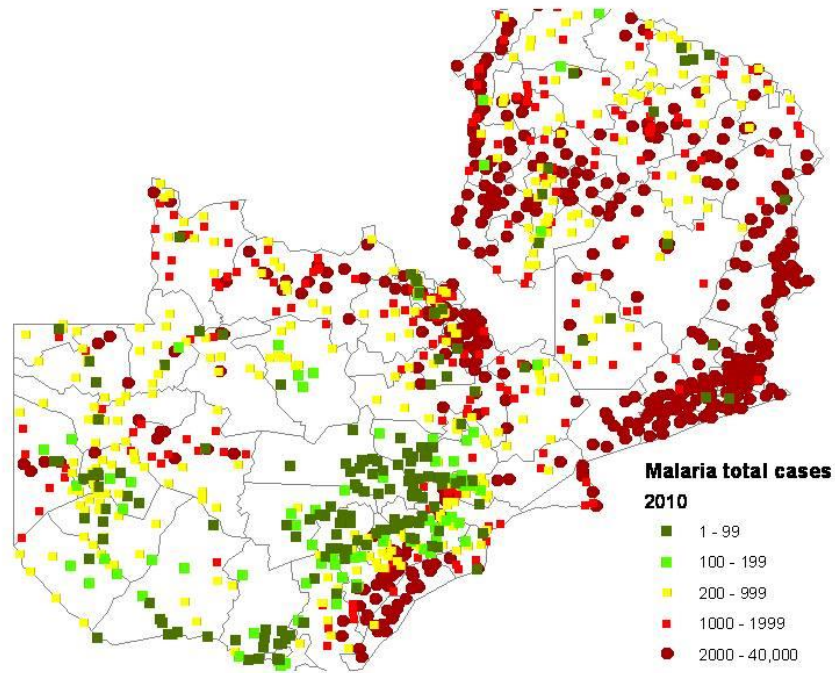
In Zambia alone over six million ITNs were distributed between 2007 and 2010.

According to 2012 MIS, 64 percent of households own at least one ITN. The question is are these ITNs being utilized appropriately?

Delivery of health interventions at community level has been successful in many African countries, America and Asia (WHO, 2010). Community based interventions have been shown to reduce morbidity and mortality in a number of communities (Lamma et al., 2011). A quasi-experimental study was done in Luangwa Zambia to evaluate an effect of Interpersonal communication by CHWs in an effort to increase ITN use among children. The study showed a great increase in ITN use among children from 54 % in 2008 to 81 percent in 2010, higher than the MIS survey done at the same time. (Keating and Changufu, 2012). These results suggest that health education given during the study definitely had some influence in the increase in ITN use.

Zambia is doing so well with educating the public where health matters are concerned. Health education in Zambia seems to be only delivered on special days or occasions such as world malaria day (Chanda, 2013) as opposed to throughout the year.

According to 2010 MIS, Southern province was one of the provinces with low prevalence of malaria (Ministry of health, 2010). However according to the local report, there are some areas identified to have high prevalence of malaria still. Some of the areas identified to have high prevalence of malaria are the districts along lake Kariba; Siavonga, Sinazongwe, Gwembe and Kalomo.



**Fig 1. Map shows areas of interest where prevalence of malaria is still high in Zambia.**

### **Factors influencing ITN ownership and use**

There are a number of studies that were done to determine ownership and usage of ITN in children under 5 and pregnant women, but few studies done to determine ownership and use in other age groups. Despite a number of studies determining ITN ownership, there are few studies done to determine factors influencing use of ITNs. Some of the factors influencing ITN ownership are discussed below;

Education of head of household was found to be a factor in the ownership and use of ITN. Heads of households that had at least primary education had knowledge on the transmission and prevention of malaria and were therefore more likely to own and use an ITN (Atieli et al., 2011).

Study done in Bioko Island found that economic boom that took place there had an impact on ITN use. An economic boom resulted in better housing resulting in increase in sleeping areas. As a result there weren't enough ITNs to cover new sleeping spaces.

Houses where IRS was performed were more likely to own and use ITNs based on couple reasons; people who have access to IRS are more likely to have access to ITNs.

The other reason is that if someone is interested enough to have IRS they are more likely to use ITNs in the prevention of malaria (Garcia-Basteiro et al., 2011)

Shape of the net owned had great influence on use. People in rural areas who owned conical nets were more likely to use them than those who owned rectangular nets.

People who owned rectangular nets reported that rectangular nets were harder to hang in houses found in rural areas. Most houses found in rural areas are round shaped, making it difficult to hang a rectangular net. Conical nets were said to be convenient in that they can be easily moved from one sleeping space to another (Baume et al., 2009).

Age seems to play a role in the use of ITN. In most malaria endemic countries the age 5 to 19 is least protected by ITNs. Noor and others looked at surveys done between 2005 and 2009 in 8 different countries on the use of ITNs by age group and sex. Generally the overall ITN use by age was similar across all countries under study. ITN use was high among children less than 5 years old, sharply declining among children aged 5 to 19 years before rising again among adults aged 22 to 44 and then gradually decreasing again in older ages. In all the countries the proportion of all not protected by ITN about 32 to 42% children the age group 5 to 19 was among those (2009).

Other factors include Selling of ITNs and ITNs discarded due to damage (Garcia-Basteiro et al., 2011).

Another factor that influences ITN use is the availability of education by CHWs (Christopher J. B, 2011).

## CHAPTER THREE

### **3.0 OBJECTIVES**

#### General objective

The general objective of this research is to determine the factors that influence ownership and use of ITNs and the role of CHWs in promoting ITN ownership and use in selected districts of Southern province. The Specific objectives of the research include:

#### Specific objectives

1. To determine the association between socio-demographic factors and ownership of ITN.
2. To determine the association between socio- demographic factors and use of ITN
3. To determine the usage patterns of ITNs by mechanism/source of distribution
4. To determine the association between information education communications messages heard and utilization of ITNs.

## CHAPTER FOUR

### **4.0 RESEARCH METHODOLOGY**

#### **4.1 Study designs**

##### MIS study design

MIS is an exercise that is carried out every year throughout the country. During the survey a questionnaire is administered to selected households. MIS is designed to measure progress toward achieving goals and targets in the National malaria strategic plan. In Zambia the MIS is usually conducted by the Ministry of Health (MOH) in conjunction with other agencies such as NMCC, CSO, etc.

The survey from which data was extracted was a cross sectional monitoring survey that was carried out between April and May 2013 in specific districts of Southern province. During the survey, consent for participation was obtained from all people aged 18 and above individually. For the participants under age 18, consent was obtained from responsible household members aged 18 and above.

Study included population of all ages, women, men and children. Zambia is divided into 10 provinces. Each province is subdivided into district, each district is further subdivided into districts, and each district is further subdivided into constituents and wards. Each ward is subdivided into census supervisory areas (CSAs) that, is further subdivided into standard enumeration areas (SEAs) classified as rural/urban, which has the households. It is from these SEAs that the households were randomly selected. The sample sizes for MIS survey were 6338 individuals in all four districts, 1339 households and 800 women.

#### **4.2 Research setting**

Three of the districts under study are located along Lake Kariba these are; Siavonga, Sinazongwe and Gwembe. The fourth district, Kalomo, is also located in Southern province, and borders Sinazongwe and Zimbabwe in the east. All four districts are located within the Zambezi valley. The areas receive low to moderate annual rainfall between November and April with average rainfall of 600 to 700 mm per year. The climate is mostly dry and hot during the dry season which lasts from May-October.



Communities in these districts live along the Zambezi River. Most villages are built along riverbanks, sandbanks and flood plains areas putting people at risk for several diseases such as malaria and schistosomiasis. The livelihood of people along Lake Kariba is mainly small scale subsistence agriculture and livestock rearing. The main crops that are grown in these areas are sorghum, millet and maize. During dry season, most households' source of income is vegetable cultivation. Most of the households keep livestock such as cattle, chickens and goats. Fishing along Lake Kariba is also a huge economic activity. The total population of the four districts is 498,916 and approximately 69,337 households (CSO, 2010). There are about 43 health centers in these districts (Eisle, 2011).

Malaria interventions such as ITN use and IRS were scaled up in most of the study districts between 2009 and 2010. CHWs were given bicycles to aid in the ITN distribution process by the Irish Aid (Malaria consortium).

### **Study tool**

During the survey, two questionnaires were administered by trained health workers. Health workers were primarily nurses from the public health sector accompanied by field assistants who underwent standardized training that lasted five days. Training was facilitated by NMCC, MACEPA and other partners. The data retrieval sheet for this study was adapted from the MIS questionnaire. During the MIS the first questionnaire was administered to the head of household and listed everyone in the house. The questionnaire included questions on fever prevalence and treatment with antimalarial drugs, IRS and information on ITNs including household possession, net treatment status and use of nets among all household members. A full net roster was used during the survey to identify each net in the household one at a time, to ascertain details about

the treatment status and branding, as well as age and condition of the net. The net roster was also used to assign which household member slept under each net. The second questionnaire was administered to selected women aged 15 - 49. The second questionnaire included questions on malaria knowledge. Knowledge was determined by the number of questions regarding malaria cause, signs and symptoms and prevention respondents answered correctly. Info was entered into PDAs.

### **4.3 Study Population**

#### **Inclusion**

The study included all participants who were able to provide necessary information

The study also included women, men and children of all ages. The women questionnaire was only targeting women aged 15 – 49.

#### **Exclusion criteria**

The study excluded all participants who were not able to provide necessary information..

The women questionnaire excluded all women less than 15 and those older than 49.

