



ENVIRONMENTAL HEALTH PROJECT

ACTIVITY REPORT

No. 51

Community and Household Assessment
of Malaria Prevention
in Eastern Province, Zambia:
Summary of Findings on
Knowledge, Attitudes, Behaviors, and Practices

October 1998

by
Karen Shelley, Ph.D., MPH
and
Esther Mambwe, M.Sc.

Prepared for the USAID Mission to Zambia
under EHP Activity No. 433-CC
Environmental Health Project
Contract No. HRN-C-00-93-00036-11, Project No. 936-5994
is sponsored by the Bureau for Global Programs, Field Support and Research
Office of Health and Nutrition
U.S. Agency for International Development
Washington, DC 20523

CONTENTS

Acknowledgments	iii
Acronyms	v
Executive Summary	vii
1 BACKGROUND AND PROJECT CONTEXT	1
1.1 Introduction	1
1.2 Background	1
1.3 Program Context and Project Setting	2
1.4 Objectives	7
2 PROJECT FRAMEWORK AND APPROACH	10
2.1 Conceptual Framework	10
2.2 Study Design, Methods, and Sampling Criteria	11
3 FINDINGS OF THE KNOWLEDGE, ATTITUDE, BEHAVIORS, AND PRACTICES STUDY	13
3.1 Phase 1: Household Interviews—Analysis and Findings	13
3.1.1 Characteristics of Households	13
3.1.2 Survey Findings about Mosquito Nets	15
3.1.3 Perceptions of Malaria and Fever	16
3.1.4 Sleeping Arrangements	17
3.1.5 Communication Patterns	19
3.1.6 Household Economics	21
3.1.7 Some Unanswered Questions	23
3.2 Phase 2: Trials of Improved Practices with Mosquito Nets	24
3.2.1 Trials of Improved Practices	24
3.2.2 Introducing the Mosquito Net Trials	25
3.2.3 Building Community Knowledge About Nets	25
3.2.4 Community Concerns	26
3.2.5 Considerations and Characteristics of Mosquito Net Purchasers	26
3.2.6 Household Acceptability of Nets in Eastern Province Communities	28
3.2.7 Follow-up Evaluation	29

4	LESSONS LEARNED	31
4.1	Summary of Lessons Learned	31
4.2	Continuing Feedback to Communities	33
4.3	Improving Knowledge of Net Treatment	33
4.4	Training DHMTs and Nongovernmental Organizations on Methods for Household and Behavioral Studies	33
5	NEXT STEPS	35
5.1	Recommendations	35
5.2	Conclusions	36
	REFERENCES	39

APPENDICES

A	Collaborations and Consultations in Zambia
B	Household Interview Guide
C	Inventory of Community Associations and Groups
D	Trials of Improved Practices: Second Round Household Feedback on Mosquito Net Use

FIGURES

1	Map of Districts in Republic of Zambia	3
2	Map of Chama District, Zambia	4
3	Map of Lundazi District, Zambia	5
4	Map of Chipata District, Zambia	6
5	Creation of Increased Demand for Population, Health, and Nutrition Interventions	8

BOXES

1	Common Methods Used in Participatory Household Research	10
2	Identifying Local Communication Networks	19
3	Identifying Appropriate Communication Channels in Eastern Zambia	20

TABLES

1	Study Sites	12
2	Sample Distribution, KABP Household Component	12
3	Summary of Household Sociodemographic Characteristics	14
4	Mosquito Net Use among Households in Study Site Communities by District	15
5	Frequency of Radio Listening	21
6	Households with Radios and Listening Patterns	21
7	Estimates of Household Monthly Cash Income in Zambian Kwacha	22

ACKNOWLEDGMENTS

Program planning and project activities in Zambia and the United States were financially supported by the Environmental Health Project and the USAID Mission to Zambia. Colleagues at The Manoff Group, BASICS, Lusaka, the Zambian Central Board of Health, and the Ministry of Health in Zambia gave valuable insight in developing and implementing the formative research on malaria prevention. Special thanks to Ernest Hamalila, Vera Mwewa, Zunga Simbwalanga, and Fakeya Ngwenya for field assistance and their expertise in cross-cultural communication. Neighborhood Health Committees in Chipata, Lundazi, and Chama Districts of Eastern Province Zambia enthusiastically participated in the household assessment of existing malaria prevention strategies and mosquito net trials. District Health Management Teams in the Eastern

Province districts welcomed opportunities to participate in and learn more about behavioral and social dimensions of mosquito net use by household members. Directors and staff at the Tropical Disease Research Center, Ndola, Zambia made important technical and programmatic contributions to Phase 2 of the formative research and program planning on mosquito net use in Zambian communities. Esther Mambwe's contribution to health communication research during Phase 2 was central to the program's success. Lyson Mwanza, TDRC technician enthusiastically gave his time and experience to community-based education and in assisting families with hanging mosquito nets. Special thanks to Marcia Griffiths and the Manoff Group; Craig Hafner, Environmental Health Project; and Paul Zeitz, USAID Mission in Lusaka, for support for the community-based work.

ACRONYMS

BASICS	Basic Support for Institutionalizing Child Survival
DHMT	District Health Management Team
EHP	Environmental Health Project
IEC	information, education, and communication
ITNs	insecticide-treated nets
KABP	knowledge, attitudes, behaviors and practices
NHC	Neighborhood Health Committee
TDRC	Tropical Disease Research Center, Ndola, Zambia
TIPs	trials of improved practices
USAID	United States Agency for International Development
ZIHP	Zambian Integrated Health Project

EXECUTIVE SUMMARY

Malaria prevention is a central goal of environmental health initiatives in sub-Saharan Africa. Strengthening the capacity of rural and urban households to prevent malaria requires understanding their social, behavioral, and economic practices. Cultural knowledge about the environment, illness beliefs, home treatment, and protective strategies are aspects of historical and social traditions that are shaped and transformed within households. Key child caregivers and economic providers live and make decisions within household settings. Members of extended kin groups in these settings safeguard children and adults from malaria and other sicknesses. International health initiatives must try to understand the ways that household members make decisions that have key impacts on malaria morbidity and mortality.

This report summarizes the planning, design, implementation, and results of field studies carried out as part of formative research activities for malaria control and mosquito net use in Eastern Province, Zambia. The work is part of the broader Eastern Province initiative supported by the Zambian Central Board of Health; the Tropical Disease Research Center of Ndola, Zambia; the Essential Drug and Medical Supplies Store; and USAID. Planning and coordination activities were implemented by the Environmental Health Project and the Manoff Group during November 1997. The two phases of the study were carried out in Zambia between December 3, 1997, and April 8, 1998. This document reports findings and program implications of a household- and community-based knowledge, attitudes, behaviors, and practices study (KABP) in Chipata, Lundazi, and Chama districts and a trial of improved practices (TIPs) with mosquito nets in two rural communities of the program area.

A conceptual framework informed by the *household production of health* paradigm was used as the basis of the study. This model provides a guide for the design and collection of qualitative and quantitative data. The framework points to

the need to examine economic, social, and cultural data that integrally impact the extent of household acceptability of malaria prevention strategies and health program sustainability. Strategies for reducing mosquito exposure begin in household settings since, for children under 5 years and pregnant women, the greatest health risks from vectors occur in the home (and specifically the sleeping) environment.

The research design called for household interviews with 240 participants, focus groups, and in-depth interviews with community members and health personnel. Community participants assisted in the collection of information and helped to plan feedback sessions. Appropriate health communication channels were identified and assessed.

The study also examined cultural beliefs that impact malaria prevention actions. Preventing disease transmission requires understanding community members' perceptions of risks and causes. Findings verified the widespread observations of anthropologists that beliefs about the causes of malaria and fevers include notions about natural, human, and supernatural causation. Some cultural beliefs are based on knowledge of disease vectors in the natural environment, while others are based on indigenous ethnomedical beliefs. For example, some people believe that parents' behaviors and moral standards are the cause of their children's poor health; others have a more contemporary understanding of environmental factors; while some continue to believe that supernatural agents and malicious human intent are causes of malaria in some circumstances.

The study assessed current knowledge, perceptions, and ways of preventing malaria and fevers. In eastern Zambian households, several strategies for eliminating mosquitoes from household environments are used during the rainy season. Study results indicate that 6.7% of 240 households sampled in the three districts used mosquito nets. Plants with repellent qualities, commercial mosquito coils, and sprays were also

available but used infrequently. Coils and sprays were considered too costly for regular purchase and use.

Results of focus group discussions indicate that while imported double-size and single-size nets are currently sold in a few commercial outlets in Chipata, Lundazi, and Chama towns, they are not commonly sold in shops or in neighborhood kiosks of the districts' rural areas. The study identified only one mobile vendor in Chama District who occasionally sells untreated nets made in Tanzania.

While town and rural residents of the three districts perceive that mosquito nets are highly desirable items for household use, they believe the nets are too costly and beyond their financial means. There is little knowledge of or experience with insecticide-treated nets (ITNs), except among members of health committees who have recently become involved in community mobilization activities. None of the community members had any prior experience in the treatment of nets with safe insecticides and no knowledge of health benefits of treated nets.

As economic and social units, households in the three districts rely on their own food production. Small amounts of cash generated by households from seasonal sales of maize, rice, ground nuts, beans, cotton, and tobacco are usually invested in food supplements, school fees, medicines, and clothing. Part-time jobs and seasonal agricultural work generate additional cash for some household members. Mosquito nets are not considered a high priority among items that local residents might consider purchasing. Maize meal, school fees, medicines, blankets, sugar, and salt ranked higher.

Existing communication channels for strengthening malaria prevention strategies were assessed. Traditional media including community drama, small group didactic sessions with opportunities for questions and discussion, and interpersonal communication through kinship and neighborhood links are recommended in all rural areas of the three districts. Radio communication was not found to be potentially effective or cost-effective. Lack of access to radios and batteries

was a problem, as was lack of time for women to listen to the radio.

Existing community groups such as agricultural associations, churches, women's groups, sports groups, and parent-teacher associations provide networks for effective communication, information dissemination, and community motivation. It is recommended that these groups be involved in the communication network on a monthly basis in both rural and town communities.

Trials of improved practices were initiated in two communities—one in Lundazi District and one in Chipata District. The household acceptability of mosquito nets was evaluated in coordination with Neighborhood Health Committees and household members who purchased treated nets. Household members demonstrated their willingness to use nets consistently. Although children under 5 years and women of reproductive age were the primary targets for the trials, adult men generally had priority for net use, as the head of household and main breadwinner. The issue then becomes whether the household can purchase more than one net.

Health center staff and community health workers can assist households by developing well planned health communication strategies and teaching modules concerning appropriate environmental control techniques and strengthening care-giving strategies. A plan of action, based on a series of biweekly meetings and discussions between health centers and communities, should be implemented. Participation of the Lutheran World Federation, Peace Corps volunteers, the Society for Family Health, Africare, the Adventist Development and Relief Agency, and other international donor agencies is highly recommended.

Monitoring the mosquito nets in trial households should be continued through

December 1998. Additional qualitative information is needed to design effective program components and comprehensive communication strategies. Information concerning families' willingness to use nets during the dry season and to take nets for timely retreatment is urgently needed.

1

BACKGROUND AND PROJECT

CONTEXT

1.1 Introduction

Formative research and community assessments are routine components of international environmental and public health initiatives. Methodological innovations and insights from behavioral, social, and environmental research, however, are oftentimes left unreported or are only briefly summarized in published reports of program results. In partnership with the Ministry of Health in Zambia and the Central Board of Health, the United States Agency for International Development (USAID) is supporting thorough, participatory information-gathering exercises as the basis for developing effective program actions to address malaria and other serious health problems in Zambia.

This report summarizes the formative research and early lessons learned from a community-based malaria prevention program in eastern Zambia. As a case study of malaria control and prevention in the context of southern Africa, the work demonstrates the need for carefully designed cultural, social, and economic assessments of community life. It shows how behavioral and social analyses substantively contribute to the design and implementation of environmental health action at the household and community level.

Comprehensive formative research on behavioral strategies and existing collective action of households are essential aspects of the design of health interventions. In international health initiatives in Asia, Africa, and Latin America, understanding the social organization and existing strategies of households and community organizations is key to the control of

environmental health and infectious disease problems. Behavioral and community-centered research and documentation in major health interventions can contribute significantly to the appropriateness of a program as well as the likelihood of its sustainability.

Seasonality is a key factor which influences labor, diet, the agricultural cycle, and household economics. It also affects the level of mosquito nuisance perceived by family members. Malaria prevention activities at the household level are more common during the rainy season—from November to June—when local populations see and hear more mosquitos. Members of local populations, however, are usually unaware that many of the mosquitos that are responsible for night nuisances are not actually carriers of malaria. The onset of the rainy season, nonetheless, heightens cognitive awareness of fevers and malaria risks.

1.2 Background

Zambia, a landlocked country in southern Africa, borders on Zimbabwe, Malawi, and Congo (formerly Zaire). Zambia enjoyed a period of political stability following its independence, but has experienced economic shortfalls and a declining agricultural sector in recent years. The health of Zambian children under five has declined over the past five years, indicated by increased cases of malnutrition and infant and childhood diseases. The Central Board of Health is initiating decentralization and cost recovery plans to strengthen local health care services and to reach Zambia's diverse population. Infectious diseases and reproductive health present

substantial challenges within the context of declining national funds for drugs and timely health services (University of Zambia and Macro International Demographic and Health Survey 1996). HIV rates in Zambia are among the highest in Africa (National Research Council 1996). Health intervention programs on malaria, syphilis, and HIV prevention require careful planning and coordination.

Malaria is endemic in Zambia and is a leading cause of infant, childhood, and adult morbidity and mortality. Children under five years old and pregnant women are at highest risk of malaria infection. Zambian child survival and maternal health intervention programs at district and national levels are challenged to address malaria through sound health policies, curative therapies, and preventive initiatives.

Malaria is a year-round environmental health threat in eastern Zambia. Chipata, Lundazi, and Chama Districts (see Figure 1) are the focus of the Zambian Integrated Health Project (ZIHP) through support from international agencies, nongovernmental organizations, and local technical agencies. These three target districts bordering Malawi are a full day's drive from Zambia's capital city of Lusaka.

