

Understanding Malaria Prevention & Control in Rural Cambodia: A formative research study

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Perhaps most importantly, this study is indebted to the participating villagers who have shared their views and experiences, helping us to better understand malaria prevention and control in rural Cambodia.

Note: The research protocol for this study was submitted to the National Ethics Committee for Health Research, Ministry of Health, Kingdom of Cambodia

ACRONYMS AND ABBREVIATIONS

AD	Administrative District
A+M	Artesunate and Mefloquine
BTC	Belgian Technical Cooperation
CMBS	Cambodia Malaria Baseline Survey
CNM	National Malaria Center
CSHGP	Child Survival and Health Grants Program
CRC	Cambodian Red Cross
CVCG	Community Volunteer Care Group
FGD	Focus Group Discussion
HC	Health Center
HMIS	Health Management Information System
ICH	Integrated Child Health
IDI	In-depth interview
IEC	Information, Education, and Communication
IM	intramuscularly
IV	intravenously
ITN	Insecticide Treated (Bed) Net
KPC	Knowledge, Practices, and Coverage
LLIN	Long lasting insecticide treated mosquito net
M&E	Monitoring & Evaluation
MOH	Ministry of Health
MVU	Mobile Video Unit
OD	Operational District
p.	plasmodium
PHD	Provincial Health Department
PSI	Population Services International
RACHA	Reproductive and Child Health Alliance (local NGO)
RTK	Re-treatment Kit
USAID	United States Agency for International Development
VHSG	Village Health Support Group
VMW	Village Malaria Worker

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EXECUTIVE SUMMARY

Background

Cambodia has the worst malaria mortality and morbidity rates in Southeast Asia and one of the highest rates of malaria drug resistance in the world.¹ According to the National Health Statistics Report (NHSR) 2003, malaria is the third most common cause of outpatient attendance, the fifth main health problem among inpatients, and the second most common cause of hospital mortality.

Factors such as poor health infrastructure, drug resistance, and delayed care-seeking contribute to the ongoing threat of malaria in Cambodia. Health center understaffing as well as chronic drug stock-outs limit effective treatment delivery. Private vendors who provide drugs, especially in remote and difficult to access areas are by and large unregulated and untrained. Such vendors may be increasing the potential for further drug resistance as they frequently provide ineffective and/or partial drug courses. Delayed care-seeking at the health center and under utilization of insecticide treatment and mosquito nets are also issues which need further attention.

The American Red Cross (ARC), in partnership with the Cambodian Red Cross (CRC), is implementing an Integrated Child Health (ICH) Project funded by United States Agency for International Development (USAID). The goal of the ICH Project is to reduce child morbidity and mortality in a sustainable fashion in Angkor Chum Operational District of Siem Reap Province, Cambodia. To support the project's goal, a research study was carried out by ARC in partnership with CRC, the National Malaria Center, the Siem Reap Provincial Health Department, and the Angkor Chum Operational District with support from the Belgian Technical Cooperation (BTC), Reproductive and Child Health Alliance (RACHA), and Population Services International (PSI).

Study goal and design

The study's primary goal is to align stakeholders in the development and implementation of a comprehensive, evidence-based strategy to overcome the challenges to effective malaria prevention and treatment in Angkor Chum Operational District. Three research modules focusing on (1) malaria prevention, (2) early identification and referral, and (3) treatment were designed and developed for this study. Secondary quantitative analysis of relevant data from the population-based KPC survey undertaken in March 2005 was also completed to corroborate several qualitative findings.

Findings

Data from the March 2005 KPC survey revealed striking differences between the administrative districts of Angkor Chum and Varin concerning transmission knowledge among caretakers. While 86 percent of caretakers from Angkor Chum district identified "mosquito bites" as the cause of malaria, only 64.9 percent of Varin district caretakers cited that same response. Participants of the focus group discussions (both genders), also

¹ <http://www.cambodia.net/malaria/facts.html>, retrieved January 17, 2006

demonstrated a good understanding of malaria transmission, most frequently citing "mosquito bites" as the primary cause of malaria.

False beliefs related to malaria transmission, although limited, do exist. False beliefs include ingestion of bad/dirty/unboiled water, cutting grass around the home, and avoidance of contact with people who have malaria.

According to KPC survey data, 67.9 percent of households in Angkor Chum have a mosquito net compared to 58.4 percent of households in Varin. Responses given during the focus group discussions suggest that most people view mosquito nets as important and beneficial. The chief motivating factor for mosquito net use was the prevention of mosquito bites; the single de-motivating factor reported was the unpleasant smell of a new net. Focus group participants commonly expressed concern that: (1) they did not have an understanding of insecticide treatment, (2) they did not have sufficient mosquito nets to protect the entire family, and (3) mosquito nets tear or rip easily.

Statistical analysis failed to detect a correlation between households reporting fever with a mosquito net in the home. It would be expected that households with a mosquito would have less fever; this was not the case. As this data was collected in March (non-transmission season), it is plausible that at least some fever recorded was not malaria. Other plausible explanations for the seeming ineffectiveness of mosquito net use in reducing fever prevalence include: (1) removal of children from under the mosquito net after dusk, (2) lack of insecticide use, and (3) holes or tears in the net.

Female focus group participants became excited and wanted to learn more about insecticide treatment when facilitators introduced the topic. The women overwhelmingly responded that they would bring their net for insecticide treatment to health center outreach if it were offered as a *free* service. One reoccurring theme among focus group participants who had experience with insecticide treatment was the idea that the more recent insecticide treatment was not effective as it did not kill lice as it did following treatment done (by the health center) in 2003.

Focus groups (both genders) reported giving priority use of the mosquito net to small children. The primary reason for this is that people recognize that young children are more vulnerable to malaria. However, there was no mention in any group about increased malaria risk or priority net use for pregnant women.

The practice of removing small children from under the mosquito net after dusk, to avoid leaving the child alone while they visit with family and neighbors, seems to be common.

Among focus group discussions with people who currently do not use a mosquito net, there was a strong interest to have one, but reported that cost was the barrier.

In the KPC survey, among caregivers reporting their youngest child having fever in the previous two-week period, 46 percent cited that they sought advice or treatment outside

the home. If the child's symptoms persist or get worse, the mother will most frequently consult a shopkeeper and purchase drugs following their recommendation. If the child's symptoms persist or get worse following self-treatment (after two days), they will then take their child to the health center or hospital.

Focus group discussions revealed that following recognition of malaria signs and symptoms, a mother typically employs traditional medicines to make a tea. The tea is most commonly used externally (e.g. not ingested) to reduce body temperature. This homecare is used for the first one to two days of symptom onset.

If the child's symptoms persist or get worse, the mother will most frequently consult with a shopkeeper and purchase drugs following their recommendation. If the child's symptoms persist or get worse following self-treatment (after two days), they will then take their child to the health center or hospital.

Malarine is not widely available and the price is increased by up to six times the recommended selling price. Most focus group participants are able to identify the product stated they had seen it on television advertisements. Other drugs bought from village shopkeepers for malaria symptoms are mostly non-effective. Care-seeking with shopkeepers was reported to delay recommended treatment by two days.

Action Plan

A one-day stakeholder workshop was convened on November 25, 2005 to share the study findings and develop a joint strategy. The ARC, National Malaria Center, Provincial Health Department, Operational District, BTC, PSI, RACHA and CRC all participated. Stakeholders developed a joint action plan that identified activities needed to strengthen health education, insecticide treatment, mosquito nets, as well as drug availability and access.

Definitions

Clinical malaria is defined as the presentation of malaria symptomology without a positive blood test.

Confirmed malaria is defined as those cases that have a positive diagnostic test. In Cambodia, the Ministry of Health (MOH) aims for all malaria cases to be confirmed.

The terms **cause** and **transmission** are used interchangeably in this report. Although, technically, malaria is caused by the *p. falciparum*, *p. vivax*, *p. malariae*, and *p. ovalae* parasites transmitted by mosquitoes, villagers have a more pragmatic understanding of malaria causation that is based on the transmission pathway (e.g. mosquito bites).

Barriers refer to external factors that prevent or hinder a behavior.

Resistances refer to individual, group, or cultural beliefs, ideas, or thoughts that prevent or hinder a behavior.

Introduction

Malaria is a significant public health issue. In Cambodia, the presence of *plasmodium (p.) falciparum*, *p. vivax*, *p. malariae* and *p. ovalae* is complicated by one of the highest rates of drug resistance in the world². *P. falciparum*, the most potentially deadly type of malaria, accounts for an estimated 60-90 percent of rural cases.³ With a malaria incidence (treated cases) of 7.5 per 1000 and 382 deaths in 2004, malaria poses a considerable disease burden, especially in high transmission areas.⁴ New settlers in high transmission areas, people living or working in proximity to medium and high forest-covered zones, people who are immune compromised, pregnant women, and children under five are at greatest risk of infection. One study documented malaria parasite rates in children to be 47 times higher in villages surrounded by forest than by rice fields.⁵ Non-use of mosquito nets and under utilization of insecticide treatment further increases malaria risk among the vulnerable.⁶

In November and December 2004, the four (Second Round) Global Fund sub-recipients in Cambodia (CNM, Health Unlimited, Partners for Development and Populations Services International) commissioned the United Kingdom based Malaria Consortium to provide technical assistance in carrying out the Cambodia National Malaria Baseline Survey (CMBS) with the Cambodian National Institute of Public Health. The CMBS collected quantitative information at the national level to serve as a malaria situational

² <http://www.cambodia.net/malaria/facts.html>, retrieved January 17, 2006

³ Population Services International, Annual Report 2004 p.12

⁴ USAID, Malaria Strategic Plan 2006-2011, p.10

⁵ Royal Government of Cambodia Ministry of Health, Country Update on Malaria Control, 2001

⁶ Royal Government of Cambodia Ministry of Health, National Centre for Parasitology, Entomology and Malaria Control, November 2004 p.5

analysis, record core indicator baseline figures, and improve malaria control interventions, policies, strategies, and programmatic priorities.

