Kingdom of Cambodia

Nation Religion King

Cambodia Malaria Survey

2013

Authors

National Centre for Parasitology, Entomology and Malaria Control

Dr Huy Rekol
Dr Siv Sovannaroth
Dr Lek Dy Soley
Dr Chan Vanna
Dr Chea Sokun
Dr Oung Yeang
Dr Bou Kheng Thavrin
Ms Mam Montha
Mr You Yom
Ms Hok Chan Theasy

Malaria Consortium

Dr Ruth Ashton
Glaister Leslie
Dr Sylvia Meek
Pengby Ngor
Sarala Nicholas
Chandary Rang
Dr Arantxa Roca-Feltrer
Celine Zegers de Beyl

UN Office for Project Services

Gulshod Allabergenova
Seshu Babu Vinjamuri

Implemented by:
National Centre for Parasitology,
Entomology and Malaria Control, Cambodia

Design, analysis and report by:
Malaria Consortium

Data collection by:
SBK Research and Development

In collaboration with:
Ministry of Health, Cambodia
Institut Pasteur in Cambodia
UN Office for Project Services

With funding support from:
The Global Fund to Fight AIDS,
Tuberculosis and Malaria, single-stream funding

Cambodia Malaria Survey

2013

Acknowledgements

The authors would like to thank the Director and staff of the National Centre for Parasitology, Entomology and Malaria Control, the Ministry of Health of Cambodia and partners for their dedication to the National Malaria Control Programme and their commitment to the elimination of artemisinin resistance and malaria in Cambodia. The authors acknowledge funding support from the Global Fund to Fight AIDS, Tuberculosis and Malaria for this study.

We would also like to express our sincere appreciation to all members of the Cambodia Malaria Survey 2013 teams and technical partners for their collaboration.

Finally, we would like to thank the many field interviewers who worked arduously on data collection, as well as laboratory technicians who read and quality assured blood slides. We would also like to thank the Institut Pasteur in Cambodia for its support in conducting the polymerase chain reaction analysis included in this report.

The authors acknowledge funding support from the Global Fund to Fight AIDS, Tuberculosis and Malaria for this study.

Contents

Tables and figures

Abbreviations and acronyms

ACT	artemisinin-based combination therapy
AIDS	acquired immune deficiency syndrome
AMFm	Affordable Medicines Facility – Malaria
A+M	artesunate and mefloquine
AS-MQ	artesunate-mefloquine
BCC	behaviour change communication
CI	confidence interval
CMS	Cambodia Malaria Survey
CNM	National Centre for Parasitology, Entomology and Malaria Control
DHA	dihydroartemisinin
DHA-pip	dihydroartemisinin-piperaquine
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GPS	global positioning system
HF	health facility
HIS	Health Information System
IRS	indoor residual spraying
ITN	insecticide-treated net
KHR	Cambodian Riel
LLIHN	long lasting insecticidal hammock net
LLIN	long lasting insecticidal net
MIS	Malaria Information System
MMW	mobile malaria worker
NGO	non-governmental organisation
NMCP	National Malaria Control Programme
NMS	National Malaria Survey
P. falciparum	*Plasmodium falciparum*
P. vivax	*Plasmodium vivax*
PCA	principal components analysis
PCR	polymerase chain reaction
RDT	rapid diagnostic test
SES	socioeconomic status
SSF	single-stream funding
US	United States
VHV	village health volunteer
VMW	village malaria worker

Executive summary

The Cambodia Malaria Survey (CMS) 2013 was conducted from October to November 2013 during the peak malaria transmission season by a partnership of organisations supporting the National Centre for Parasitology, Entomology and Malaria Control (CNM). This large-scale household, drug and net outlet and health facility (HF) survey was funded by the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund) single-stream funding (SSF). However, the survey addressed indicators beyond this grant to enable CNM to evaluate additional key national and regional indicators.

The main purpose of the CMS 2013 was to assess the performance and impact of malaria control activities in Cambodia, while monitoring and evaluating activities funded by Global Fund. The objectives of the survey were to:

- Update the malaria epidemiological situation and assess whether malaria prevalence had declined since the CMS 2010;
- Determine the coverage of key interventions;
- Track key knowledge, attitude, behaviour and practice indicators to assess the outcomes of behaviour change communication (BCC) strategies;
- Assess current strategies for malaria control and to improve strategies for malaria elimination efforts;
- Contribute to the refinement of malaria risk stratification in the context of malaria elimination;
- Assess strategic and operational options and recommend mid-course corrections and improvements where needed.

The methods of the CMS 2013 are directly comparable with those of the CMS 2010. Every effort was made to ensure comparability with the national prevalence surveys in 2004 and 2007 also, although some changes were made between the 2007 and 2010 surveys that should be noted when comparing indicators from the CMS 2013 with data from 2004 and 2007.

The survey was not nationwide: malaria transmission intensity is heterogeneous, so the survey focused on populations at highest risk by stratifying first higher-risk provinces and then by distance from forest. A total of 3,286 households were visited and interviewed in the CMS 2013 survey (40 households in 82 clusters; 42 clusters from Domain 1 and 40 clusters from Domain 2). Excluding households sampled in risk category 4, a total of 2,726 households were sampled in villages less than two kilometres from the forest (risk categories 1-3).

A total of 82 net outlets and 79 drug outlets were surveyed for the net and drug outlet survey component. For the HF survey, 62 HFs (31 public and 31 private) were visited, 809 patients with fever presenting at HFs (364 patients at public facilities and 445 patients at private facilities) were administered exit interviews, and 48 patients with confirmed malaria diagnoses from public HFs were followed up at their village for interview.

Key findings and recommendations

Household survey

- **Continuing decline in malaria prevalence.** Prevalence of *Plasmodium* infection by microscopy has declined in each successive national survey since 2004. Weighted national prevalence by microscopy was 4.4% in 2004, 2.6% in 2007 and 0.9% in 2010 and had declined to 0.1% in 2013. Prevalence by polymerase chain reaction (PCR) in 2013 was also very low, at 0.9%. If restricting to villages within two kilometres of the forest (risk categories 1-3), the weighted prevalence of infection by microscopy in 2013 was 0.1% and by PCR 1.5%.
- **Increased ownership of long-lasting insecticidal nets (LLINs).** Mass distributions of LLINs in Cambodia at a one net to one person ratio have resulted in an increased proportion of households (all risk categories) with any LLINs (52% in 2010, 75% in 2013) and with sufficient LLINs (23% in 2010, 51% in 2013). However, further progress to achieve universal coverage with LLINs is needed.
- **Increased proportion of the at-risk population sleeping under LLINs.** In the targeted at-risk villages (those in risk categories 1-3, located less than two kilometres from the forest), use of LLINs increased from 32% in 2010 to 57% in 2013. However, the main reason for this increase was a switch in use from insecticide-treated nets (ITNs) to LLINs. This indicator continues to be below the CNM target of LLIN use, thus further qualitative research is recommended to understand net preference and the reason some individuals continue to use untreated nets rather than LLINs.
- **Increased net use among forest-goers.** Of participants included in the household survey who reported sleeping overnight in the forest in the previous six months and who are resident in the targeted at-risk villages, the proportion reporting they used an ITN on their last trip to the forest increased moderately from 37% in 2010 to 43% in 2013. Use of any net on last visit to the forest has remained stable (74% in 2010, 72% in 2013), indicating increased use of ITNs/LLINs among those taking nets to the forest.
- **Decrease in the proportion of fevers attributable to malaria.** Of all participants in the household survey who reported experiencing fever, the proportion who described the fever as 'malaria-like' reduced from 7.5% in CMS 2010 to 0.9% in CMS 2013. This likely reflects a reduction in the burden of malaria, but also a perception among the population that malaria is a less likely cause of fever.

- **Need to revisit the behaviour change communication (BCC) strategy to address misconceptions and low knowledge indicators.** While knowledge that malaria is caused by mosquito bites is high, approximately 25% of respondents reported that malaria was related to not boiling water – similar to the proportions that reported that malaria was related to forest visits. Furthermore, while many respondents reported that sleeping under a mosquito net would prevent malaria, few reported specifically that treated nets would prevent malaria. Revision of BCC messaging to focus on treated mosquito nets and the added benefits of using ITNs is recommended.
- **Low reported use of village malaria workers (VMWs) for malaria diagnosis and treatment.** The low proportion of interviewed individuals who would visit a VMW for malaria testing or for advice and treatment is in sharp contrast with other national surveillance data that reveal high access to VMWs. Malaria Information System (MIS) data reveal that 44% of all confirmed malaria cases identified within the public health sector in Cambodia in 2013 were diagnosed by VMWs. In clusters in Domain 1 with VMWs in place since 2012 or earlier (26 clusters), 28.7% of householders identified VMWs as a location for malaria diagnosis. It is recommended to revise the questions for the next CMS to understand more about the qualitative factors relating to factors influencing where people choose to go for malaria diagnosis and treatment.

Net and drug outlet survey

- **Successful removal of oral artemisinin monotherapy from drug outlets.** While in the CMS 2010 85% of private drug outlets reported not selling oral artemisinin monotherapy, in the 2013 survey this had increased to 100% of outlets, a significant success for Cambodia.
- **Availability of malaria diagnostic testing services at most drug outlets, but few record malaria diagnoses.** Nearly three-quarters of surveyed drug outlets reported that they had malaria diagnostic testing services, although demand from clients for malaria testing is relatively low. If comprehensive data on all malaria diagnoses made nationally are to be available in the future as part of improved malaria surveillance, the proportion of private sector facilities and pharmacies maintaining records of malaria diagnosis must be improved, and these data should be reported in a systematic way.
- **Sale of untreated mosquito nets more common among net outlets than sale of LLINs or long-lasting insecticidal hammock nets (LLIHNs).** While a variety of nets were found to be on sale at the net outlets surveyed, a larger proportion of outlets sold conventional nets than LLINs or LLIHNs, with B52 nets being the most commonly sold. Few outlets sold LLIHNs, while more than half sold untreated hammock nets, even though untreated hammock nets were on average far more expensive than LLIHNs.