The Zambian Central Board of Health, with support from USAID and other collaborating partners, is currently engaged in nationwide health reforms that center around decentralization of health management systems and strengthening of district-focused and community health services. District health management teams are assuming responsibility for medical services and public health interventions for environmental health, immunization, child survival, and reproductive health. Policy changes and reform strategies emphasize the development of strong partnerships between residential communities and trained staff in local health centers. Neighborhood Health Committees (NHCs) have been identified as the cornerstones of community participation and action designed to improve child survival and environmental health conditions. Environmental health issues include the development of clean water supplies, sanitation, and control of mosquito breeding sites and spread of disease

vectors. Malaria prevention and treatment are key responsibilities of community members, community health workers, and local health center staffs.

In recent decades, the World Health Organization has led an international search for effective malaria control techniques in sub-Saharan Africa. Changes in environmental conditions and in parasitic vectors, along with inappropriate and incomplete doses of medication, have contributed to complex and changing drug resistance patterns. Finding economically sound methods of malaria prevention is an important dimension of disease control. Epidemiological research in the Gambia, Kenya, Central African Republic, and Tanzania has shown some promising results. Community-based trials involving households members in sub-Saharan Africa have shown that when insecticide-treated mosquito nets are used consistently and appropriately, they are an efficacious means of reducing malaria morbidity and mortality among high-risk populations (Lengeler, Cattani, and de Savigny 1996).

1.3 Program Context and Project Setting

In October 1997, collaborating agencies met in eastern Zambia to develop a Memorandum of Understanding (MOU) in conjunction with representatives from NHCs and District Health Management Teams from Chipata, Lundazi, and Chama (see Figures 2, 3, and 4). The MOU called for formative research on knowledge, attitudes, behaviors, and practices (KABP) concerning malaria and malaria control to be carried out prior to the initiation of intervention programs planned for 1998.

Figure 1

Republic Of Zambia



Figure 2

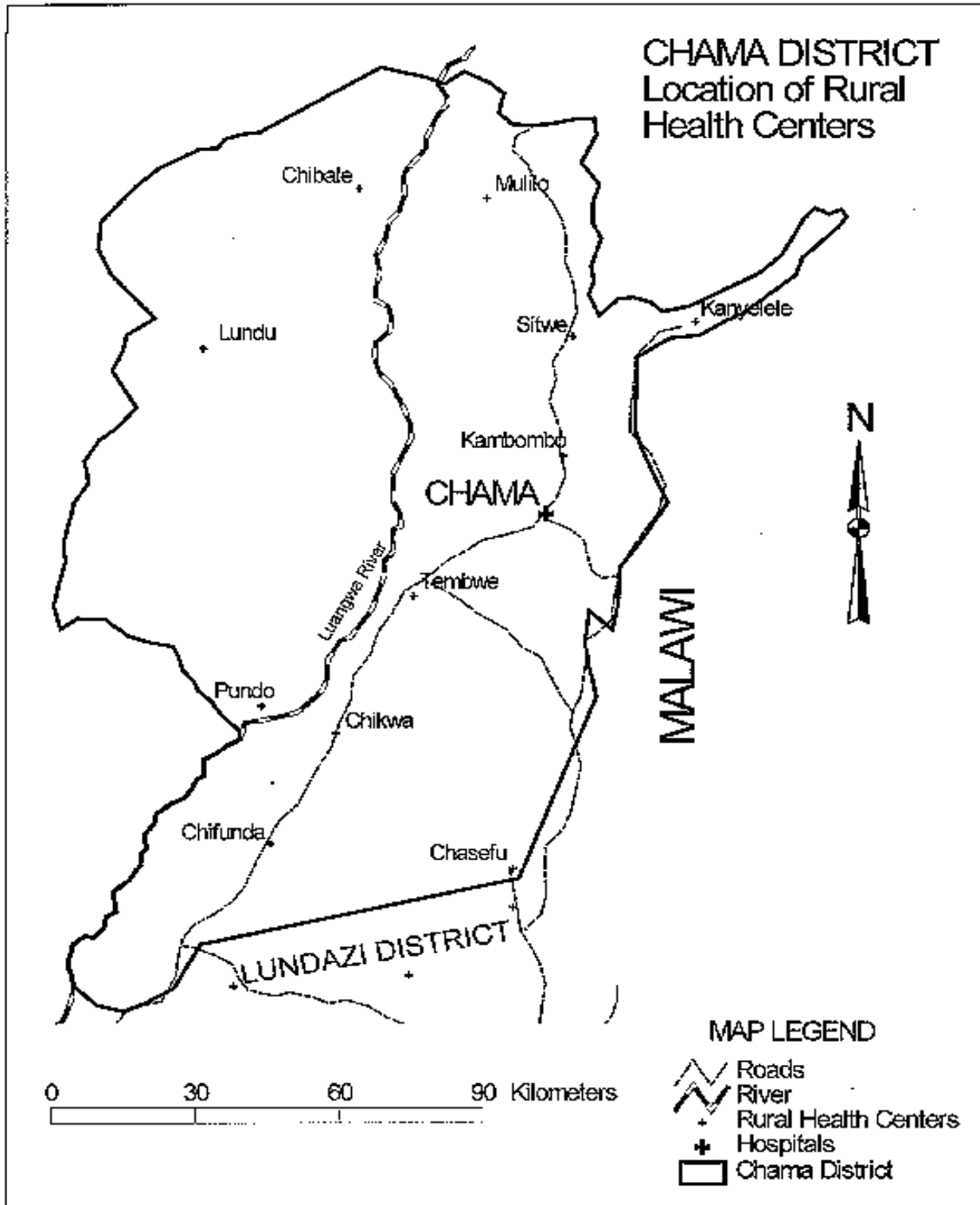
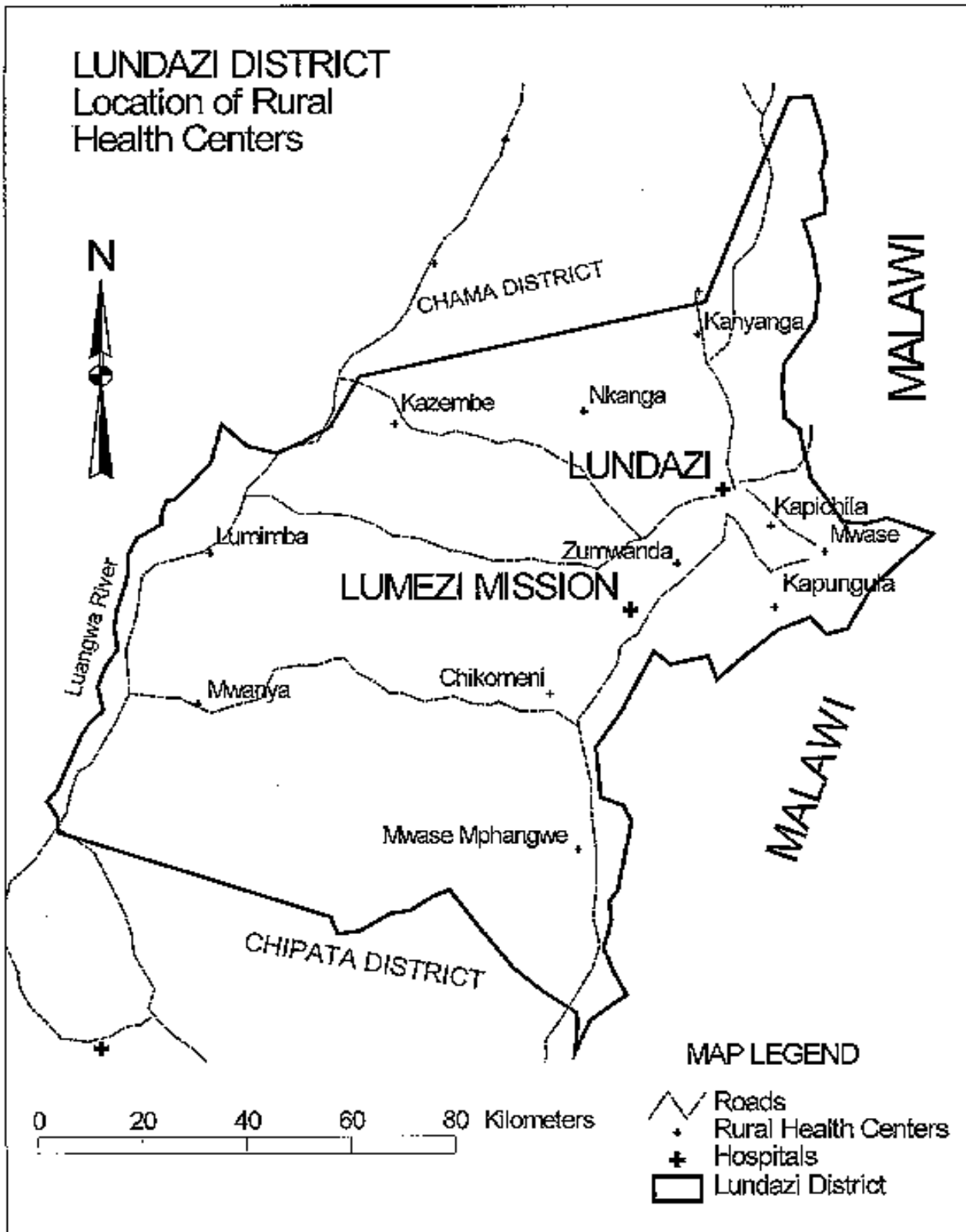


Figure 3



The development of community partnerships between local health center staffs and community-based NHCs created an active participatory constituency within selected project sites in three eastern Zambian districts. These partnerships were designed to build better health care services and improve community health conditions in residential areas. The strategy empowers communities to take responsibility for health promotion and prevention and to help tailor services to community needs. Increased demand for health services and health technologies is created by improved health staff training and information, education, and communication (IEC) programs within communities (see Figure 5).

In preparation for the design and field implementation of the formative study on KABP concerning malaria prevention, planning meetings and consultations were carried out with collaborating agencies and other consultants (see Appendix A). A detailed work plan was developed with the Environmental Health Project (EHP), and communications were established among BASICS, Washington; the Manoff Group; BASICS, Lusaka; and EHP. At the recommendation of Paul Zeitz, USAID/Lusaka, the activity was to be implemented during the early part of the rainy season, when roads in the project areas were passable and most rural communities were accessible by vehicle.

1.4 Objectives

The project team developed study objectives congruous with the larger project's commitment to community participation and the strengthening of partnerships between local health center staff and communities lying within the catchment regions of these health centers. The primary objective of the study was to document cultural knowledge and existing practices of malaria prevention used in diverse rural and town settings in the program areas. The study design took into consideration language and cultural diversity and anticipated differences in economic and household organization.

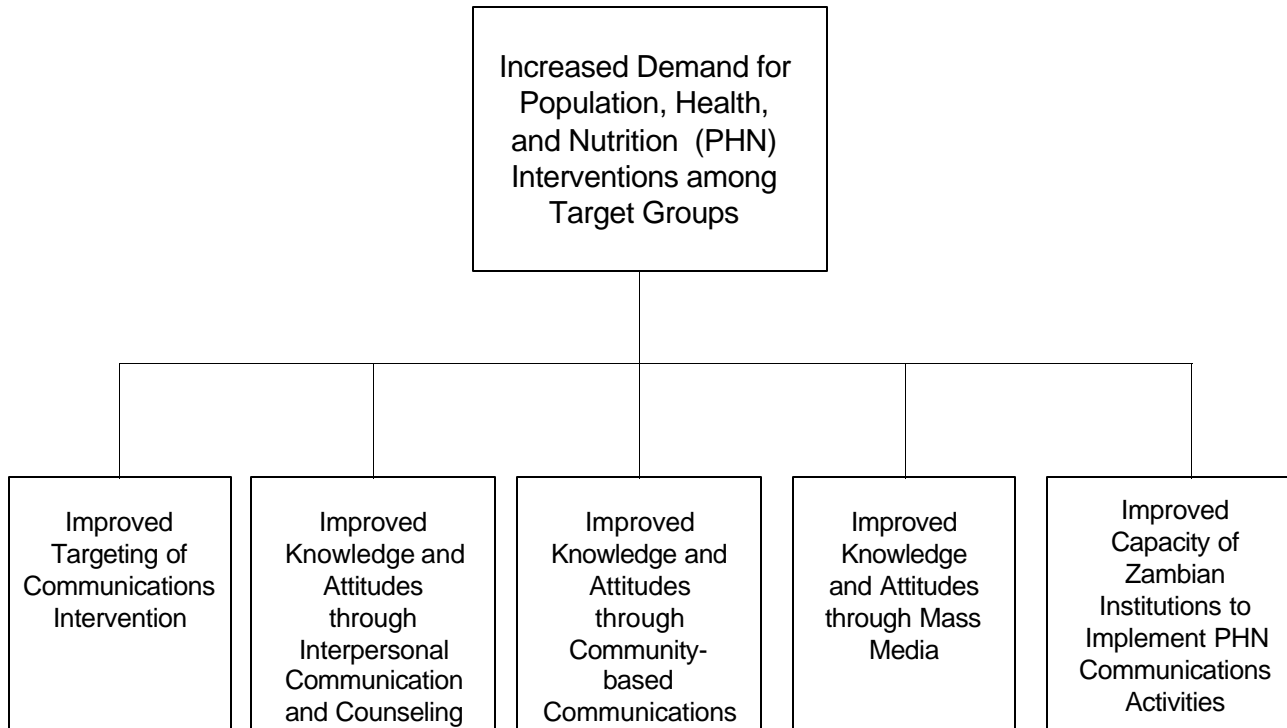
Several different types of information were needed to plan health communication materials and introduce mosquito nets. Existing social groups and organizations that could be used to enlist community participation needed to be documented as well.

The following six objectives of the study were identified during the course of the planning process:

- # Design and implement a two-component formative study on knowledge and behaviors concerning malaria prevention as part of USAID's Integrated Child Survival Project in eastern Zambia.
- # Develop appropriate research interview guides and qualitative instruments for a household component and a community component using multiple approaches to the systematic inquiry.
- # Involve health center and NHC members in data collection and community-based activities.
- # Discover and document existing perceptions of malaria and fever among adults and children in three Eastern Province districts.
- # Learn about existing household- and community-level health, social, and economic strategies and activities that promote healthy living, safeguard the health of children and adults, and contribute to the prevention of malaria.
- # Document household sleeping patterns that potentially influence how mosquito nets might be used.