According to the *Cambodia National Malaria Baseline Survey (CMBS) 2004*, 23.8 percent of children under 5 years of age were reported to have fever in the past two weeks. The Integrated Child Health (ICH) Project Knowledge, Practices and Coverage Survey (March, 2005), suggests that the malaria situation is even more severe in Angkor Chum OD. Two-week fever prevalence for children under two years of age was documented at 38 percent.⁷

Prevention, as well as timely and correct treatment, will reduce the malaria burden and avoid unnecessary deaths.

Presently, untreated mosquito nets are available through the private sector. The price ranges from about \$2.50 to \$4.00 depending on the distributor and size of the net. Insecticide used for treatment of mosquito nets is available in limited amounts through the National Malaria Center.

Recognition of danger signs is a precursor to seeking prompt care and treatment that can greatly improve chances for child survival. Children with uncomplicated malaria must be given prompt treatment (recommended within 24 hours of fever onset) with an effective anti-malarial drug to avoid subsequent progression to severe malaria.⁸

The *Community drug use practices in malaria in Cambodia study* revealed that treatment efficacy is highest among public health facilities and lowest among village providers. By increasing drug availability in the village, private village providers have seemingly filled a service gap, especially in remote and difficult to access areas. Unfortunately, these vendors are by and large untrained and unregulated.

Additionally, there is growing evidence that village drug sellers may be contributing to the potential for further drug resistance as they frequently provide ineffective and/or partial drug courses. *The Community drug use practices in malaria in Cambodia study* revealed that amongst people with suspected malaria within the previous two weeks, 74 percent received anti-malarials. However, only nine percent received a recommended first line treatment of A+M (6 percent) or malarine (3 percent).

According to the *Report of the Cambodia National Malaria Baseline Survey 2004*, of respondents or other household members with fever in the last two weeks reporting taking drugs, only 7.3 percent reported taking a known anti-malarial drug.

⁷ The differences in these prevalence rates may also be attributed to: (1) the age difference among those included in the sample (younger children are likely to be more vulnerable than older children) and/or (2) seasonal variations.

⁸ Crawley, J. Reducing deaths from malaria among children: the pivotal role of prompt, effective treatment in Technical Reference Materials: Malaria, PVO Child Survival and Health Grants Program, revised 2004

Furthermore, as most malaria treatments provided through village shop keepers are ineffective, their purchase and use consumes scarce resources and delays effective treatment care-seeking: needlessly increasing the risk for death.

In Cambodia, the recommended treatment for uncomplicated malaria for children aged 6 months to 5 years is artesunate suppositories for 5 days followed by mefloquine. For this age group, *the Community drug use practices in malaria in Cambodia study* documented that only 3.4 percent received artesunate and mefloquine with a further 2 percent receiving A+M. Only one child received an artesunate suppository, one additional child received an artemisinin suppository. Neither case received mefloquine. Only 48 percent of children in this age group with suspected malaria received any artemisinin.

The National Malaria Center (CNM) has taken steps to increase drug access and availability in the most remote villages through its Village Malaria Worker (VMW) program. VMWs are trained in malaria prevention, identification (including testing), and treatment; they are also provided with malaria drugs (A+M). At the time of this study, the CNM had in place 17 VMWs, all based in Varin administrative district.

Study Partners

The American Red Cross (ARC), in partnership with the Cambodian Red Cross (CRC), is implementing an Integrated Child Health (ICH) Project in Angkor Chum Operational District, Siem Reap Province. The ICH Project, funded by USAID, is working alongside the Ministry of Health (MOH) and numerous non-governmental organizations to reduce infant and child morbidity and mortality. The ICH Project focuses on the child survival "scorecard" interventions identified as priorities during the December, 2004 National Child Survival Partnership Workshop in Phnom Penh, Cambodia. These interventions have been demonstrated to have the greatest impact on child mortality and include use of insecticide-treated mosquito nets as well as improved access to appropriate anti-malarials through early identification and referral.⁹

In Angkor Chum Operational District, numerous stakeholders are working towards improving effective malaria prevention and control. Population Services International (PSI) is socially marketing *malacheck*, a rapid diagnostic test kit to confirm *p. falciparum* malaria, to trained, private pharmacists. PSI is also socially marketing *malarine*, a highly effective three-day treatment combining artesunate and mefloquine, the current regimen recommended for *p. falciparum* malaria by the World Health Organization and the CNM. Three-day treatments are pre-packaged for adults and children over five years of age. Additionally, as part of the Second Round Global Fund activities, PSI is preparing to market a long-lasting insecticide treated mosquito net (LLIN), and a stand-alone re-treatment kit (RTK) for traditional nets kits around June 2006. Both products will be sold at a subsidized price.

The local non-governmental organization Reproductive and Child Health Alliance (RACHA) is working with shopkeepers across Angkor Chum OD to simultaneously reduce distribution of counterfeit anti-malarial drugs while increasing access to *malarine*. RACHA is also training shopkeepers in early identification of malaria symptoms to improve early referral to the health center.

The Belgian Technical Cooperation (BTC), through its Provision of Basic Health Services project, is supporting the improvement of health service delivery focusing on extending hours of operation at the health center.

With the support of the CNM, the Siem Reap Provincial Health Department (PHD) and Angkor Chum Operational District (OD) have successfully distributed approximately 2,000 mosquito nets to villagers in priority zones 1 (in the forest) and 2 (less than 200 meters from the forest). Additionally, they have treated over 600 mosquito nets with insecticide and put in place 17 village malaria workers (VMWs) to facilitate malaria education and access to anti-malarials in the most remote villages. Unfortunately, monthly stock-outs of dipsticks (testing kits) and anti-malarial drugs at the health centers continue to be a barrier to effective treatment provision.

⁹ Jone G, Steketee R, Black R, Bhutta ZA, Morris SS., How many child deaths can we prevent this year? *The Lancet* Vol 362, July 5, 2003

The qualitative piece of this study was undertaken in partnership with the above stakeholders (PSI, RACHA, BTC, CNM, PHD, and OD) to better understand limiting factors to effective malaria prevention and treatment.

Goal and Objectives

The goal of the study is to align stakeholders in the development and implementation of a comprehensive, evidence-based strategy to overcome the challenges to effective malaria prevention and treatment in Angkor Chum Operational District focusing on the two Administrative Districts of Varin and Angkor Chum. The secondary goal is to forward the understanding and strategic development of malaria prevention and control activities in Cambodia. Specific objectives related to malaria prevention, early identification, referral and treatment are detailed below.

Prevention

1. Identify and document motivating factors as well as resistances and barriers to year-round mosquito net use.
2. Understand mosquito net practices among villagers including priority usage within the family/household, attitudes related to insecticide treatment including KO tabs, and removing infants and small children from under the net to carry them on their backs during the night.
3. Understand attitudes relating to insecticide re-treatment campaigns through expanded health center outreach.

Early Identification

4. Understand caretaker perceptions of fever, high fever and convulsions as malaria danger signs.
5. Identify and develop messaging that alerts caretakers to the malaria danger signs.
6. Identify and document perceptions of *malacheck* as well as barriers and resistances to its use.

Referral and treatment

7. Understand preferred malaria treatments and the reasons for preference among caregivers.
8. Understand caretaker motivating factors as well as resistances and barriers in prompt care seeking at the health center following identification of malaria danger signs.
9. Understand caretaker perceptions of *malarine* as well as barriers and resistances to its purchase and use.
10. Understand the role of opinion leaders and shopkeepers in promoting and distributing ineffective/sub-optimal malaria treatments.
11. Understand shopkeeper perceptions of *malarine* as well as barriers and resistances to stocking it.

Methodology

The methodology section describes the study modules, sampling and recruitment, team training, and logistics, in addition to recording and analysis.

The research protocol consisted of three modules focusing on malaria prevention, early identification, and referral and treatment. To complement qualitative data, quantitative data related to malaria knowledge, mosquito net use, and treatment seeking patterns, collected in March, 2005 as part of the baseline cross-sectional KPC survey was re-analyzed.

Table 1. Research modules, planned target groups and methodology

Module	Planned Target Groups (and number FGDs/IDIs)		Planned Methodology
1-Prevention	1. Female caregivers aged 19-49 of children <5	a. self-reporting year-round mosquito net use (8) b. self-reporting seasonal mosquito net use (1) c. self-reporting no mosquito net use (4)	Focus Group Discussions
	2. Married men aged 19-49 with children <5	a. self-reporting year-round mosquito net use (7) b. self-reporting seasonal mosquito net use only (4) c. self-reporting no mosquito net use (1)	
2-Early Identification and Referral	1. Female caregivers aged 19-49 of children <5 (9)		Focus Group Discussions, In-depth interviews
	2. Married men aged 19-49 with children <5 (10)		
3-Treatment	1. Commune/village leaders (3/3)		In-depth interviews
	2. Village Malaria Workers (3)		
	3. Shopkeepers (3)		
	4. Midwives (4)		
4-Knowledge, Practice, and Coverage (KPC)	1. Caregivers with child under 2 years of age 2. Caregivers reporting child under 2 years of age with fever in the previous 2 weeks		Secondary quantitative analysis of relevant baseline survey data

Sample and Recruitment

The Angkor Chum and Varin administrative district governors selected 19 malaria-affected villages for participation in the study. A visit schedule was jointly developed. The selected villages were geographically distributed over each district. Prior to field work, the district governors informed commune and village leaders about the study and asked them to organize target group participation on a voluntary basis following the agreed upon schedule. Village leaders attempted to pre-select participants to meet the criteria of the target groups as requested by the district governors.

Focus group discussions were segmented by gender. This was done to address concern about the potential for limited participation and free expression of female participants in mixed gender groups. In practice, segmentation by gender proved challenging as men often gravitated to participate in women only groups. The study team resolved this issue by creating a 'faux' group discussion when necessary. That is, upon arriving in the village, pre-selected participants were screened again by the study team. Only those fulfilling the selection criteria were brought out of earshot from the waiting point to conduct the focus group discussion. The remaining villagers were engaged in a general discussion about malaria prevention and control. The later or 'faux' group discussion however was not recorded or analyzed.