Table 0.1: CMS 2013 key Global Fund indicators

No.	Indicator as specified in Global Fund performance frameworks	Indicator as measured in CMS 2010/CMS 2013	CMS 2010 (total)		CMS 2013 (total)		CMS 2013: Domain 1		CMS 2013: Domain 2		
			% (N)	95% CI	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	P-value
	Household										
1.1	Malaria prevalence among residents and visitors in targeted at-risk villages*	% malaria positive – slides	0.9 (77)	0.6, 1.3	13	0.1 [0.1, 0.3]	7	0.2 [0.1, 0.6]	6	0.1 [0.0, 0.2]	Pr = 0.313
		% malaria positive – PCR	-	-	115	1.5 [0.7, 3.2]	71	2.2 [0.8, 5.9]	44	0.9 [0.5, 1.4]	Pr = 0.082
1.2	% of households living in targeted at-risk villages[1] with at least one ITN/LLIN	% households ITNs	74.7 (2,411)	66.8, 81.3	2,445	89.5 [85.9, 92.2]	1,291	90.5 [87.7, 92.7]	1,154	88.5 [81.3, 93.1]	Pr = 0.511
		% households LLINs	51.7 (1,677)	43.6, 59.6	2,407	87.9 [84.0, 93.0]	1,257	87.6 [83.4, 90.8]	1,150	88.2 [80.9, 93.0]	Pr = 0.854
1.3	% of households in targeted at-risk villages[1] that have sufficient treated mosquito nets (i.e. at least 1 ITN/LLIN for 2 persons)	% sufficient ITNs	37.7 (1,206)	32.3, 43.4	1,705	62.2 [57.4, 66.8]	919	63.6 [58.2, 68.7]	786	60.8 [52.7, 68.4]	Pr = 0.561
		% sufficient LLINs	22.8 (730)	18.3, 28.1	1,635	59.3 [54.1, 64.3]	867	59.4 [53.3, 65.2]	768	59.2 [50.8, 67.2]	Pr = 0.974
1.4	% population living in targeted at-risk villages who slept under ITN/LLIN previous night	% slept under an ITN									
		Total (risk categories 1-3)	52.6 (8,922)	46.3, 58.8	8,425	59.9 [55.6, 64.1]	4,189	59.5 [54.1, 64.8]	4,236	60.3 [53.5, 66.6]	Pr = 0.867
		Children <5 years (risk categories 1-3)	56.3 (1,005)	49.3, 63.2	891	63.3 [57.9, 68.4]	417	62.3 [54.4, 69.6]	474	64.1 [56.6, 71.0]	Pr = 0.738
		Pregnant women (risk categories 1-3)	59.1 (96)	48.9, 68.6	93	61.5 [52.1, 70.2]	37	62.5 [47.0, 75.7]	56	61.0 [49.0, 71.8]	Pr = 0.873
		% slept under a LLIN									
		Total (risk categories 1-3)	31.5 (5,366)	26.1, 37.4	8,083	57.3 [53.0, 61.5]	3,935	55.4 [50.3, 60.4]	4,148	59.1 [52.3, 65.6]	Pr = 0.377
		Children <5 years (risk categories 1-3)	34.5 (618)	28.3, 41.3	850	60.6 [55.2, 65.7]	386	57.5 [49.9, 65.0]	464	63.1 [55.6, 70.0]	Pr = 0.301
		Pregnant women (risk categories 1-3)	35.7 (55)	25.7, 47.2	88	57.7 [48.2, 66.7]	35	56.7 [39.7, 72.3]	53	58.3 [47.0, 68.8]	Pr = 0.874

Table 0.1: CMS 2013 key Global Fund indicators

No.	Indicator as specified in Global Fund performance frameworks	Indicator as measured in CMS 2010/CMS 2013	CMS 2010 (total)		CMS 2013 (total)		CMS 2013: Domain 1		CMS 2013: Domain 2		
			% (N)	95% CI	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	P-value
1.5	% population living in non-targeted at-risk villages[2] who slept under ITN during previous night	% population in risk category 4 slept under ITN	10.6 (284)	5.1, 20.6	905	35.6 [18.6, 57.1]	518	39.9 [16.7, 68.7]	387	30.5 [10.3, 62.8]	Pr = 0.626
1.6	% forest-goers living in targeted at-risk villages[1] who slept under ITN last time they were in forest	% forest-goers slept under ITN last night in forest	37.1 (471)	31.1, 43.5	382	48.7 [38.8, 58.6]	155	46.9 [32.3, 62.2]	227	49.9 [37.3, 62.5]	Pr = 0.770
1.7	% population living in targeted at-risk villages who had fever in previous 2 weeks and received antimalarial treatment according to national policy within 24 hours of onset of fever	% population with self-reported malaria fever (i.e. *krungjanh*) who sought treatment within 24 hours	38.8 (33)	25.3, 54.3	18	68.8	7	89.7	11	36.5	N/A
1.8	% target population who can explain how malaria is prevented through use of ITN	% respondents in risk category 1-3 stating ITN as prevention method against malaria	49.8 (1,524)	45.9, 53.7	1,269	47.2 [42.4, 52.1]	781	56.8 [49.6, 63.7]	488	37.6 [31.4, 44.1	Pr = 0.001

Notes: 1) Risk categories 1-3, less than two kilometres from the forest; 2) risk category 4, two kilometres or more from the forest.

Health facility survey

- **Need to increase knowledge of recommended first-line treatment for malaria.** Recommended treatment for *Plasmodium vivax* and *Plasmodium falciparum* has changed from the 2010 (CQ and AS-MQ, respectively) to the 2013 (DHA-pip or AS-MQ for both) survey periods. The treatment for *P. falciparum* is again in the process of changing, with draft revised National Treatment Guidelines for Malaria produced in January 2014. It is recommended that strategies to communicate changes in recommended first-line treatment to public and private HF staff be improved, since reported knowledge of the recommended drugs for *P. falciparum* and *P. vivax* were 65% and 48% in public facilities, but only 45% and 23% in the private facilities surveyed.

Background

Despite decreasing trends in malaria morbidity and mortality over the past decade, malaria remains a public health concern in Cambodia. In order to track the progress of the National Malaria Control Programme (NMCP) during the period of support from the Global Fund for AIDS, Tuberculosis and Malaria (Global Fund), Cambodia undertook a comprehensive and rigorous baseline survey in 2004, with subsequent national malaria surveys held in 2007 and 2010. These surveys were used as tools to monitor and evaluate the impact of the NMCP's activities on malaria prevalence and other impact and coverage indicators. Also in 2009, a survey in containment areas (Domains 1 and 2) was conducted to serve as a baseline for the evaluation of activities targeting artemisinin resistance and the knowledge and behaviour of mobile/migrant populations in relation to preventing and treating malaria.

Continuing funding from Global Fund will allow the NMCP to carry on with monitoring and evaluation. This is necessary to assess the impact of activities in the long term, including on antimalarial drug resistance and access to diagnosis and prevention. A national malaria survey for 2013 was therefore planned for under the Global Fund grant.

The Cambodia Malaria Survey (CMS) 2013 was financed under Global Fund single-stream funding (SSF) Phase II but addresses indicators beyond those under this mechanism. This was so it could cover different aspects of the NMCP, and enable the evaluation of activities included in the performance frameworks of the SSF consolidation (Global Fund Round 9 Phase I, Rolling Continuation Channel Round 2 and Affordable Medicines Facility – Malaria (AMFm)) national and regional indicators.

National programme goals and objectives

The NMCP has recently developed a new National Strategic Plan for Elimination of Malaria (2011-2025) as well as a Monitoring and Evaluation Plan that consolidates the objectives and indicators of current funding in the country.

The National Strategic Plan aims to ensure no artemisinin-resistant malaria parasites are detected in Cambodia by 2015 and to achieve elimination of *Plasmodium falciparum* malaria by 2020 and of *Plasmodium vivax* malaria by 2025

The National Strategic Plan includes the following objectives:

1. To ensure universal access to early malaria diagnosis and treatment services with an emphasis on detection of all malaria cases (including among mobile/migrant populations) and ensure effective treatment including clearance of *P. falciparum* gametocytes and dormant liver stage of *P. vivax*.
2. To halt drug pressure for selection of artemisinin-resistant malaria parasites by improving access to appropriate treatment and preventing use of monotherapies and substandard drugs in both public and private sectors.
3. To ensure universal access to preventive measures and specifically to prevent transmission of artemisinin-resistant malaria parasites among target populations (including mobile/migrant populations) through mosquito control, personal protection and environmental manipulation.
4. To ensure universal community awareness and behaviour change among the population at risk, support the containment of artemisinin-resistant parasites and eliminate all forms of malaria through comprehensive behaviour change communication (BCC), community mobilisation and advocacy.
5. To provide effective management (including information systems and surveillance) and coordination to enable rapid and high-quality implementation of the elimination strategy.

Purpose and objectives of the Cambodia Malaria Survey 2013

The main purpose of the CMS 2013 was to assess the performance and impact of malaria control activities in Cambodia, with monitoring and evaluating activities funded by Global Fund as well as the Containment Project. The objectives of the survey were to:

1. Update the malaria epidemiological situation and assess whether malaria prevalence had declined since the previous CMS (in 2010)
2. Determine coverage of key interventions
3. Track key knowledge, attitude, behaviour and practice indicators to assess the outcomes of BCC strategies
4. Assess current strategies for malaria control and improve those for malaria elimination
5. Contribute to the refinement of malaria risk stratification in the context of malaria elimination
6. Assess strategic and operational options and recommend mid-course corrections and improvements where needed

This survey was not nationwide, as malaria transmission rates are heterogeneous. It focused on populations at the highest risk, stratifying first by domains (Domain 1: western provinces where containment activities took place; Domain 2: southern and eastern provinces) and then by distance from the forest,[1] in the same 20 at-risk provinces sampled in the CMS 2010. As with the previous survey, the survey excluded four provinces/municipalities (Kandal, Prey Veng, Svay Rieng and Phnom Penh) as they were not considered to be at risk of malaria.

The methodology for the CMS 2013 was based largely on the protocols used in 2010 and 2007. Data collection took place at the end of the rainy season, between October and November (peak malaria transmission time), as in the 2010, 2007 and 2004 surveys. Results from this survey were designed to be comparable with those from previous surveys.

1 Distance to forest was defined according to forest cover in 2007.

The CMS 2013 had four components:

1. A household survey, including a *Plasmodium* prevalence survey (3,280 households sampled within 82 villages)
2. An outlet (drugs and nets) survey linked to the household survey (four outlet interviews per village)
3. A health facility (HF) survey (31 public and 31 private HFs within the 20 at-risk provinces)
4. A patient exit and client satisfaction survey (to be completed through the HF survey)

National and regional indicators

Where possible, the CMS 2013 aimed to address the key indicators against which the NMCP is required to report, including national and regional indicators as well as Global Fund and other project-based indicators. The following are some of the outcome and process indicators.