Certain program constraints and practical considerations shaped the identification of objectives, creation of the study design, and the implementation process. These included field costs for vehicles, personnel time, seasonal changes, existing program framework, and future program needs.

Figure 5
Creation of Increased Demand for Population, Health, and Nutrition Interventions



During planning meetings at EHP (November 1997), collaborating partners recommended that the sample for the KABP be relatively small and be based on a convenience sample with established criteria

rather than a population-based sample. While a population-based study was preferable, practical considerations such as logistics, personnel costs and impassable roads in the valley regions made such a design impractical.

2 PROJECT FRAMEWORK AND APPROACH

2.1 Conceptual Framework

Health behavior is multifaceted and complex, having both individual dimensions and collective or social-group dimensions. In recent years, recognition of the importance of health behavior research both in pre-program health assessments and in planning health interventions that are culturally, economically and socially appropriate has grown. The sustainability of community-based interventions is in part dependent on sound analyses of relevant social groups, such as households and community organizations, and upon examination of individual behaviors such as maternal care-giving strategies. Households and existing community organizations are the cornerstones for sustaining new technologies and positive health behaviors over time.

More traditional methods in public health research have focused on individuals identified and enumerated in formal population-based surveys in order to statistically document existing rates of morbidity and mortality. Although these methods determine relative risk, they typically give little attention to social units such as households and community organizations, which are central to introducing change. Disease prevention and behavioral change require seeking out additional frameworks for examining and understanding the interrelationships between health behavior, economic systems, and social institutions.

Community-based research requires not only sound epidemiological studies for establishing mortality and morbidity patterns but also analysis of key social units—extended family, household, and community. The conceptual model used in the study provides an analytical framework

underlying the research design for malaria prevention in Zambia. The paradigm draws from anthropological social theory and systems theory which emphasize the dynamic interrelationships between the environment, disease, and key social units whose members make critical health decisions. As key social units in rural and town communities, households produce and allocate vital resources, and their decision-making strongly influences environmental health practices. Household members are also key players in transmitting and changing aspects of cultural knowledge and traditions about child care, disease, treatment, and prevention. Box 1 lists some of the common methods used in household and community information-gathering.

Box 1: Common Methods Used in Participatory Household Research

- , In-depth interviews with selected community participants
- , Focus groups with mixed gender representation
- , Focus groups with same-sex gender representation
- , Didactic problem-solving sessions with community leaders
- , Didactic problem-solving sessions with women of reproductive age
- , Participatory household inventory of health center attendance during an established time period
- , Participatory community mapping exercises
- , Community-based surveillance with community health workers

Social scientists working in community-based programs have drawn upon a paradigm focusing on household decision-making called *the household production of health* (Berman, Kendall, and Bhattacharyya 1994). This model is particularly useful in rural and small town international contexts where access and utilization of formal health services are limited by a variety of social, economic, cultural, and transportation factors. Households, rather than individuals or health workers, are the cornerstones and foundations of health choices and practices. In these contexts, adoption of new technologies and behavioral change by mothers and household heads to reorganize household routines require many cognitive and cultural evaluations. The *household production of health* paradigm recognizes that households are economic units within which critical decisions about nutrition, child care, and disease prevention are made. Households are also fundamental units of socialization where dynamic social and cultural ideologies are passed on and reformulated in response to new opportunities. Establishing new priorities concerning household expenditures, such as investing in mosquito nets or allocating cash for latrine building, involves evaluation of a range of economic and cultural values.

Deciding how best to protect young children from injuries, social threats, and diseases within the context of severe economic constraints is a highly complex process.

2.2 Study Design, Methods, and Sampling Criteria

Study designs and methods for assessing behavioral patterns require some general background knowledge of cultural diversities, language groups, and residential configurations before the baseline data can be established. In the Zambia project, prior planning processes had determined that both qualitative and quantitative behavioral data were needed to answer questions about household organization, economics, and health behavior. Although published material on Zambia was widely available, no studies contained the kinds of ethnomedical, household, kinship,

and environmental information sufficient for the detailed design of interview and focus group discussion guides.

Ideally, in a community study, development of focus group questions can be initiated prior to finalizing the design of household instruments. In the eastern Zambia program, the study design incorporated data collection on two different levels of human interaction—household and community. The consultant trained members of the research team and employed standard survey methods (Fowler 1993) and standard qualitative methods used by anthropologists (Miles and Huberman 1994) and public health scientists (Maibach 1995; Krueger 1998).

Selection of study communities was based on the following identified criteria:

- # Representation of all language groups in both the community and household samples
- # Representation of all households from known cultural traditions in both the community and household samples
- # Inclusion of town and rural households, with an emphasis on rural communities.

Table 1 lists the communities selected in each of the three districts.

A team of male and female local interviewers was assembled in Chipata with the assistance of District Health Management Team members, the Ministry of Education, and local researchers. (See Appendix A for a list of individuals, by organization.) Criteria for selection included fluency in the local languages of Tumbuka, Senga, and Nyanja and experience in qualitative data collection. A week-long training session followed. Training incorporated lecture presentations, question and answer sessions, role play, and pretesting in community settings.

Table 1: Study Sites

Chipata District	Lundazi District	Chama District
Jerusalem Mshawa Madzimoyo Feni Sub-Center Kapata New Jim	Zumwanda Kanyanga Mwase-Lundazi Kapichila Lundazi Boma	Katangalika Kapilingizya Mundalanga Chama Boma

Following training, the field staff conducted interviews in 240 households between December 11, 1997, and January 2, 1998 (see Table 2). (Appendix B contains the complete Household Interview Guide, in both English and Tumbuka.) Respondents ranged in age from 28 to 67 years. Among the participants interviewed, 55.8% were household heads, 37.1% were spouses of household heads, and 5% were sons and daughters of household heads. Household size ranged from 1 person to 21 persons. In the case of large households, extended family members who are members of the same residential unit have routine sleeping places located in one of

several dwellings and domestic structures owned by a single household. Of the total sample, 42% came from Chipata District, which has the largest population of the three districts.

In Chama District, the number of males interviewed in households was considerably less than females. In Zambia, labor migration to the Copperbelt or Lusaka is common. In Chama District, there are few employment opportunities for adult males. Women and children frequently remain in the home district to continue agricultural production for the household, while males leave to work for cash wages and return for periodic visits.

Table 2: Sample Distribution, KABP Household Component

Participants in Household Interviews	Chipata 41.7% (100)		Lundazi 33.3% (80)		Chama 25.0% (60)		Total Sample 100% (240)	
	M	F	M	F	M	F	M	F
Household Respondents by Sex	46.0%	54.0%	51.3%	48.8%	26.7%	73.3%	42.9%	57.1%

3 FINDINGS OF THE KNOWLEDGE, ATTITUDE, BEHAVIORS, AND PRACTICES STUDY

3.1 Phase I: Household Interviews—Analysis and Findings

Results from the survey of 240 households included a wealth of qualitative and quantitative information assembled with the help of community volunteers, community health workers, and members of neighborhood health committees. Interviewers assisted with coding and entry of quantitative data into Excel spreadsheets. Qualitative responses were coded and analyzed.

3.1.1 Characteristics of Households

Understanding how households are organized as social units can provide a basis for planning strong community-based health programs. In Eastern Province, rural households in the project area usually include members of three generations related through patrilineal lines. (When a woman marries, she leaves her father's household and joins her husband's family and its economic activities in a different community.) In Chipata town and Lundazi Boma, households were generally smaller and comprised of two generations.

The mean household size among those surveyed was 6.5 members (see Table 3). Households in rural Lundazi District were slightly larger than those visited in rural Chipata and Chama districts. Well established agricultural production in some Lundazi areas allows for the support of a larger number of kin in a single household.

The mean educational level of household heads interviewed was 5.7 years. Among the three

districts, study participants in Lundazi reported the highest educational level at 7.2 years. This figure represents a relatively high level of formal education. Further documentation, however, is needed to verify these initial findings.

Planners of malaria control and prevention programs are interested in physical characteristics of domestic dwellings located in high transmission areas because house construction techniques, among other factors, can influence the extent of exposure to mosquito vectors. Rural households use one to four structures to accommodate family members. Typically, the household head and spouse reside in a main house that has a rectangular floor plan. Other family members may use smaller houses or cooking houses for sleeping. Some of these are round, and some are rectangular. Food is prepared and cooked outdoors, in an open kitchen structure, or adjacent to the main house underneath the overhang of the roof.

Marked contrasts in house construction techniques exist among town compounds of Chipata town (for example, New Jim, Old Jim, Kapata) and houses in rural agrarian communities such as Jerusalem, Kanyanga, and Katangalika. The following are some of the different characteristics:

- # Houses in rural settlements of all three districts are made primarily from locally fired mud bricks with thatched roofs and pole beam construction. A very small number of houses have roofs made with corrugated iron sheets. Another small number are constructed of cement blocks. Some houses in the vicinity of Chipata and Lundazi towns have asbestos roofs. In the houses with grass or thatched roofs, there is usually a gap between the walls

and the roof line. Construction techniques have minimized roof-line gaps in some houses. Residential structures used for sleeping include both round and rectangular floor plans.

Rural houses often have one to four small, square windows or small, round wall vents that are often covered during the rainy season with burlap sacking or nylon panels from sugar sacks. Other houses have window closures fashioned from wood. Some windows have no closures. A very small number of houses, primarily in towns, have glass windows.

Table 3: Summary of Household Sociodemographic Characteristics

	Chipata District n=100	Lundazi District n=80	Chama District n=60	Total Sample n=240
Mean Household Size	6.1 persons	7.0 persons	6.4 persons	6.5 persons
Mean Years of Education of Respondents	4.9 yrs.	5.2 yrs.	5.0 yrs.	5.0 yrs. 5.2 yrs. for males 4.9 yrs. for females
Mean Years of Education of Household Heads	4.9 yrs.	7.2 yrs.	6.9 yrs.	5.7 yrs.
Households with Children < 5 Years	66.0%	75.0%	75.0%	71.3%
Average Number of Children < 5 Yrs. Per HH	1.2	1.6	1.3	1.3
% of Households with Women of Reproductive Age	97.0%	97.5%	96.7%	97.1%
Mean # Women of Reproductive Age per Household	1.5 women	1.6 women	1.5 women	1.5 women
Mean Number of Persons Sleeping in HH	6.0 persons	6.8 persons	6.5 persons	6.4 persons
% Female-Headed Households	27.0%	7.5%	13.3%	17.1%

- # House doorways differ in rural settlements in the three districts. Wooden plank doors or doors made with bamboo-like reeds bound tightly together are common. Other doorway closures are fashioned from thatched dried grasses. Houses in some rural communities have open gaps of 10 inches or more above the doorways of the primary dwelling. Some doorways are partially covered with sacking material
- # All floor space is used for sleeping. During the daytime, sleeping space is used for other household purposes such as food preparation and child care.

3.1.2 Survey Findings about Mosquito Nets

All households interviewed had some basic awareness of nets as a technology for preventing mosquito bites and reducing the nuisance of mosquitoes during sleep. In all three districts, residents reported having very positive opinions concerning the desirability of mosquito nets. None of the household participants, however, had experience with treating or dipping a net.

As expected, few households had mosquito nets (see Table 4). Researchers conducted shorter, modified interviews with

representatives of these households. Those interviews provided a basis for insights about existing knowledge and experience with mosquito nets. Teachers, health workers, and retirees who were formerly employed in urban areas of the Copperbelt or Lusaka were among those who most often owned mosquito nets and understood their role in reducing the risk of malaria infection. A large proportion of participants who did not have mosquito nets cited money constraints as the primary reason for not having them.

Risk of fire through contact with mosquito netting is a possible safety hazard that community-based malaria prevention programs need to examine. In Zambia, women typically build cooking fires outdoors, in a separate cooking house, or on the house stoop adjacent to the exterior house wall. During the rainy season, women occasionally move cooking fires indoors for warmth, but indoor cooking is not the general practice of families.

Rural households sometimes use small kerosene wicks for light inside houses. Candles and larger kerosene lanterns are thought to be too costly for daily use. Participating household members who use mosquito nets need to place small wicks far away from mosquito netting.

Table 4: Mosquito Net Use among Households in Study Site Communities by District

	Chipata District	Lundazi District	Chama District	Total Sample
Households that currently have a mosquito net	4 % (4/100)	2.5 % (2/80)	16.7 % (10/60)	6.7% (16/240)
Households that have ever considered buying a net	79.0% (79/100)	77.5% (62/80)	91.5% (55/60)	81.7% (196/240)

3.1.3 Perceptions of Malaria and Fever

NHC members in each study site were asked to participate in learning more about the ways that malaria is perceived, diagnosed, and treated within household settings. Interviews and focus groups revealed that culture plays a significant role in knowledge about malaria, its causes, and the social, environmental, and supernatural factors that can affect its complex manifestations. Study participants cited mosquitoes as only one of several probable causes of malaria.

Both children and adults are perceived to be frequently affected by signs of fever, vomiting, and diarrhea. The causes of these signs are interpreted by variety of cultural and contextual explanations. Signs of illness in young children always occur in clusters and are noted by activity patterns, breast-feeding, body temperature, food consumption, and sleeping regimes.

Within the dynamic cultural beliefs of Zambian clans and communities, several categories of illness are commonly thought to affect children. Characteristics of language and culture influence and, to some extent, can predict a caregiver's course of action. These language and cultural categories are common in all communities of Bantu-speaking peoples in east, central, and southern Africa. Common perceptions are that sicknesses are caused by God, man, irritated clan ancestors, and malevolent spirits.

Nyanga, Tumbuka, and Senga languages are spoken in rural locales and towns within the three program districts. Each of the three languages uses a variety of terms to describe ill-health and interprets signs in a variety of ways that reflect differing beliefs about the cause and the severity of the illness. These differences underlie decisions and appropriate strategies to treat the illness.

Current strategies for preventing malaria reflect these multicausal beliefs. Responses included the following:

- # using latrines
- # keeping houses clean
- # clearing dwelling surroundings of grass and other vegetation

- # preventing and eliminating mosquito breeding sites
- # digging pits for disposal of household rubbish

Participants' responses illustrate that local beliefs about malaria etiology are often not congruent with conventional biomedical explanations, but some overlap does exist. Disease categories used as a part of ethnomedical diagnosis in household and community settings are extensive and reflect the subtle distinctions that mothers and other caregivers make when children are affected by sickness.