For the prevention module, focus groups were also segmented by self-report of mosquito net use. The plan was to conduct three focus groups with each of the six target groups. However, individuals reporting seasonal mosquito net use and non-net use were scarce. In one village, the primary investigator went to every house in that village to locate non-users; none were found. This was repeated in another village where the only houses that were reported not to have a mosquito net, were those where nobody was home (and those were very infrequent). Field teams were only able to complete one FGD with men reporting seasonal use. In the villages, many men were reported to be either working in rice fields or in the jungle cutting wood. A total of 26 focus group discussions were completed for module 1. Table 1 above shows the number of groups by target group.

In relation to the early identification and referral module, the plan was to conduct four male and four female focus groups. A total of nine male and ten female groups were completed as the planned number of groups proved to be inadequate in exhausting new information. Additionally, sixteen in-depth interviews were conducted using this same module: commune leaders (3), village chiefs (3), Village Malaria Workers (3), shopkeepers (3), and midwives (4). These same 16 key informants were also interviewed using module three which focused on treatment.

The fourth module, knowledge, practice, and coverage (KPC), was derived from a secondary analysis of relevant data from the population-based survey carried out in Pourk, Angkor Chum, and Varin districts in March, 2005. This survey used a randomized, two-stage cluster methodology to achieve a representative sample for the three districts. The survey tool included a series of questions (see Annex 4) to investigate

care-seeking practices for caregivers of children under two years reporting their youngest child to have had fever within the last two weeks. Relevant data from Angkor Chum and Varin districts was re-analyzed to enhance and corroborate findings from the qualitative modules of this study. Behavioral recall has been demonstrated to increase validity when linked to an actual event (e.g. care-seeking for a recent illness episode). Therefore, the data is considered to be relatively valid and accurate. Finally, quantitative data from the KPC survey relating to malaria transmission knowledge and mosquito net use has also been incorporated into this report to provide a more comprehensive understanding of the actual situation in Angkor Chum and Varin.

Training

The study team conducted a one-day training on September 19, 2005. The training included a review of qualitative study skills including facilitation of focus group discussions and note-taking. The training also encompassed a detailed discussion of the study objectives and discussion guides. The training ended with logistics planning.

Logistics

The study team focused on completion of focus group discussions for modules 1 and 2 from September 20-24, 2005. During that week, the study team was organized into two teams, each of which consisted of two, two-person interview sub-teams. Each two-person sub-team rotated facilitator and note-taker responsibilities.

Module 3 in-depth interviews were completed from September 27 -30, 2005.

Recording and Analysis

Each sub-team was responsible for joint review of the notes before submission to the ARC monitoring and evaluation officer each day. All focus groups and in-depth interviews were also recorded using digital MP3 recorders. Recordings were downloaded each night onto a computer to facilitate detailed review of sessions as needed during analysis.

Data analysis was done by hand in order to permit this to be completed in Khmer (Cambodian language). The intent was to reduce the time involved with translation as well as minimize the potential for loss of information. Data analysis involved classification of interviewer notes by topic and target group. Recordings were repeatedly checked to supplement interview notes for clarity or additional detail when needed. Summary tables were developed in Khmer for comparison and cross-referencing of data. Summary matrixes and findings were translated into English. These were reviewed and discussed in detail with the primary investigator for production of this report.

Findings

Prevention knowledge and understanding of transmission

Quantitative KPC survey data shows significant differences in caretaker knowledge about malaria transmission between Angkor Chum and Varin. Eighty-six (86) percent of Angkor Chum caretakers cited "mosquito bites" as the cause of malaria compared to 64.9 percent of Varin caretakers. Residents of more rural Varin district were more likely to identify incorrect transmission routes such as witchcraft, intravenous drug use, blood transfusion, injection, and sharing razor blades (cumulative total of 18.2 percent). "Other" responses included: acclimation to new place (lack of environmental immunity), travel to and return from the forest or mountain, ingestion of bad/dirty/un-boiled water, no bed net, small ponds (breeding sites), and sleeping in the rice field. The association of malaria with bad/dirty/un-boiled water, while technically not accurate, is a constructive health belief for diarrhea prevention.

Table 2. Reported cause of malaria by administrative district

Cause	Angkor Chum			Varin			Chi2 for difference in %
	n	N	%	n	N	%	
Mosquito bites	72	84	85.7	50	77	64.9	0.0021
Witchcraft	0	84	0.0	2	77	2.6	0.1372
Intravenous drug use	0	84	0.0	2	77	2.6	0.1372
Blood tranfusion	0	84	0.0	4	77	5.2	0.0056
Injection	0	84	0.0	1	77	1.3	0.2948
Sharing razor blades	1	84	1.2	5	77	6.5	0.0760
Other	3	84	3.6	10	77	13.0	0.0240

Corroborating quantitative data shown above, both women's and men's focus groups demonstrated a basic understanding about malaria transmission. Both groups most commonly identified mosquito bites as the cause of malaria. Most other causes identified by both groups were attributable to un-boiled/dirty drinking water, no hygiene, non-use of mosquito nets, and lack of insecticide. Of interest is the fact that these causes were expressed from the perspective of non-action on the part of the individual or family, thus suggesting there is potential to take action, and therefore control over transmission.

The only notable difference between the men and women's groups was that women were more descriptive and detailed when discussing the causes of malaria.

Table 3. Causes of malaria reported during focus group discussions

Women's FGDs	Men's FGDs
<ul style="list-style-type: none"> -Mosquito bite -Drinking dirty/un-boiled water - Sleep without mosquito net - No hygiene -No insecticide -Cha Baum bite* - Travel/overnight in stay at the mountain or in the forest (looking for food or wood) - Dirty water in small pond surround the house (breeding sites) -Lack of vitamins (general) 	<ul style="list-style-type: none"> -Mosquito bite -Drinking dirty/un-boiled drinking water (including mountain water) - No hygiene - Sleep without mosquito net -No Insecticide - Lack of clothing to protect skin -Drinking water contaminated by limestone -Children taking a dirty shower - "Affected land" meaning malaria endemic area -Not enough food

*Cha Baum is a large flying insect

Although not as common, there is some understanding of the connection between illness and nutrition. Women associated lack of vitamins with malaria; men mentioned not enough food. That is, women were more concerned about the nutritional quality of the food, in contrast to men who were concerned with quantity and feeling full after eating. One older woman commented, *"Everyday we only eat salt and chilly water with rice and prauhauk (salt flavored with fish), we do not have enough money to buy pork, fish, and vegetables. If we eat like that how can we have enough vitamins? If I had enough money, I would buy meat and vegetables to give my family good vitamins"*.

When asked what people do to prevent malaria, focus group participants commonly cited burning wood, palm leaf, cow and buffalo dung to repel mosquitoes, use of mosquito nets, cutting grass around the house, as well as avoiding contact with people that have malaria.

Mosquito nets

Data from the KPC survey showed that 63.4 percent of households in Angkor Chum and Varin had a mosquito net in the home (validated by the interviewer). Boys were more likely (68.3 percent) than girls (58.2 percent) to live in a home with a mosquito net. Stratification by mother's age revealed that young mothers (under 25 years of age) are more likely to have a mosquito net (nearly four out of every five), compared to older mothers (25 years of age and older), of which only 54.9 percent have a net.

Stratification by administrative district also showed that surveyed households in Angkor Chum (67.9) are more likely to have a mosquito net than households in Varin (58.4).

Table 4. Mosquito net in home by child gender, mother's age and administrative district

Background Characteristic				
	n	N	%	CI
Mosquito net in home	102	161	63.4	52.8 - 73.9%
<i>Child's gender</i>				
Female	46	79	58.2	42.8 - 73.6%
Male	56	82	68.3	54.0 - 82.5%
<i>Mother's Age</i>				
<25 years	46	59	78.0	63.0 - 92.9%
25 years and over	56	102	54.9	41.2 - 68.6%
<i>Administrative District</i>				
Angkor Chum	57	84	67.9	53.7 - 82.0%
Varin	45	77	58.4	42.9 - 74.0%

Logistic regression analysis failed to detect a correlation between households reporting fever (as the outcome variable) with correct transmission knowledge or presence of a mosquito net in the home. It would be expected that households with a mosquito net would have less fever; this was not the case. As this data was collected in March (non-transmission season), it is plausible that at least some fever recorded was not malaria. Other plausible explanations for the seeming ineffectiveness of mosquito net use in reducing fever prevalence include: (1) removal of children from under the mosquito net after dusk, (2) lack of insecticide use, and (3) holes or tears in the net.

Focus groups and in-depth interviews provide insight into motivating and de-motivating factors related to mosquito net use. Information summarized below is for all target groups as inter-group comparisons revealed no notable differences.

Table 5. Motivating and de-motivating factors for use of mosquito net

Motivating	De-motivating
<ul style="list-style-type: none"> - <i>To prevent mosquito bite</i> - <i>Disease prevention</i> - <i>Malaria prevention</i> - <i>Easy/improved sleeping</i> - <i>Protect child health</i> - <i>Reduced medical costs</i> - <i>Avoidance of fever</i> 	<ul style="list-style-type: none"> - <i>Unpleasant smell</i>

Focus group participants were easily able to identify many benefits of using mosquito nets. Consistently, people expressed that mosquito nets are important and useful.

New nets were reported to have a slight, unpleasant smell. People noted that this is not a major concern, and would not prevent them from using a net. One woman stated, *"My child had difficulty sleeping under the mosquito the first night because they were not used to it and because of the smell, after the first night my child sleeps well."*

Focus group participants commonly complained that they did not have an understanding of insecticide treatment, only having one net in the home, and that mosquito nets often tear or rip easily. One man stated, *"I have seven children and only one mosquito net, which the health center gave me in 2003. Now it is broken and has holes."*

Women mosquito net users were more likely to be familiar with insecticide treatment. They reported that health center staff had provided insecticide treatment in the community within the last six months and previously in 2003. Several people stated that the more recent treatment was not effective as it did not kill lice as it did following the 2003 treatment. Men reported having heard about insecticide treatment, but not having experience using it. Mosquito net non-users had never heard about insecticide treatment.