Global Fund Round 9/SSF consolidated performance framework

- Malaria prevalence among residents and visitors in targeted at-risk villages
- Percentage of households in targeted at-risk villages with at least one insecticide-treated net (ITN)/long lasting insecticidal net (LLIN)
- Percentage of households in targeted at-risk villages with sufficient treated mosquito nets (i.e. at least one ITN/LLIN for two persons)
- Percentage of population living in targeted at-risk villages sleeping under an ITN/LLIN the previous night
- Percentage of population living in non-targeted at-risk villages sleeping under an ITN during the previous night
- Percentage of forest-goers living in targeted at-risk villages sleeping under an ITN the last time they were in the forest
- Percentage of households more than two kilometres from the forest (risk category 4) buying a conventional net 'bundled' with a SuperMalatab insecticide kit and then treating the net
- Percentage of population living in targeted at-risk villages suffering from fever in the previous two weeks and receiving antimalarial treatment according to national policy within 24 hours of the onset of fever
- Percentage of target population able to explain how the use of ITNs prevents malaria

Regional Mekong malaria monitoring and evaluation framework

- Percentage of households in endemic areas with at least one ITN/LLIN and/or sprayed by indoor residual spraying (IRS) in the previous 12 months
- Percentage of at-risk population knowing the causes and symptoms of and the treatment or preventive measures for malaria

- Percentage of individuals in areas at high risk of malaria sleeping under an ITN/LLIN the previous night
- Percentage of individuals residing in areas at risk of malaria with fever in the previous two weeks who sought health care within 24 hours of the onset of fever (same or next day)
- Percentage of facilities without stockouts of first-line antimalarial medicines and diagnostics during the previous 12 months

Core indicators to be collected during CMS 2013

Household survey

- Malaria prevalence (by microscopy and polymerase chain reaction (PCR)) among residents and visitors
- Percentage of individuals residing in areas at risk of malaria with fever in the previous two weeks who sought health care within 48 hours of the onset of fever (same or next day)
- Percentage of individuals presenting to a health worker in the previous two weeks with fever receiving antimalarial treatment according to national policy, disaggregated by probable/confirmed *Plasmodium* infection, species, age less than five years, other age/sex groups, public and private sector, within 24 hours/48 hours of onset of fever and simple and severe malaria
- Percentage of individuals presenting to a health worker in the previous two weeks with fever who had a finger prick for malaria testing, disaggregated by age and sex groups, public and private sector, etc.
- Percentage of households at risk of malaria in targeted villages with at least one ITN (conventional treated net or LLIN) and/or sprayed by IRS in the previous 12 months
- Percentage of households in targeted at-risk villages[2] that have sufficient treated mosquito nets (i.e. at least one ITN/LLIN for two persons)
- Percentage of population at risk of malaria living in targeted villages sleeping under an ITN (conventional treated net, LLIN or long-lasting insecticidal hammock net (LLIHN)) during the previous night
- Percentage of population living in villages located between two and five kilometres from the forest sleeping under an ITN (conventional treated net, LLIN or LLIHN) during the previous night
- Percentage of forest-goers in targeted villages reporting sleeping under an ITN (conventional treated net, LLIN or LLIHN) the last time they slept in the forest
- Percentage of target able to explain how the use of ITNs prevents malaria
- Percentage of population at risk knowing the cause and symptoms of and the treatment or preventive measures for malaria

2 Located less than two kilometres from the forest.

Drug outlets

- Percentage of private drug sellers aware of appropriate malaria diagnosis and treatment
- Percentage of drug sellers selling and/or testing with rapid diagnostic tests (RDTs) when clients ask for a malaria test
- Percentage of drug sellers aware of National Treatment Guidelines for Malaria and stating the correct drug treatment
- Percentage of private sector outlets in endemic provinces not selling artemisinin monotherapy
- Percentage of drug outlets with subsidised drugs in stock, disaggregated by Malarine/AMFm drug, etc.
- Percentage of private drug sellers recommending the appropriate malaria treatment

Net outlets

- Percentage of surveyed outlets that stock bundled nets (penetration %)

Health facilities

- Percentage of HFs offering basic malaria care services (malaria diagnosis, treatment, referral, health education and ITNs)
- Percentage of HFs with all malaria-responsible staff present in surveyed HF/ engaged in fieldwork on the day of the survey
- Percentage of HFs with all four essential supplies to diagnose/prevent malaria in HF on the day of the survey (thermometer, RDTs, microscope, slides and reagents)
- Percentage of HFs with first-line medications for malaria on the day of the survey
- Percentage of HFs with up-to-date clinical/laboratory records of malaria cases
- Percentage of HFs with up-to-date stock records
- Percentage of HFs in which interviewed health worker reported receiving in- or pre-service training in malaria in the previous 12 months
- Percentage of HFs receiving malaria programme-related supervision at least once in the previous three months (supervision includes one or more of the following: checked records or reports, checked supplies, observed work, provided feedback, gave praise, provided updates, discussed problems)
- Number and percentage of HFs with microscopy and/or RDT capability
- Percentage of HFs in which health worker carries out all four key assessment tasks (take history of fever and travel, record temperature, check presence of danger signs, perform RDT or take a blood slide and examine under a microscope); indicator assessed through patient exit interview

- Percentage of HFs in which health worker prescribed an antimalarial to the patient or caretaker of a child and can correctly describe how to administer the drug
- Number and percentage of HFs with no reported stockouts of nationally recommended antimalarial drugs (artemisinin-based combination therapy (ACTs) lasting more than one week at any time during the previous three months
- Number and percentage of HFs with no reported stockouts of RDTs lasting more than one week at any time during the previous three months

Survey methodology

The CMS 2013 comprised four components:

1. A household survey, including a *Plasmodium* prevalence survey (targeting 3,280 households within 82 villages)
2. An outlet (drugs and nets) survey linked to the household survey (four outlet interviews per village)
3. An HF survey (31 public and 31 private health facilities within the 20 at-risk provinces)
4. A patient exit and client satisfaction survey (to be completed through the HF survey)

The combination of four surveys was required because addressing the survey objectives required multiple target groups. These surveys used a combination of techniques to estimate specific indicators and assess the provider/user situation. Figure 0.1 shows the different components of the CMS 2013.

The household survey provided information about current knowledge, behaviour and practices of people in villages at risk of malaria in prevention and treatment. It also estimated the prevalence of *Plasmodium* infection and malaria illness using a malariometric survey at household level. In addition, it collected blood samples on a pre-cut filter, which were used for 1) molecular detection and species identification for malaria measures; and 2) seroprevalence analysis, with remaining blood spots stored for future screening of potential molecular markers and genotyping for drug resistance.

The drug outlet/net outlet survey was conducted to assess whether outlets were providing adequate treatment and prevention to the community. It recorded brands and types of antimalarial medicines, diagnostics and mosquito nets for all outlets in the survey.

The survey of public and private HFs providing malaria services in endemic areas provides an overview of malaria-related health care services in target provinces and assesses the capacity of HFs to provide appropriate diagnosis and treatment of malaria. The survey included an audit of malaria-related services, including availability of antimalarial medicines, treatment guidelines, trained health workers and laboratory diagnostic capacity. There were also

exit interviews with current fever cases and follow-up interviews with current or recent malaria cases, tracked down to their home/work location. A client satisfaction survey (part of the HF survey) gathered information on the quality of health services from the client's perspective.

Similar to previous rounds of the CMS (in 2004, 2007 and 2010), data collection for all components took place after the rainy season, between October and November 2013.

It should be noted that, owing to logistical constraints, CMS sampling may not capture the most remote settings. This may potentially lead to bias in the interpretation of indicators for interventions targeted at hard-to-reach areas (e.g. the Village Malaria Worker programme).

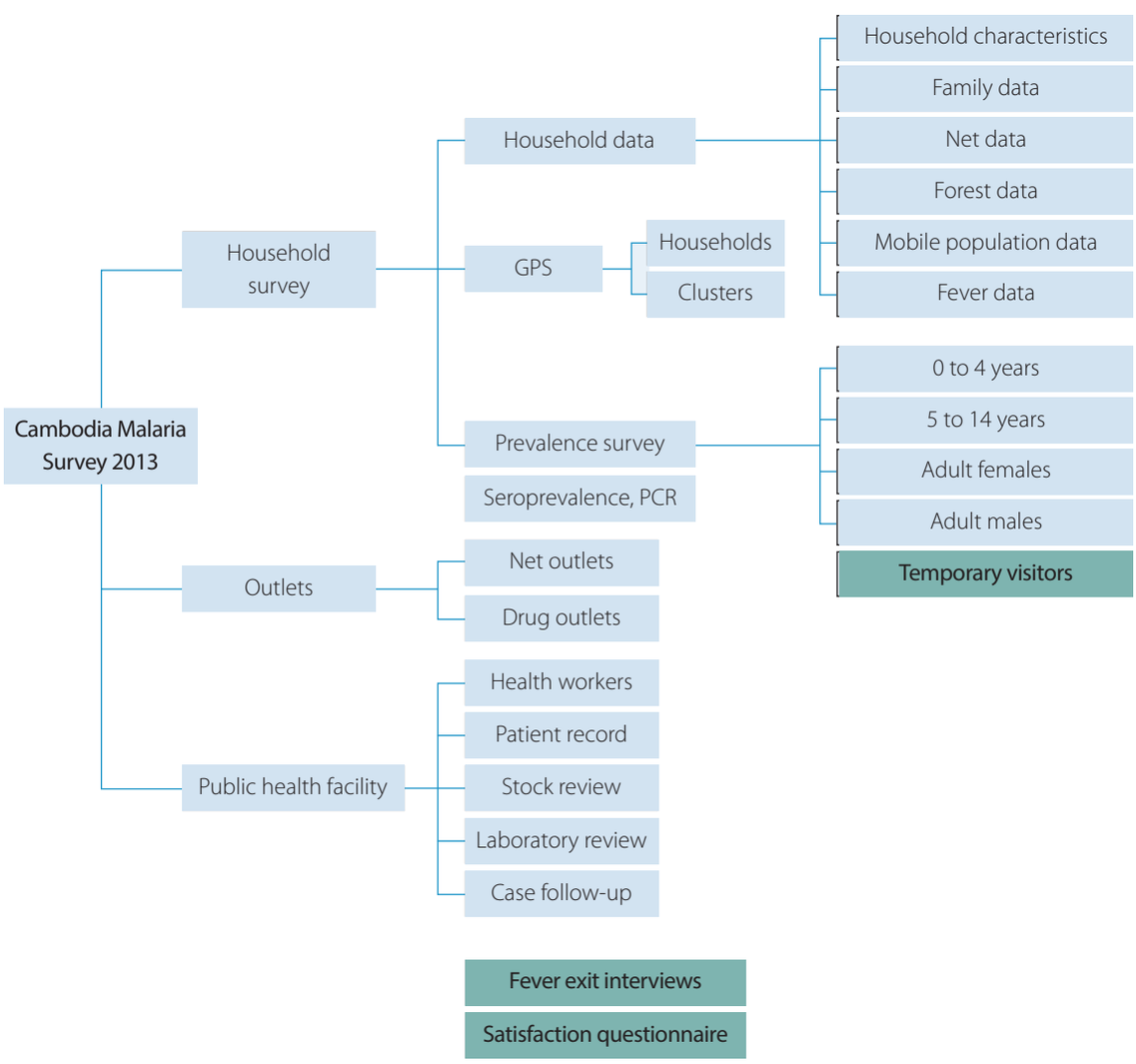

Figure 0.1: Components of the Cambodia Malaria Survey 2013

Study site, geographical domains and risk stratification

The sampling universe for this survey was modified from that used in 2004 and 2007 but remained consistent with that used in the CMS 2010. Domains were defined in the same way as in 2010: Domain 1 includes provinces in western Cambodia (Containment Zones 1 and 2) and Domain 2 provinces in eastern and southern Cambodia that previous surveys showed to have higher than malaria prevalence (Table 0.2). Figure 0.2 presents these domains in a map.