In eastern Zambia, the current ethnomedical system is highly dynamic. Beliefs vary markedly from one household to the next and are highly influenced by the educational level of caregivers and household heads. Child caregivers with eight years of education have more knowledge of medical efficacy and are more likely to attribute malaria to mosquitoes.

Currently, rural and town households use a number of strategies to reduce the nuisance of insects. During household interviews and focus groups, some town participants explicitly discussed the role of mosquitoes in malaria transmission, stating that reducing or eliminating mosquitoes can prevent malaria; other residents perceive mosquito control primarily as an effective way of reducing a (biting) nuisance. Community participants frequently reported rainy season strategies such as closing windows or ventilator holes and closing exterior doors. Rural households in all three districts use sacking, brick fragments, or plastic sheeting to close off mosquito entry points. Interviewers reported observing that doors were often ajar during late afternoon and early evening hours.

At the household level, local plants are used as fumigants and insect control strategies. Certain green plants are perceived to be natural insecticides or repellents. Among households of the Lundazi District, participants cited using local plants (*kapapa*, *nyimbu*, *mzomba*, and *kanunu*), which they burn or smoke indoors. Women generally make use of a variety of plants perceived to have some effects on limiting mosquitos.

Interviewees cited other household insects and bugs, such as ticks, bedbugs, and roaches, as environmental health problems.

Both mosquito coils and commercial spray repellents are familiar to most local residents, but are not commonly purchased. Some families who live near markets or small shops in Chipata, Lundazi, and Chama towns report that they purchase these items during the rainy season if cash is available.

3.1.4 Sleeping Arrangements

When studying attitudes and practices related to malaria, interviewers must pay special attention to household sleeping arrangements. Although this is a sensitive topic, malaria prevention programs that anticipate introducing new technologies such as curtains or nets need baseline information on how culture affects sleeping accommodations. Program planners need to ascertain the number of young children who generally sleep together to estimate how many nets will be needed in a particular locale. The number of sleeping locations can be calculated, but quantitative data do not give the full story needed to ensure household acceptability and program sustainability.

In Zambia, children and adults have a variety of customs in this regard. Raised beds, mattresses, folded blankets, and sleeping mats are the most commonly used accommodations. Each of these practices requires qualitative data collection to understand the feasibility of net use with different practices.

A family homestead in Eastern Province typically includes several dwellings, a cooking house or shelter, several grain bins, and oftentimes additional structures for domestic animals and fowl. Household members sleep in the family's main house as well as in additional domestic structures, including kitchens, smaller rectangular houses, and round houses. Cultural beliefs and practices concerning gender and relative age influence decisions about sleeping patterns. Not surprisingly, larger households typically use more structures. Meeting culturally ideal sleeping patterns requires expenditure of considerable

family resources, which young families may not have.

Living space in homes or other domestic structures is used for a variety of purposes. Family members use sitting areas and other rooms as sleeping areas at night. Among those households surveyed, the number of different structures used by a single household for sleeping purposes ranged from one to seven. Among households that were selected for interview, 51.7% use only one domestic structure for sleeping, 25.4% use two different structures, 11.7% use three structures, and 4.2% use more than three structures for sleeping. Further details of sleeping patterns were documented in a sub-sample of 120 households. Within this subsample, 11 used kitchen houses for preparing food and sleeping.

Mothers sleep on the same mat with breastfeeding infants and children under two years. Women of reproductive age usually sleep in one of the sleeping rooms or partitioned areas of the main house. Older children sleep on floor mats in the main room (sitting room) of the family's primary dwelling or in a smaller one-room auxiliary house situated nearby. Siblings of the same sex often share a sleeping mat. The size of sleeping mats, which are made of reeds, varies somewhat, but is generally about 1.5 meters wide and approximately 2 or 2.2 meters in length. These mats are used as places to sit as well as to sleep.

Depending on available housing accommodations, older male or female youths sometimes have their usual sleeping place on floor mats in a cooking house situated near the family's main house. Adult males and married couples sleep on reed mats, mattresses, or raised beds, depending on the family's resources; sleeping mats placed directly on the floor were most commonly cited by those interviewed. Raised beds are not common but were reported in some households.

Relative age, gender, and kin relationships are key factors that determine where particular family members sleep. In some communities of Eastern Province, youth form neighborhood groups and sleep with others of their sex in nearby households. A few cases of this pattern were

identified, but it was infrequently found among households that participated in the study.

Since the study team could not observe a household's evening activity and sleeping patterns, it had to rely on personal accounts. Actual behavior patterns may vary from those reported. During October and November, the hottest months of the dry season, a few households reported that some family members occasionally slept outdoors. Doors to houses are usually closed during sleeping hours, but they may be opened for several hours on hot nights. During the rainy season, household representatives said that they were careful to close doors to keep mosquitoes out of their houses.

Estimates of the number of mosquito nets needed per family depend on whether all family or only those members at greatest risk (pregnant women and children under five years) will be covered. Cultural traditions and gender relationships give preference to male household heads as mosquito net users. The number of nets needed for an extended family depends on the number of household members, the number of sleeping structures used, and the sleeping arrangement of children, youth, and adults. Most households having six or seven members would need three or four nets, if all members are to be accommodated. Smaller households (one to five members) might need two nets. Among those households with children, two nets would cover pregnant women and children under two years of age. Additional nets would be needed for children three to five years who do not sleep with their mothers. Most household members are not likely to invest in more than one net initially, unless prices are extremely low.

The following guidelines for gathering information on sleeping arrangements may be helpful for program planning:

Ask community participants to assist in an informal interview setting using open-ended questions. It is recommended that sleeping arrangements not be part of formal questionnaire formats. At the time of the household interview, explain to a mother of the household why information on sleeping

arrangements is needed for program planning and request her assistance.

- # Initiate an informal discussion by interviewing mothers in household settings and ask general questions about where young children sleep. First let mothers discuss sleeping arrangements for young children. Begin slowly with questions about where young children under five years sleep. Gender differences and relative age are less sensitive for youngsters; public discussion of adult sleeping places is a more culturally delicate topic.
- # Ask mothers to indicate on a simple sketch of the floor plan where children sleep and the ages of the children. Ask follow-up questions to clarify whether children sleep with other siblings and whether they sleep on mats, mattresses, or beds. The interviewer draws the mats or mattresses on the sketch, periodically asking the mother for her input.
- # Ask the mother to indicate on the evolving sketch where the older children sleep. If these youth sleep in a separate structure, ask the mother to help you sketch that structure and indicate if there are additional youth who rest there. If the youth sleep in a communal or a shared neighborhood structure, ask the number of different households who use the accommodation.
- # Ask the mother to indicate on the sketch where she and elder grandmothers or other elder relatives sleep.
- # Ask where the father of the family usually sleeps. Ask if there are seasonal differences in the places used for sleeping.
- # Ask the mother if some members occasionally sleep outdoors and the frequency and motivation for the practice.
- # Ask the mother if any household members sleep in a kitchen house or other structures used for storage or other purposes.
- # Follow up with open-ended discussion questions if any household members have not been accounted for.

3.1.5 Communication Patterns

Health planners will need to learn as much as possible about communication patterns in program areas since creating new demand for health services and new technologies depends on community education. In economically diverse communities, a variety of different communication channels are likely to be needed to motivate and sustain changes in households and individuals. In the formative study, existing communications channels were identified and assessed as potential channels for improving malaria prevention. Interpersonal communication, community forums, health center talks and mass media such as radio and community organizations were examined.

Community associations, health centers, churches, sports clubs, and kinship networks in the three districts were found to be important links in the communication network (see Box 2). Community drama and small discussion groups of caretakers and household heads are likely to be effective communication channels. Headmen of rural villages are often local opinion leaders as well as political leaders who call community members together. Indigenous languages are used in daily communication.

Box 2: Identifying Local Communication Networks

A participatory inventory of community groups was initiated by community volunteers and members of the formative research field team. Diverse local communication networks were identified that could provide support for information and environmental health activities in the future:

- , women’s agricultural clubs
- , nutrition groups
- , agricultural cooperative groups
- , sports clubs
- , drama groups
- , church groups
- , traditional healer associations
- , parent-teacher associations

As for means of communicating, radio was found to be inappropriate for improving malaria prevention and treatment in the three districts of the intervention program. Telephones and mass media such as newspapers and television are not available in most parts of the three districts. Mobile videos are trendy health education trainers but are not likely to be technically supported or well utilized in eastern Zambia. Road transportation outside Chipata town is poorly maintained. In addition, there is no electricity outside Chipata town, Lundazi Boma, and Chama Boma except at a few mission stations that have a generator and provide a few hours of electricity during evening hours.

Building on existing networks of communication and using a variety of channels are key elements of community-based health programs. Both traditional and contemporary social groupings as well as interest groups are powerful avenues for communicating new ideas (see Box 3).

Kinships form the basis of important daily interpersonal communication links. Among both men and women, relatives are valued

Box 3: Identifying Appropriate Communication Channels in Eastern Zambia

Communities have experience in bringing new information to their neighborhoods. Sustainable health interventions should utilize channels that are already proving to be effective, such as the following:

- , community-based drama by local amateur actors and actresses
- , printed material written in Tumbuka and Nyanja
- , small group neighborhood discussions
- , storytelling and songs
- , participatory demonstrations

sources of information on a variety of topics including family social support, agricultural production, and health. Patrilineal kin ties form the basis of residential organization and access to

agricultural land in many Eastern Province communities. In rural communities, neighbors are often kinsmen. Many local settlements or villages are formed around lineage ties.

Diffusion of new ideas in rural communities often spreads along kinship lines as brothers exchange news and lend social and economic support to their respective households. Married women who participated in focus groups commented that kin relations are very trusted sources of information.

As a part of household interviews in each district, participants were asked to indicate sources they perceived as giving reliable information. Health center personnel were among the most frequently cited. The challenge for health managers and planners of communication strategies is to help ensure that information they pass informally is accurate and reliable.

As part of the community component of the formative study, members of NHCs were asked to help compile an inventory of existing associations and interest groups (see Appendix C for a sample form). Collective social groups bring residents together for social action, economic development, and educational purposes. A number of interest groups and associations are organized and periodically hold community meetings in the three districts. These collectives have potential for involvement in community-based malaria prevention in a variety of ways. Such groups may be interested in providing their membership with information about mosquito nets, appropriate medications, and preventive strategies for households.

Among households in the total sample, 36.7% had working radios. Working radios were most common among households in Chipata District. The most frequent radio listeners in Chipata, Lundazi, and Chama districts were found to be male household heads. In focus groups, women said that they had little time to listen to radios and that batteries were unavailable or not readily available. Household representatives reported radio listening patterns as shown in Tables 5 and 6. Among those residents who listened to radios, radios of neighbors and friends were the source of information.

Even in households with working radios, child caretakers seldom had the opportunity to listen because of time constraints and agricultural work in distant gardens. Men typically controlled choice of radio topics. News broadcast were most often heard.

Table 6 indicates that there are more working radios in households of Chipata District than the other two districts within the program area. In Chama District, only 17 of the 60 households interviewed had working radios. These data indicate that radio is not an appropriate channel of information dissemination for malaria control programs in the rural districts of eastern Zambia.

The contrast in radio listening patterns within the country has important implications for budget discussions on health communications. Lack of household money

Table 5: Frequency of Radio Listening

District	Frequency of Listening	No. of Households	% of Households
Chipata	Daily listening	28	28.0%
	At least once weekly	5	5.0%
	Rarely listen	16	16.0%
	Never listen	51	51.0%
Sub-Total		100	100.0%
Lundazi	Daily listening	14	17.5 %
	At least one weekly	1	1.3%
	Rarely listen	12	15.0%
	Never listen	53	66.2%
Sub-Total		80	100.0%
Chama	Daily listening	9	15.0%
	At least once weekly	2	3.3%
	Rarely listen	7	11.7%
	Never listen	42	70.0%
Sub-Total		60	100.0%
TOTAL		240	

Table 6: Households with Radios and Listening Patterns

	Chipata District	Lundazi District	Chama District	Total Sample
Households with working radios	41.0% (41/100)	37.5% (30/80)	28.3% (17/60)	36.7% (88/240)
Reports of radio listening	49.0% (49/100)	33.8% (27/80)	30.0% (18/60)	39.0% (94/240)

for radios and batteries is a barrier to health communication at present. Economic constraints are so severe in eastern Zambia that health planners need to carefully examine the economic priority of residential units.

3.1.6 Household Economics

Rural households are engaged in subsistence farming of maize, rice, groundnut, and sorghum. Some households sell small quantities of grain and groundnut. There are marked seasonal changes in

economic resources, and cash within households is extremely limited.

Demands on available cash are great. In response to interview questions, household representatives rated food and school fees as high priorities when choosing how cash is to be used. Cash is often generated for a particular purpose and then spent on or invested in an immediate need. Table 7 summarizes the reports of estimated combined cash income for all household members. Interpretations of these amounts, however, should be considered within the social context of agrarian economic systems.

In addition, a number of important factors influenced the actual cash amounts that household representatives reported at the time of interview. Few households have written records of monthly income. Small amounts of cash are generated periodically from a variety of different sources. Income is often not pooled. During certain months of the year, family members earn little cash from agricultural produce. Thus, the estimates summarized in Table 7 are based on approximations and are probably less than actual cash generated from all sources.

In Chipata District, members of town households (e.g., New Jim and Kapata in Chipata town) generate more monthly cash income from selling food, wood, and charcoal

at local markets than do those in rural Chipata District. In addition, town households are more likely to have members who earn cash from temporary and full-time employment opportunities. While regular monthly salaries were reported infrequently by households in rural Chipata, Lundazi, or Chama Districts, most households situated near town centers in all three districts reported some salaried employment.

Chipata District Household Economic Activities.

The primary food crops produced in Chipata District are maize, groundnut, beans, bananas, and green vegetables. Some households are able to produce food for home consumption and sell relatively small surpluses on a seasonal basis. Other households combine food production for their own consumption and cash cropping of two primary nonfood products, tobacco and cotton. In Chipata, there is a lively seasonal market for small-scale traders selling mangoes and bananas. As with the other two districts, households located in areas of Chipata town have more opportunities for income generation in the informal economic sector and the formal wage sector than do rural households.