### **4.4 Sample selection**

The survey from which data was extracted used cluster sampling design that was used during the 2013 MIS. Each province is subdivided into district, each district is further subdivided into constituents and wards. Each ward is subdivided into census supervisory areas (CSAs) that, is further subdivided into standard enumeration areas (SEAs) classified as rural/urban, which has the households. It is from these SEAs that the households were randomly selected. The sample sizes for MIS survey were 6338 individuals in all four districts, 1339 households and 800 women.

### **Study design of secondary data analysis study**

The data used for this study were from a cross-sectional, cluster randomized household survey extracted from the 2013 MIS that was part of an evaluation of a large-scale test

and treat intervention campaign for reducing malaria burden at community level. The study is based on secondary data analysis using the survey data that covered four districts in Southern Province. The study focused on four districts namely Siavonga, Sinazongwe, Gwembe and Kalomo. The study extracted data from households and individuals that had contained necessary information to the study such as ITN use, malaria knowledge information.

### **Inclusion criteria**

The study included all participants with available data on necessary variables

The study also included women, men and children of all ages. The women questionnaire was only targeting women aged 15 – 49.

### **Exclusion criteria**

The study excluded all participants with missing data on any variable necessary to the study.

## **4.5 STUDY VARIABLES**

<b>TYPE OF VARIABLE</b>	<b>VARIABLE</b>	<b>SCALE MEASUREMENT</b>	<b>INDICATOR / FROM QUESTIONNAIRE</b>
<b>Dependent</b>	ITN use	1-yes    2- no	Question # 25
<b>Independent</b>  1. Background characteristics	Age	Given in years	Household listing
	Sex	1 – male    2 - female	Household listing
	Residency Live here	1 – yes    2 - no	Household listing
	Stay here	1 – yes    2- no	Household listing

	Head of household ever attended school	1 – yes    2 - no	Question # 9.11
	Head of household education level	1 – primary 2 – secondary 3 – higher/tertiary	Question # 9.12
2	Availability of ITN	Proportion of number of people who reported owning at least 1 ITN	Question # 16, 17
3	Where ITN obtained		Question # 20a
4	Malaria knowledge	Proportion of number of women who answered questions correctly	Section 3 Question # 250, 251, 252,253, 254, 255,
5	Role of CHW	Availability of CHWs	Question # 261, 262, 264

#### **4.6 Data processing and Analysis**

Data on ITNs and malaria knowledge from the study areas was extracted from 2013 MIS database and analyzed using Stata version 13.1 (StataCorp. 2013. *Stata Statistical Software: Release 13*. College Station, TX: StataCorp LP). Descriptive analysis was used to determine frequencies using mean and standard deviation. Chi-square was used to determine the association between possible explanatory variables such as household characteristics, ITN characteristics, respondents belief or knowledge about malaria and the dependent variable which is whether one used or slept under an ITN the night prior to the survey.

Bi-variable analysis using cross tabulations was used to show the association between independent and dependent variables. The value of  $P < 0.05$  was considered significant. Odds ratio was used to determine strength in association between dependent and independent variables. An asset-based wealth index was constructed based on information collected during the household questionnaire about various house items and possessions. These assets were used to construct a relative wealth index using principal component analysis

#### **4.7 Ethical consideration**

During the survey written consent was obtained from respondents aged 18 and above. Consent was also obtained at household level. Respondents were informed that participation in the survey was voluntary.

All the names of respondents and households that were recorded were strictly kept as confidential information. All respondents' data was linked to code numbers. Only code numbers and no names were used during analysis for confidentiality purposes.

Ethical clearance was sought and granted by the University of Zambia biomedical research ethics committee.

## **CHAPTER 5**

### **RESULTS**

#### **Characteristics of sample**

The socio-demographic characteristics of the household composition or participants are shown in table 1 below. More than half of the participants were females 3232 (51%) and 3106 (49%) were males. The mean age of household members was 20 years. 3163 (76.46%) respondents reported to have at least one mosquito net in their respective

households. Some respondents who own ITNs did not use them the night prior to the survey. Out of 5419 (85.5%) respondents who owned 3675 (67.8%) said they slept under a net the night prior to the survey.

Most of the heads of households were reported to have ever attended school (72.2%). Among those who report to have ever attended school, 727(65.2%) had primary education, 337(30.2%) had secondary education and (4.6%) had tertiary/higher education. The mean number of persons per household was 4.5 with 2.3 standard deviation. While the mean number of mosquito nets per household was 1.4. The mean age of household heads was 41.6 years. Coming to the wealth quintiles of households as assessed from the household heads, most of the households were between 2<sup>nd</sup> and 4<sup>th</sup> quintiles thus about 60 % distributed as quintile 2 287(20.5%), quintile 3 or middle 286 (20.4%) and quintile 4 275(19.7%).

**Table1. Distribution of respondents' socio-demographic characteristics**

Variable	N= 6338 participants
Age of the respondents (mean age)	20 (18.1)
<b>Sex of cases, n (%)</b>	
Male	3106 (49)
Female	3232 (51)
<b>Usually lives at surveyed household, n (%)</b>	
Yes	6274(99.0)
No	61 (1)
Reported that their household had at least one ITN, n (%)	3163 (76.46)
<b>Household characteristics n (%)</b>	<b>N = 1339</b>
Age of household mean (SD)	41.6 (14.5)
Head of household attended school	1115 (79.7)
Number of persons per household mean (SD)	4.5 (2.3)
Number of nets per household mean (SD)	1.4 (1.2)
<b>Highest level of education attained by head of household</b>	
Primary	727 (65.2)
Secondary	337 (30.2)

Tertiary (higher)	51 (4.6%)
<b>Head of household wealth quintiles, n (%)</b>	
Lowest	266 (19.01)
Second	287 (20.51)
Middle	286 (20.44)
Fourth	275 (19.66)
Highest	285 (20.37)

### **Association between ITN use and some factors**

At the bivariate analysis level, education level of head of household was associated with ITN use (OR 0.67, =P = 0.001). Participants from a household where the head attended school were more likely to use ITN (52%) than those from households where the head never attended school (39.6%) (Table 2). There was a statistical significance between the level of education of the head of household and ITN use with P value of <0.001. The higher the level of education of the head of household, the more likely people were to use ITN. In other words respondents from households where the head had tertiary education were more likely to use ITNs as opposed to those from households where the head only had primary or secondary education. Out of 282 respondents from households where the head had tertiary education 167 (59.2) used ITN the night prior to the survey and out of 3422 respondents from households where the head only had primary education 1691 (49.4%) reported having slept under an ITN the night prior to the survey. Wealth quintile had an association with ITN use. Respondents in the wealthiest households were more likely to use ITNs as opposed to respondents living in the poorest households (52.8% vs 41%).

**Table 2. Association between different factors and ITN use**

**Association between socio-demographic factors and ITN use**

<b>Variable</b>	<b>Used ITN</b>		<b>OR(95%CI)</b>	<b>P value</b>
	<b>Yes</b>	<b>No</b>		
<b>Sex</b>				
Male	2674 (49.3%)	434 (47.2%)	1.10(0.91-1.33)	0.239
Female	2747 (50.7%)	485 (52.8%)		
Age of participants, mean (SD)	20.0 (17.6)	23.1 (20.4)		0.001
Number of sleeping spaces, mean(SD)	3 (1.2)	2.1 (1.0)	0.88(0.99)	0.002
<b>Head of household attended school</b>				



Yes	2721 (52.1%)	2502 (47.9%)	0.67(0.53-0.85)	0.001
No	442 (39.6%)	673 (60.4)		
<b>Highest level of education attained by head of household</b>				
Primary	1691(49.4%)	1731(49.4%)		
Secondary	863 (56.8%)	656(43.2%)		0.001
Tertiary (higher)	167 (59.2%)	115 (40.8%)		
<b>Wealth quintile</b>				
Lowest	473 (41%)	681 (59%)		
Second	546 (43%)	724 (51.1%)	1.28(1.197-1.37)	0.001
Middle	694 (52.9%)	619 (47.1%)		
Fourth	540 (45.5%)	648 (54.6)		
Fifth	746 (52.8%)	668 (47.2%)		

Out of the total number of participants who owned ITNs 3560 (97%) had white nets, 44 (1.20%) had blue nets, 34(0.93%) had green nets, 5 (0.14%) had red nets and 25 (0.68%) had black nets. Out of 3560 (97%) of participants who owned white ITNs, 3098 (87.02%) reported having slept under an ITN the night prior to the survey (Table 3). out of 44 (1.20%) participants who owned blue ITNs only 17 (38.64%) reported having slept under an ITN the night before the survey. 34 (0.93%) of those who owned green ITNs 22 (64.7%) used ITNs. . 25 (0.68%) owned black ITNs and 21 (84%) used ITNs the night before the survey. 5(0.14%) of participants who owned red ITNs all 5 of them slept under an ITN. Logistic regression shows a significant association between color of ITN and use (OR=1.01 at 95% CI 1.05-1.09; p = 0.0001).

2635 respondents owned ITNs that were in good condition and 298 respondents owned nets that were in poor condition. Out of 2635 respondents who owned ITNs that were in good condition 2335 (88.61%) slept under an ITN the night prior to the survey and out of 298 respondents who owned ITNs in poor condition (ITNs with 1 to 4 holes that fit a

touch battery) 211 (70.81%) used ITN the night prior to the survey. The study shows that condition of an ITN was strongly associated with use (OR=0.56, 95% CI 0.49 – 0.61, p= 0.001). Participants whose nets were in good condition (no holes) and fair condition (no holes that fit a touch battery) were more likely to use them as opposed to those with more than one hole.