In line with the CMS 2010 and based on the estimated distance from the forest, four strata were used to categorise at-risk villages. Most villages in risk categories 1-3 are located less than two kilometres from the forest and have been targeted for interventions through the public health sector. Risk category 4 is beyond two kilometres from the forest and will be targeted by interventions through the private sector.

Study design and sample size

Household survey

The household survey design was multi-stage, first sampling clusters, then households within each cluster and then individuals within each household. The sample size was estimated to be 1,682 households in Domain 1 and 1,606 in Domain 2. This is based on the following assumptions: 1) a reduction in parasitaemia of 30% since the CMS 2010; 2) a design effect of 2.0; 3) 80% power; and 4) 5% non-response. To achieve this sample, 42 and 40 clusters were selected from Domains 1 and 2, respectively. It was assumed each cluster would consist of a single village, since most villages have at least 40 households.

The sample design for the household survey was non self-weighting, and analysis was adjusted using the appropriate weights for households and individuals, respectively.

Table 0.2: Distribution of provinces in the two geographical domains

Domain 1 (western – containment areas)	Domain 2 (eastern and southern)
Banteay Meanchey	Kampong Cham
Battambang	Kampong Chhnang
Kampong Speu	Kampong Thom
Kampot	Kep
Koh Kong	Kratie
Oddar Meanchey	Mondulkiri
Pailin	Rattanakiri
Preah Vihear	Sihanoukville
Pursat	Stung Treng
Siem Reap	Takeo

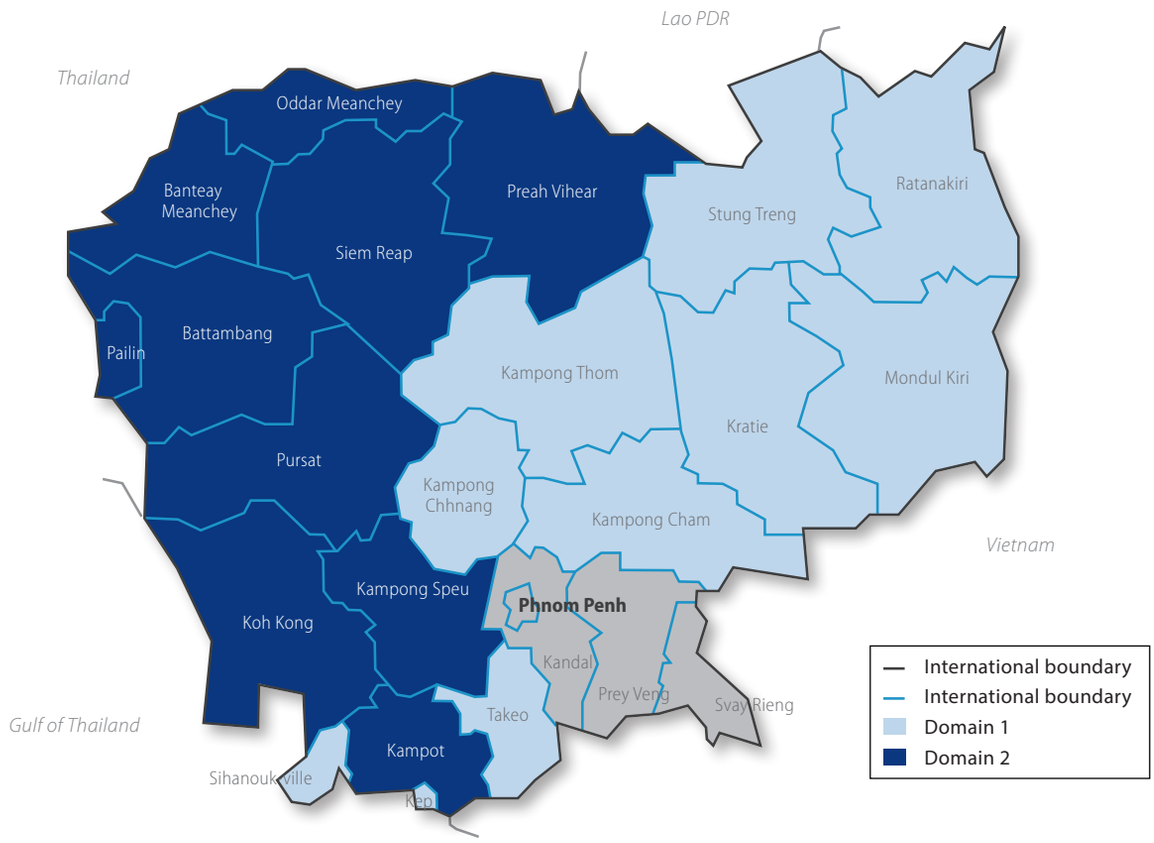

Figure 0.2: Map of CMS 2013 domains

Within each cluster, 40 households to be sampled were randomly selected from a list of all registered and unregistered families in the village. This list was obtained from the village chief on arrival in the cluster, with additional information provided by village health volunteers (VHVs), village malaria workers (VMWs) and mobile malaria workers (MMWs).

A questionnaire was administered to a respondent in each selected household. Whenever possible, the person interviewed was a female head of household. Questions addressed household composition, characteristics and assets, net use, treatment-seeking, knowledge of malaria transmission and prevention, exposure to BCC messages, forest-related activities and travel amongst permanent and temporary visitors.

Malaria prevalence survey

A finger prick blood sample was taken from a subsample of four individuals in the household, with one person randomly sampled from each of the following groups: 1) aged under five years; 2) aged 5-14 years; 3) adult female (15 years and above); and 4) adult male (15 years and above), to compare malaria risk in these groups. A household survey blood sample sheet was used to record samples taken and included in the household questionnaire.

Blood slides were prepared for microscopy, and two dried blood spots were collected on filter paper for PCR and serology. Pregnant women in the household

were invited to provide a blood sample regardless of whether they were the adult female randomly selected to provide blood in their household. Blood samples were also taken from temporary visitors to the household: up to four people per household were randomly selected from this group. Additionally, if any persons in the household appeared to be symptomatic for malaria (fever), they were given an RDT. Those with a positive result were treated with the appropriate antimalarial drug according to the current antimalarial treatment policy in Cambodia.

Microscopic examination of Giemsa-stained blood smears was performed to determine the presence of *Plasmodium* parasites in survey participants. An extensive training and quality assurance programme was implemented to ensure the accuracy of microscopy data. Blood-takers were trained in smear preparation and staining procedures, and microscopists were required to pass a blinded practical qualifying examination before reading smears obtained from the survey. A senior microscopist at CNM rechecked all smears these readers judged positive, having been blinded to the results of the first reader. Additionally, a senior microscopist double-checked 10% of all smears the first microscopist judged negative. In both cases, the senior microscopist's reading was used in the event of non-concordance with the first reader.

Drug outlet and net outlet surveys

For each selected household survey cluster, two drug outlets and two net outlets serving the village were sampled; these could be located within the cluster or in the nearest/most easily accessible town. On arrival in the village, the field staff compiled a list of all of the outlets that sold antimalarial drugs and mosquito nets. This information was sourced from national and provincial lists as well as interviews with VMWs and other malaria workers/volunteers at the community level, village/commune chiefs and/or health care workers. The fieldworkers also walked around the market to find any outlets missed through the previous sources.

A structured questionnaire was used to document details of the outlet and the respondent. From drug outlets, information on sales and stock management of ACTs, other antimalarials and RDTs was recorded, together with knowledge of the national drug policy for malaria and common dispensing practice. Awareness of ongoing activities to contain artemisinin resistance and banned oral artemisinin monotherapies was also noted, as well as referral practices for potential severe malaria cases.

In mosquito net outlets, stock and sales were recorded for LLINs, conventional nets, nets bundled with Super Malatab and insecticides. Specific details were asked on the brand of net usually sold, the current stock held, cost price and sale price, source of net stocks and frequency of supply. Information was recorded separately for hammock nets.

Health facility survey

A total of 62 HFs were sampled, split equally between public and private facilities. This sample size assumes 80% of public facilities to be fully functioning, with

25% precision and a design effect of 2.0. Public health facilities were sampled from within two incidence strata: 1) ≥14 malaria cases per week; and 2) <14 cases per week, as well as by facility type (health centre, former district hospital and referral hospital).

Lack of a structured list of private HFs in Cambodia meant the sampling of private facilities was paired with that of sampled public facilities. At each public HF, a geographical assessment of neighbouring private facilities (polyclinics and cabinets) was compiled, with one private facility then sampled per sampled public health facility. To avoid bias from neighbouring facilities, private facilities were selected only if they were more than five kilometres from the public health facility.

Structured observations of health workers at HFs in Cambodia are constrained by the small number of malaria cases health workers manage on a daily basis. However, since it is important to assess the delivery of services to malaria cases within the public HF system, exit interviews with all fever cases were used as a proxy measurement. Up to 20 interviews were conducted in each facility. It was envisaged that each sampled HF would be visited for a maximum of five days or until the number of fever cases required was met. Because of difficulties obtaining sufficient numbers of malaria cases, patient records were examined for the two months prior to the visit in each HF, with details of the most recent 20 malaria cases recorded and a follow-up interview conducted at their home/work location where feasible.

Fieldwork process

Household and outlet component

The sampling design is 82 clusters, split between Domains 1 and 2.