Lundazi District Household Economic Activities.

In Lundazi District, maize, groundnut, and beans are the primary food crops. Rural families produce these key crops

Table 7: Estimates of Household Monthly Cash Income in Zambian Kwacha

	Chipata	Lundazi	Chama	Total Sample
<K15,000 monthly	48.9%	43.5%	47.3%	46.7%
K15,001 - 100,000	42.0%	39.1%	40.0%	41.0%
>K 100,000	9.1%	15.9%	12.7%	12.3%
	100.0%	100.0%	100.0%	100.0%

(U.S. \$1=K1350)

for home consumption. As in Chipata District, some households combine subsistence production and cash production of the crops. Tobacco and cotton are important cash crops that supplement the livelihood of some agrarian households. Lundazi farming communities are often characterized by old, well-established cultivation and home sites.

Lundazi residents rely on other food crops grown primarily for home consumption and informal exchange through barter arrangements. These include sweet potatoes, cassava, millet, green vegetables, tomatoes, sugar cane, and sunflowers.

Chama District Household Economic Activities. In Chama, the primary food crops grown for household consumption are maize, rice, and groundnut. Rice is a significant cash crop in this district. Additionally, some farming households sell a portion of their agricultural harvest at the end of the growing season. Other producers trade or sell small quantities to neighbors when they need cash and have grains available. Millet, sorghum, cassava, soybeans, and vegetables are also grown primarily for household consumption. Cotton is the most important nonfood cash crop.

Income-generating activities in rural areas contrast with those in town areas. Residents of rural communities engage in the following income-generating activities:

- # bricklaying
- # doing piecework agricultural labor, such as land clearing, planting of seeds, weeding, or harvesting
- # brewing beer
- # occasionally selling fruits or garden vegetables
- # house building
- # repairing bicycles
- # selling packaged groceries such as sugar and biscuits
- # occasionally selling chickens, guinea fowl, ducks
- # selling pigs or other livestock
- # cutting and collecting firewood
- # cutting and selling grass for house roofs
- # doing carpentry
- # occasionally selling fresh fish

- # making sleeping mats to sell

Residents of communities in high-density town areas of the three districts engage in the following activities:

- # providing bicycle transport services
- # working as domestic workers
- # tailoring
- # brewing beer
- # conducting traditional healing
- # shopkeeping
- # working in salaried positions as government or private sector employees
- # doing carpentry
- # market trading of grains, other produce, meats

3.1.7 Some Unanswered Questions

During Phase 1, team members and partner agencies learned that mosquito nets are recognized as an appropriate malaria prevention strategy in eastern Zambia but that economic barriers prevent most rural farming households from acquiring them. While the formative research provided good documentation on cultural knowledge, treatment, and preventive patterns of malaria, knowledge and attitudes concerning mosquito nets themselves were rather speculative. Detailed insights concerning knowledge and practices pertaining to cultural and social aspects of mosquito net use were limited because of few actual experiences with consistent net use within households. There was also an additional program need for empirical data on household acceptability of mosquito nets. In light of these needs, a separate follow-up activity ("Phase 2") was designed to help provide practical program information that would enhance both the success and sustainability of the proposed community-based mosquito net program.

3.2 Phase 2: Trial of Improved Practices with Mosquito Nets

Phase 2 of the KABP study was conducted between February 27 and April 9, 1998. In this phase, the Tropical Disease Research Center (TDRC), EHP, and BASICS's Community Partnership program collaborated on a community-based learning exercise on insecticide-treated nets (ITNs) in two selected sites in Lundazi and Chipata Districts. Consensus-building was a time-consuming aspect of the activity but one that proved to be critical to its success. Meetings and periodic updates were held with members of District Health Management Teams (DHMTs) in Lundazi and Chipata Districts.

3.2.1 Trials of Improved Practices

The key objective of this phase was to provide practical and programmatic knowledge concerning the acceptability of ITNs at the household level and to provide a better understanding of appropriate information, education, and communication channels for planning upcoming ITN interventions.

Prior to the beginning of Phase 2, preliminary outlines of objectives and methods for the learning activity were presented and reviewed with members of the Central Board of Health. At a meeting in Ndola at TDRC, the activity was also discussed with directors and technical staff with considerable experience in ITN programs in Zambian communities. Recommendations from BASICS and TDRC concerning implementation strategies provided useful insights. Health management teams in the two districts met with a team from BASICS, TDRC, and the EHP consultant. Community Partnership focal persons were asked to help plan and coordinate the activity. Consensus-building discussions were carried out in early March 1998, and the merits of possible sites were considered. DHMTs were advised that the number of nets available for the activity was very small and that communities should be aware that this activity was a preliminary exercise being carried out to learn about the appropriateness and acceptability of nets and to learn more about appropriate

strategies for further IEC development and effective IEC channels. Site selection proved to be a somewhat treacherous process. Regional and community alliances made it difficult to agree on the communities to be the sites of the trials.

Eighty mosquito nets in three sizes (rectangular family size, rectangular double-bed size, and conical double-bed) were provided for the Trials of Improved Practices (TIPs). Conical nets were green, and rectangular nets were white. The price was to be established independently by NHC members in consultation with communities and could vary slightly according to local situations. Prices ranging from K4,000 to K10,000 were suggested, with the recommendation that NHC members have the final decision on price.

Prior to initiating the activity, the following guidelines and recommendations were established through consultations with BASICS, EHP, and the TDRC team:

- # Nets for the TIPs should be sold at a subsidized price established through consultation with the local health committee and NHC. In determining the price, NHC members should consider the time of the year and local factors affecting the availability of cash.
- # A community meeting to gather information, educate, and answer questions should be organized prior to distribution of nets. Following this recommendation, technical assistance from a TDRC technician and expertise from an IEC consultant were requested for a 30-day period.
- # Community Partnership focal persons and member NHCs should be the key coordinators and advisors at the community level. Health committees should be assembled to discuss the activity and to seek advice on how to ensure community participation and communication.
- # Household monitoring should be conducted following the purchase and hanging of nets by household members. Upon the recommendation of the NHC, one man and one woman would be selected as monitors in

each site. The objectives and methods of the monitoring process were clarified, and a short draft protocol for the monitoring activities were developed (see Appendix D).

3.2.2 Introducing the Mosquito Net Trials

Phase 2 began in each of the two communities with a series of meetings with health committees, health center staff, and NHCs. After consultation with members of the DHMT in the Lundazi and Chipata Districts, two sites were selected—Zanga Zanga/Matifeyo in the Kanyanga catchment area of northern Lundazi and Kaulimbe in the Mshawa catchment area of Chipata District. NHC members were given 40 nets to sell in each of the two sites at prices they deemed affordable.

Regional health committees, clinic personnel, and NHCs met to discuss and decide on avenues of appropriate community education, appropriate costs, storage of nets during sales periods, and types of payment that would be accepted. Some members of NHCs and regional health committees advocated in-kind rather than cash payments for nets. Regional health committees and NHCs had to face a practical exercise in establishing policies for community-based net sales. Eventually it was decided that only cash would be accepted because of the short duration of the trial project and the difficulty of marketing small quantities of produce. Nets were sold between March 19 and April 4, 1998, by designated neighborhood committee members who served in official roles as treasurers of each NHC during that period.

Net sales began only after sufficient time was devoted to community information sessions and education. In one trial community, a folk drama was planned and presented in the local language, ChiTumbuka. The performance was extremely well received. Follow-up focus group interviews were conducted following the performance. Findings confirmed that the play educated community members and raised a number of key issues about the appropriateness and acceptability of mosquito nets. Despite this, the community believed that the nets were desirable. Improving

the health of community members, especially the young, was a repeated theme of the discussions.

3.2.3 Building Community Knowledge about Nets

Three types of nets were purchased from ChemDol for the trial: green conical nets; large, white rectangular nets; and rectangular family-sized nets. Each net was treated with permethrin insecticide when it was purchased. Each net was treated separately in a 15 litre plastic bucket, and community members were taught appropriate techniques for treating nets. Permeoate insecticide sachets were used. One sachet was used per net, regardless of net size. Safety precautions were described and followed. Each person who assisted with the treatment of a net was asked to wash his hands with soap and water that were made available.

Reed mats (*mpasa*) used for sleeping are made locally within the district. While sizes vary, residents consider mat size when evaluating the appropriateness of different types of mosquito nets. Mats were measured. Smaller mats, sometimes referred to as single mats, were 186 cm. x 133 cm. Large reed sleeping mats were 222 cm. x 169 cm.

3.2.4 Community Concerns

The existing widespread knowledge that nets reduce mosquito nuisances motivated interest in purchases, but community members had a wide range of concerns. Many household heads requested that nets be made available for purchase on an installment basis. Others felt that nets should be provided to households at no cost because families in their community had no cash resources.

Mothers wanted to know if the solution for treating nets would be harmful to young children. They also discussed whether the different net styles and sizes could be easily used with sleeping mats rather than with beds. Some mothers said that their infants and toddlers might be afraid to stay under the nets alone.

Potential buyers discussed the pros and cons of white versus green mosquito nets. Women generally agreed that the green nets would not look soiled as quickly as the white nets. Green nets, however, were available only in the conical double-bed size, not in the larger family size. Conical nets were thought by some participants to be inconvenient for use with rectangular mats.

Insufficient cash was the most common financial barrier to the purchase of nets. Both men and women had to devise ways of raising cash to afford the nets. Some residents sold chickens, others sold small quantities of ground nuts, and others arranged loans from relatives to cover part of the cost. Only three families that were not based on polygynous unions could afford more than one net for their household. In Zanga Zanga, few households had sufficient cash resources to purchase nets.

3.2.5 Considerations and Characteristics of Mosquito Net Purchasers

TIPs involving a small sample of households and communities give program coordinators important indicators of household acceptability and the characteristics of households that are most likely to be first-wave adopters of new health technologies. These small-scale trials answer four important questions:

- # Who is likely to purchase and use mosquito nets?
- # What are the primary motivating factors influencing decisions to acquire nets?
- # Do first-wave buyers find that mosquito nets are acceptable within the social, cultural, and physical settings of their households?
- # Are the planned information, education, and communication strategies sufficiently comprehensive and culturally appropriate to increase demand for mosquito nets?

Answers to these questions are particularly useful to strengthen program implementation strategies not only at the time of launching a

community program and introducing a new product, but also as part of first- and second-year program monitoring and evaluation activities.

Households in Zambian communities are extremely diverse in terms of culture, economic status, and educational level. Hence, one size or style of net is not likely to be appropriate for every family. Distributors are encouraged to market several types and sizes of nets to meet the diverse needs of rural and town households. For example, there is a marked contrast between the domestic organization and cultural beliefs of Ngoni residents and Tumbuka peoples. Ngoni cultural traditions shape cultural practices and child care strategies within small rural communities in Chipata District. These practices and beliefs should be taken into account in the development of IEC materials for optimal net use.

There are several key questions that malaria prevention strategists need to keep in mind when assessing household acceptability. Do our health initiatives that introduce mosquito nets reach all types of households, or do they tend to reach only the more affluent, more highly educated? Do needy households respond to health promotion campaigns? Do households with mothers and fathers of different educational levels embrace behavioral change initiatives in different ways? Recognition and documentation of the economic, social and cultural diversity of households within a program area are often overlooked by health professionals because they have traditionally relied upon a homogeneous set of health messages to reach target audiences. Social marketing research, however, has shown that different segments of populations have different motives and different perceived family priorities. These segments may respond to IEC messages in different ways. Demand for child survival health services can be increased and the acquisition of new health-promoting technologies enhanced by program planners' understanding different segments of diverse communities. Noting those who respond fully to program initiatives as well as those who do not can help to reach more corners of participating communities.

Methods. Three data collection methods were used to assess appropriateness and acceptability of strategies and products: focus groups, in-depth interviews with household members, and discussion group meetings with NHCs. All methods were participatory. Data collection techniques promoted further community involvement and actively engaged beneficiaries as program monitors and strategists.

Establishing Prices. In Kanyanga, Lundazi District, the price of nets was subsidized, and, after considerable debate, set at K4,000 Zambian kwacha each or approximately US\$2.66. Purchasers sold chickens, engaged in paid farm labor, and sold small quantities of agricultural products to raise cash. In Kaulembe in Chipata District, the Mshawa Area Health Committee set prices slightly higher—at K6,500 or approximately US\$4.35. The price included the cost of the initial treatment of the net. In addition to payment, each purchaser was charged with the responsibility of helping to give program and technical feedback for a 6-month period.

Household Characteristics. Both male and female household heads made decisions to purchase mosquito nets. In the Kanyanga catchment area, small-scale traders and subsistence farmers elected to buy nets from NHCs. At least three pregnant women were among those who elected to purchase nets. Families with young children and those with no children under 5 years were equally enthusiastic about purchasing nets. Purchasers included polygynous and nonpolygynous households.

In the two trial communities, decision-making about the purchase of nets was greatly influenced by male household heads. Although there was discussion within the family, the father of the extended family usually made the final decision.

In Kanyanga, the less affluent of the two trial areas, participating households were largely from the Tumbuka ethnic group. Among those who acquired nets were single mothers, polygynous as well as non-polygynous households, and couples with young children. Nets were used primarily with reed floor mats. Participants were able to make height adjustments in suspending nets and found that they could be used with floor mats.

In the second trial site, Kaulembe, Chipata District, in which the local Ngoni people speak Nyanja and some English, more middle-income households invested in nets. (Poorer households did not buy nets as readily.) The occupations of net purchasers in this locale contrasted with those in the Kanyanga area. Teachers, shopkeepers, cotton buyers, a headmaster, a blacksmith, and several commercial farmers purchased nets during the 3-week sale period. In Kaulembe, more residents planned to use their nets with raised beds than those in the Kanyanga area of Lundazi, where reed sleeping mats are more common. These behavioral and social patterns have important implications for planning and obtaining target information, as well as in planning education and communication programs for communities.