There was however, no significant association between shape of the net and use (OR=1.01, 95% CI 0.98 – 1.04, p = 0.632)

**Table 3. Association between ITN use and ITN characteristics**

Variable	Used ITN		OR(95% CI)	P value
	Yes	No		
<b>Condition of net</b>				
Good (no holes)	2335(88.6)	300(11.4)	0.56 (0.49-0.61)	0.001
Fair (no holes that fit touch battery)	570(90.6)	59(9.4)		
Poor(1-4 holes that fit touch battery)	211(70.8)	87(29.2)		
Unsafe(more than 4 holes fit touch battery)	44(44)	56(56)		
<b>Color of net</b>				
Green	22(64.7)	12(35.3)	0.01(1.05-1.09)	0.0001
Blue	17(38.6)	27(61.4)		

Red	5(100)	0		
White	3098(87)	462(13)		
Black	21(84)	4(16)		
Shape of net				
Conical	116(87)	17(12.8)	1.01 (0.98-1.04)	0.632
Rectangular	3042(86.2)	488(13.6)		
Other	5(100)	0		

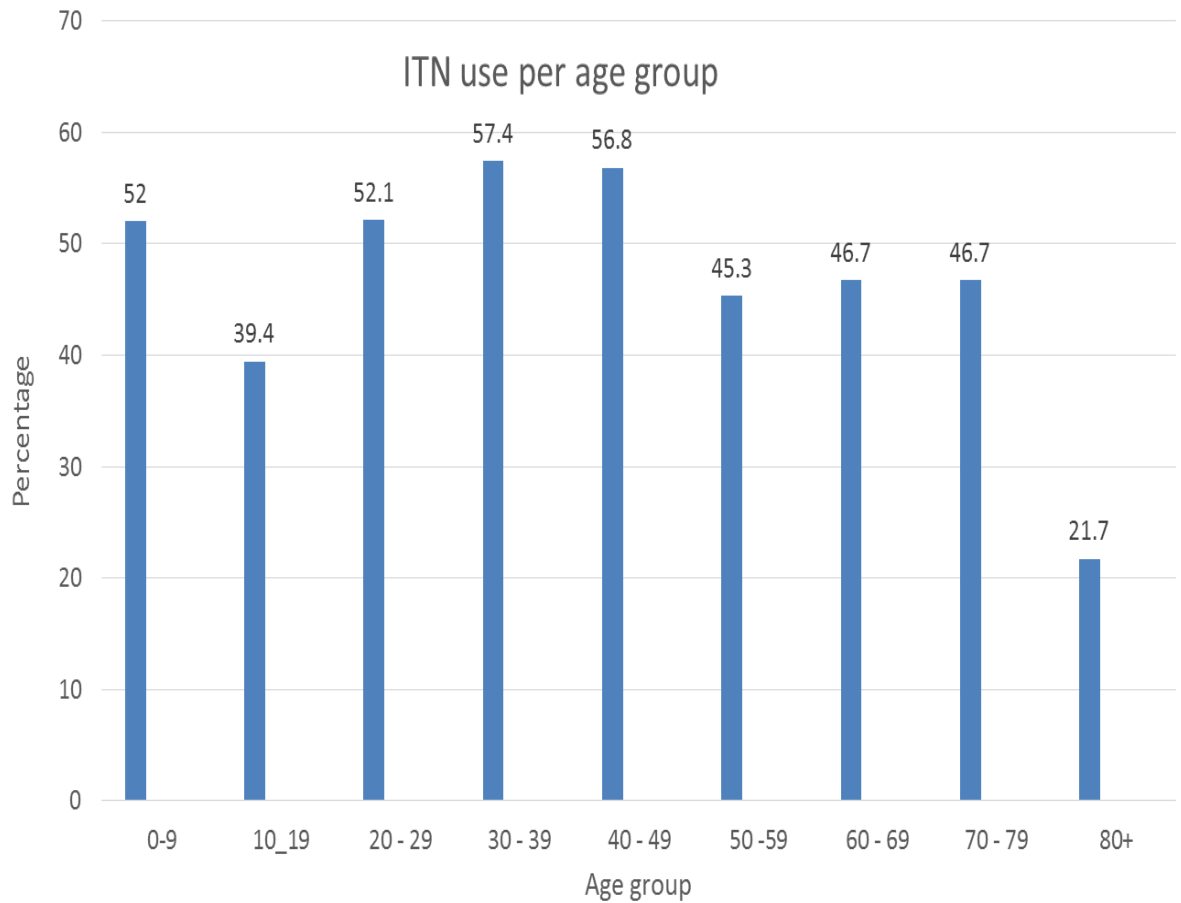
Number of sleeping spaces in household and number of people were both positively correlated with number of mosquito nets used. These correlations are both significant ( $r = 0.325$ ,  $P < 0.001$  and  $r=0.467$ ,  $P < 0.001$ ) respectively (Table 4). Correlation coefficient measures the strength of the two variables. Thus for every increase in number of sleeping spaces or people in household there was significant increase in number of mosquito nets used in household.

**Table 4. Correlations between number of nets and other variables**

<b>Variable</b>	<b>number of nets</b>	
	<b>Correlation coefficient</b>	<b>P value</b>
<b>Number of spaces</b>	<b>0.325</b>	<b>&lt;0.001</b>
<b>Number of persons in household</b>	<b>0.467</b>	<b>&lt;0.001</b>

The study showed an association between age and ITN use. ITN use was lowest among participants aged 10 to 19 (39.4%) and 80 and above (21.7%) and highest among participants aged 30 to 39 (57.4%) and 40 to 49 (56.8%) fig 2.

**Fig 2**



Out of 2550 respondents who obtained ITNs from Government clinic or hospital

2284(89.5%) reported having slept under an ITN the night prior to the survey (Table 5).

Out of 162 respondents who obtained/purchased ITNs, 140(86.4%) used ITNs. 121

respondents obtained ITNs from other sources and of those 104(85.9%) used the ITN the

night the net. Interestingly 713 respondents obtained ITNs from CHWs and only (534) 74.9% said they slept under an ITN the night prior to the survey.

**Table 5. Source of ITN and use**

Variable	N- 6338	Used ITN		P value
		Yes	No	
CHW		534(74.9%)	179(25.1%)	<0.001
Government hosp/clinic		2284(89.5%)	266(10.43%)	
Shop (pharmacy, family/friends)		140(86.4%)	22(13.6%)	
Neighborhood health committee		101(82.8%)	21(17.2%)	
Other		104(85.9%)	17(14.1%)	

The study shows that a high number of people were knowledgeable about malaria. 711 out of 800 participants had the knowledge that mosquito bites cause malaria. 86% knew that mosquito nets protect against malaria. 87.8% said sleeping under a net is the most important method of prevention against malaria as opposed to other methods such as using mosquito repellent, environmental factors such as filling the puddles, cutting grass, burn leaves and taking preventive medicine.

Out of the 800 participants that were interviewed regarding information education communication, 800 (100%) of them said they had heard information on malaria. Of all

the participants that had heard malaria information 60.50% received information from government clinic/hospital, whereas 18.75% received information from CHWs (Table 6). In the study out of the 800 participants who reported that they had heard some information on malaria, about 10.66% of them heard malaria information from home and out of those that heard malaria information from home 6.75% reported that they got the information from CHWs and 4% from Health care worker, 1% from family/friends.

A logistic regression test was done to determine an association between source of IEC and ITN use. The study found a strong association between IEC from CHWs and ITN use p value 0.006, OR= 1.2, 95% CI 1.2 - 3.2.

**Table 6. Information education communication from CHWs**

<b>Variable</b>	<b>N = 800</b>
<b>Ever heard malaria information</b>	800 (100)
<b>Malaria information source</b>	
<b>Government clinic/hospital</b>	484 (60.50%)
<b>CHWs</b>	150 (18.75%)
<b>Drama</b>	4 (0.5%)
<b>TV</b>	15 (1.88%)
<b>Heard malaria information from home</b>	81 (10.66%)
<b>Source of malaria information at home</b>	
<b>CHWs</b>	54 (6.75%)
<b>Health care worker</b>	32 (4.0%)
<b>Family/friends</b>	8 (1%)

Out of the 800 women who heard malaria messages, the women who are more likely to use ITN are those who heard that malaria can kill (52.3% ,p < 0.001) (Table 6), those who heard messages on the importance of seeking treatment within 24 hours of

symptoms (21.43%,  $p < 0.003$ ) and those that heard that mosquitoes spread malaria(70.5%,  $p < 0.001$ ).

**Table 7**

**Association between type of malaria information heard and ITN use**

<b>Variable</b>	<b>N =</b>	<b>Heard message n- (%)</b>	<b>Used ITN Yes</b>	<b>No</b>	<b>P Value</b>
<b>Malaria is dangerous</b>		145 (18.1)	90 (62.1%)	55 (37.9%)	<0.597
<b>Environmental sanitation(keep surrounding clean, fill water puddles)</b>		43 (5.4%)	29 (67.4%)	14 (35.6%)	<0.031
<b>Malaria can kill</b>		283 (35.4%)	148 (52.3%)	135 (47.7%)	<0.001
<b>Sleeping under net important</b>		263 (32.8%)	159 (60.5%)	104 (39.5%)	<0.893
<b>Seek treatment in 24 hrs.</b>		14 (1.8%)	3 (21.43%)	11 (78.6%)	<0.003
<b>Who should use net</b>		20 (2.5%)	12 (60%)	8 (40%)	<0.991
<b>Mosquitoes spread malaria</b>		190 (23.8%)	134 (70.5%)	56 (29.5%)	<0.001
<b>Importance of spraying</b>		4 (0.5%)	4 (100%)	0	<0.103



## CHAPTER SIX

### **6 DISCUSSION**

The study findings suggest that low ITN use in Siavonga, Sinazongwe, Gwembe and Kalomo is associated with several factors ranging from socio-demographic factors, net characteristics, ITN distribution and information education communication which need to be addressed in future interventions to promote ITN use. The study shows that a big number of people may own ITNs and still not use them, which is as good as not having them at all. Out of a number of factors that were considered in this study, the factors that were found to have an impact or some association with ITN use are age, education of head of household, number of sleeping spaces, some net characteristics such as condition of the net, color of the net, other factors were source of ITN and general knowledge on malaria. According to the study findings, people who get information on malaria from CHWs are more likely to use ITNs as opposed to those who obtain information from T.V, family, drama and hospitals.