82 clusters x 40 households/cluster = 3,280 households

Seven teams were used to conduct all household and outlet surveys in the 20 provinces. It was planned that each team would visit a cluster for two days and one night (to avoid bias from people absent during the day and to ensure all blood samples were taken). Therefore, each team would complete three to four clusters per week.

82 clusters @ 3 clusters per week = approximately 27 team weeks

Each team for the household and net/drug outlet components included 13 members, as follows:

- One survey supervisor
- Four household interviewers
- One supervisory technician
- Four blood-takers
- One outlet interviewer
- Two drivers

The four household interviewers also had to be able to interview six to eight households per day. The outlet interviewer visited one drug and one net outlet in the selected cluster, plus one drug and one net outlet in the nearest market or town. For seven teams of 13 field workers, it was calculated that the survey would be complete within approximately five calendar weeks. The survey team revisited households where individuals were absent during the initial visit up to a maximum of three times, to ensure all household members were able to provide a blood sample. The team also collected global positioning system (GPS) coordinates for a central point in the village.

Health facility component

The HF sample included 31 public health facilities (referral hospitals, former district hospitals and health centres) and 31 private health facilities (polyclinics and cabinets).

31 public + 31 private = 62 health facilities

The HF survey team included five members, as follows:

- One survey supervisor
- One HF interviewer
- One HF exit interviewer
- One follow-up interviewers
- One driver

Each team was expected to complete three health facilities per week. Therefore, to survey 62 health facilities required approximately 21 team weeks. Thus, five teams were recruited to complete the HF survey component during a total of four calendar weeks.

Ethical considerations

Individual informed consent was sought from all respondents before interviews were conducted. Before each interviewee was asked to provide consent, the interviewer gave a brief description of the study objectives, data collection procedure, expected benefits and possible risks, as well as the voluntary nature of participation at all stages of the interview. Assurances were given to all participants that data would be kept private and confidential.

Community consent was obtained by holding a meeting with village and commune leaders prior to the scheduled visit to the study villages, informing them of the purpose and procedures involved and obtaining their agreement.

Qualified staff collected blood during the household survey according to standard operating procedures, using a single-use lancet. The head of household gave consent for blood sampling of individuals within their household, and all individuals aged over 16 also gave verbal assent to provide blood. Individuals with fever during the survey were tested with an RDT, to provide on-the-spot diagnosis of malaria. Any person with positive RDT result was treated

according to national guidelines. No subsequent follow-up of individuals found to be positive by microscopy or PCR was possible.

Sample weights

Within each domain, the sampling of clusters was non-proportional across risk categories, so the sample data for the household survey are not self-weighting. All household survey analysis presented (unless otherwise stated) accounts for sample weights within each domain together with adjustment for clusters and sampling strata (i.e. risk category strata).

In addition, the prevalence survey, where individuals were sampled for four different age and sex groups (under five, 5-14 years, males 15 and above, females 15 and above), required additional weighting. Analysis presented of prevalence survey accounts for these individual weights. One-third of villages in Cambodia are currently at risk of malaria. The sampling frame included 4,846 at-risk villages (2008 Census population 3,729,962) out of 14,717 total villages in Cambodia.

Data processing and analysis

All survey data were entered using EpiData 3.1 (EpiData Association, Odense, Denmark), with the exception of slide readings, which were recorded in Microsoft Excel (Microsoft Corporation, Seattle, WA, US). Double entry was conducted for all collected data, with appropriate verification and validation completed. Data were transferred to Stata 12.0 (StataCorp, College Station, TX, US) for data processing and analysis.

After initial data cleaning and consistency checks, data were recoded and key indicators generated using predefined definitions. After recoding, all household data were adjusted for study design – that is, clustering, sample strata and sample weights at individual and household level – as appropriate. Analysis focused on key indicators providing overall estimates by background characteristics including domain, risk category and socioeconomic status. Where possible, indicators presented were comparable with the CMS 2010 and previous surveys. Sample weights were not applied to the outlets and health facility data.

A wealth index was obtained for each household in the survey based on household characteristics and assets using principal components analysis (PCA). Households were then classified into wealth index quintiles, which described the summary socioeconomic groups. Wealth quintiles were calculated separately for each domain. The household quintile was applied to an individual within that household for any individual-level analyses.

Results

Household and outlet surveys

Part 1: Background and demographics

A total of 3,286 households were visited and interviewed in the CMS 2013 survey, with 2,726 of these located in targeted villages less than two kilometres from the forest (risk categories 1-3).

All basic demographic characteristics were similar in Domains 1 and 2, and no statistical evidence was found for a difference in key indicators of overnight forest visits, travel away from home or household ownership of nets was seen between domains.

Demographic information from sampled households indicates that more than half of the individuals identified as travellers (sleeping away from home in the previous six months) were adult males. Similarly, 79% of those identified as sleeping overnight in the forest in the previous six months were adult males.

Table 1.1a: Denominators for household and sampled individuals, risk categories 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Households[1]	**3,286**		**1,702**	**52.6 [48.9, 56.2]**	**1,584**	**47.4 [43.8, 51.4]**
People in households	**16,698**		**8,289**	**50.2 [46.2, 54.3]**	**8,409**	**49.8 [45.8, 53.8]**
Age/sex						
Under 5 years	1,602	9.4 [8.8, 10.1]	750	8.8 [8.0, 9.6]	8,52	10.1 [9.1, 11.2]
5 to 14 year olds	3,886	23.0 [21.9, 24.0]	1,939	22.9 [21.6, 24.3]	1,947	23.0 [21.4, 24.7]
Male adults, 15+ years	5,350	32.2 [31.4, 33.0]	2,664	32.3 [31.3, 33.4]	2,686	32.0 [30.9, 33.2]
Female adults, 15+ years	5,860	35.4 [34.5, 36.4]	2,936	36.0 [34.8, 37.2]	2,924	34.9 [33.4, 36.4]
Currently pregnant (% of all eligible women)	**173**	**2.9 [2.4, 3.4]**	**75**	**2.6 [2.0, 3.5]**	**98**	**3.1 [2.5, 3.8]**
Household nets						
Any type of mosquito net	3,275	99.7 [99.5, 99.9]	1,699	99.9 [99.6, 100.0]	1,576	99.5 [99.0, 99.8]
ITN[2]	2,708	77.8 [69.7, 84.2]	1,450	79.5 [66.7, 88.3]	1,258	75.8 [65.0, 84.1]
LLIN[3]	2,649	75.4 [66.6, 82.5]	1,400	75.6 [61.5, 85.8]	1,249	75.1 [64.1, 83.6]

Table 1.1a: Denominators for household and sampled individuals, risk categories 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
People who go to forest and sleep overnight (past 6 months)	879	5.1 [4.2, 6.2]	378	4.9 [3.6, 6.5]	501	5.4 [4.1, 7.0]
People who travel and sleep away from home (past 6 months)	3,906	23.2 [21.4, 25.1]	2,013	24.4 [22.0, 27.0]	1,893	22.0 [19.5, 24.7]
Temporary visitors in the household	167	1.0 [0.7, 1.5]	101	1.2 [0.7, 2.0]	66	0.8 [0.5, 1.3]
People in households who reported fever in the previous two weeks	1,657	9.9 [8.8, 11.1]	810	9.6 [8.5, 10.7]	847	10.3 [8.5, 12.4]
Blood samples taken for slide/PCR[4]	8,613		4,492		4,121	
Risk category[5]						
1 (<500m)	1,246	26.7 [23.2, 30.4]	622	27.7 [22.3, 33.8]	584	25.5 [21.5, 29.8]
2 (500m-<1km)	800	24.2 [21.6, 27.1]	400	18.5 [15.6, 21.8]	400	30.6 [26.3, 35.2]
3 (1km-<2km)	680	18.1 [16.3, 20.0]	360	20.0 [17.8, 22.4]	320	16.0 [13.2, 19.2]
4 (≥2km)	560	31.0 [27.3, 35.0]	280	33.7 [28.4, 39.5]	280	28.0 [23.1, 33.5]
SES group						
Q1 (poorest)	657	20.4 [16.5, 25.1]	341	20.9 [15.8, 27.2]	316	19.9 [14.3, 27.2]
Q2	655	21.0 [18.3, 24.0]	340	21.0 [18.0, 24.4]	315	20.9 [16.5, 26.2]
Q3	656	20.7 [18.6, 23.0]	341	21.5 [18.7, 24.6]	315	19.8 [16.8, 23.2]
Q4	655	20.1 [16.7, 23.9]	340	19.4 [15.8, 23.5]	315	20.8 [15.2, 27.8]
Q5 (least poor)	655	17.8 [13.4, 23.3]	340	17.2 [12.1, 24.0]	315	18.5 [11.7, 28.0]

Notes: SES = socioeconomic status; CI = confidence interval. 1) All data are for risk categories 1-4; 2) ITN includes recently treated and LLINs; 3) LLIN includes both bed and hammock nets; 4) three individuals with PCR results but no slide data, and 12 with slide data but no PCR; 5) proxy measure for distance from forest and risk of local transmission of malaria; called 'risk zone' in the CMS 2007 and the 2004 baseline survey.

Among those individuals who reported being forest-goers, more than half had visited the forest in the previous month. Over a quarter of individuals reported that they had spent more than 10 nights sleeping in the forest; in Domain 1 this proportion increased to more than one-third.

However, working in the forest was not the most common reason for individuals to travel away from home. Working on a *chamkar* (farm) or plantations and visiting relatives were more commonly reported reasons for travel. The majority of individuals reported that they travelled infrequently, with only one or two trips in the previous three months.

Temporary visitors represented a very small proportion of individuals surveyed, and the small number of respondents limits the interpretation of the characteristics of these visitors. Almost half of the visitors were unsure of the length of their stay, and more than 90% of these temporary visitors reported that they had also visited another country in the same year, demonstrating the transient and highly mobile nature of this subpopulation.

Table 1.1b: Denominators for outlets and health facilities

	Total	Domain 1	Domain 2
	N (%)	N (%)	N (%)
Drug outlets[1]	79	41 (51.9)	38 (48.1)
Mosquito net outlets	82	43 (52.4)	39 (47.6)
Health facilities			
Public	31	17 (54.8)	14 (45.2)
Private	31	17 (54.8)	14 (45.2)
Follow-up interviews (public only)	48[2]	28 (58.3)	20 (41.7)
Exit interviews	809	475 (58.7)	334 (41.3)
Public	364	230 (63.2)	134 (36.8)
Private	445	245 (55.1)	200 (44.9)

Notes: 1) Located in or near the selected clusters for all four risk zones; 2) not including refusals and patients lost to follow-up.