Educational Levels of Net Buyers. The educational level of household heads was thought to be one of several influencing factors. Among the net buyers in the Kanyanga area of Lundazi where subsistence farmers predominate, the average educational level was 4.6 years for adult males and 3.5 years for adult women. In Kaulembe, Chipata District, the average educational level of male net buyers was 10.5 years. Females in the same Kaulembe households had an average educational level of 8.5 years.

Household Spatial Considerations. Some nets were used with raised beds situated in rather private sleeping rooms. Once these nets were hung, they remained stationary with edges secured around bed frames and mattresses. Other nets were hung in large, multipurpose rooms in the front of rectangular houses. These rooms are used for child care, handwork, and family social life during daytime hours.

Both conical nets and double-size rectangular nets were purchased by residents who own one-room round structures with low roof lines and no windows.

Net Coverage. Some households (12 out of 80) bought more than one net, but most of the households in both the Kanyanga and Kaulembe areas invested in only one net because of cost constraints. Program planners are aware that children under 5 years and pregnant women are at

highest risk from malaria episodes, and that in most cases, more than one net per household will be required to cover these high-risk persons. Leaders in rural communities anticipate that most households would not elect to purchase more than two nets. Polygynous households, however, are likely to purchase more nets.

3.2.6 Household Acceptability of Nets in Eastern Province Communities

Follow-up activities were scheduled in each of the two trial communities to learn more about household acceptability and the design of educational campaigns. Entomologists and international health planners are particularly concerned about what is termed compliance and the acceptability of new health technologies. When products are demonstrated to be socially and culturally acceptable, their use is more likely to continue through time and have a positive impact on health.

The cultural beliefs dictate that men have the greatest right to mosquito net use. Several families commented specifically that the father of the family is the most important breadwinner and thus should be protected from malaria. Clearly, the indigenous concepts of being at risk to disease contrast with some of the more traditional perspectives of health planners and medical staff. Both points of view have merit.

Feedback and Focus Group Discussions at First Follow-Up. The first follow-up exercise involved feedback sessions beginning with the respective NHCs. Community monitors were asked to begin a round of in-depth interviews with net purchasers and their household members to learn about net compliance. Focus group discussions were organized to give feedback on the actual experiences of those who had purchased nets. (See Appendix D.)

The following are some early observations made by NHC members as a result of these interviews:

- # Community members were very pleased to purchase nets and to have an opportunity to participate in a learning experience that would help other communities in their districts.
- # Most households had asked for assistance in hanging nets for the first time.
- # Community members expressed hope that they would have weeks to organize and raise sufficient funds to purchase nets.
- # No community members were aware of any negative effects or impacts of the insecticide used to treat nets. Community members responded positively to seeing how nets were treated.
- # Mothers said that children were not afraid to sleep under the nets and were excited about the novelty of the new household item.
- # NHC members said that many other community members wanted to buy nets but did not have cash available at the time of the learning trial.
- # In communities where there were few raised beds within homes, residents found that they could adapt both the conical and rectangular nets for use with mats on the floor.
- # NHC members were uncertain as to whether they had successfully reached the program targets of covering children under 5 years and pregnant women during the first weeks of the trial. Respect for neighbors' privacy prevented inspections during evening hours. Reports were, however, that many young children were enjoying restful nights under the nets. Two pregnant women were known to be using nets.

Through focus groups, household representatives who were among the net buyers provided additional insight into the actual experiences and dilemmas that community members faced. A sample of their comments follows:

- # "My son is going to help raise cash for a net by doing piecework (casual labor) in other peoples' fields."

- # “Households that have nets are now very happy. They enjoy their sleep because they are no longer bitten by mosquitoes.”
- # “Other insects are also dying—bedbugs, cockroaches, and crickets. Even lice seem to be dying.”
- # “Children sleep well and quietly without any bother. Before we had nets, the young children would cry during the night because of mosquito bites.”
- # “Those families without nets are trying very hard to find money to buy the nets because they have seen that nets are very good.”

3.2.7 Follow-up Evaluation

A second follow-up exercise, consisting of focus group discussions and interviews with household heads, was carried out in both communities where the trial nets were hung.

NHCs determined that mosquito nets were being well accepted in residential households in both communities. The trial provided essential information for planning IEC programs. In addition, it provided very important insights about time, skills, and organizational strategies that neighborhood and regional health committees will need to acquire and distribute nets. Money management skills will clearly also be needed at the community level.

Household follow-up information after a 6-week period provides some additional early reactions and community evaluations on mosquito net use. Although self-reporting of net use has clear limitations, it does provide insight into daily issues that participants face.

Indications were that children under 5 were using the nets. The challenge for families arises when economic constraints limit them to purchasing only one net. The question of coverage for pregnant women is much more difficult to assess in a short-term, follow-up exercise and will require more in-depth monitoring and evaluation.

One Lundazi participant and community health worker pointed out that children under 5 years sometimes sleep in different households. Grandparents, living in the same community with their children, often take care of young children

and allow them to sleep in their homes. He said that purchasing only one net for his child made him think about the logistics and dilemmas of where the net should be hung. At present, he could not afford to buy more than one net.

While residents found conical double-size nets to be portable, four-cornered, family-size nets tied to a house beam were found to be much less portable and tended to remain in the household where they were hung.

Individuals who work as traders and travel away from their homes will need to use single-size portable nets and will need to ensure that young children and women of reproductive age are still covered by nets while they are away.

After 6 weeks, net buyers noticed that insect and mosquito densities in their houses seemed to be slightly increasing after an initial noticeable decrease. This observation puzzled many residents. Participants wondered if the insecticide used to treat the nets was strong

enough to protect against malaria for the recommended 6-month treatment before retreatment would be needed.

These observations remind program planners that communities need extensive education concerning malaria control. Residents understandably have a lively curiosity and are keen observers of their indoor environments. Their observations may be the result of a variety of different factors that will need to be addressed. Entomologists have documented that the mosquitoes which most people hear and see are not always the carriers of the malaria parasite. Household members may be observing changes in cockroach, ant, lice, and cricket populations, not just the densities of mosquitoes. Program planners will need to provide feedback to communities about observed changes in strengths of net insecticides and the recommended action.

4 LESSONS LEARNED

A wide range of policy and program planning implications arose from the formative studies. Because program decisions are being made at a variety of levels in the districts, Lusaka, and Washington and because a wide range of agencies are collaborating on this activity, communicating results and integrating research findings are important, though difficult, tasks.

4.1 Summary of Lessons Learned

Insights about community patterns, cultural knowledge and beliefs, and household structure provide practical guidelines for interventions programs. The following points emerged from Phases 1 and 2:

- # *Significance of Households.* In eastern Zambia, households are the cornerstone of preventive health measures and decision-making. Environmental health programs on malaria, water, and sanitation require in-depth understanding of household economics, gender roles, and social organization in order to motivate residents to achieve and sustain change.
- # *Cash Limitations.* Cash income is extremely limited among rural households in eastern Zambia. Food and school expenditures are higher priorities than mosquito nets. Cost recovery programs need to consider cash requirements as significant barriers. Seasonal differences in household incomes suggest that net sales will be highly seasonal. During the rainy season, households will have very little cash. From May to July, households will have more cash available and more alternative ways of generating cash. Lack of transport (other than bicycles) inhibits periodic sales of

food surpluses and is a major barrier to cash generation.

- # *Food Shortages.* Because of the severe limits on cash in some rural communities, program planners need to ensure that the nutritional level of young children is not jeopardized by the purchase of mosquito nets. Seasonal hunger and nutritional shortfalls are major problems in Chama District. Some households in Chipata and Lundazi also periodically experience prolonged food shortages. Integrated health programs require a comprehensive consideration of environmental, nutritional, and infectious disease issues.
- # *Materials Needed.* Nails and cord or rope were needed for hanging each mosquito net. Four-cornered nets required the most rope and assistance in hanging and positioning in the house.
- # *Marketing.* NHCs sold the nets, the committee treasurer kept records, and the community participated in all aspects of the Phase 2 activities. NHCs set net prices in consultation with health center committees, focal persons, and representatives from the DHMTs. In Zanga Zanga/Matifeyo, the price was set at K4,000, and in Kaulembe, where more cash was available, the price was K6,500. Each household that asked to purchase a net was obliged to participate in feedback interviews with community monitors and focus groups during three follow-up rounds.

In each community, the health benefits of mosquito nets were presented through appropriate communication channels that had been identified in Phase 1. Information and education at the community level began with health center committees and NHCs. Next a

community-wide meeting and participatory demonstration was planned and coordinated with members of NHCs and partnership focal persons.

Communication Strategies. Well-planned community education programs are needed to strengthen current knowledge concerning the health benefits of mosquito nets and their role in malaria prevention at the household level.

Using several different channels of communication is likely to make a measurable impact on increased knowledge and behavioral change. Small group health talks and other oral communication, providing time for questions and discussions, are particularly effective. Folk media, such as songs and drama, and short information pamphlets have been demonstrated to be very effective in eastern Zambian communities.

- *Community Drama.* Community drama was very successful in Zanga Zanga and is a highly desirable medium. Presented in the local language, it can send powerful messages, in appropriate metaphor, that cultivate the acceptance of new ideas.
- *Neighborhood Health Education Groups for Child Caregivers.* Mothers of young children currently perceive that malaria and fevers come from a variety of sources. Childhood illness is often thought to be a social sanction (i.e., punishment for immoral behavior of parents or other relatives) rather than the result of an environmental or infectious disease.
- *Need for Pamphlets and Tapes.* Educating mothers about the causes of malaria and effective treatments will require long-term commitment to community-based learning and health center support. Audio tapes might be tested for usefulness in this context. There is also an urgent need for well-designed pamphlets on malaria prevention and appropriate treatment in this region of Zambia. Currently there is no local production of printed health

information in Nyanga, Tumbuka, or Senga.

- *Men as Purchasers of Nets.* In most households, men have a dominant position as key wage-earners and decision-making authorities. They are key persons to be motivated and educated about the health advantages of mosquito nets.
 - *Men as Mosquito Net Users.* As dominant figures in most Zambian households, men are likely to be the users of a mosquito net, once purchased. The program intervention, however, is attempting to protect the populations most vulnerable—children under five years and women of reproductive years. Materials are needed to educate men about the particular vulnerability of the target groups to malaria. Rather than making an either/or choice which pits the importance of the household male against that of others, the best course may be promotion and pricing strategies which encourage the purchase of more than one mosquito net per household.
- # *Organizational Capacity of Neighborhood Health Committees.* NHCs demonstrated that better organization will be needed to plan and implement net distribution when the ITNs are distributed in July for the Year One pilot phase of the Community Partnership program.
- # *Safe and Appropriate Techniques of Net Treatment.* Once nets are purchased, selected community members should learn safe and appropriate net treatment techniques (“net moistening”) within community settings.
- # *Hanging Nets.* Members of households need assistance in hanging double-size and family-size nets in the rural home settings. Ropes used for hanging blankets and clothes were often repositioned to accommodate space for a net.
- # *Sizes and Color Preferences.* All sizes of nets used in this exercise were found to be acceptable to household members. Both conical and rectangular nets were adapted for use with

floor mats. Double rectangular nets and family-size nets were easily used by families with several small children who sleep together on one mat. In this exercise, one style of rectangular, family-size net, however, was considered a bit too short when used with a sleeping mat (*mpasa*). The side panels of these family-size rectangular nets should be cut 20 inches longer. While this net could still be used by all households, it had to be hung rather low in the room. This particular net was clearly designed by the manufacturer to be used with a raised bed rather than a floor mat.

When large numbers of mosquito nets are ordered for the program area, USAID, TDRC, and Society for Family Health will need to give careful attention to size specifications. Size measurements are available for partner organizations and program advisors. In the selected pilot communities, program planners must take sleeping patterns and floor mats into account.

Household members mostly preferred the rectangular or “four-corner” nets. Green nets were particularly popular in the two rural communities.

4.2 Continuing Feedback to Communities

As a part of the partnerships between health center staff and communities, regular forums for continuing feedback about environmental and health intervention programs need to be planned and implemented. Planning can best be carried out with the collaboration of existing community organizations and churches.

4.3 Improving Knowledge of Net Treatment

Mosquito net programs in other African countries have all had difficulty in establishing consistent retreatment programs. Ensuring that new net owners watch and assist with the initial treatment of their nets is an important element in program

planning. Re-treatment efforts require an entirely different strategy and motivation. In eastern Zambia, retreatment services will be funded through international partnership agreements. Community access to such service needs to be established and costs kept as low as possible. Community-based distributors can work out of retreatment centers where possible.

Along with information on net retreatment, residents need continuing access to additional environmental health information on disease prevention at the household level. It would be beneficial for EHP to collaborate with international partners and other contractors in the creation of health communications and construction information to ensure the reduction of mosquito breeding sites, and to promote development of safe water supplies and improved household sanitation systems.

4.4 Training DHMTs and Nongovernmental Organizations on Methods for Household and Behavioral Studies

Community-based program techniques are components of the tool kits that DHMTs will need to acquire. Successful environmental health programs require sound training of DHMT members and staff of nongovernmental organizations on household survey methods and participatory community-based activities. A number of communities sites in the valley regions of these districts still need community and behavioral assessments. Studies also need

to be carried out in those areas in which ecology and structural design of houses differ from communities in higher elevations.

5 NEXT STEPS

5.1 Recommendations

While the baseline and formative studies on malaria prevention have been completed, there is a critical need to monitor how the households are using nets and who actually sleeps under the nets consistently. The recommended next steps are outlined below.

Continued Monitoring of TIPs Households

Feedback on household experiences and successes in using mosquito nets is urgently needed to inform the Year One Pilot Program net distribution. More information on household acceptability and seasonal change in net use is needed. The newly assembled Chipata-based team can take a leadership role in assembling and monitoring household acceptability through time. Consultants can provide technical support and data analysis assistance. As the Eastern Province program spreads to a regional program, lessons learned from the Year One Pilot Program and selected target communities can be very important for future decision-making. A chronicle of community participation activities is of particular importance.

Problem-Solving Discussions

During the course of the TIPs, a number of community issues concerning the care of nets, distribution, and hanging arose. To address these issues, mechanisms to formalize feedback and discussion among community members, NHCs, and health center staff need to be developed. Improving problem-solving

skills is an important step toward program sustainability.