A number of studies done in SSA in determining factors that influence ITN use had similar findings. Most studies done in SSA showed that a large number of people who owned ITNs did not actually use them. A study done in Ethiopia where a survey of 857 households was conducted showed that 91% of participants owned ITNs but only 65% slept under an ITN the night before the survey (Baume et al., 2009) . Another study done in Uganda showed 65% ITN ownership but only 23 % ITN usage (Hanson et al., 2009). Lack of ITN use can be attributed to several factors. The findings in this study reveal several factors that had an impact on ITN use in the districts under study. These factors include age, level of education of head of household, knowledge on the importance of

ITN use, malaria knowledge, where ITN obtained and number of people in a household, and number of ITNs in a household.

## **AGE**

Age was found to be associated with ITN use in the districts under study. According to the study, younger participants were more likely to use ITNs as opposed to older people. However, children between the ages of 10 to 19 were less likely to use ITN. These findings are similar to the 2010 MIS findings where children aged 15 to 19 reported low ITN use. An explanation for low ITN use among teenagers could be attributed to the lack of knowledge on malaria transmission and prevention. Not many studies have been done in Zambia to determine malaria knowledge among adolescents. A study done in Nigeria identified a knowledge gap on malaria transmission and prevention among adolescents. The study showed that only 25.7 % of respondents were aware that ITNs prevent against malaria (Udonwa, 2010). ITN use was found to be low as well in adults aged 50 and above. This could be that adults give priority to children to use ITNs. This can be a huge setback in universal coverage, all households should be encouraged to own enough ITNs for everybody. It also could be that people don't understand the importance of universal coverage which states that every sleeping space should be covered with an ITN (MIS 2010). These findings suggest that there is need to educate the public or communities on the importance of universal coverage. There is need to focus on educating school going children on the importance of using ITNs. According to the study findings, a small percentage of people heard messages on who should sleep under a net. If universal coverage is to be achieved then people need to be educated on who should sleep under a net, how to use a net and the importance of owning and using an ITN.

### **Education level of head of household**

Education of head of household was associated with ITN use. Participants from households where the head of household had attended school were more likely to use ITN as opposed to respondents from households where the head had no form of education. These findings are similar to the findings of the study done by Keating et al in Luangwa Zambia (2010). The study done by Keating et al showed that people with higher education were more likely to use ITNs as opposed to those that did not attend school. Another study done in Northern Nigeria found that people from households where the head had some education were more likely to own and use ITNs compared to those from households where the head was uneducated (Yazoume et al, 2012). This might be because people with some education are more likely to be exposed to malaria information through booklets or media (Keating, 2010). People who are educated are more likely to have easy access to malaria information because they are more likely to live in places where malaria information is readily available. It is therefore important for people delivering health education to the public to be aware of someone's education or literacy level. The health information has to be delivered to suit the education level of the recipient.

### **NUMBER OF SLEEPING SPACES**

Number of sleeping spaces and the number of ITNs in a household were associated with use. The more sleeping spaces and participants there were in a household, the more ITNs used. This simply suggests that people need to realize or be educated on the fact that all sleeping spaces should be covered with a mosquito net. Study done in Bioko Island

found that economic boom that took place there had an impact on ITN use. An economic boom resulted in better housing resulting in increase in sleeping areas. As a result there weren't enough ITNs to cover new sleeping spaces (Garcia-Basteiro et al., 2011).

## **CHARACTERISTICS OF THE NET**

### **Color of net**

The color of the net and ITN use showed statistical significance. More than 90 of participants owned white nets and of those more than 80% were likely to use them. This could be that white is a neutral color and most acceptable. Another explanation for these results could be that most of the nets distributed in the country were white, therefore white was more likely to be used than other scarce colors. A study done by Baume in Ethiopia found similar results, participants were more likely to use blue mosquito nets because most of the mosquito nets distributed throughout Ethiopia at the time of study were blue (2009).

### **Condition of the net**

There was a strong association between condition of ITN and use and ITN. ITNs with more holes were less likely to be used compared to nets that did not have a hole or nets with only one hole. It is however possible that some households did not use ITN simply because they thought it was old and therefore not effective. The study findings are similar to the study done by Baume et al which showed that people did not use nets because they did not see insects being killed upon contact with the nets and therefore considered the nets ineffective (2009).

### **Shape of the net**

The study done by Baume et al suggest that the shape of an ITN has influence on ITN use (2009) however, according to this study the shape of the net was not associated with

ITN use, this finding however was not statistically significant. People who owned ITNs used them regardless of shape. This could be attributed to the new economic status of the districts under study. Most of the areas in the districts under study are rural, the houses found there are more modern compared to other rural areas, this can be attributed to the booming economy in the country. Most net shapes are easy to hang in modern houses. A study done by Baume et al, concluded that people in rural areas who owned conical nets were more likely to use them than those who owned rectangular nets because rectangular nets are harder to hang in houses found in rural areas (2009)

### **SOURCE OF ITN**

According to the study findings, participants who obtained ITNs from government clinics, shops, NHC and other places like pharmacy were more likely to use ITNs as opposed to participants who obtained ITNs from community health workers. One would expect ITN use to be highest among participants who obtained ITNs from CHWs.

According to diffusion of innovation theory, people are more likely to accept a commodity or new ideas from someone they know, trust or relate to (Rimer et al 2005). CHWs are chosen by communities and usually share a lot in common. These findings contradict findings of other studies which show that involvement of community based interventions has a great impact on ITN uptake (Keating et al, 2012).

The explanation for these findings could be that CHWs just distributed ITNs without proper education on importance of ITNs or targeting interventions that will result in behavior change, to increase ITN uptake. ITN distribution without key messages will not translate in ITN use.

### **MALARIA KNOWLEDGE.**

The findings of this study suggest that the majority of respondents had the knowledge that malaria is caused by mosquito bites and that ITNs protect from malaria however, they did not understand the importance of sleeping under an ITN hence the low ITN use. In contrary a study done by Rhee et al in Piron Mali, showed that people who had knowledge on malaria, were more likely to implement malaria prevention interventions such as treatment and use of nets (2005). The findings could be attributed to the kind of messages and the way messages were presented. It could be that the people that were educating these communities were just talking about the fact that ITNs protect from malaria, as opposed to stressing the importance of sleeping under a mosquito net. The study done by Amoran in Nigeria confirms the fact that health education has great influence on ITN use if well executed (2012). From the study we can see that less than 50 percent of the participants heard information on the importance of sleeping under a net. People might have the knowledge on malaria but if they don't know or don't understand the importance of some prevention interventions, they may not see any need to change their behavior towards health practices. ITNs do not only act as barriers against mosquitoes, they also act as insecticide, reducing the number of mosquitoes present. Such information can increase ITN use. There are some studies that were done that showed that people were knowledgeable about cause of malaria, knew the signs and symptoms of malaria but did not know that sleeping under a mosquito net is an important way of preventing malaria (Udonwa, 2010).

There is need to implement strategies that will result in behavioral change if we are to win the fight against malaria in Zambia. If it means having CHWs hang ITNs in communities, then NMCP need to invest in that.

According to the study findings, CHWs don't have a huge impact in the malaria prevention interventions in the areas under study. There were few participants who heard or obtained malaria information from CHWs. This could be that there are not enough or many CHWs out in communities to help in the malaria interventions or it could be that CHWs that are in the communities are not doing much. This indicates that there is need to deploy more CHWs in districts or areas that are still experiencing high prevalence of malaria.

## CHAPTER 7

### **CONCLUSION AND RECOMMENATIONS**

According to the study findings, there is still a lot to be done in the specific districts under study as well as a country in the promotion of malaria intervention control. There is a lot to be done to promote ITN use. ITN distribution and ownership on its own does not translate into ITN use. ITN distribution needs to be accompanied by interventions or strategies that will promote use. Factors that influence ITN use need to be taken seriously and addressed appropriately if the battle against malaria is to be won. Health education on the importance of ITN use should be a priority. More CHWs should be trained and deployed in communities to reinforce malaria prevention interventions.

#### **Study limitations**

The study used secondary data as a result there is a limit to some information that would have been necessary to answer some questions for instance one would have wanted to get information from the CHWs themselves concerning malaria prevention activities in the district but that information in the data.

Respondents reported ITN use, there is therefore a possibility that some people reported having used an ITN the night prior to the survey, when they actually didn't use ITN.

## **Recommendations**

- More studies on ITN use should be done in areas where there is still high prevalence of malaria. More factors that influence ITN use should be explored.
- Health education on malaria transmission and prevention should be delivered in different local languages and in different forms such a drama. Demonstrations on how to hang ITNs need to be performed to cover people with different levels of education.
- The study showed low ITN use among children aged 10 to 19. It is therefore important to educate school going children on malaria transmission and prevention to promote ITN use. Necessary to do a qualitative study that will help determine why there is low ITN use in this age group.
- There is need to promote health education on importance of ITNs at a household level (door to door) to promote use. It is also crucial for CHWs to conduct door to door surveys to assess net conditions in communities frequently.
- Interventions that will promote behavioral change towards health practices such as ITN use should be implemented.
- The study found that there weren't many people who received malaria information at home or from CHWs .There is need to train and deploy more CHWs in communities to distribute, educate and carry out interventions that will promote ITN use.