Table 1.2: Age and sex distribution of residents, visitors, travellers and forest-goers, risk categories 1-4

	Total	<5 years		5-14 years		15+ years, male		15+ years, female	
	N	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Residents	16,531	1,583	9.4 [8.8, 10.1]	3,868	23.1 [22.0, 24.2]	5,292	32.1 [31.3, 32.9]	5,788	35.4 [34.4, 36.4]
Visitors[1]	167	19	10.0 [5.5, 17.4]	18	11.5 [7.3, 17.6]	58	38.8 [28.6, 50.1]	72	39.8 [31.2, 49.0]
Travellers[2]	3,906	147	3.2 [2.5, 4.1]	287	7.0 [5.8, 8.5]	2,165	55.8 [53.7, 57.8]	1,307	34.0 [32.2, 35.8]
Forest-goers[3]	879	26	2.8 [1.6, 4.8]	28	2.9 [1.8, 4.8]	681	78.7 [72.7, 83.6]	144	15.6 [12.2, 19.7]
Domain 1									
Residents	8,188	739	8.8 [8.0, 9.6]	1,924	23.0 [21.7, 24.4]	2,631	32.3 [31.2, 33.3]	2,894	36.0 [34.7, 37.2]
Visitors	101	11	8.3 [4.0, 16.1]	15	14.8 [10.0, 21.4]	33	40.1 [25.6, 56.6]	42	36.8 [25.4, 50.0]
Travellers	2,013	80	3.3 [2.3, 4.7]	155	7.3 [5.7, 9.2]	1,095	54.9 [51.8, 58.1]	683	34.5 [31.9, 37.1]
Forest-goers	378	10	2.9 [1.2, 6.8]	12	3.3 [1.7, 6.2]	302	79.8 [69.0, 87.5]	54	14.0 [8.9, 21.5]
Domain 2									
Residents	8,343	844	10.1 9.1, 11.2]	1,944	23.1 [21.5, 24.8]	2,661	32.0 [30.8, 33.1]	2,894	34.8 [33.3, 36.3]
Visitors	66	8	12.5 [5.1, 27.6]	3	6.6 [1.8, 21.3]	25	36.8 [25.2, 50.1]	30	44.1 [33.7, 55.1]
Travellers	1,893	67	3.2 [2.2, 4.5]	132	6.8 [5.0, 9.1]	1,070	56.7 [53.9, 59.4]	624	33.4 [30.8, 36.1]
Forest-goers	501	16	2.7 [1.4, 5.2]	16	2.6 [1.2, 5.5]	379	77.6 [70.7, 83.2]	90	17.1 [13.2, 21.9]

Notes: 1) Temporary visitors in the household at the time of the survey (risk categories 1-4); 2) people who travel and sleep away from the home during the past 6 months (risk categories 1-4); 3) people who go to the forest and sleep there overnight during the past 6 months (risk categories 1-4).

Table 1.3: Details for forest goers, risk categories 1-4

	Total		Domain 1		Domain 2		P-value
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Total forest-goers	879	100	378	100	501	100	
Last visit to the forest							
Last night	28	3.4 [2.1, 5.5]	13	2.9 [1.3, 6.3]	15	3.8 [2.0, 7.1]	
<1 week	239	26.2 [20.9, 32.4]	99	22.9 [15.5, 32.5]	140	29.2 [21.9, 37.7]	
1-< 4 weeks	239	26.5 [21.2, 32.7]	118	28.9 [20.8, 38.7]	121	24.4 [17.4, 33.0]	Pr = 0.074
≥4 weeks	357	41.7 [35.4, 48.2]	147	45.2 [36.3, 54.3]	210	38.5 [30.2, 47.5]	
Not sure	16	2.2 [0.9, 5.4]	1	0.1 [0.0, 0.4]	15	4.1 [1.7, 9.9]	
Nights in the forest							
1-2	185	21.8 [16.3, 28.5]	87	21.4 [13.8, 31.5]	98	22.1 [14.8, 31.6]	
3-5	213	23.0 [17.4, 29.6]	78	18.0 [11.1, 28.0]	135	27.4 [19.6, 36.9]	
6-10	193	21.7 [17.1, 27.1]	78	18.5 [11.8, 27.8]	115	24.6 [19.4, 30.6]	Pr = 0.171
>10	272	31.7 [23.4, 41.5]	128	39.7 [25.7, 55.7]	144	24.5 [16.5, 34.7]	
Not specified	16	1.9 [0.8, 4.5]	7	2.3 [0.6, 8.9]	9	1.4 [0.7, 3.1]	

Table 1.4: Details of travellers, risk zones 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
	3,906	100	2,013	100	1,893	100
Last travelled away from home						
Last night	110	3.1 [2.1, 4.6]	47	2.6 [1.4,4.6]	63	3.8 [2.3, 6.2]
<1 week	836	20.3 [17.6, 23.4]	400	18.8 [15.2, 23.1]	436	22.0 [18.1, 26.5]
1-<4 weeks	1,040	25.5 [22.6, 28.6]	582	27.3 [23.4, 31.7]	458	23.4 [19.3, 28.0]
≥4 weeks	1,831	48.6 [44.5, 52.8]	943	49.3 [43.9, 54.8]	888	47.9 [41.6, 54.2]
Not specified	89	2.4 [1.6, 3.6]	41	1.9 [1.1, 3.5]	48	3.0 [1.7, 5.0]
Reasons for travel						
Work in forest	342	8.9 [6.9, 11.4]	130	6.3 [3.8, 10.3]	212	11.7 [8.8, 15.5]
Work on *chamkar*/plantation	918	22.8 [17.7, 29.0]	291	14.3 [8.8, 22.4]	627	32.4 [24.5, 41.5]
Visit relatives	552	13.1 [10.8, 15.8]	325	14.1 [10.7, 18.4]	227	12.0 [9.3, 15.3]
Other	1,512	40.0 [34.1, 46.2]	805	42.4 [32.8, 52.7]	707	37.3 [31.7, 43.2]
Trips away from home past 3 months						
1-2	2,689	69.5 [66.1, 72.8]	1,500	74.8 [70.5, 78.6]	1,189	63.7 [58.1, 69.0]
3-5	669	17.2 [14.6, 20.0]	267	13.8 [10.4, 18.1]	402	20.9 [17.4, 25.0]
6-10	221	5.2 [4.0, 6.8]	95	4.2 [3.0, 5.9]	126	6.3 [4.3, 9.3]
>10	95	2.4 [1.9, 3.1]	30	1.4 [0.9, 2.2]	65	3.5 [2.5, 4.8]
Not specified	232	5.7 [4.5, 7.0]	121	5.8 [4.4, 7.6]	111	5.6 [3.9, 7.8]
Countries visited in 2013						
Laos, Thailand, Vietnam	811	21.4 [15.7, 28.5]	594	30.2 [19.9, 42.9]	217	11.6 [8.3,15.9]

Table 1.5: Details of visitors, risk categories 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
	162	100	100	100	62	100
Length of time in the village						
1 month	64	39.6 [26.6, 54.4]	31	29.5 [17.2, 45.8]	33	55.7 [32.0, 77.1]
1-2 months	47	26.5 [14.3, 43.8]	30	25.5 [11.7, 47.0]	17	28.0 [9.7, 58.6]
3-6 months	28	16.8 [8.5, 30.6]	19	20.6 [9.4, 39.2]	9	10.9 [3.4, 30.1]
>6 months	21	16.1 [8.2, 29.1]	18	22.9 [11.3, 40.9]	3	5.4 [1.1, 22.7]
Not specified	2	0.9 [0.2, 3.7]	2	1.5 [0.4, 5.9]	0	0.0
Reason for visit						
Work (arranged before arrival)	20	14.6 [8.0, 25.2]	11	16.1 [7.7, 30.6]	9	12.4 [4.6, 29.3]
Look for work	27	13.6 [7.6, 23.3]	27	22.3 [11.8, 37.9]	0	0.0
Make new home	15	7.7 [2.7, 19.7]	7	5.6 [0.8, 29.6]	8	10.9 [3.9, 26.9]
Visit relatives	69	44.3 [30.5, 59.0]	41	43.8 [26.8, 62.4]	28	45.1 [23.9, 68.3]
Other	31	19.8 [10.6, 33.7]	14	12.3 [6.2, 23.0]	17	31.6 [12.8, 59.3]
Intended length of stay						
<2 weeks	34	23.8 [15.1, 35.5]	14	16.9 [8.5, 30.9]	20	34.8 [17.9, 56.5]
2-4 weeks	11	6.0 [2.5, 13.5]	4	3.1 [0.8, 11.6]	7	10.6 [3.8, 26.1]
1-3 months	26	15.3 [9.2, 24.4]	18	19.1 [11.2, 30.7]	8	9.3 [3.5, 22.4]
3-6 months	21	12.2 [5.9, 23.8]	15	12.7 [5.6, 26.3]	6	11.6 [2.7, 38.4]
6-12 months	16	9.9 [5.4, 17.4]	13	12.7 [6.9, 22.0]	3	5.5 [1.4, 19.5]
>12 months	3	1.4 [0.3, 5.5]	3	2.2 [0.5, 8.8]	0	0.0
Not sure	51	31.4 [19.9, 45.8]	33	33.4 [17.0, 55.2]	18	28.3 [16.6, 43.9]
Next place of travel						
Return home	114	69.0 [53.8, 80.9]	65	61.2 [40.3, 78.6]	49	81.2 [65.6, 90.8]
Work in this province	18	15.0 [6.7, 30.1]	15	21.3 [9.0, 42.7]	3	4.9 [1.1, 20.1]
Work in another province	2	1.2 [0.3, 5.0]	1	1.0 [0.1, 8.0]	1	1.4 [0.2, 10.1]
Other	7	3.8 [0.9, 15.1]	6	5.1 [0.9, 24.3]	1	1.7 [0.3, 10.6]
Don't know	21	11.1 [4.2, 26.5]	13	11.4 [2.7, 37.0]	8	10.7 [3.3, 29.7]
Travelled to another country in 2013						
Yes	146	91.3 [81.7, 96.1]	92	91.7 [77.3, 97.3]	54	90.7 [74.6, 97.0]
No	13	6.6 [2.7, 15.2]	8	8.3 [2.7, 22.7]	5	4.0 [1.2, 13.1]
Not sure	3	2.1 [0.3, 13.5]	0	0.0	3	5.3 [0.8, 28.1]

Part 2: Prevalence

During the CMS 2013, 8,596 slides in total were collected and read, with 14 found to be positive for any species of *Plasmodium*. The weighted and population-representative prevalence of infection by microscopy was 0.1%, compared with 0.9% 2010, 2.6% in 2007 and 4.4% in 2004. No significant difference in prevalence of infection by microscopy was observed between domains.