- *Challenges in Valley Areas.* The valley areas of the three districts have received only short visits by program representatives, many valley communities have never been visited and have no awareness of the malaria prevention program. Work in the valley areas should begin in August when roads are passable. DHMT staff can help conduct community-based assessments, inventories, and community mapping exercises along with the Chipata-based team and consultants as needed to address this situation.
- *Health Action Training with Peace Corps Volunteers and Community-Based Distributors.* Training in malaria prevention needs to move beyond the health center staff, focal persons, and NHCs. Community education is critical. U.S. Peace Corps volunteers and their Zambian counterparts, who have frequent contacts and educational opportunities in rural communities, should be used. These volunteers urgently need concise printed material about malaria prevention. They need and have requested training and discussions with program leaders and consultants on the effectiveness of mosquito nets. Currently they do not have access to basic epidemiological data nor program training modules.

5.2 Conclusions

In Eastern Zambia, current knowledge about effective means of malaria prevention is limited within the lay population of rural communities.

Knowledge of scientifically documented and cost-effective ways of preventing malaria is lacking among household members. Raising the level of knowledge about malaria transmission and prevention among ordinary men and women within communities is a cornerstone of malaria prevention programs. Team work that incorporates short- and long-term efforts by local institutions, community residents, health facility staff, and NGO partners can work towards strengthening knowledge, which leads to community action.

Environmental Exposure

Environmental exposure to mosquito bites is extensive for all age groups of the population in Eastern Province. Populations living in the three nucleated towns—Chipata, Lundazi Boma, and Chama Boma—as well as those in the many dispersed rural communities, are affected. There are two primary determinants of environmental exposure patterns in rural Eastern Province communities: local house construction characteristics that contribute to high densities of mosquitoes during sleeping hours and hand-cultivation and agricultural work during daytime and early evening hours that exposes young children and adults to mosquito vectors.

Home Caregivers and Enabling Factors

Protecting children from disease and injury is seen as an important social role of adult household members. Household heads recognize that ensuring healthy growth and development of the young is the primary role of adult family members. Home caregiving of sick children is an important responsibility of the mothers of young children. While mothers recognize fevers, diarrhea, and loss of appetite as common symptoms associated with malaria, the health danger of mosquito bites is not universally recognized. Awareness of the many ways that such factors influence household organizational patterns and decision-making can help to enhance the planning and success of intervention strategies. There are no major cultural beliefs or patterns

that conflict with malaria intervention programs that focus on increasing knowledge and strengthening treatment and preventive strategies.

Social and Cultural Challenges to Malaria Prevention

Some current ethnomedical beliefs and practices do impede effective malaria prevention and treatment. The health care system in the three target districts incorporate traditional and biomedical beliefs and practices. Childhood fevers are often attributed to supernatural beliefs, parental misconduct, and natural causes such as unclear water. Malaria is not always recognized as an illness transmitted by mosquitoes. Traditional practitioners sometimes offer treatments and preventive strategies that differ from those recommended by health facility staffs.

In some Tumbuka and Ngoni communities, adolescents sleep in separate youth houses. In some small communities, young people of the same gender from several families sleep in structures apart from other family members. Community members are currently discussing alternative ways of acquiring mosquito nets for them. There have been several suggestions of ways to share the cost of additional nets among families. Although these youth are not at highest risk of malaria infection, local families believe that it is extremely important to provide protection for these valued young people.

Women of reproductive age often sleep with young children, especially if infants are breastfeeding. Social customs of separating or isolating mothers immediately after childbirth and during menstruation can be dealt with by encouraging households to purchase two or three nets in order to accommodate culturally ideal sleeping patterns. Planning for women to sleep with young children in the household is socially appropriate. The challenge for program planners is to encourage families to purchase more than one net.

Current Barriers to Mosquito Net Acquisition

The primary barrier to mosquito net acquisition in each of the three program districts is cost. A secondary barrier is the lack of knowledge and thorough understanding of the positive health impacts of consistent net use year round. Community clubs and associations are currently discussing possible income-generating activities that might help raise cash for net purchases.

Communication Barriers

Structural partnerships between health facilities and communities in each of the districts have been formed but are still at a very early stage of development. Successful program partnerships that result in positive health impacts call for weekly communication between rural neighborhoods and clinic staff. Working partners need face-to-face discussions through scheduled meetings as well as opportunities for informal dialogue. Because bicycles and walking are the local modes of travel, transportation and communication networks between health facilities and communities are currently limited; three rural health centers have one

motorcycle. Health center staff are currently not able to visit all outlying communities. Core partnership relations can only be sustained by more face-to-face interaction.

Beyond the communication challenges between health facility staffs and community leadership groups, additional challenges exist within neighborhoods and villages where IEC programs will be initiated. Social institutions, including churches and schools, have not yet been sufficiently utilized in the partnership-building process. These institutions can be especially helpful in sustaining the effectiveness of community-based health programs. Existing community associations centering around agricultural activities, credit, child nutrition groups and sports interests are potentially effective channels for malaria education and training. They offer untapped opportunities for discussions, motivation for behavioral change, and strengthening of knowledge.

Perceptions and Acquisition of Health Technologies

Rural residents in Eastern Province currently perceive mosquito nets to be beyond the reach of most household budgets. School fees and supplemental grains are higher priorities for household expenditures. KABP study results indicate that many household incomes in the districts are under K15,000 Zambian kwacha (approximately \$11.54 per month). As knowledge of the health benefits of mosquito nets increases within the program area, income-generating activities within communities will be needed to assist families in purchasing enough nets to accommodate all at-risk household members.

REFERENCES

- Berman, P., C. Kendall, and K. Bhattacharyya. 1994. "The Household Production of Health: Integrating Social Science Perspectives on Micro-Level Health Determinants," *Social Science and Medicine* 38(2):205-215.
- Fowler, F.J. 1993. *Survey Research Methods*. 2nd ed. Newbury Park, Calif.: Sage Publications.
- Krueger, R.A. 1998. *Analyzing and Reporting Focus Group Results*. Thousand Oaks, Calif.: Sage Publications.
- Lengeler, Christian, Jaqueline Cattani, and Don de Savigny. 1996. *Net Gain*. Ottawa: International Development Research Centre and World Health Organization.
- Maibach, E. 1995. *Designing Health Messages*. Thousand Oaks, Calif.: Sage.
- Memorandum of Understanding. October 1997. Eastern Province Zambia. Washington, D.C.: USAID.
- Miles, M.B. and A.M. Huberman. 1994. *Qualitative Data Analysis*. Thousand Oaks, Calif.: Sage.
- National Research Council. 1996. *Preventing and Mitigating AIDS in Sub-Saharan Africa*. Washington, D.C.: National Research Council.
- Pelto, P. 1970. *Anthropological Inquiry*. New York, N.Y.: Harper and Row.
- Shelley, Karen. 1997. *Formative Research on Malaria Prevention and Mosquito Net Use in Eastern Province Zambia*. Arlington, Va.: Environmental Health Project, Report for the File No. 169.
- Academy for Education Development. 1995. *A Tool Box for Building Health Communications Capacity*. Washington, D.C.: AED.
- University of Zambia, Central Statistical Office and Macro International. 1996. *Demographic and Health Survey, Zambia*. Calverton, Md.: Macro International.

Appendix A

Collaborations and Consultations in Zambia

BASICS, Lusaka

Remi Sogunro, Chief of Party
Rodwell Kafula, Senior Program Officer
Elizabeth Burleigh, Community Partnership Coordinator
Vera Mwewa, Community Partnerships Officer
Ernest Hamalila, Community Partnerships Officer
Esther Mambwe, Information, Education, Communication Specialist
Josephine Nyambe, Information, Education, Communication Officer
Mary Ettling, Consultant

Central Board of Health, Lusaka

Gavin Silwamba, Director
M. Nyirenda
C. Malele

Tropical Disease Research Centre, Ndola and Lusaka

Tom Sukwa, Director
Chilunga Puta, Principal Scientific Officer
Rory Nefdt, National Malaria Control Coordinator, Lusaka
Christine Manyando, National Malaria Program
Freddie Masaninga, Entomologist
Lyson Mwanza, Senior Technician, Vector Biology Unit
Violet Siachinji, Vector Biology Unit

Chama District

Mr. Ngoma, District Health Management Health Team
Mr. G. Moyo, District Focal Person, Environmental Health Technician
Baron Zimba
Daniel Zimba
Blaston Kaluba, Katangalika

Chipata District

F. B. Muchanga, Acting Director, Chipata District Health Management Team
F. M. Sichembe, Chipata District Health Management Team, Administration, Acting Manager
S. M. Munene, Acting Manager, District Health Management Team, Planning and Development
Benson Musonda, District Focal Person, Environmental Health Technician
Simataa Nyambe, District Health Inspector, Chipata District
Charles Kamzimbi, Jerusalem Health Centre, Chipata District
Mr. Mumba, Mshawa Health Centre, Clinical Officer
H. Zulu, Environmental Health Technician, Mshawa Health Centre
Zunga Simbwalanga, Provincial Management Office, Chipata

Fakeya Ngwenya, Teacher, Kanjala Basic School
G. A. Daka, Chairman, Neighborhood Health Committee, Kaulembe
Mr. Phiri, Neighborhood Health Committee, Kaulembe
J. Ngoma, Neighborhood Health Committee, Kaulembe

Japanese International Cooperation Agency

Mr. Maoki Ando, Assistant Resident Representative

Lundazi District

P. C. Mpande, Director, District Health Management Team
G. K. Banda, District Health Management Team, Planning and Development
S. Muyendeka, District Health Management Team, Administration
Charity Nalwamba, District Focal Person, Environmental Health Technician
Daniel Kalemba, Kanyanga Health Centre
L. Nkhata, Chairman, Neighborhood Health Committee, Matifeyo
Prince Nyirenda, Community Health Worker, Matifeyo/Zanga-Zanga
J. Ngoma, Neighborhood Health Committee, Matifeyo/Zanga-Zanga
Christine Mfuni, Neighborhood Health Committee, Matifeyo/Zanga-Zanga
Kumbukilan Zimba
Esther Chipeto
Henry Zimba
Gilbert Mwale, Lutheran World Service, Kapichila
Joyce Phiri, Nthengele
Lackson Moyo, Zumwanda

Society for Family Health

Brad Lucas
Derrick Mumba

USAID/Lusaka

Paul Zeitz, Senior Policy and Technical Advisor
George North, USAID Technical Advisor

Appendix B

Household Interview Guide

English Language Version
&
Tumbuka Language Version

Community-Based Health Planning Activity Chipata, Lundazi, and Chama Districts

*Request for Assistance from Community Members and
Representatives of Households*

Good Morning/Good Afternoon:

The Central Board of Health, the District Health Management Team, Health Centers and Community Partners in Chipata, Lundazi and Chama Districts are visiting communities to learn and understand more about the ways that families are protecting children and adults from common sicknesses. Health Centers and Health Committees will be jointly working together with local families to improve the health. Community health committees are organizing to help support members of households in this regions. We are asking for your participation to help us learn more about how you are coping with diseases such as malaria, diarrhea, measles, and respiratory infections. Health Centers and Health Committees want to better understand the ways that families in this region are currently trying to strengthen the health of their household members.

We are requesting your help in answering some questions about the improvement of health and the prevention of sickness. We would like to talk with the head of the household or another responsible person who is at home today.

If a household member agrees, explain the following points:

Some of the questions will be about fevers and malaria. Other questions are about how you organize the sleeping arrangement for the members of your family. In the event that new malaria prevention efforts are undertaken, the health committees and local organizations may explore the increased use of mosquito nets as a way of improving health and preventing certain sicknesses.

We plan to give the community feedback on the results of these exercises through community meetings and discussions with neighborhood health committees. We expect the feedback to begin in February 1998 following completion of the information gathering exercises during December and early January. The program calls for us to visit communities in Chipata, Lundazi and Chama Districts. Your participation is a key aspect of the program.

Household Interview Guide
Knowledge, Attitudes, Behaviors and Practices of Bed Nets and Malaria Control
Eastern Province Zambia
EHP, MANOFF, BASICS

<p>1. Name of Respondent No. _____</p> <p>_____</p> <p>2. Circle: Male=1 Female=2 [__]</p>	<p>3. Name of Interviewer [__] [__]</p> <p>_____</p> <p>4. Date of Interview _____</p> <p>[__] [__] [__]</p>
--	--

5. Respondent: Head of Household ____=1 Spouse of Household Head ____=5
 Son of Household Head ____ =2 Daughter of Household Head ____=6
 Father of Household Head ____ =3 Other, specify _____ =7
 Mother of Household Head ____ =4

6. What is your marital status? [__]
 Married, living with spouse ____ =1
 Single ____ =2 Is respondent a widow/widower? ____ =3
 Divorced __ =4
 Other, specify _____ =5 [__]

7. District Circle: Chipata=1 Lundazi=2 Chama =3 [__]
 8. Community or Village _____ [__]
 9. Health Center Catchment Area _____ [__]
 10. Respondent's Highest Grade Completed _____ [__]
 11. Household Head's Highest Grade Completed _____ [__]

Household Composition

12. Number of adults in household >18 years

Male _____	Female _____	Total _____
------------	--------------	-------------

[__] [__] [__]

13. Children and Youth

No. of children/youth in household Between 5 and 18 years _____	No. of children under 5 years _____	Total Children and Youth ____
--	--	----------------------------------

[__] [__] [__]

14. No. of women of reproductive age (15 – 49) years regardless of kin relation [__]

15. No. of short-term visitors or persons residing temporarily with usual household members _____ [__]

16. Grand total of children, youth and adults who routinely sleep in household____ []

17. Total number of different structures in which members of this household sleep _____ []

18. *Interviewer's Additional Comments on Household Composition:*

Perceptions Concerning Relationship Between Health and Environment

19. What are the main health problems or sicknesses that people in this community experience?

(Interviewers record respondent's words verbatim)

1. Which of these sicknesses have affected members of your household during the past two (2) years? Probe: What do you mean by____? *(Interviewers should use local terms and vernacular terminology in recording)*

Indicate which sickness and age of family member:

21. What are the sicknesses that frequently affect young children under 5 years in this community?

(Interviewers use local language terms and vernacular terminology in recording)

- 1. _____ []
- 2. _____ []
- 3. _____ []
- 4. _____ []
- 5. _____ []

22. What are the common sicknesses of children and adults during the RAINY season?
(Interviewers use local language terms and vernacular terminology in recording)

<p>Common sicknesses of children</p> <p>1. _____ []</p> <p>2. _____ []</p> <p>3. _____ []</p> <p>4. _____ []</p>	<p>Common sicknesses of adults</p> <p>1. _____ []</p> <p>2. _____ []</p> <p>3. _____ []</p> <p>4. _____ []</p>
---	---

23. What are the common sicknesses of children and adults during the DRY season?
(Interviewers use local language terms and vernacular terminology in recording)

<p>Common sicknesses of children</p> <p>1. _____ []</p> <p>2. _____ []</p> <p>3. _____ []</p> <p>4. _____ []</p>	<p>Common sicknesses of adults</p> <p>1. _____ []</p> <p>2. _____ []</p> <p>2. _____ []</p> <p>3. _____ []</p>
---	---

24. A. What do you think are the main causes of fevers in young children?
 Probe: What other causes of fever do some persons in this region believe in?