## REFERENCES

- Amoran, O., Fatugase, O. K., Alausapact, M. O. 2012. Health education intervention on insecticide treated nets uptake among nursing mothers in rural communities in Nigeria. *BMC Research Notes* 2012 5: 444.
- Ankomah, A., Adebayo, S. B., Arogundade, E. D., Anyanti, J., Nwokolo, E., Ladipo, O. & Meremikwu, M. M. 2012. Determinants of insecticide-treated net ownership and utilization among pregnant women in Nigeria. *BMC Public Health*, 12, 105.
- Atieli, H. E., Zhou, G., Afrane, Y., Lee, M. C., Mwanzo, I., Githeko, A. K. & Yan, G. 2011. Insecticide-treated net (ITN) ownership, usage, and malaria transmission in the highlands of western Kenya. *Parasit Vectors*, 4, 113.
- Baume, C. A., Reithinger, R. & Woldehanna, S. 2009. Factors associated with use and non-use of mosquito nets owned in Oromia and Amhara regional states, Ethiopia. *Malar J*, 8, 264.
- Beier, J. C., Keating, J., Githure, J. I., Macdonald, M. B., Impoinvil, D. E. & Novak, R. J. 2008. Integrated vector management for malaria control. *Malar J*, 7 Suppl 1, S4.
- Central Statistical Office (Cso), M. O. H. M., Tropical Diseases Research Centre (Tdrc). 2009. Demographic and Health Survey 2007. Calverton, Maryland, USA: University of Zambia, and Macro International Inc.
- Chanda, E., Kamuliwo, M., Steketee, W.R., Macdonald M, B., Babaniyi, O., Mukonka, V, M., An Overview of the Malaria Control Program in Zambia. 2013. Hindawi.
- Chizema-Kawesha, E., Miller, J. M., Steketee, R. W., Mukonka, V. M., Mukuka, C., Mohamed, A. D., Miti, S. K. & Campbell, C. C. 2010. Scaling up malaria control in Zambia: progress and impact 2005-2008. *Am J Trop Med Hyg*, 83, 480-8.

- Eisele, T. P., Miller, J. M., Moonga, H. B., Hamainza, B., Hutchinson, P. & Keating, J. 2011. Malaria infection and anemia prevalence in Zambia's Luangwa District: an area of near-universal insecticide-treated mosquito net coverage. *Am J Trop Med Hyg*, 84, 152-7.
- Garcia-Basteiro, A. L., Schwabe, C., Aragon, C., Baltazar, G., Rehman, A. M., Matias, A., Nseng, G. & Kleinschmidt, I. 2011. Determinants of bed net use in children under five and household bed net ownership on Bioko Island, Equatorial Guinea. *Malar J*, 10, 179.
- Hanson K, Marchant T, Nathan R, Mponda H, Jones C, et al. 2009. Household ownership and use of insecticide treated nets among target groups after implementation of a national voucher program in the United Republic of Tanzania: plausibility study using three annual cross sectional household surveys. *BMJ* 339: b2434.
- Kate Macintyre, M. L., 2 Joseph Keating, 1 Busiku Hamainza, 3 John Miller 4 And & Eisele 1, T. P. 2011. Determinants of hanging and use of ITNs in the context of near universal coverage in Zambia. *Health policy and planning*, 1-10.
- Killeen, G. F., Smith, T. A., Ferguson, H. M., Mshinda, H., Abdulla, S., Lengeler, C. & Kachur, S. P. 2007. Preventing childhood malaria in Africa by protecting adults from mosquitoes with insecticide-treated nets. *PLoS Med*, 4, e229.
- Larson, P. S., Mathanga, D. P., Campbell, C. H., Jr. & Wilson, M. L. 2012. Distance to health services influences insecticide-treated net possession and use among six to 59 month-old children in Malawi. *Malar J*, 11, 18.
- Lengeler, C. 2009. Insecticide-treated bed nets and curtains for preventing malaria. *Cochrane Database of Systematic Reviews* 2004.

- Mendis, K., Rietveld, A., Warsame, M., Bosman, A., Greenwood, B. & Wernsdorfer, W. H. 2009. From malaria control to eradication: The WHO perspective. *Trop Med Int Health*, 14, 802-9.
- Ministry Of Health 2010. Zambia National Malaria Indicator Survey. 2010.
- National cancer institute. 2005. Theory at a glance; A guide for health promotion preactice.
- Amoran, Fatugase, Fatugase, Alausa. 2012 Impact of health education intervention on insecticide treated nets uptake among nursing mothers in rural communities in Nigeria. *BMC Research Notes* 2012, 5:444
- Rhee, M., Sissoko, M., Perry, S., Mcfarland, W., Parsonnet, J. & Doumbo, O. 2005. Use of insecticide-treated nets (ITNs) following a malaria education intervention in Piron, Mali: a control trial with systematic allocation of households. *Malar J*, 4, 35.
- Roll Back Malaria 2011. Roll Back Malaria Partnership Progress and Impact Series. Geneva.
- Roll Back Malaria .April 2011
- Progress and Impact Series Country Report Focus on Zambia. Geneva.
- Takken, W. 2002. Do Insecticide-treated bednets have an effect on malaria vectors? . *Trop Med Int Health*, 7, 1022-1033.
- Udonwa Ndifreke., Gyuse Abraham., Etokidem Aniekan. 2010. Knowledge and prevention practices among school adolescents in a coastal community in Calabar, Nigeria. *African; J Fam Med Primary Care* 2, 1
- Vanden Eng, J. L., Thwing, J., Wolkon, A., Kulkarni, M. A., Many, A., Erskine, M., Hightower, A. & Slutsker, L. 2010. Assessing bed net use and non-use after

long-lasting insecticidal net distribution: a simple framework to guide programmatic strategies. *Malar J*, 9, 133.

Welch Kevin, F. M. 2012. Barriers in access to insecticide-treated bednets for malaria prevention: An analysis of Cambodia DHS data. *J Vector Borne Dis*, 49, 1-7.

WHO 2010a. World Malaria Report 2010. Geneva: World Health Organisation.

WHO 2010b. World Malaria Report Global Malaria Programme.




# Questionnaire adopted from NMCC

## ZAMBIA MALARIA INDICATOR SURVEY MODEL HOUSEHOLD QUESTIONNAIRE

IDENTIFICATION <sup>1</sup>																			
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NAME OF HOUSEHOLD HEAD _____																			
CLUSTER NUMBER.....																			
HOUSEHOLD NUMBER.....																			
REGION .....																			
URBAN/RURAL (URBAN=1, RURAL=2).....																			
LARGE CITY/SMALL CITY/TOWN/COUNTRYSIDE <sup>2</sup> .....																			
(LARGE CITY=1, SMALL CITY=2, TOWN=3, COUNTRYSIDE=4)																			

INTERVIEWER VISITS				
	1	2	3	FINAL VISIT
DATE	_____	_____	_____	DAY MONTH YEAR
INTERVIEWER'S NAME	_____	_____	_____	NAME
RESULT*	_____	_____	_____	RESULT
NEXT VISIT: DATE	_____	_____		TOTAL NO. OF VISITS
TIME	_____	_____		TOTAL PERSONS IN HOUSEHOLD
*RESULT CODES: 1 COMPLETED 2 NO HOUSEHOLD MEMBER AT HOME OR NO COMPETENT RESPONDENT AT HOME AT TIME OF VISIT 3 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD OF TIME 4 POSTPONED 5 REFUSED 6 DWELLING VACANT OR ADDRESS NOT A DWELLING 7 DWELLING DESTROYED 8 DWELLING NOT FOUND 9 OTHER _____ (SPECIFY)				TOTAL ELIGIBLE WOMEN
				LINE NUMBER OF RESPONDENT TO HOUSEHOLD QUESTIONNAIRE

SUPERVISOR	OFFICE EDITOR	KEYED BY
NAME _____	NAME _____	NAME _____

SUPERVISOR	OFFICE EDITOR	KEYED BY
DATE _____		
		

<sup>1</sup> This section should be adapted for country-specific survey design.

<sup>2</sup> The following guidelines should be used to categorize urban sample points: "Large cities" are national capitals and places with over 1 million population; "small cities" are places with between 50,000 and 1 million population; the remaining urban sample points are "towns."

### HOUSEHOLD LISTING

Now we would like some information about the people who usually live in your household or who are staying with you now.