Focus group participants consistently cited their desire to have more mosquito nets in the home; they described one net as being too small or narrow to accommodate all family members. One mother stated, *"Because I have four children and only one mosquito net, all my children must sleep under that net, because it is too narrow they are not able to sleep well; too many people are sleeping together and they are not getting enough air."*

With limited net availability, priority use becomes an issue. Among doer focus groups (those reporting to use mosquito nets), both women's and men's groups consistently reported giving priority use to small children. The primary reason for this is that people recognize that young children are more vulnerable to malaria. One father explained, *"My youngest children are more easily affected by disease and need protection. I am afraid the baby will get sick"*.

Women commonly sleep with their children if there is space under the mosquito net. However, there was no mention in any group about increased malaria risk or priority net use for pregnant women.

Other research¹⁰ has suggested that small children are frequently removed from under the mosquito net after dusk. This practice seems to be common as approximately half of all focus groups confirmed this to be true. This practice is linked to a cultural taboo against leaving small sleeping children unattended; and is related to the belief that spirits may wake the baby, causing it to cry which may result in the child becoming sick. Sleeping

¹⁰cited in Ministry of Health, Kingdom of Cambodia, *Annual progress report*, National Center for Parasitology, Entomology and Malaria Control, 2004

children are often left to be cared for by other family members while the mother spends time visiting with family, neighbors and/or watching television. When other household members are not available to watch the sleeping child, the mother will take the child with her.

Non-doers, or those people who currently do not use a mosquito net, expressed strong interest to have a mosquito net, but reported that cost was the barrier. One mother reported, "*the Indian seller charges 15,000 Riel for one mosquito net, this is too high, so people are not able to buy it*". Cost was also cited as a barrier to taking a mosquito net when traveling to the forest or rice field. Not surprisingly, non-users were unable to describe the advantages of mosquito net use as easily as users.

Focus group members' concerns about lack of insecticide treatment information is consistent with findings from the KPC: only seven households reported to have soaked or dipped their mosquito net in a liquid that repels mosquitoes or insects. None reported to have had done so within the past 12 months.

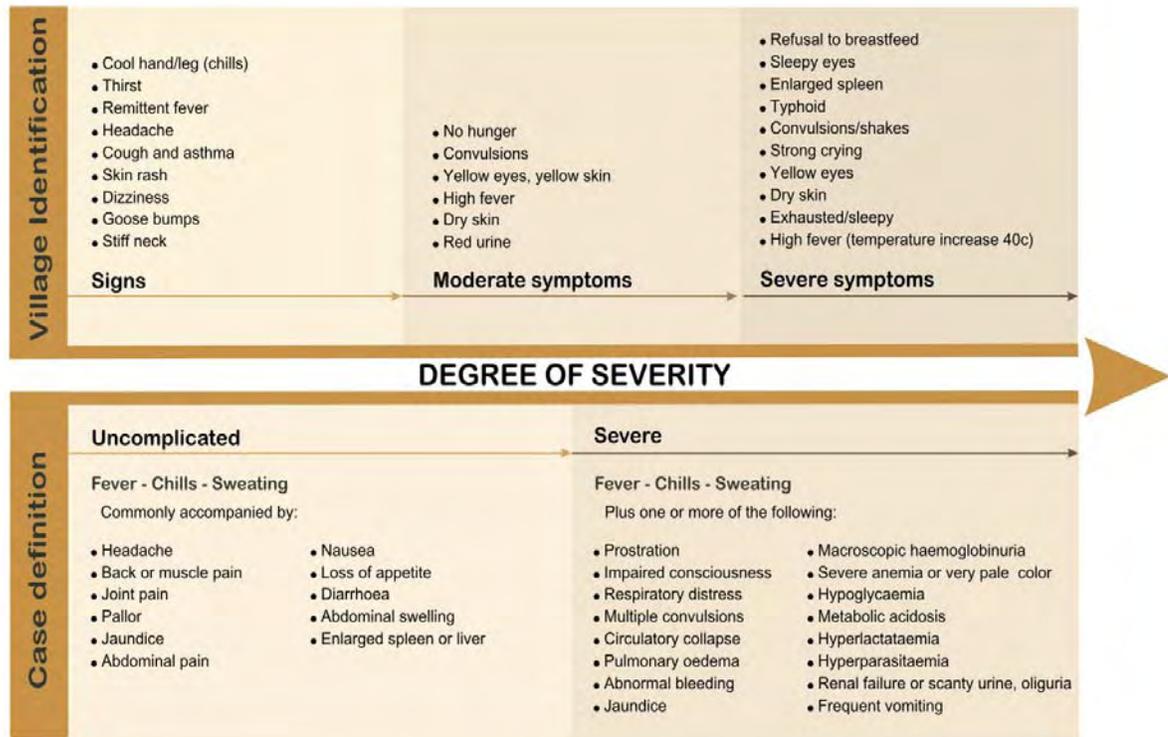
Female interviewees were interested to learn more about insecticide treatment. They overwhelmingly responded that they would bring their net to health center outreach if this were offered as a *free* service. One woman explained, "*if the health center gives insecticide, I will bring my net for treatment because I want to protect my family against mosquito bites so they are not effected by mosquito diseases.*" Although men did not disapprove of insecticide treatment, they were less interested. One man explained, "*I know that health center staff come to explain about insecticide treatment, but I have not been involved with that.*"

Another important aspect of insecticide treatment of mosquito nets is the washing interval. Data from the KPC survey showed that frequency of mosquito net washing as follows: 30.2 percent once a week, 51.2 percent once a month and 18.5 percent less than once a year.

Early identification and referral

Focus group participants and interviewees easily understood the Khmer term for malaria, *kruun chang*. This term was frequently interchanged with *g'dao k'lang* literally translated as strong heat, and *roung ngiem* the local term for exhaustion associated with malaria. People were able to describe signs and symptoms that they associate with malaria. Focus group participants were asked to categorize each sign or symptom they described as a sign, moderate symptom, or severe symptom. A severe symptom was defined as one that is life threatening, indicating the need for immediate attention from the health center or hospital. Both men and women provided similar information, although, women were able to describe signs and symptoms in more detail. The illustration below summarizes malaria signs and symptoms by village identification and case definition.

Illustration 1. Signs and symptoms of malaria: village recognition versus case definition¹¹



There was no consensus or clear understanding of the degree of severity for convulsions/shaking and high fever; there was significant discussion in most focus groups about this as they were both identified as moderate and severe symptoms. There was some agreement that convulsions and high fever become very serious, but only after 2-3 days. This confusion can result in delayed care-seeking at the health center.

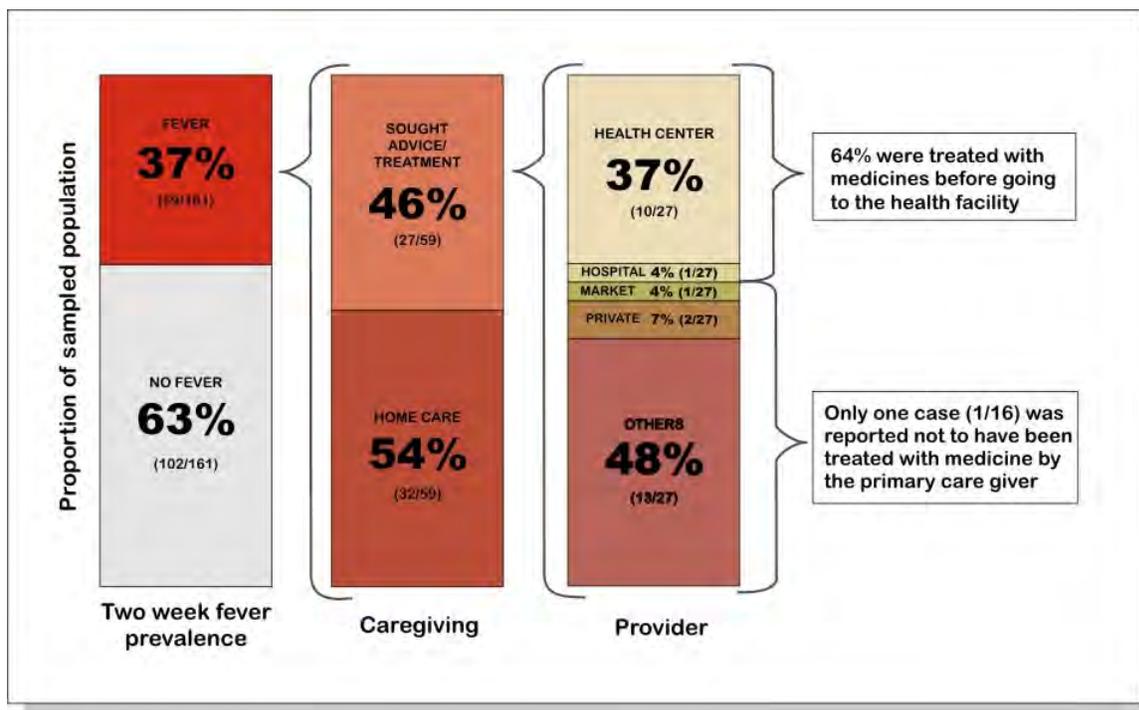
Villagers are able to identify remittent fever and chills (cold hands/legs) as a malaria sign. Sweating was not mentioned at all as a sign or symptom. This is likely due to the perception of sweating as normal (not surprising for rural Cambodia). Several other symptoms identified by villagers are being confused with other illness (cough, asthma or typhoid). Additionally, there is a common association of red with heat. Therefore, red urine should logically indicate overheating from high fever. This however, is not a symptom of malaria that follows the standard case definition.