PCR analysis of 8,601 samples found 119 infections: 60 *P. falciparum*, 49 *P. vivax*, one *P. ovale* and nine mixed infections of *P. falciparum* and *P. vivax*. The weighted and population-representative prevalence of infection by PCR was 1.1%. The overall prevalence of *Plasmodium* infection did not significantly differ by domain, given wide confidence intervals (CI) around each prevalence estimate. Similarly, the species distribution did not differ significantly by domain. However, when simply observing the total infections of each species identified by PCR, *P. falciparum* was more common in Domain 1 and *P. vivax* in Domain 2 (but not statistically significant). The majority of PCR-confirmed infections were found in risk category 1 (<500m from the forest) but infections were found in all four risk categories.

Table 2.2 presents a breakdown of infection by age and sex, wealth quintile and risk category. Few significant associations were seen with infection, likely because of the low numbers of infections. However, microscopy-confirmed infection was found to be associated with lower wealth quintiles (p=0.016), and prevalence of PCR-confirmed infection decreased with increasing risk category, defined by increasing distance from forest (p=0.006).

Table 2.1: Malaria prevalence by species and domain in villages, risk categories 1-4

	Total		Domain 1		Domain 2		P-value[1]
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Slides	**8,596**		**4,482**		**4,114**		
Total positive	14	0.1 [0.1, 0.3]	8	0.2 [0.1, 0.5]	6	0.1 [0.0, 0.1]	0.110
P. falciparum	3	0.1 [0.0, 0.2]	2	0.1 [0.0, 0.4]	1	0.0 [0.0, 0.1]	
P. vivax	11	0.1 [0.0, 0.2]	6	0.1 [0.0, 0.4]	5	0.0 [0.0, 0.1]	0.193
P. falciparum + P. vivax	0		0	0	0	0	
Other	0		0	0	0	0	
PCR	**8,601[2]**		**4,483**		**4,118**		
Total positive	119	1.1 [0.6, 2.3]	72	1.5 [0.6, 4.1]	47	0.7 [0.4, 1.2]	0.168
P. falciparum	60	0.6 [0.3, 1.2]	47	0.9 [0.4, 2.1]	13	0.2 [0.1, 0.4]	
P. vivax	49	0.4 [0.2, 0.6]	15	0.3 [0.1, 0.8]	34	0.5 [0.3, 0.9]	
P. falciparum + P. vivax	9	0.0 [0.0, 1.0]	9	0.3 [0.1, 1.8]	0	0	0.138
Other	1	0.0 [0.0, 0.1]	1	0.0 [0.0, 0.2]	0	0	
Fever	**1,657**	**9.9 [8.8, 11.1]**	**810**	**9.6 [8.5, 10.7]**	**847**	**10.3 [8.5, 12.4]**	**0.520**

Notes: 1) Comparing Domain 1 and Domain 2; 2) PCR data not available for 12 of the total of 8,613 dried blood spots collected from individuals.

Table 2.2: Distribution of malaria species by age/sex, socioeconomic group and risk category

	Blood samples	Total positive	P-value	*P. falciparum*	*P. vivax*	*P. falciparum* + *P. vivax*	Other
	N	% (N)		% (N)	% (N)	% (N)	% (N)
Microscopy							
Age/sex	8,596						
<5 years	1,129	0.3 (2)	0.319	0.2 (2)	0.0 (0)	0	0
5-14 years	1,859	0.1 (1)		0.0 (0)	0.1 (1)	0	0
Male 15+ years	2,454	0.2 (8)		0.0 (1)	0.2 (7)	0	0
Female 15+ years	3,154	0.0 (3)		0.0 (0)	0.0 (3)	0	0
SES	8,574						
Q1 (poorest)	1,703	0.2 (5)	0.500	0.0 (0)	0.2 (5)	0	0
Q2	1,705	0.2 (5)		0.2 (2)	0.1 (3)	0	0
Q3	1,802	0.0 (2)		0.0 (0)	0.0 (2)	0	0
Q4	1,704	0.1 (2)		0.1 (1)	0.0 (1)	0	0
Q5 (least poor)	1,660	0.0 (0)		0.0 (0)	0.0 (0)	0	0
Risk category	8,596						
1 (<500m)	3,226	0.2 (10)	0.678	0.0 (1)	0.2 (9)	0	0
2 (500m-<1km)	2,150	0.1 (2)		0.0 (0)	0.1 (2)	0	0
3 (1km-<2km)	1,751	0.1 (1)		0.1 (1)	0.0 (0)	0	0
4 (≥ 2km)	1,469	0.1 (1)		0.1 (1)	0.0 (0)	0	0
PCR							
Age/sex	8,601						
<5 years	1,130	0.9 (12)	0.034	0.7 (8)	0.1 (2)	0.0 (1)	0.1 (1)
5-14 years	1,864	1.1 (24)		0.6 (15)	0.3 (7)	0.2 (2)	0.0 (0)
Male 15+ years	2,455	1.8 (51)		0.6 (16)	0.8 (29)	0.5 (6)	0.0 (0)
Female 15+ years	3,152	0.9 (32)		0.5 (21)	0.3 (11)	0.0 (0)	0.0 (0)
SES	8,579						
Q1 (poorest)	1,700	1.1 (30)	0.416	0.6 (12)	0.4 (16)	0.2 (2)	0.0 (0)
Q2	1,705	1.3 (25)		0.5 (11)	0.4 (10)	0.3 (4)	0.0 (0)
Q3	1,800	1.0 (23)		0.6 (12)	0.3 (10)	0.0 (0)	0.1 (1)
Q4	1,703	1.6 (28)		0.9 (18)	0.5 (9)	0.2 (1)	0.0 (0)
Q5 (least poor)	1,657	0.7 (13)		0.3 (7)	0.2 (4)	0.2 (2)	0.0 (0)
Risk category	8,601						
1 (<500m)	3,220	2.9 (89)	<0.001	1.6 (48)	0.6 (31)	0.6 (9)	0.1 (1)
2 (500m-<1km)	2,148	1.0 (20)		0.6 (11)	0.4 (9)	0.0 (0)	0.0 (0)
3 (1km-<2km)	1,750	0.3 (6)		0.0 (0)	0.3 (6)	0.0 (0)	0.0 (0)
4 (≥ 2km)	1,469	0.2 (4)		0.1 (1)	0.2 (3)	0.0 (0)	0.0 (0)

Of 118 PCR-confirmed infections with microscopy data also available, only 9 (7.6%) were also positive by microscopy, while five microscopy-confirmed infections were found to be negative by PCR (two *P. falciparum,* three *P. vivax*). Among the 69 individuals found to have *P. falciparum* infection by PCR (including those with mixed infection), only 22 of these were adult males, low considering that this demographic group is usually considered to be at highest risk. Three pregnant women were found with PCR-confirmed malaria (1.2% of all pregnant women), two with *P. falciparum* and one with *P. vivax*.

When interpreting data from Table 2.3, it should be noted that the CMS sample design does not generate prevalence estimates that are representative at province level, so these data should be interpreted cautiously.

Half of sampled provinces had no infections identified by microscopy but only three provinces had no *Plasmodium*.identified by PCR. The highest prevalence of infection identified by PCR was Oddar Meanchey, followed by Pailin and Kep. Kep had the lowest number of blood samples tested by PCR, therefore prevalence in Kep should be considered with a wide confidence interval. The number of infections found in Pailin is surprising, considering the substantial reductions in malaria burden reported through the Malaria Information System (MIS) in this province. Again, the number of individuals tested through PCR was much lower in Pailin than in other provinces, and these data should be interpreted cautiously.

Some clustering of *P. falciparum* in households was observed: 58 households had only one infection, four households had two infections and one household contained three people with *P. falciparum*. The households with clusters of cases were located in Banteay Meanchey, Kratie, Oddar Meanchey and Pailin.

No *Plasmodium* infections were identified in temporary visitors tested at households (Table 2.4). The highest prevalence of infection by PCR among mobile populations was among those identified as forest-goers, with 5.2% prevalence overall. No evidence was found for differences in the prevalence of infection by PCR or microscopy among mobile populations between Domain 1 and Domain 2.

If restricting estimates of malaria prevalence to areas less than two kilometres from the forest (risk categories 1-3 only), prevalence of infection by PCR is 1.6% (95% CI 0.7, 3.3) among residents, 3.0% (95% CI 1.1, 7.8) among travellers and 7.3% (95% CI 2.6, 18.6) among forest-goers.

Common risk factors for *Plasmodium* infection were identified using both microscopy and PCR data (Table 2.6). No differences in odds of infection by microscopy were found by domain, age, sex, socioeconomic status, recent fever or reported use of mosquito nets. Odds of being found to have *Plasmodium* infection by PCR were increased among adult males (p=0.01) and individuals using LLINs (p=0.041). However, this association with LLIN use may be a result of targeted distribution of LLINs to the highest risk categories, since the odds of being PCR positive were significantly lower in risk categories 3 and 4 than in risk category 1.