LINE NO.	USUAL RESIDENTS AND VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	RESIDENCE		AGE	TIME INDOORS / OUTDOORS				ELIGIBLE WOMEN
				Does (NAME) usually live here?	Did (NAME) stay here last night?		To the nearest hour, what time last night did (NAME) go indoors for the evening?	To the nearest hour, what time last night did (NAME) go to bed?	To the nearest hour, what time this morning did (NAME) get out of bed?	To the nearest hour, what time this morning did (NAME) go outdoors?	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(7.1)	(7.2)	(7.3)	(7.4)	(8)
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\* CODES FOR Q.3  
RELATIONSHIP TO HEAD OF HOUSEHOLD:  
01 = HEAD  
02 = WIFE/HUSBAND  
03 = SON OR DAUGHTER  
04 = SON-IN-LAW OR DAUGHTER-IN-LAW

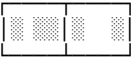
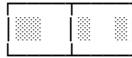

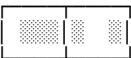
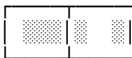

05 = GRANDCHILD  
06 = PARENT  
07 = PARENT-IN-LAW  
08 = BROTHER OR SISTER  
09 = OTHER RELATIVE  
10 = ADOPTED/FOSTER/STEPCHILD  
11 = NOT RELATED  
98 = DON'T KNOW

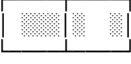


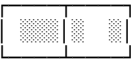
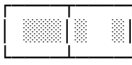
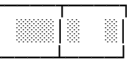
NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP																																																																		
9.11	For the head of household, did he/she ever <b>attend</b> school?	YES..... 1 NO..... 2	←10																																																																		
9.12	For the head of household, what is the highest level of school <b>attended</b> : primary, secondary, or higher? <sup>1</sup>	PRIMARY..... 1 SECONDARY..... 2 HIGHER..... 3																																																																			
Does your household have: <sup>2</sup>		<table border="0"> <thead> <tr> <th></th> <th>YES</th> <th>NO</th> </tr> </thead> <tbody> <tr><td>ELECTRICITY.....</td><td>1</td><td>2</td></tr> <tr><td>RADIO.....</td><td>1</td><td>2</td></tr> <tr><td>TELEVISION.....</td><td>1</td><td>2</td></tr> <tr><td>MOBILE TELEPHONE.....</td><td>1</td><td>2</td></tr> <tr><td>NON-MOBILE TELEPHONE.....</td><td>1</td><td>2</td></tr> <tr><td>REFRIGERATOR.....</td><td>1</td><td>2</td></tr> <tr><td>BED.....</td><td>1</td><td>2</td></tr> <tr><td>CHAIR.....</td><td>1</td><td>2</td></tr> <tr><td>TABLE.....</td><td>1</td><td>2</td></tr> <tr><td>CUPBOARD.....</td><td>1</td><td>2</td></tr> <tr><td>SOFA.....</td><td>1</td><td>2</td></tr> <tr><td>CLOCK.....</td><td>1</td><td>2</td></tr> <tr><td>FAN.....</td><td>1</td><td>2</td></tr> <tr><td>SEWING MACHINE.....</td><td>1</td><td>2</td></tr> <tr><td>CASSETTE PLAYER.....</td><td>1</td><td>2</td></tr> <tr><td>PLOUGH.....</td><td>1</td><td>2</td></tr> <tr><td>GRAIN GRINDER.....</td><td>1</td><td>2</td></tr> <tr><td>VCR/DVD.....</td><td>1</td><td>2</td></tr> <tr><td>TRACTOR.....</td><td>1</td><td>2</td></tr> <tr><td>VEHICLE.....</td><td>1</td><td>2</td></tr> <tr><td>HAMMER MILL.....</td><td>1</td><td>2</td></tr> </tbody> </table>		YES	NO	ELECTRICITY.....	1	2	RADIO.....	1	2	TELEVISION.....	1	2	MOBILE TELEPHONE.....	1	2	NON-MOBILE TELEPHONE.....	1	2	REFRIGERATOR.....	1	2	BED.....	1	2	CHAIR.....	1	2	TABLE.....	1	2	CUPBOARD.....	1	2	SOFA.....	1	2	CLOCK.....	1	2	FAN.....	1	2	SEWING MACHINE.....	1	2	CASSETTE PLAYER.....	1	2	PLOUGH.....	1	2	GRAIN GRINDER.....	1	2	VCR/DVD.....	1	2	TRACTOR.....	1	2	VEHICLE.....	1	2	HAMMER MILL.....	1	2	
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What type of fuel does your household mainly use for cooking?		<table border="0"> <tbody> <tr><td>ELECTRICITY.....</td><td>01</td></tr> <tr><td>LPG/NATURAL GAS.....</td><td>02</td></tr> <tr><td>BIOGAS.....</td><td>03</td></tr> <tr><td>KEROSENE.....</td><td>04</td></tr> <tr><td>COAL/LIGNITE.....</td><td>05</td></tr> <tr><td>CHARCOAL.....</td><td>06</td></tr> <tr><td>FIREWOOD/STRAW.....</td><td>07</td></tr> <tr><td>DUNG.....</td><td>08</td></tr> <tr><td>OTHER.....</td><td>96</td></tr> </tbody> </table> <p>(SPECIFY)</p>	ELECTRICITY.....	01	LPG/NATURAL GAS.....	02	BIOGAS.....	03	KEROSENE.....	04	COAL/LIGNITE.....	05	CHARCOAL.....	06	FIREWOOD/STRAW.....	07	DUNG.....	08	OTHER.....	96																																																	
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14e	How many separate rooms are in this household?  INCLUDE ALL ROOMS, INCLUDING KITCHEN, TOILET, SLEEPING ROOMS, SALON, etc.	NUMBER OF ROOMS	<table border="1"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>																																																																		



14f	How many rooms in this household are used for sleeping? INCLUDE ONLY ROOMS WHICH ARE USUALLY USED FOR SLEEPING.	NUMBER OF SLEEPING ROOMS <input type="text"/> <input type="text"/>	
14g	How many separate sleeping spaces are there in your household? INCLUDE ALL SLEEPING SPACES, INCLUDING IF THERE IS MORE THAN ONE SLEEPING SPACE IN EACH ROOM USED FOR SLEEPING.	NUMBER OF SLEEPING SPACES <input type="text"/> <input type="text"/>	
14h	Does any member of the household own any agricultural land?	YES.....1 NO.....2	—<14j
14i	How much agricultural land do members of this household own?	Lima..... <input type="text"/> <input type="text"/> Acres..... <input type="text"/> <input type="text"/> Hectares..... <input type="text"/> <input type="text"/> 95 or more hectares.....995 Don't know.....998	
14j	Does this household own any livestock, herds other farm animals, or poultry?	YES.....1 NO.....2	
14k	How many of the following animals does this household own? IF NONE, ENTER '0' IF MORE THAN 95, ENTER '95' IF UNKNOWN, ENTER '98': Traditional cattle? Dairy cattle? Beef cattle? Horses, donkeys, mules? Goats? Sheep? Pigs? Chickens? Other poultry? Other livestock?	TRADITIONAL <input type="text"/> <input type="text"/> DAIRY <input type="text"/> <input type="text"/> BEEF <input type="text"/> <input type="text"/> HORSES/DONKEYS/MULES <input type="text"/> <input type="text"/> GOATS <input type="text"/> <input type="text"/> SHEEP <input type="text"/> <input type="text"/> PIGS <input type="text"/> <input type="text"/> CHICKEN <input type="text"/> <input type="text"/> OTHER POULTRY <input type="text"/> <input type="text"/> OTHER LIVESTOCK <input type="text"/> <input type="text"/>	

15	Does any member of your household own: A watch? A bicycle? A motorcycle or motor scooter? An animal drawn cart? A car or truck? A boat with a motor? A banana boat?	<table style="width: 100%; border: none;"> <thead> <tr> <th></th> <th style="text-align: right;">YES</th> <th style="text-align: right;">NO</th> </tr> </thead> <tbody> <tr> <td>WATCH.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>BICYCLE.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>MOTORCYCLE/SCOOTER.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>ANIMAL-DRAWN CART.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>CAR/TRUCK.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>BOAT WITH MOTOR.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>BANANA BOAT.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> </tbody> </table>		YES	NO	WATCH.....	1	2	BICYCLE.....	1	2	MOTORCYCLE/SCOOTER.....	1	2	ANIMAL-DRAWN CART.....	1	2	CAR/TRUCK.....	1	2	BOAT WITH MOTOR.....	1	2	BANANA BOAT.....	1	2	
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15A	At any time in the past 12 months, has anyone sprayed the interior walls of your dwelling against mosquitoes? <sup>2</sup>	<table style="width: 100%; border: none;"> <tbody> <tr> <td>YES.....</td> <td style="text-align: right;">1</td> </tr> <tr> <td>NO.....</td> <td style="text-align: right;">2</td> </tr> <tr> <td>DON'T KNOW.....</td> <td style="text-align: right;">8</td> </tr> </tbody> </table>	YES.....	1	NO.....	2	DON'T KNOW.....	8	<15D																		
YES.....	1																										
NO.....	2																										
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15B	How many months ago was the house sprayed? <sup>2</sup> IF LESS THAN ONE MONTH, RECORD '00' MONTHS AGO.	MONTHS AGO..... <input style="width: 40px; height: 20px; border: 1px solid black;" type="text"/>																									
15C	Who sprayed the house? <sup>2</sup>	<table style="width: 100%; border: none;"> <tbody> <tr> <td>GOVERNMENT WORKER/PROGRAM ...</td> <td style="text-align: right;">1</td> </tr> <tr> <td>PRIVATE COMPANY .....</td> <td style="text-align: right;">2</td> </tr> <tr> <td>HOUSEHOLD MEMBER.....</td> <td style="text-align: right;">3</td> </tr> <tr> <td>OTHER _____</td> <td style="text-align: right;">6</td> </tr> <tr> <td style="text-align: center;">(SPECIFY)</td> <td></td> </tr> <tr> <td>DON'T KNOW .....</td> <td style="text-align: right;">8</td> </tr> </tbody> </table>	GOVERNMENT WORKER/PROGRAM ...	1	PRIVATE COMPANY .....	2	HOUSEHOLD MEMBER.....	3	OTHER _____	6	(SPECIFY)		DON'T KNOW .....	8													
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15D	At any time in the past 12 months, have the walls in your dwelling been plastered or painted?	<table style="width: 100%; border: none;"> <tbody> <tr> <td>YES.....</td> <td style="text-align: right;">1</td> </tr> <tr> <td>NO.....</td> <td style="text-align: right;">2</td> </tr> <tr> <td>DON'T KNOW.....</td> <td style="text-align: right;">8</td> </tr> </tbody> </table>	YES.....	1	NO.....	2	DON'T KNOW.....	8	16																		
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15F	Have any of the following been used in your living space over the last week: Mosquito coils? Insecticide spray (eg. DOOM, Rungu, Expel)? Repellents?	<table style="width: 100%; border: none;"> <thead> <tr> <th></th> <th style="text-align: right;">YES</th> <th style="text-align: right;">NO</th> </tr> </thead> <tbody> <tr> <td>Mosquito coils.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Insecticide spray.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> <tr> <td>Repellents.....</td> <td style="text-align: right;">1</td> <td style="text-align: right;">2</td> </tr> </tbody> </table>		YES	NO	Mosquito coils.....	1	2	Insecticide spray.....	1	2	Repellents.....	1	2													
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16	Does your household have any mosquito nets that can be used while sleeping?	<table style="width: 100%; border: none;"> <tbody> <tr> <td>YES .....</td> <td style="text-align: right;">1</td> </tr> <tr> <td>NO.....</td> <td style="text-align: right;">2</td> </tr> </tbody> </table>	YES .....	1	NO.....	2	→ 27																				
YES .....	1																										
NO.....	2																										
17	How many mosquito nets does your household have? IF 7 OR MORE NETS, RECORD '7'.	NUMBER OF NETS..... <input style="width: 40px; height: 20px; border: 1px solid black; background: repeating-linear-gradient(45deg, transparent, transparent 2px, black 2px, black 4px);" type="text"/>																									
17a	Has anyone in your household ever sold or given away a mosquito net?	<table style="width: 100%; border: none;"> <tbody> <tr> <td>YES, SOLD A MOSQUITO NET .....</td> <td style="text-align: right;">1</td> </tr> <tr> <td>YES, GAVE AWAY A MOSQUITO NET... </td> <td style="text-align: right;">2</td> </tr> <tr> <td>NO.....</td> <td style="text-align: right;">3</td> </tr> <tr> <td>DON'T KNOW .....</td> <td style="text-align: right;">4</td> </tr> <tr> <td>REFUSED .....</td> <td style="text-align: right;">5</td> </tr> </tbody> </table>	YES, SOLD A MOSQUITO NET .....	1	YES, GAVE AWAY A MOSQUITO NET...	2	NO.....	3	DON'T KNOW .....	4	REFUSED .....	5															
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<p><sup>1</sup> Categories to be developed locally and revised based on the pretest; however, the broad categories must be maintained. In some countries, it may be desirable to ask an additional question on the material of walls or ceilings.</p> <p><sup>2</sup> This question should be deleted in countries that do not have an indoor residual spraying program for mosquitoes.</p>																											