¹¹ Case definitions taken from the *National Treatment Guideline for Malaria, National Centre for Parasitology, Entomology and Malaria Control, November 2004, pp.7-8*

Care-seeking behavior

According to the KPC survey, 37 percent of mothers reported that their youngest child had fever in the last two weeks. These mothers were asked more detailed questions concerning treatment and care seeking for this illness episode.

Graph 1. Report of care-seeking behavior among children with fever in the past two weeks (KPC)

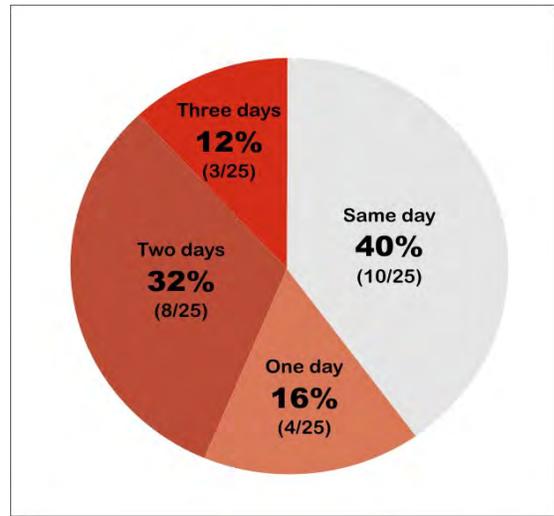


Of caregivers reporting their youngest child had fever in the past two weeks during the KPC survey, 46 percent stated that they sought advice or treatment outside the home; 54 percent stated that they did not. Of those 27 cases reporting treatment outside the home, 10 cases went to the health center, 1 case went to the hospital, 1 case went to the market, and 2 cases went to a private provider; 13 cases reported "other", detail for "other" was not recorded at the time of the survey.

Among those cases going to the health center or hospital, 64 percent were treated with medicines before going to the facility. Among those cases going outside of the formal health sector (market, private provider, or other), only one case was reported not to have been treated with medicine by the primary caregiver. This data suggests that almost all fever is treated first by the primary caregiver; over half of first care/treatment for fever is administered in the home.

Chart 1. Time-lapse for fever care-seeking

Data from the KPC survey revealed that, for those reporting treatment outside the home, 40 percent reported care-seeking the same day as signs or symptoms appear; 16 percent report waiting one day; 32 percent report waiting two days; and, 12 percent cited waiting three days. A total of forty-four (44) percent reported waiting two or three days before seeking care compared to a total of fifty-six (56) percent reporting care-seeking within one day. This corroborates the focus group discussion finding that there is no consensus on when convulsions and fever become severe, and need referral to the health center or hospital.



Data from focus group discussions and in-depth interviews with villagers and key informants corroborates the quantitative findings described above, providing a more detailed account of what is happening with care-seeking for fever at the village level.

Following recognition of malaria signs, a mother typically forages on the mountain or around the village for traditional medicines such as the Persian lilac leaf and other non-specified, edible plants. These leaves are crushed with unheated water to make a tea. The tea is sponged or wrapped on the child's body with a soaked cloth to reduce the temperature. Some people give the tea to the child as a drink. This home treatment is commonly used for the first one to two days of the onset of signs.

Also, not uncommon, was report of food preparation to offer to the spirit. By contrast, mention of the consultation with *kru k'mai* or traditional healers/witch doctors was isolated.

If the child's symptoms persist or get worse, the mother will most frequently go to the shopkeeper for treatment advice and to purchase drugs. The most commonly mentioned drugs purchased from the village shopkeeper for malaria signs and symptoms included paracetamol, ampicine, tetracycline, novazine, quinine, powder ampicine, powder cloramphenical, yakhamchai, and sombucmum (both unidentified medicines from Thailand).

The national 1st line treatment guideline for *p. falciparum* malaria is artesunate +mefloquine; the 2nd line treatment guideline is quinine+tetracycline. The treatment for *p. vivax* and *p. malariae* is chloroquine. Drug dosages and delivery mechanism (suppository, syrup, tablet, and intramuscular or intravenous injection) vary depending on the drug type, patient's weight/age, and illness severity (uncomplicated or severe).

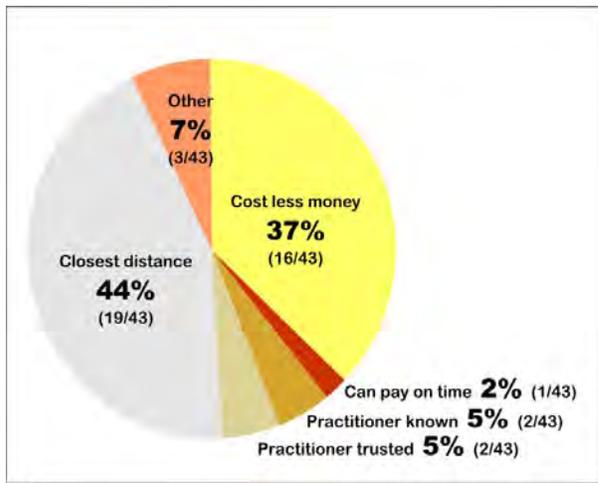
Focus group participants stated that caretakers seek care with the shopkeeper due to close distance, convenience and lack of resources for transportation to the health center. Quality of care at the health center was only mentioned by one person as a reason for seeking care first with shopkeepers.

Shopkeepers stated that people always come to them to discuss treatments. Shopkeepers reported their role to provide advice and treatments in the village. One shopkeeper explained, *"Many people come to ask me about what to do for their sick child. When they have fever I give them paracetamol because my supplier, the big pharmacy in Pourk, uses this for fever. If the sick child's condition has not improved after two days I will recommend that the mother takes the child to the health center or hospital."*

If the child's symptoms persist or get worse following self-treatment (after one to three days), most people reported that they will then take their child to the health center or hospital.

If this is not possible (no transportation, etc.) or if treatment at the health center is not effective, mothers will resort again to the preparation of traditional teas (described above) in the home. Noticeably absent from caregiver accounts was advice seeking from opinion leaders other than shopkeepers.

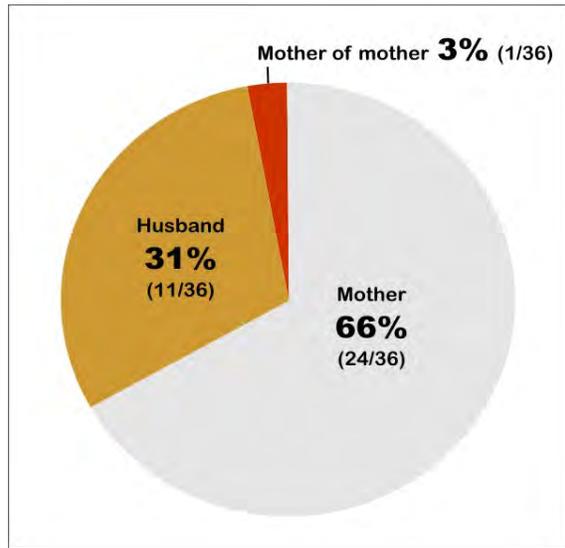
Chart 2. Reason child taken to chosen provider



The KPC survey quantified the children were taken to the chosen provider (multiple answers were recorded). Forty-four (44) percent of responses were related to closest distance. Thirty-seven (37) percent of responses included price as a reason. Other responses included knowing or trusting the practitioner, and the possibility to pay in installments.

Also of interest is decision-making regarding care-seeking practice. According to the KPC survey, less than one-third of husbands get involved with the decision to take their child for treatment. By contrast, key informants interviewed as part of the qualitative modules of the study perceive that the community is involved in decision-making regarding treatment. People involved include village health workers, village health support group members, family members, village leaders, elders, traditional birth attendants, and shopkeepers. One midwife stated, *"mothers consult with their village leader or the village health worker because they trust them and they believe they have been educated by the health center staff."* One village leader commented, *"I have advice from the district chief and information from the health center to give information to the community people when they get sick. It is my job to know what is going on in this community and the people always report to me when there is any problem. I am the leader of the people and when I say anything the people listen."* One village health worker noted, *"I am always the first to get information"*.

Chart 3. Decision maker for care-seeking



Malacheck and malarine

Only one traditional midwife and one private clinic were able to identify *malacheck* as a rapid diagnostic test for malaria. In relation to *malarine*, approximately 20 percent of study participants were able to identify the packaging. Most focus group participants who were able to identify the product stated they had seen it on television advertisements. Those people were also knowledgeable about correct use and expressed confidence that it is very effective treatment for malaria. Furthermore, they understood that *malarine* is not for use by children under five years of age. Everybody noted that the price of *malarine* is expensive. One mother stated, *"malarine is very effective, but it is expensive. One box, it can cost up to 16,000 Riel. This medicine has very good quality."*

Recommendations

Prevention

Health education messages should reinforce the common understanding that malaria is caused by mosquito bites and the common belief that mosquito nets are important and beneficial. Villager concerns related to not having enough information about insecticide treatment needs to be addressed through interpersonal communication. This information is likely to generate demand for insecticide treatment.

Linking insecticide treatment to ongoing health center outreach activities was well received by mothers. This strategy should be expanded to all villages¹² with the goal of reaching at least 60-70 percent of households with at least one insecticide treated net to achieve the community-wide effect.^{13,14} Insecticide treatment linked to outreach should remain a free or highly subsidized service to achieve the coverage target. Presently the MOH has no concrete plans for insecticide re-treatment in Angkor Chum OD.

Excessive washing of nets will likely reduce the effectiveness of insecticide treatment. Clear messaging needs to be developed and communicated to sensitize people to the appropriate washing interval. It is recommended that washing is done no more than once every three months. PSI plans to support the introduction of long lasting insecticide treated nets (LLIN). The insecticide on LLINs remains efficacious for approximately 21 washes, therefore washing every three months would render a LLIN effective for 5 years, at which point the net would likely need to be replaced due to tearing. Messaging to villagers to wash more frequently (as currently practiced) may be difficult to correct in the future.