24B. Probe: Are there any other beliefs or events that are thought to sometimes bring fevers in young children? *(Interviewer records responses using local language terms and vernacular terms as perceived by the respondent).*

Beliefs

1.

2.

3.

4.

Any particular events or omissions?

25. In your opinion, what are the main causes of malaria (hot body)?

Probe: What are some of the different reasons that people are affected by malaria (hot body)?

Probe: How do you find out the cause of a sickness that affects a child or an adult?

1.
2.
3.
4.

26. A. In your opinion, what can people do **to avoid getting malaria**? Probe.

1.
2.
3.
4.

26. B. Do you do any of these things to prevent malaria in your family? Why do you use that method?

How often? Probe: Why is it difficult to try ways of prevention sometimes?

Probe: What else would you do if you had the means to try?

--

27. What insects or household bugs are a bother to family members? Could you tell me about those household pests and the problems they cause.

Pest/ Insect	Known Problems It Causes

28. How do members of this community try to rid their homes of these pests?

29. *If plants were not mentioned previously, interviewer should ask:* Are any local plants burned to rid the home of pests? Other ways or strategies?
(Interviewer should specify local plant names and how they are used.)

30. Are sprays used by your family on a periodic basis ? Which one? What brands?
 kufafaza? (kupompa?)
 Mankwala?

31. A. What techniques do you use to control or reduce the nuisance of pests?

Type of Pest	Technique for Control	Result? How successful?

B. Which of these methods do you regularly use? About how often?

32. Have you purchased any mosquito coils or other products during this rainy season or last rainy season for household use? *(Interviewer should record whether current or last rainy season or both)*

Product or Other Item Acquired	From Where?	Cost

33. Tell me about any strategies or methods that you rely upon to reduce mosquitoes around the place where you live and eat?

34. Do you go to a temporary home during the planting season? *If yes*, When you go to your temporary homes at garden sites are there any methods used to protect from mosquitoes?
 ___ yes ___ no Please discuss how you cope with mosquitoes when you are planting.

Household Economic Activities

35. A. Now, I would like to make a list of the different economic and work activities of members of this household. Can you tell me the various types of work people of this household carry out?

Primary Economic /Work Activities of the Household Head. Indicate if any CASH earned for each or not.	Other Economic/Work Activities of Household Members and by whom. Any CASH earned?
1.	1.
2.	2.
3.	3.
4.	4.

B. Do you make local beer for sell? ___yes=1 ___no=0 [___]

C. Probe: What economic/work activities do the children participate in?

36. Do members of this household have gardens that are currently being planted or cultivated?

___ yes=1 [___]
 ___ no =2

Comments:

37. *If yes above*, is the gardening for: ? (Interviewer circles ONE of the following below)

- a. primarily the family's own use =1 [___]
- b. the family's use and for selling=2
- c. selling only=3
- d. other, specify types of cultivation =4 _____
- e. not applicable=5

38. What food crops did household members produce last year? Can we make a list?

- 39.A Did you produce groundnuts? _____ yes=1 no=0 []
 Were you able to sell any bags? _____ []
 Number of bags sold last year _____ []
- B. Did you produce beans? _____ yes=1 no=0 []
 Were you able to sell any? _____ Amt. _____ [] []
- C. Did you produce maize? _____ []
 Were you able to sell any? _____ Amt. _____ [] []
- D. Did you produce rice, millet, sorghum, soybeans or sunflowers? _____ []

40. What non-food crops do household members routinely or seasonally plant?

41. Probe: Did you produce any tobacco for sale? _____ []
 Were you able to sell any? _____ []
 Any cotton? _____ Were you able to sell any? _____ []
 Any other cash crops? _____

42. Does the family have livestock or other animals? Please estimate the number.

- cattle (1 - 5 stock) _____
 cattle (>5 stock) _____
 goats (1 - 5) _____
 goats (>5 stock) _____
 pigs _____
 chickens/guinea fowl _____
 ducks/geese _____
 rabbits _____
 other, specify _____

43. What other types of work are household members doing for cash wages or salary?

44. What is the approximate combined monthly income from all the main economic activities?

Comments:

45. Are there other persons residing outside this household who help to financially support this family?

About how often do you receive support from them?

- yes _____ yes=1 no=0 []
 no _____

46. Are there any other informal economic activities that household members engage in to generate income? Probe: Are there any other occasional or seasonal economic activities?

47. Structural Characteristics of House

Roof type _____ thatched=1 other=2

House flooring _____ mud=1 cement=2

Door type _____ wood=2 thatched=2

Windows # _____ Type of window coverings/closures? _____

Type of exterior walls _____

48. Household Ownership and Investments Does anyone in the house own a _____?

- A. Bicycle _____ yes=1 no=0 A.
- B. Working radio _____ yes=1 no=0 B.
- C. TV _____ C.

Other observations _____

49. What household items have you purchased for the family during the past 12 months other than foodstuffs? Probe: Which person in the family decided to make these purchases?

Probe for other key household expenses such as school fees

50. If you have some additional cash, about K40,000, what are the items that you would spend the money on that your family needs and wants? What are the things that you would consider?

51. Now, I am going to read a short list of items that families in this area sometimes want. If you were to have money available, what would be the order of your preferences for using additional household money? (*Interviewer indicates that this is a Ranking Exercise and reads list*)

- ___ tablets or other medicines(mankwala)
- ___ school fees
- ___ mealie meal
- ___ agricultural tools or plow
- ___ sugar
- ___ salt
- ___ batteries
- ___ mosquito nets
- ___ sleeping mats (mpasa)
- ___ blankets
- ___ bicycle

52. A. Did you ever consider buying a mosquito net?
___ yes=1 ___ no=0

B. Can you explain some of the reasons why you don't have mosquito nets for family members? Are there any reasons why you don't want them?

53. Are any members of this family currently using mosquito nets?
A. yes _____ no _____ yes=1 no=0 A.
B. Number of nets _____ B.

If no, skip to PAGE 11

THE FOLLOWING QUESTIONS ARE FOR FAMILIES THAT HAVE EVER USED A MOSQUITO NET:

54. In the past, did you ever own and use a mosquito net?
yes _____ no _____ yes=1 no=0

A. *If yes*, For how long did you use it? _____

B. *If yes*, Which members of the family are using the net(s)?

55. *If yes to Q. 54. Interviewer should ask* What did you find were the benefits of using a net?

56. *If yes to Q. 54*, Did you experience any difficulties or problems with the nets?
Tell me about those please. Probe: Were there any other disadvantages or inconveniences?

57. *If yes to Q54, Interviewer asks:* At what times of the year did you use the net?
___ all year round =1
___ only during the rains or when there are mosquitos=2
___ other times, specify _____ =3

58. *If yes to Q. 54, Interviewer asks* What was the frequency of using the nets? How often?

___ every night =1 [___]

___ primarily during the rainy season =2

___ occasionally =3

___ when bothered by mosquitos =4

59. *If yes above to Q. 54, From what shop or market or person did you obtain the net?*

Size and types of net? _____ Single size=1 Double size=2 ¾=3 [___]

What was the cost? K _____

Was it a gift? Yes ___ No ___ yes=1 no=0 [___]

For how long a period has the net been in use? _____

How often do members of the family sleep under a net? _____

What are the main reasons that prompted you to buy or obtain a mosquito net?

60. *If no to #54. Have you ever had an opportunity to sleep under a mosquito net that belonged to another family or to a place where you stayed.? Yes ___ No ___* [___]

61. *If yes, When? Where? Please tell me what you remember about that experience? Probe: Were there benefits that you found in using the net?*

62. Have you ever considered buying a mosquito net? What are/were the points you considered?

63. Where would you most likely go to look for the best price if you were thinking of buying a mosquito net?

Communication Patterns

64. What types of community or association meetings have you attended during the past year? Tell me about the purpose of the meetings and the organizers or sponsors. How often do you attend such meetings? How many people attended each meeting?

Types of Meeting, Sponsor	Frequency	No. of Persons
<hr/>		
<hr/>		

65. In your opinion, which places, organizations or persons in this area provide reliable information about new products or ways of protecting the family's health?

66. Have you ever made purchases from traveling vendors or mobile drug sellers?
 ___ yes=1 []
 ___ no =2

67. Is there a radio in the house that is currently working?
 Do you ever listen to a radio? yes___ no___ [] []
 Yes, daily ____ =1
 Yes, about once weekly ____ =2
 Rarely _____ =3 []
 Never _____ =4

68. Do you have radio batteries at present? []

69. Are you usually able to afford them? []

70. What stations do you hear? []

71. What are your favorite programs? At what times of day? []

72. Do you hear radio from Malawi or Zambia or both? ____ []

73. How do you prefer to receive information that might be of some assistance to the family?

Probe: Through which avenues do you prefer to receive new information?

Community meetings? Small groups of neighbors? Through radio? At the health center?

Household-based counseling? Other avenues preferred?

Care of Family Members Within Households and Sleeping Patterns

74. A. Where do the children of the family sleep?

B. Now, regarding the sleeping places for the children of the family, can you please indicate the places where they usually sleep? (*Interviewer uses sketch and attached form*)

75. What do the children usually sleep on in this family? []

76. Let's count the number of mats and their arrangement.

Number of mats _____ []

Type and material _____ []

Size approx. _____ []

77. Do any children or other persons sleep in the cooking house/kitchen?

yes ____ yes=1 no=2 []

no ____

Number ____ Ages of persons sleeping in cooking house or kitchen _____

78. Does anyone from the household ever sleep outside? Who? When? Why does that person sleep outside? []

79. Where is the household head's usual sleeping place? (Indicate if this is a male or female)
(*Indicate on attached sketch*)

80. Where do the mothers of the family usually sleep?
(*Indicate on attached sketch*)

81. If a mother in the family has an infant under 2 years, where does the infant sleep?

82. Are there raised beds (e.g. with bed frames) for any family members? Which household members sleep in the raised beds?

83. At approximately what times do the children go to rest for the night? Probe.

84. At approximately what times do the adults retire for the evening?

85. If anyone goes to relieve himself during the night, does he/she leave the house? What happens to the door of the house during that time?

86. What is the family's routine early in the morning? What times do different members of the family get up and begin to move about?

87. During the rainy season, do you get up at the same time in the morning or does your morning routine differ in any way?

88. Do you use cloth or sheets for sleeping ? yes___ no___

89. Who uses them? _____

90. Blankets? Yes___ No___

91. Do you use a kerosene lamp in the evenings? *If yes*, where is it placed?

92. Do you have a routine practice concerning opening or closing windows and doors at evening time? Probe: What about during hot evenings?

I certify that I have reviewed the interview and all responses are clearly written and complete.

Signature _____ **Date** _____

Observations By Interviewers:

A. Describe the ceiling structures that will allow nets to be hung or create difficulties in hanging a net or nets for family members.

B. Indicate the number of housing structures in the compound including cooking house or kitchen but do not count grain storage structures, latrines, livestock or chicken pens _____

C. Indicate number of structures used for sleeping by members of household. ____

Additional Observations and Comments:

Appendix C

Inventory of Community Associations and Groups

KABP Survey on Malaria Prevention and Control, Community Component

Date: -12-97

District:

Zone:

Community:

Focal person:

List of Existing Community Associations and Contact Persons. Inventory includes agricultural networks or groups, women's groups, church groups, sports associations and other types.

Name of Association or Group	Types of Activities and Topics of Interest	Contact person	Possible Involvement

Appendix D

Trials of Improved Practices Second Round Household Feedback on Mosquito Net Use

1. Household Number _____ Community _____ Recorder _____

2. Person Interviewed _____ Date _____
M _____ F _____

3. Which members of the household used the net for sleeping during the past 7 days?

Net 1: Shape _____ Size _____ Color _____
Children under 5 years _____ (Indicate ages) _____
mother _____ (Indicate if expectant mother) _____
father _____
Children over 5 years _____ (Indicate ages) _____
Other _____ (specify) _____
Other _____ (specify) _____

Net 2: Shape _____ Size _____ Colour _____
Children under 5 years _____ (Indicate ages) _____
mother _____ (Indicate if expectant mother) _____
father _____
Children over 5 years _____ (Indicate ages) _____
Other _____ (specify) _____
Other _____ (specify) _____

4. When you learned about an opportunity to purchase a net, what was your main motivation for buying the mosquito net? (Recorder should chose only one from the list below.)

- A. to reduce the nuisance of mosquito bites _____
- B. to prevent the risk of contracting malaria _____
- C. other reasons _____ Specify _____

5. Have you or other members of the family found any disadvantages or inconveniences while using the mosquito nets?

Yes _____

No _____

If yes above, interviewer asks: What are those inconveniences or problems? _____

6A. What is the MOST IMPORTANT BENEFIT of using a mosquito net that you and the others in the family have found?

6B. What are the additional benefits for you and others in the family? _____

7A. Have you or members of the family considered washing the net at this time?

Yes _____

No _____

7B. Has the net been soiled in any ways? Please tell me about that.

8. In what ways has having a net changed the place in the household where children sleep?

No changes _____

Changes were _____

(Indicate children's age, where applicable above)

9. What advice would you give to other families who may consider purchasing mosquito nets?

10. Do you plan to use the net during the dry season months?

Yes _____

No _____

Please discuss your thoughts about dry season use of the net _____

11. In general, how do you evaluate the value or worth of the mosquito net (2) for your family?