18	ASK RESPONDENT TO SHOW YOU THE NET(S) IN THE HOUSEHOLD. IF MORE THAN THREE NETS, USE ADDITIONAL QUESTIONNAIRE(S).	NET #1	NET #2	NET #3
		OBSERVED ..... 1 NOT OBSERVED ..... 2	OBSERVED ..... 1 NOT OBSERVED ..... 2	OBSERVED ..... 1 NOT OBSERVED ..... 2
19	How long ago did your household obtain the mosquito net?	MOS AGO  MORE THAN 3 YEARS AGO ..... 95	MOS AGO  MORE THAN 3 YEARS AGO ..... 95	MOS AGO  MORE THAN 3 YEARS AGO ..... 95
20	OBSERVE OR ASK THE BRAND OF MOSQUITO NET.  IF BRAND IS UNKNOWN, AND YOU CANNOT OBSERVE THE NET, SHOW PICTURES OF TYPICAL NET TYPES/BRANDS TO RESPONDENT.	'PERMANENT' NET <sup>1</sup> Permanet.....11   Olyset.....12   MamaSafeNite.....13   NetProtect.....14    Other/Don't Know..... 16 (SKIP TO 24)=   'PRETREATED' NET <sup>2</sup> ICONET.....21   Fennet.....22   KO Nets.....23   Safinet.....24    Other/Don't Know..... 26 (SKIP TO 22)=   OTHER.....31 DON'T KNOW BRAND.....98	'PERMANENT' NET <sup>1</sup> Permanet.....11   Olyset.....12   MamaSafeNite...13   NetProtect.....14    Other/Don't Know.....16 (SKIP TO 24)=   'PRETREATED' NET <sup>2</sup> ICONET.....21   Fennet.....22   KO Nets.....23   Safinet.....24    Other/Don't Know. 26 (SKIP TO 22)=   OTHER.....31 DON'T KNOW BRAND.....98	'PERMANENT' NET <sup>1</sup> Permanet.....11   Olyset.....12   MamaSafeNite..13   NetProtect.....14    Other/Don't Know.....16 (SKIP TO 24)=   'PRETREATED' NET <sup>2</sup> ICONET.....21   Fennet.....22   KO Nets.....23   Safinet.....24    Other/Don't Know..... 26 (SKIP TO 22)=   OTHER.....31 DON'T KNOW BRAND.....98
20a	Where did you obtain the net?	GOVERNMENT CLINIC/HOSPITAL NEIGHBORHOOD HEALTH COMMITTEE (NHC) COMMUNITY HEALTH WORKER (CHW) / AGENT RETAIL SHOP PHARMACY WORKPLACE OTHER (SPECIFY) _____ DON'T KNOW	GOVERNMENT CLINIC/HOSPITAL NEIGHBORHOOD HEALTH COMMITTEE (NHC) COMMUNITY HEALTH WORKER (CHW) / AGENT RETAIL SHOP PHARMACY WORKPLACE OTHER (SPECIFY) _____ DON'T KNOW	GOVERNMENT CLINIC/HOSPITAL NEIGHBORHOOD HEALTH COMMITTEE (NHC) COMMUNITY HEALTH WORKER (CHW) / AGENT RETAIL SHOP PHARMACY WORKPLACE OTHER (SPECIFY) _____ DON'T KNOW
20b	Did you purchase the net?	YES.....1 NO.(skip to 21).....2 NOT SURE.....8	YES.....1 NO.(skip to 21).....2 NOT SURE.....8	YES.....1 NO.(skip to 21).....2 NOT SURE.....8
20c	How much did you pay for the net when it was purchased?	In Kwacha 	In Kwacha 	In Kwacha 
21	When you got the net, was it already factory-treated with an insecticide to kill or repel mosquitoes?	YES.....1 NO.....2 NOT SURE.....8	YES ..... 1 NO ..... 2 NOT SURE ..... 8	YES.....1 NO.....2 NOT SURE.....8
22	Since you got the mosquito net, was it ever soaked or dipped in a liquid to kill or repel mosquitoes or bugs?	YES.....1 NO.....2 (SKIP TO 24) =  NOT SURE.....8	YES ..... 1 NO ..... 2 (SKIP TO 24) =  NOT SURE ..... 8	YES.....1 NO.....2 (SKIP TO 24) =  NOT SURE.....8

23	How long ago was the net last soaked or dipped? IF LESS THAN 1 MONTH AGO, RECORD >00' MONTHS. IF LESS THAN 2 YEARS AGO, RECORD MONTHS AGO. IF '12 MONTHS AGO' OR '1 YEAR AGO,' PROBE FOR EXACT NUMBER OF MONTHS.	MOS AGO  MORE THAN 2 YEARS AGO.....95 NOT SURE ..... 98	MOS AGO  MORE THAN 2 YEARS AGO ..... 95 NOT SURE ..... 98	MOS AGO  MORE THAN 2 YEARS AGO..... 95 NOT SURE ..... 98
23a	Where was the net soaked or dipped?	HOME.....1 GOVERNMENT CLINIC/HOSPITAL.....2 RETAIL SHOP.....3 PHARMACY.....4 WORKPLACE.....5 OTHER (SPECIFY).....6 DON'T KNOW.....7	HOME GOVERNMENT CLINIC/HOSPITAL RETAIL SHOP PHARMACY WORKPLACE OTHER (SPECIFY)..... DON'T KNOW	HOME GOVERNMENT CLINIC/HOSPITAL RETAIL SHOP PHARMACY WORKPLACE OTHER (SPECIFY)..... DON'T KNOW
23b	Did you pay to soak or dip the net?	YES.....1 NO.(skip to 24).....2 NOT SURE.....8	YES.....1 NO.(skip to 24).....2 NOT SURE.....8	YES.....1 NO.(skip to 24).....2 NOT SURE.....8
23c	How much did you pay to soak or dip the net?	In Kwacha 	In Kwacha 	In Kwacha 
23d	PLEASE RECORD OR ASK THE GENERAL CONDITION OF THE NET.	1 Good (no holes) 2 Fair (no holes that fit a torch battery) 3 Poor (1-4 holes that fit a torch battery) 4 Unsafe (>5 Holes that fit a torch battery) 5 Unused (still in package) 98 Unknown	1 Good (no holes) 2 Fair (no holes that fit a torch battery) 3 Poor (1-4 holes that fit a torch battery) 4 Unsafe (>5 Holes that fit a torch battery) 5 Unused (still in package) 98 Unknown	1 Good (no holes) 2 Fair (no holes that fit a torch battery) 3 Poor (1-4 holes that fit a torch battery) 4 Unsafe (>5 Holes that fit a torch battery) 5 Unused (still in package) 98 Unknown
23e	PLEASE RECORD OR ASK THE COLOR OF THE NET.	1. Green 2. Blue 3. Red 4. White 5. Black Other _____	1. Green 2. Blue 3. Red 4. White 5. Black Other _____	1. Green 2. Blue 3. Red 4. White 5. Black Other _____
23f	PLEASE RECORD OR ASK THE SHAPE OF THE NET.	1. Conical 2. Rectangular 3. Other _____	1. Conical 2. Rectangular 3. Other _____	1. Conical 2. Rectangular 3. Other _____
23g	Is the net hanging for sleeping? PLEASE OBSERVE OR ASK IF THE NET IS HANGING	YES.....1 NO.....2	YES.....1 NO.....2	YES.....1 NO.....2
24	Did anyone sleep under this mosquito net last night?	YES.....1 NO.....2 (SKIP TO 26) =——  NOT SURE.....8	YES ..... 1 NO ..... 2 (SKIP TO 26) =——  NOT SURE ..... 8	YES.....1 NO.....2 (SKIP TO 26) =——  NOT SURE.....8

"Permanent" is a factory treated net that does not require any further treatment.  
2 "Pretreated" is a net that has been pretreated, but requires further treatment after 6-12 months.