Focus group participants perceived that a more recent insecticide treatment was not as effective as a previous treatment. Lice and bedbug elimination is an added benefit of insecticide treatment, but only following the first treatment. These pests are likely to develop pyrethroid resistance fairly soon after the introduction of insecticide.¹⁵ This should be communicated to villagers.

Avoidance of people sick with malaria as a prevention measure should be addressed to reduce disease stigmatization. The identified link between illness and nutrition needs further exploration as part of planned future work on nutrition.

¹² According to the *Report of the Cambodia National Malaria Baseline Survey 2004*, "There is considerable evidence of malaria transmission in the zone from 1 to 2 kilometers from the nearest forest. The risk is less than for those closer to the forest, but indicates the need for the control programme to include this zone in its control strategies."

¹³ Maxwell CA et al. (December 2002) *Effect of community-wide use of insecticide-treated nets for 3-4 years on malarial morbidity in Tanzania*, *Journal of Tropical Medicine and International Health*, Volume 7 No 12, pp. 1003-1008

¹⁴ Hawley WA et al. (2003) *Community-wide effects of permethrin-treated bednets on child mortality and malaria morbidity in western Kenya*, *American Journal of Tropical Medicine and Hygiene*, 68 (Supp. 4), pp. 121-127

¹⁵ World Health Organization. (2003) *Malaria Vector Control: Decision Making Criteria and Procedures for Judicious Use of Insecticides*, p. 16

False beliefs relating to malaria transmission such as ingestion of bad water and cutting grass to eliminating breeding sites around the home (never proven to reduce malaria incidence¹⁶) have no negative consequence, and are best left unchallenged. However, they should not be encouraged.

A strategy is needed to address the issue of removing small children from under the mosquito net after dusk. PSI has suggested sewing insecticide treated material onto slings being used to carry children as a possible solution. A small pilot should be undertaken to explore the effectiveness of such an intervention.

The single de-motivating factor reported was the unpleasant smell of a new net. However, study participants stated that this would not deter them from using a mosquito net. No follow-up on this issue is considered necessary at this time.

Access to mosquito nets

The primary reason for non-use of mosquito nets is cost. Most mosquito net users want additional nets, citing that one net is not sufficient to protect their entire family. A segmented distribution scheme consisting of targeted net provision according to vulnerability and ability to pay is recommended to address these issues. High risk groups including children under two years of age and pregnant women, whom do not have resources to purchase a subsidized mosquito net, should be provided with a free net. Free nets should be used to incentivize ante-natal visits and other health services as appropriate at the health center. Subsidized and full cost nets should be made available for purchase by families interested in having additional nets for family members not at high risk.

Identification and referral

People need simple and clear information in order to accurately identify the malaria danger signs and know when it is time to seek care within the formal health sector.

Community opinion leaders view they have an important role to play in malaria control, they should be called upon to fulfill that role and provided with accurate information to support health promotion and referral.

A system needs to be set up to facilitate timely referrals to the health center.

Care-seeking

The subsidized sale of *malarine* through shopkeepers is problematic. The product is not widely available and the actual price is increased by up to six times the advertised retail price printed on the box. Health authorities have expressed that poor villagers often do not complete the prepackaged three-day course, as shopkeepers sell one or two days of

¹⁶ Walker, K. (April 2002) *Environmental Health Project Activity Report 108, A Review of Control Methods for African Malaria Vectors*, p. 9

drugs if that is all that the customer can afford. This is complicated by increased pricing in the village. Clearly, there is cause for concern about increased drug resistance.

Other drugs sold by village shopkeepers for the treatment of malaria are outside of the national treatment guidelines; by and large, shopkeepers are not selling effective or appropriate treatments. The result is a loss of scarce resources and time, both of which could be better spent on acquiring effective treatment.

A comprehensive strategy, which offers villagers a viable alternative, with consideration to distance and pricing, is needed to effectively address this issue. The strategy should: (1) increase drug availability and access thru health centers and village malaria workers; (2) increase the number of village malaria workers; (3) increase the number of *malarine* sales agents, possibly involving Village Health Support Groups; (4) establish a monitoring plan with follow-up to stop retail mark ups on the suggested retail price; (5) educate caretakers of the ineffectiveness of alternative drugs provided by shopkeepers to shift demand to health centers, village malaria workers, and *malarine* sales agents; and, (6) engage opinion leaders in implementation.

Action Plan

A one-day stakeholder workshop was convened to achieve the defined goal of *aligning stakeholders in the development and implementation of a comprehensive, evidence-based strategy to overcome the challenges to effective malaria prevention and treatment in Angkor Chum Operational District*. The National Malaria Center (CNM), Provincial Health Department (PHD), Operational District (OD), Belgian Technical Cooperation (BTC), Population Services International (PSI), Reproductive and Child Health Alliance (RACHA), the Cambodian Red Cross (CRC), and the American Red Cross all participated. The workshop was held at the Angkor Chum Operational District office on November 25, 2005 and included a presentation of the study findings and recommendations followed by discussion to outline a joint action plan (see table 6).

Table 6. Planned Activities and Responsible Parties

Number	Activities	Responsible
1.	<i>Health education</i>	
1.1	Prevention, early identification, and referral training to field officers	ARC/CRC OD, RACHA
1.2	Prevention, early identification, and referral training to CRC volunteers	CRC, VMW
1.3	Prevention, early identification, and appropriate care-seeking (to shift demand to health centers, VMWs, and <i>malarine</i> sales agents) training to households	CRC volunteers
1.4	Engage community leaders in implementation	ARC/CRC
1.5	Media messaging (radio, advertisements)	PSI
1.6	Mobile Video Unit (MVU)	PSI
1.7	IEC materials development, provision of prototype	RACHA, CNM
1.8	Train VHSGs on diagnosis, primary care, and referral	further discussion

Table 6. continued

Number	Activities	Responsible
2.	<i>Insecticide treatment</i>	
2.1	Provision of insecticide (ARC to write request letter)	CNM, PHD
2.2	Organization of treatment stations linked to HC outreach	OD, ARC/CRC
2.3	Community mobilization to bring mosquito nets for treatment	ARC/CRC
2.4	Develop insecticide-treated sling for children removed from under the net at night	PSI
2.5	Pre-test and pilot insecticide-treated sling in 10 villages to demonstrate impact; explore potential for scale-up following results of pilot	ARC/CRC
3.	<i>Mosquito nets</i>	
3.1	Procurement of nets	PHD/OD, ARC/CRC
3.2	Free/heavily subsidized distribution to pregnant women via HCs	OD
3.3	Criteria development for free/heavily subsidized distribution to high risk poorest of the poor in the community	OD, ARC/CRC
3.4	Free/heavily subsidized community distribution	VHSG, CRC volunteers
3.5	Social marketing of subsidized nets	ARC/CRC, PSI
3.6	Monitoring for correct use	all
4.	<i>Increase drug availability and access</i>	
4.1	Ensure drug supply in the HCs	PHD, OD
4.2	Increase <i>Malarine</i> distributors in the community	PSI
4.3	Follow-up monitoring	OD to coordinate
4.4	Reduce inappropriate drug supply from community vendors	government authorities

All activities for which ARC and CRC are responsible have been integrated into the annual Integrated Child Health (ICH) Project work plan. Implementation of these activities will be done in close coordination with all stakeholders to ensure implementation of the comprehensive strategy.

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Participating Villages

Village	Commune	District	Method	Date
1. Prasat Trave	Kourk Doung	Angkor Chum	FGD	9/20/05: 9/27/05
2. Kamplerb	Kourk Doung	Angkor Chum	FGD: IDI	9/20/05
3. Kok Kandal	Lovea Krang	Varin	FGD	9/20/05
4. Ou Tey	Lovea Krang	Varin	FGD	9/20/05
5. Dom Em	Kourk Doung	Angkor Chum	FGD: IDI	9/20/05: 9/28/05
6. Romdul	Varin	Varin	FGD	9/21/05
7. Kok Krous	Varin	Varin	FGD	9/21/05
8. Toul Meat	Varin	Varin	FGD: IDI	9/21/05: 9/29/05
9. Rokar	Doun Peng	Angkor Chum	FGD	9/22/05
10. Chan Roun	Prasath	Varin	FGD	9/22/05
11. Vean	Prasath	Varin	FGD	9/22/05
12. Kor Rolum	Ta Saum	Angkor Chum	FGD	9/22/05
13. Nokor Pheas 1	Nokor Pheas	Angkor Chum	FGD	9/22/05
14. Nokor Pheas 2	Nokor Pheas	Angkor Chum	FGD	9/22/05
15. Reussey Thom	Svay Sar	Varin	FGD	9/23/05
16. Svay Sar	Svay Sar	Varin	FGD	9/23/05
17. Kor Chas	Sre Khvaoav	Angkor Chum	FGD	9/23/05
18. Korolum	Tasoam	Angkor Chum	IDI	9/26/05
19. Dambor	Svay Sar	Varin	IDI	9/30/05

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Annex I- Focus Group Discussion Guide 1- Malaria Prevention

Target Groups (CIRLE ONE):

- (1) Female caregivers aged 19-49 of children <5 *doers* (self-report of year-round mosquito net use);
- (2) Female caregivers aged 19-49 of children <5 *doers1* (self-report of seasonal mosquito net use);
- (3) Female caregivers aged 19-49 of children <5 *non-doers* (self-report of no mosquito net use);
- (4) Married men aged 19-49 with children <5 *doers* (self-report of year-round mosquito net use);
- (5) Married men aged 19-49 with children <5 *doers1* (self-report of seasonal mosquito net use only);
- (6) Married men aged 19-49 with children <5 *non-doers* (self-report of no mosquito net use)

I. Introduction

Welcome and thank you for taking time to participate in this discussion today. My name is [moderator] and this is [note-taker] and we are working with the Red Cross and Operational District to help find solutions to the problem of malaria. Your comments will be used to help the development of effective programming to improve malaria prevention and control.

II. Ground rules

We are interested in all your opinions and feelings. There are no right or wrong answers. We need your ideas, so any criticisms you have will not hurt our feelings. We encourage you to provide frank comments. We encourage you to share openly your ideas. Do not wait for the moderator to ask for your opinion, feel free to speak at any time. You will have a chance to speak and all ideas, concerns and opinions are of value. The session will last approximately 1-1.5 hours.

III. Confidentiality/Informed Consent

Everything that is said in this group is confidential and we will not tell anyone that you participated in this discussion. My assistant will take some notes and I will record this session to help us remember comments from the group.

I also want to make sure that everybody knows that your participation is voluntary. You are under no obligation to be here or participate in this group if you do not want to do so. You may leave at any time. Is there anybody who would prefer to leave at this time?

IV. Introduction of participants

We would like each of you to introduce yourself. Also, please tell us how many children you have and tell me the age of your youngest child.

V. Research questions

- 1.1 All of you said that you had a young child. Could you tell me what are the main illnesses of young children in your community?
- 1.2 Could you tell me what causes malaria?
- 1.3 Could you tell me how people in this village prevent malaria?
- 1.4 Can you tell me more about mosquito nets... what are some advantages to using one? PROBE: Please tell me more about that... What else?....
- 1.5 What are some disadvantages to using a mosquito net?... PROBE: Please tell me more about that... What else?....

FOR *doers* and *doers1* ONLY:

- 1.6 Everybody here told me that they have a mosquito net in their home. Can you tell me who sleeps under it every night?... PROBE: What about your small children? What about your youngest child?...
- 1.7 Is there ever a time when your youngest child does not sleep under the net? PROBE: Can you tell me more about that?... Why?...
- 1.8 Is there ever a time when your youngest child is removed from under the mosquito net after dusk?... PROBE: Can you tell me more about that?... Why?....
- 1.9 What could somebody do or say to make you want to always have your youngest child sleep under the net?.... PROBE: Can you tell me more about that?...

FOR non-doers ONLY

- 1.10 Have you ever considered using a mosquito net?...
- 1.11 What has stopped you from using one?....PROBE: What else?.. Can you tell me more about that?...

ALL

- 1.12 What could somebody do or say to make you want to use a mosquito net all year long?.... PROBE: Can you tell me more about that?...

- 1.13 Have you ever heard about KO-trine or insecticide treatment to dip/soak your mosquito net? Has anybody here used KO-trine or another insecticide treatment for soaking/dipping a mosquito net? PROBE: Can you tell me more about your experience with treating/re-treating a mosquito net?
- 1.14 During health center outreach, has the staff ever brought insecticide treatment for people to be able to re/treat their net here in the community?..
- 1.15 If the VMW or the health center outreach staff were to provide insecticide treatment during health center outreach, would you bring your net (if you had one) ?...
- 1.16 Let's suppose that you have a mosquito net, how much would you be willing to pay to have it treated with insecticide?
- 1.17 What are the *advantages* to KO-trine or insecticide treatment for a mosquito net?... PROBE: Can you tell me more about that?...
- 1.18 What are the *disadvantages* to KO-trine or insecticide treatment for a mosquito net?... PROBE: Can you tell me more about that?...
- 1.19 Is there anything that anybody could do or say that would convince you to seek insecticide treatment for your mosquito net? PROBE: Can you tell me more about that?...

VI. Wrap-up

We have discussed a lot of issues about malaria today. We want to thank you for your participation. Your comments and ideas you have shared will help us to better plan prevention promotion in your community. Before we finish, do you have any questions or us?

Annex 2- Focus Group Discussion Guide 2-Malaria Identification and Care-seeking

Target Group (CIRLE ONE):

- (1) women caregivers 19-49 years of age with children <5; and
- (2) married men aged 19-49 with children <5

I. Introduction

Welcome and thank you for taking time to participate in this discussion today. My name is [moderator] and this is [note-taker] and we are working with the Red Cross and Operational District to help find solutions to the problem of malaria. Your comments will be used to help the development of effective programming to improve malaria prevention and control.

II. Ground rules

We are interested in all your opinions and feelings. There are no right or wrong answers. We need your ideas, so any criticisms you have will not hurt our feelings. We encourage you to provide frank comments. We encourage you to share openly your ideas. Do not wait for the moderator to ask for your opinion, feel free to speak at any time. You will have a chance to speak and all ideas, concerns and opinions are of value. The session will last approximately 1-1.5 hours.

III. Confidentiality/Informed Consent

Everything that is said in this group is confidential and we will not tell anyone that you participated in this discussion. My assistant will take some notes and I will record this session to help us remember comments from the group.

I also want to make sure that everybody knows that your participation is voluntary. You are under no obligation to be here or participate in this group if you do not want to do so. You may leave at any time. Is there anybody who would prefer to leave at this time?

IV. Introduction of participants

We would like each of you to introduce yourself. Also, please tell us how many children you have and tell me how old is your youngest child.

V. Research questions

- 1.1 All of you said that you had a young child. Could you tell me what are the main illnesses of young children in your community?
- 1.2 I would like to talk more about malaria, could you tell me what causes malaria?

- 1.3 Could you tell me how you know that your child has malaria?... PROBE: Please tell me more about that... What else?.... Anything else?... **RECORD ALL SYMPTOMS**

GET AN EXHAUSTIVE LIST OF SYMPTOMS TO USE FOR Q1.4 AND Q1.5

- 1.4 I want to talk about each of the symptoms that were mentioned by the group. You told me that _____ (high fever, convulsions/shakes, etc.) indicate that your child has malaria. How serious is that symptom?...

IF GROUP HAS DIFFICULTY EXPRESSING THIS, USE THE LIKERT SCALE.

- 1.5 If your child has _____ (high fever, convulsions/shakes, etc.) what would you do first? What would you do next? And after that?... PROBE: Please tell me more about that....

REPEAT Q1.4 AND Q1.5 WITH EVERY SYMPTOM MENTIONED BY THE GROUP FROM QUESTION 1.3.

- 1.6 Have you ever used or heard of *malacheck*?... **SHOW SAMPLE**
PROBE: Can you tell me more about your experience with *malacheck*?

IF THEY HAVE NEVER HEARD OF *malacheck* SKIP TO Q1.10

- 1.7 What do you think of *malacheck*?... Is it worth the cost and effort to purchase in order to diagnose malaria? Why?....
- 1.8 What prevents people from using *malacheck* every time they suspect malaria?...
- 1.9 What could somebody do or say that would convince you to use *malacheck* every time you suspect your youngest child has malaria?... PROBE: Can you tell me more about that?...
- 1.10 Now I would like to talk about treatment for malaria. I know that different people use different treatments. When your youngest child (under 5 years of age) presents the symptoms [name symptoms] that we discussed earlier, what do you do?... PROBE: Can you tell me more about that?... What are the advantages/benefits to that treatment? After you do that, what do you do next?... What do you do if the symptoms do not improve?...
- 1.11 Do you give that child any medicines?... Which ones?... Why do you give your child [name medicine]?... PROBE: Can you tell me more about that medicine?... Where do you get those medicines?....

- 1.12 At what point do you decide that you need to go to the health center?... What alerts you that the situation is very serious?... What are the words that people use to identify that [symptom] is very serious?... REPEAT ALL MENTIONED SYMPTOMS FROM Q1.3 AND RECORD ALL MENTIONED WORDS INDICATING SERIOUSNESS
- 1.13 Sometimes you may talk with other people when your child gets sick with [symptoms], with whom to you talk and who gets involved in making the decision to take your child to the health center for care?.... PROBE: Please tell me more about that...
- 1.14 Who in this community could tell you to take your child to the health center that would obligate you to do so? Who else?... PROBE: Please tell me more about these people and why they have this influence...
- 1.15 What could somebody do or say that would make you want to seek care for your child at the health center?... PROBE: Please tell me more about that...
- 1.16 Have you ever used or heard of *malarine* for treatment of children over 5 years of age and adults?... SHOW SAMPLE; PROBE: Can you tell me more about your experience with *malarine*?

IF THEY HAVE NEVER HEARD OF *malarine* END FOCUS GROUP

- 1.17 What do you think of *malarine*?... Is it worth the cost and effort to purchase in order to treat malaria? Why?....
- 1.18 What prevents people from using *malarine* when their child over 5 years of age has malaria?...PROBE: Can you tell me more about that?....
- 1.19 What could somebody do or say that would convince you to use *malarine* every time your child over 5 years of age has malaria?... PROBE: Can you tell me more about that?...

VII. Wrap-up

We have discussed a lot of issues about malaria today. We want to thank you for your participation. Your comments and ideas you have shared will help us to better plan prevention promotion in your community. Before we finish, do you have any questions for us?

Annex III- In-Depth Interview Guide 2– Malaria Treatment

Target Groups (CIRCLE ONE):

- (1) Commune or Village leader
- (2) Village Malaria Worker (VMW)
- (3) Mid-wife
- (4) Shopkeepers

I. Introduction

Welcome and thank you for taking time to participate in this discussion today. My name is [interviewer] and I am working with the Red Cross and Operational District to help find solutions to the problem of malaria. Your comments will be used to help the development of effective programming to improve malaria prevention and control.

II. Ground rules

We are interested in all your opinions and feelings. There are no right or wrong answers. We need your ideas, so any criticisms you have will not hurt our feelings. We encourage you to provide frank comments. We encourage you to share openly your ideas. The interview will last approximately 1-1.5 hours.

III. Confidentiality/Informed Consent

Everything that you say in this interview is confidential and we will not tell anyone that you participated in this discussion. I will take some notes and record this session to help me remember your ideas.

I also want to make sure that you know that your participation in this interview is voluntary. You are under no obligation to be here or participate if you do not want to do so. Are you agreeable to continuing with the interview?

I. Introduction

Could you tell me about what you do for work?...