		NET #1	NET #2	NET #3
25	Who slept under this mosquito net last night?  RECORD THE RESPECTIVE LINE NUMBER FROM THE HOUSEHOLD SCHEDULE.	NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>	NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>	NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>  NAME _____ LINE NO <input type="text"/> <input type="text"/> <input type="text"/>
26		GO BACK TO 18 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 27.	GO BACK TO 18 FOR NEXT NET; OR, IF NO MORE NETS, GO TO 27.	GO BACK TO 18 IN THE FIRST COLUMN OF NEW QUESTIONNAIRE; OR, IF NO MORE NETS, GO TO 27.

**SECTION 3: GENERAL MALARIA KNOWLEDGE / PRACTICES**

250	HAVE YOU EVER HEARD OF AN ILLNESS CALLED MALARIA?	YES.....1 NO.....2	IF 2, SKIP TO 264
251	CAN YOU TELL ME THE MAIN SIGNS OR SYMPTOMS OF MALARIA?  MULTIPLE RESPONSES POSSIBLE PROBE ONCE (ANYTHING ELSE?)	FEVER.....1 FEELING COLD.....2 HEADACHE.....3 NAUSEA AND VOMITING.....4 DIARRHEA.....5 DIZZINESS.....6 LOSS OF APPETITE.....7 BODY ACHE OR JOINT PAIN.....8 PALE EYES.....9 SALTY TASTING PALMS.....10 BODY WEAKNESS.....11 REFUSING TO EAT OR DRINK.....12 OTHER (SPECIFY)..... .....13 DON'T KNOW.....14	
252	IN YOUR OPINION, WHAT CAUSES MALARIA?  MULTIPLE RESPONSES POSSIBLE PROBE ONCE (ANYTHING ELSE?)	MOSQUITO BITES.....1 EATING IMMATURE SUGARCANE.....2 EATING COLD NSHIMA.....3 EATING OTHER DIRTY FOOD.....4 DRINKING DIRTY WATER.....5 GETTING SOAKED WITH RAIN.....6 COLD OR CHANGING WEATHER.....7	

		WITCHCRAFT.....8 OTHER (SPECIFY).....9 DON'T KNOW.....10	
253	HOW CAN SOMEONE PROTECT THEMSELVES AGAINST MALARIA?  MULTIPLE RESPONSES POSSIBLE PROBE ONCE (ANYTHING ELSE?)	SLEEP UNDER A MOSQUITO NET.....1 SLEEP UNDER A INSECTICIDE TREATED MOSQUITO NET.....2 USE MOSQUITO REPELLANT.....3 AVOID MOSQUITO BITES.....4 TAKE PREVENTIVE MEDICATION.....5 SPRAY HOUSE WITH INSECTICIDE.....6 USE MOSQUITO COILS.....7 CUT THE GRASS AROUND THE HOUSE.....8 FILL IN PUDDLES (STAGNANT WATER).....9 KEEP HOUSE SURROUNDINGS CLEAN.....10 BURN LEAVES.....11 DON'T DRINK DIRTY WATER.....12 DON'T EAT BAD FOOD (IMMATURE SUGARCANE/LEFTOVER FOOD).....13 PUT MOSQUITO SCREENS ON THE WINDOWS.....14 DON'T GET SOAKED WITH RAIN.....15 OTHER (SPECIFY).....16 DON'T KNOW.....17	
254	WHAT ARE THE DANGER SIGNS AND SYMPTOMS OF MALARIA?  MULTIPLE RESPONSES POSSIBLE PROBE ONCE (ANYTHING ELSE?)	SEIZURE / CONVULSIONS.....1 GOES UNCONSCIOUS.....2 ANY FEVER.....3 VERY HIGH FEVER.....4 STIFF NECK.....5 WEAKNESS.....6 NOT ACTIVE.....7 CHILLS/SHIVERING.....8 NOT ABLE TO EAT.....9 VOMITING.....10 FAINTING.....11 CRYING ALL THE TIME.....12 RESTLESS, WON'T STAY STILL.....13 DIARRHEA.....14 OTHER (SPECIFY:.....) .....15 DON'T KNOW.....16	
255	IN YOUR OPINION, WHICH PEOPLE ARE MOST AFFECTED BY MALARIA IN YOUR COMMUNITY?  MULTIPLE RESPONSES POSSIBLE PROBE ONCE (ANYTHING ELSE?)	CHILDREN.....1 ADULTS.....2 PREGNANT WOMEN.....3 OLDER ADULTS.....4 EVERYONE.....5 OTHER (SPECIFY).....6 DON'T KNOW.....7	
256	HAVE YOU EVER HEARD OR SEEN ANY MESSAGES / INFORMATION ABOUT MALARIA?	YES.....1 NO.....2	IF 2, SKIP TO 260
257	WHERE DID YOU SEE OR HEAR THESE MESSAGES/INFORMATION?  MULTIPLE RESPONSES POSSIBLE PROBE ONCE (ANYTHING ELSE?)	GOVERNMENT CLINIC/HOSPITAL.....1 COMMUNITY HEALTH WORKER.....2 FRIENDS/FAMILY.....3 WORKPLACE.....4 DRAMA GROUPS.....5 PEER EDUCATORS.....6 POSTERS/BILLBOARDS.....7 ON TV.....8	

		ON THE RADIO.....9 IN THE NEWSPAPER.....10 OTHER (SPECIFY) .....11 DON'T KNOW.....12	
258	HOW LONG AGO DID YOU SEE OR HEAR THESE MESSAGES?	MONTHS..... <input type="text"/> <input type="text"/>	
259	WHAT TYPE OF MALARIA MESSAGES/INFORMATION DID YOU SEE OR HEAR? MULTIPLE RESPONSES POSSIBLE PROBE O	MALARIA IS DANGEROUS.....1 MALARIA CAN KILL.....2 MOSQUITOES SPREAD MALARIA.....3 SLEEPING UNDER MOSQUITO NET IMPORTANT.....4 WHO SHOULD SLEEP UNDER MOSQUITO NET.....5 SEEK TREATMENT FOR FEVER.....6 SEEK TREATMENT FOR FEVER WITHIN 24 HOURS/PROMPTLY.....7 IMPORTANCE OF HOUSE SPRAYING...8 NOT PLASTERING WALLS AFTER SPRAYING.....9 ENVIRONMENTAL SANITATION ACTIVITIES.....10 OTHER(SPECIFY).....11 DON'T KNOW.....12	
	2 HAS ANYONE EVER PROVIDED YOU WITH EDUCATION / INFORMATION ON MALARIA <b>AT YOUR HOME</b> ?		2, SKIP O 264
	261 FROM WHOM DID YOU RECEIVE THIS EDUCATION / INFORMATION <b>AT YOUR HOME</b> ? PROBE, BUT DO NOT PROVIDE ANSWERS		
	262 HOW LONG AGO DID SOMEONE VISIT YOUR HOME TO PROVIDE EDUCATION / INFORMATION <b>AT YOUR HOME</b> ?		
	263 WHAT TYPE OF INFORMATION/EDUCATION ABOUT MALARIA DO YOU RECEIVE <b>AT YOUR HOME</b> ? PROBE, BUT DO NOT PROVIDE ANSWERS. MULTIPLE ANSWERS POSSIBLE. POSSIBLE ANSWERS INCLUDE:		
	264 HAS THE COMMUNITY HEALTH WORKER IN YOUR VILLAGE HELPED HANG A MOSQUITO NET IN THIS HOUSE?		
	265 HAVE ANY MOSQUITO NETS IN THIS HOUSE BEEN USED FOR ANY REASON OTHER THAN SLEEPING?		2, SKIP O 267
266 WHAT WAS IT USED FOR? PROBE, BUT DO NOT PROVIDE ANSWERS. MULTIPLE ANSWERS POSSIBLE. POSSIBLE ANSWERS INCLUDE:			
267 WHAT MOSQUITO NET COLOR DO YOU PREFER? PROBE, BUT DO NOT PROVIDE ANSWERS. MULTIPLE ANSWERS POSSIBLE.			

	POSSIBLE. POSSIBLE ANSWERS INCLUDE:		
268	WHAT MOSQUITO NET SHAPE DO YOU PREFER? PROBE, BUT DO NOT PROVIDE ANSWERS. MULTIPLE ANSWERS POSSIBLE. POSSIBLE ANSWERS INCLUDE:		
269	IN GENERAL, HOW OFTEN DO YOUR CHILDREN SLEEP UNDER A MOSQUITO NET?		
270	WHY DO THE CHILDREN WHO SLEEP IN THIS HOUSE SOMETIMES NOT SLEEP UNDER A MOSQUITO NET?  MULTIPLE RESPONSES PROBE ONCE (ANYTHING ELSE?)		
	NCE (ANYTHING ELSE?)		

INTERVIEWER'S OBSERVATIONS

TO BE FILLED IN AFTER COMPLETING INTERVIEW

COMMENTS ABOUT RESPONDENT:

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COMMENTS ON SPECIFIC QUESTIONS:

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ANY OTHER COMMENTS:

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SUPERVISOR'S OBSERVATIONS

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NAME OF THE SUPERVISOR: \_\_\_\_\_ DATE: \_\_\_\_\_