II. Research questions

1.1 I would like to talk to you about malaria, could you tell me what causes malaria?

1.2 Could you tell me how people in the village know that their child has malaria?...

PROBE: Please tell me more about that... What else?.... Anything else?...

RECORD ALL SYMPTOMS

1.3 Frequently, people in the village talk with other people when their child gets sick with [symptoms], with whom do they talk most? RECORD ALL MENTIONED

Where do people most commonly go for advice on treatment for malaria?

RECORD ALL MENTIONED

- 1.4 Do people ever ask you how to treat malaria?... How often do people consult with you? If somebody were to ask your advice on treating the symptoms you mentioned [name symptoms] what would you tell them?... PROBE: What else?... Can you tell me more about that?...
- 1.5 What medicines do you recommend?.. **RECORD ALL MENTIONED** Why would you recommend [name medicine]? PROBE: Can you tell me more about that one?... Do you believe it is effective?.... **REPEAT TO EXHAUST ALL MENTIONED MEDICINES**
- 1.6 In the village, who gets involved in making the decision to take a sick child to the health center for care?.... PROBE: Please tell me more about that...
- 1.7 In the village, who could tell a mother to take her child to the health center that would obligate her to do so? Who else?... PROBE: Please tell me more about these people and why they have this influence...
- 1.8 What could somebody do or say that would make a mother want to seek care for your child at the health center?... PROBE: Please tell me more about that...
- 1.9 What prevents people in the village from seeking care for a sick child at the health center? PROBE: What else? Please tell me more about that...
- 1.10 Have you ever used or heard of *malacheck*?... **SHOW PRODUCT SAMPLE**; PROBE: Can you tell me more about your experience with *malacheck*? Do people in the village use *malacheck*? Why or why not?...

IF THEY HAVE NEVER HEARD OF *malacheck* SKIP TO Q1.14

- 1.11 What do you think of *malacheck*?... Is it worth the cost and effort to purchase in order to diagnose malaria? Why?....
- 1.12 What prevents people in the village from using *malacheck* every time they suspect malaria?...
- 1.13 What could somebody do or say that would convince people in the village to use *malacheck* every time you suspect a child over 5 years of age has malaria?... PROBE: Can you tell me more about that?...
- 1.14 Have you ever used or heard of *malarine*?... **SHOW PRODUCT SAMPLE** PROBE: Can you tell me more about your experience with *malarine*?

IF THEY HAVE NEVER HEARD OF *malarine* END INTERVIEW

- 1.15 What do you think of *malarine*?... Is it worth the cost and effort to purchase in order to treat malaria? Why?....
- 1.16 What prevents people from using *malarine* when their child has malaria?...PROBE: Can you tell me more about that?....
- 1.17 What could somebody do or say that would convince people in the village to use *malarine* every time their youngest child has malaria?... PROBE: Can you tell me more about that?...

III. Wrap-up

We have discussed a lot of issues about malaria today. I want to thank you for your participation. Your comments and ideas you have shared will help us to better plan prevention promotion throughout Angkor Chum OD. Before we finish, do you have any questions for me?

Annex IV. Malaria modules extracted from the KPC questionnaire

VIII. MALARIA				
MA1	Has <NAME> been ill with fever in the last two weeks?	Yes	1	If no or don't know, go to MA22
		No	2	
		Don't not	8	
MA2	Did you seek advice or treatment for <NAME'S> fever?	Yes	1	If no, go to MA22
		No	2	
MA3	<p><i>Where did you first go for</i></p> <p>Circle only one answer.</p> <p>If 1, 2, 3, or 4 (Hospital, Write the Name</p>	Hospital	1	
		Health Center	2	
		Private Hospital/Clinic	3	
		Private Practitioner	4	
		Village Health Worker/TBA/VHC	5	
		Traditional Healer	6	
		Market	7	
		Pharmacy	8	
		Community Distributors	9	
		Friend/Relative	10	
		Other	88	
MA4	How long after you noticed <NAME'S> fever did you seek treatment from that person or place?	Same day	0	
		One day	1	
		Two days	2	
		Three days	3	
MA5	<p>Why was <NAME> taken to this <PROVIDER>?</p> <p>Anything else?</p> <p>Circle all answers.</p>	Cost less money	A	
		Can pay on time	B	
		Practitioner known	C	
		Practitioner trusted	D	
		Closest distance	E	
		Other	X	
MA6	<p>Who decided that you should go</p> <p>Anything else?</p> <p>Circle all answers.</p>	Mother	A	
		Husband	B	
		Mother of mother	C	
		Mother-in-law	D	
		Friend/Neighbors	E	
		Others	Z	
MA7	How was the child taken there?	Walk	1	
		Own transportation	2	
		Motor taxi	3	
		Friend	4	
		Car taxi	5	
		Other	96	

MA8	How much did it cost for transportation?			
MA9	Did you/they have to pay for the consultation and treatment?	Yes	1	If no, go to MA11
		No	2	
MA10	How much did you have to pay?			
MA11	After the health provider saw the child did s/he ask you to bring the	Yes	1	If no, go to MA15
		No	2	
MA12	Did you take <CHILD> back to the same health care provider?	Yes	1	If yes, go to MA14
		No	2	
MA13	If not, why?			Go to MA15
MA14	When did you take the child back?	Same day	1	
		One days	2	
		Two days	3	
		Three day	4	
		Other	5	
MA15	Where else did you go for advice Anything else? Circle all answers. If A, B, C, or D (Hospital, Health Center or Private Write the Name	Hospital	A	
		Health Center	B	
		Private Hospital/Clinic	C	
		Private Practitioner	D	
		Village Health	E	
		Traditional Health/VH	F	
		Market	G	
		Pharmacy	H	
		Community Distributors	I	
		Friend/Relative	J	
		Nowhere else	K	
		Other	Z	
MA16	Did you consult with the VHV, VHC, TBA or Key Mother?	Yes	1	If no, skip MA17
		No	2	
MA17	What did they do? Anything else? Circle all answers.	Nothing	A	
		Refer	B	
		Health Education	C	
		Gave Treatment	D	
		Follow up	E	
		Other	X	

MA8	How much did it cost for transportation?			
MA9	Did you/they have to pay for the	Yes	1	If no, go to MA11
		No	2	
MA10	How much did you have to pay?			
MA11	After the health provider saw the child did s/he ask you to bring the	Yes	1	If no, go to MA15
		No	2	
MA12	Did you take <CHILD> back to	Yes	1	If yes, go to MA14
		No	2	
MA13	If not, why?			Go to MA15
MA14	When did you take the child	Same day	1	
		One days	2	
		Two days	3	
		Three day	4	
		Other	5	
MA15	Where else did you go for advice Anything else? Circle all answers. If A, B, C, or D (Hospital, Write the Name	Hospital	A	
		Health Center	B	
		Private Hospital/Clinic	C	
		Private Practitioner	D	
		Village Health	E	
		Traditional Healer	F	
		Market	G	
		Pharmacy	H	
		Community Distributors	I	
		Friend/Relative	J	
		Nowhere else	K	
Other	Z			
MA16	Did you consult with the VHV,	Yes	1	If no, skip MA17
		No	2	
MA17	What did they do? Anything else? Circle all answers.	Nothing	A	
		Refer	B	
		Health Education	C	
		Gave Treatment	D	
		Follow up	E	
		Other	X	

Attention! Read and follow below: <i>If <NAME> was ever taken to a Hospital or Health Center --> MA18</i> If <NAME> was not ever taken to a Hospital or Health Center --> MA19				
MA18	Was <NAME> treated with any	Yes	1	If no or don't know,
		No	2	
		Don't Know	8	
MA19	Was <NAME> treated with any	Yes	1	If yes, go to MA20.
		No	2	
		Don't Know	8	
MA20	Which medicines were given to			
	If mother cannot remember Circle the letter next to the			
	For each medicine checked How long after the fever did			
	Circle the answer			
A	CHLOROQUINE	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
B	FANSIDAR	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
C	MEFLOQUINE	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
D	RECTOCAP SUPPOSITORY	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	

E	A+M2 (ENFANT)	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
F	A+M3 (ADOLESCENT)	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
G	A+M4 (ADULT)	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
H	QUININE	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
I	TETRACYCLINE	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
J	ARTESUNATE	Same Day (Day 0)	0	
		Day 1	1	
		Day 2	2	
		Day 3 +	3	
		Don't know	8	
MA21	OTHER MEDICINES Circle all answers.	Aspirin	A	
		Paracetamol	B	
		Co-Trimoxazole	C	
		Ampicillin/ Amoxicillin	D	
		Other	E	
		Unknown Medicine	F	
MA22	Were any of these injections?	Yes	1	
		No	2	
		Don't Know	8	

MA23	What causes malaria? Anything else? Circle all answers, and write	Mosquito Bites	A	
		Witchcraft	B	
		Intravenous drug use	C	
		Blood transfusions	D	
		Injections	E	
		Sharing Razor Blades	F	
		Kissing	G	
		Other	W	
		Other	X	
	Don't Know	Z		
IX.				
BE1	Do you have any bednets in your	Yes	1	If no or don't know,
		No	2	
		Don't Know	8	
BE2	May I see the bednet? Observe if bednet is hung	Hung over bed	1	
		Not hung	2	
BE3	Was the bednet ever soaked or	Yes	1	If no or don't know,
		No	2	
		Don't Know	8	
BE4	Inspect bednet for holes or	No obvious holes/tears = Good	1	
		Any visible holes/tears =	2	
BE5	How long ago was the bednet Record answer in months Less than 1 month = 00 Don't know = 99	_____ months		
BE6	Have you or someone else in Record the number of times. None = 00 Don't know = 99	_____ times		If none, go to BE8
BE7	How often do you wash your	Once a week	1	
		Once a month	2	
		Less than once a month	3	
BE8	How long have you had your Write down the number of			
BE9	Who slept under the treated Circle all answers.	Child <NAME> (the one chosen for the interview)	A	
		Mother	B	
		Husband	C	
		Other	Z	