Table 2.3: Distribution of malaria species by province, microscopy and PCR diagnosis

	Blood samples		Total positive	*P. falciparum*	*P. vivax*	*P. falciparum* + *P. vivax*	Other
	N	N	% [95% CI]	% (N)	% (N)	% (N)	% (N)
Slides	**8,596**	**14**	**0.1 [0.1, 0.3]**	**0.1 (3)**	**0.1 (11)**	**0**	**0**
Preah Vihear	152	1	1.1 [0.3, 3.5]	1.1 (1)	0.0 (0)	0	0
Oddar Meanchey	341	3	0.8 [0.2, 2.6]	0.0 (0)	0.8 (3)	0	0
Kampot	660	1	0.4 [0.1, 2.7]	0.4 (1)	0.0 (0)	0	0
Mondulkiri	170	1	0.2 [0.1, 0.7]	0.0 (0)	0.2 (1)	0	0
Kampong Thom	607	3	0.2 [0.1, 0.6]	0.0 (0)	0.2 (3)	0	0
Kratie	579	1	0.1 [0.0, 0.7]	0.1 (1)	0.0 (0)	0	0
Stung Treng	288	1	0.1 [0.0, 0.6]	0.0 (0)	0.1 (1)	0	0
Siem Reap	559	1	0.0 [0.0, 0.3]	0.0 (0)	0.0 (1)	0	0
Kampong Speu	705	2	0.0 [0.0, 0.2]	0.0 (0)	0.0 (2)	0	0
Banteay Meanchey	442	0	0	0	0	0	0
Battambang	1125	0	0	0	0	0	0
Kampong Cham	1265	0	0	0	0	0	0
Kep	88	0	0	0	0	0	0
Koh Kong	265	0	0	0	0	0	0
Pailin	229	0	0	0	0	0	0
Pursat	222	0	0	0	0	0	0
Rattanakiri	338	0	0	0	0	0	0
Sihanoukville	357	0	0	0	0	0	0
Takeo	204	0	0	0	0	0	0
PCR	**8,601**	**119**	**1.1 [0.6, 2.3]**	**0.6 (60)**	**0.4 (49)**	**0.2 (9)**	**0.0 (1)**
Oddar Meanchey	340	29	10.8 [4.7, 22.9]	5.5 (15)	1.6 (6)	3.4 (7)	0.3 (1)
Pailin	229	16	3.7 [0.5, 24.1]	3.2 (15)	0.0 (0)	0.5 (1)	0.0 (0)
Kep	88	2	3.1 [3.1, 3.1]	2.3 (1)	0.7 (1)	0.0 (0)	0.0 (0)
Stung Treng	289	10	2.6 [0.7, 9.3]	0.5 (1)	2.1 (9)	0.0 (0)	0.0 (0)
Mondulkiri	444	7	1.6 [0.2, 10.4]	1.6 (7)	0.0 (0)	0.0 (0)	0.0 (0)
Kratie	578	17	1.3 [0.5, 3.2]	0.6 (7)	0.7 (10)	0.0 (0)	0.0 (0)
Pursat	171	3	0.9 [0.9, 0.9]	0.4 (1)	0.5 (2)	0.0 (0)	0.0 (0)
Siem Reap	607	6	0.7 [0.2, 2.4]	0.0 (0)	0.7 (6)	0.0 (0)	0.0 (0)
Banteay Meanchey	554	4	0.6 [0.3, 1.2]	0.2 (1)	0.3 (3)	0.0 (0)	0.0 (0)
Kampong Thom	1,128	7	0.6 [0.2, 1.6]	0.5 (6)	0.1 (1)	0.0 (0)	0.0 (0)
Rattanakiri	1,266	7	0.5 [0.2, 1.4]	0.1 (2)	0.4 (5)	0.0 (0)	0.0 (0)
Kampong Cham	266	1	0.5 [0.1, 2.5]	0.5 (1)	0.0 (0)	0.0 (0)	0.0 (0)
Koh Kong	339	2	0.5 [0.1, 2.0]	0.4 (1)	0.1 (1)	0.0 (0)	0.0 (0)
Battambang	222	1	0.2 [0.0, 1.0]	0.0 (0)	0.2 (1)	0.0 (0)	0.0 (0)
Kampong Speu	709	6	0.1 [0.0, 0.6]	0.0 (2)	0.1 (3)	0.0 (1)	0.0 (0)
Kampot	658	1	0.1 [0.0, 0.4]	0.0 (0)	0.1 (1)	0.0 (0)	0.0 (0)
Preah Vihear	152	0	0.0	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Sihanoukville	357	0	0.0	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Takeo	204	0	0.0	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)

Table 2.4: Malaria prevalence among specific target populations by domain, risk categories 1-4

	Blood samples	Total positive		Domain 1		Domain 2		P-value[1]
		N	% [95% CI]	N	%	N	%	
Slides								
Residents	8,502	14	0.1 [0.1, 0.3]	8	0.2	6	0.1	0.108
Visitors	94	0	0.0	0	0.0	0	0	-
Travellers	1,363	8	0.4 [0.1, 1.0]	3	0.4	5	0.4	0.934
Forest-goers	401	7	1.2 [0.4, 3.4]	2	1.4	5	1.1	0.786
PCR								
Residents	8,507	119	1.2 [0.6, 2.3]	72	1.6	47	0.7	0.165
Visitors	94	0	0.0	0	0.0	0	0.0	-
Travellers	1,359	39	2.2 [0.9, 5.7]	24	3.0	15	1.3	0.221
Forest-goers	401	27	5.4 [2.0, 13.6]	15	9.0	12	2.8	0.102

Note: 1) Statistical test for difference between domains, inclusive of all risk zones.

Table 2.5: Malaria prevalence in specific target populations by *Plasmodium* species, risk categories 1-4

		P. falciparum		*P. vivax*		*P. falciparum* + *P. vivax*		Other	
	N	N	%	N	%	N	%	N	%
Slides – total									
Residents	8,502	3	0.1	11	0.1	0	0	0	0
Visitors	94	0	0.0	0	0	0	0	0	0
Travellers	1,363	1	0.0	7	0.3	0	0	0	0
Forest-goers	401	1	0.2	6	1.1	0	0	0	0
PCR – total									
Residents	8,507	60	0.6	49	0.4	9	0.2	1	0.0
Visitors	94	0	0.0	0	0	0	0	0	0
Travellers	1,359	16	0.9	19	1.0	4	0.4	0	0.0
Forest-goers	401	8	1.1	15	3.0	4	1.3	0	0.0

The strongest association with both microscopy- and PCR-diagnosed infection was being a forest-goer ($p<0.001$ for both), but having travelled was also associated with increased odds of infection by microscopy or PCR ($p=0.017$ and $p<0.001$, respectively). Finally, residence in a village where VMWs operate was associated with increased odds of infection identified by PCR, indicating that VMWs have been successfully targeted to the locations at highest risk.

Considering the different epidemiology of *P. falciparum* and *P. vivax*, a sub-analysis was conducted to compare risk factors for each species individually (Table 2.7). PCR infection was used to define species-specific infection variables, with mixed infections considered positive in both models. No difference in *P. vivax* was seen by domain, but *P. falciparum* was significantly less common in Domain 2. No significant differences in odds of *P. falciparum* were found by age or sex, but *P.* vivax infection was more common among adult males than in the

reference group of children under five years. Forest-goers and travellers had significantly higher odds of *P. vivax* infection, with weak evidence of increased odds of *P. falciparum* infection among travellers.

Reported fever was most common among children under five years of age, with prevalence of reported fever reducing with increasing age (p<0.001). An association was also seen between fever and SES, with highest reported fever among individuals in the poorest households.

Table 2.6: Determinants of a positive blood slide/PCR among risk categories 1-4

	Slide positive			PCR positive		
	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value
Domain						
1	1	-		1	-	
2	0.34	0.09, 1.37	0.127	0.47	0.15, 1.42	0.178
Age/sex						
<5 years	1	-		1	-	
5-14 years	0.30	0.03, 3.44	0.352	1.24	0.69, 2.24	0.463
Male 15+ years	0.97	0.16, 5.79	0.975	2.13	1.20, 3.79	0.010
Female 15+ years	0.25	0.03, 1.82	0.168	1.00	0.51, 1.95	0.966
SES group						
Q1 (poorest)	1	-		1	-	
Q2	1.12	0.13, 9.57	0.914	1.12	0.70, 1.81	0.632
Q3	0.20	0.01, 2.52	0.210	0.90	0.32, 2.50	0.837
Q4	0.55	0.05, 6.60	0.634	1.41	0.82, 2.43	0.211
Q5 (least poor)	-	-		0.62	0.20, 1.94	0.408
Forest goer	15.47	4.74, 50.47	<0.001	5.77	3.59, 9.28	<0.001
Traveller	4.43	1.31, 15.01	0.017	2.31	1.53, 3.47	<0.001
Fever past 2 weeks	3.47	0.81, 14.83	0.092	1.02	0.58,1.78	0.951
Slept under net last night						
Any net	2.28	0.27, 19.43	0.445	1.63	0.49, 5.46	0.425
LLIN	1.03	0.26, 4.11	0.965	1.60	1.02, 2.51	0.041
Risk category						
1 (<500m)	1	-		1	-	
2 (500m-<1km)	0.32	0.06, 1.78	0.188	0.32	0.09, 1.15	0.079
3 (1km-<2km)	0.50	0.05, 5.14	0.554	0.09	0.03, 0.30	<0.001
4 (>2km)	0.45	0.04, 4.92	0.510	0.08	0.02, 0.37	0.002
VMW present	2.89	0.56, 14.90	0.202	3.96	1.11, 14.19	0.035

Note: Binary variables reported as odds of yes against no.

Table 2.7: Risk factors for PCR-determined infection, by species, among risk zones 1-4

	PCR positive *P. falciparum*			PCR positive *P. vivax*		
	Odds ratio	95% CI	P-value	Odds ratio	95% CI	P-value
Domain						
1	1					
2	0.25	0.09, 0.69	0.008	1.92	0.54, 6.84	0.309
Age/sex						
<5 years	1					
5-14 years	0.94	0.40, 2.18	0.876	2.56	0.56, 11.60	0.219
Male 15+ years	0.87	0.43, 1.75	0.683	7.15	1.51, 33.78	0.014
Female 15+ years	0.82	0.41, 1.66	0.582	2.89	0.57, 14.67	0.197
SES group						
Q1 (poorest)	1					
Q2	0.96	0.44, 2.12	0.923	1.14	0.51, 2.54	0.752
Q3	1.14	0.36, 3.62	0.822	0.89	0.35, 2.23	0.794
Q4	1.72	0.88, 3.38	0.112	1.46	0.59, 3.60	0.403
Q5 (least poor)	0.53	0.07, 3.77	0.520	0.65	0.16, 2.68	0.551
Forest goer	1.98	0.51, 7.77	0.321	11.08	4.24, 28.96	<0.001
Traveller	1.57	0.97, 2.53	0.064	3.55	1.59, 7.95	0.002
Fever past 2 weeks	0.96	0.34, 2.69	0.934	0.63	0.17, 2.29	0.473
Slept under net last night						
Any net	3.81	0.44, 32.87	0.220	0.64	0.19, 2.24	0.484
LLIN	1.36	0.69, 2.66	0.371	1.86	0.87, 3.97	0.108
Risk category						
1 (<500m)	1					
2 (500m-<1km)	.3525096	0.08, 1.63	0.179	0.59	0.16, 2.10	0.408
3 (1km-<2km)	-			0.42	0.13, 1.33	0.138
4 (>2km)	.0396679	0.005, 0.33	0.004	0.26	0.04, 1.58	0.140
VMW present	3.232267	0.81, 12.86	0.095	2.62	0.94, 7.32	0.065

Note: Binary variables reported as odds of yes against no.

In both domains, odds of fever were reduced in adults compared with children under five years. In Domain 2, fever was less common among forest-goers, and it was less common among travellers than non-travellers in Domain 1. In both domains, odds of recent fever were significantly higher in individuals sleeping under an LLIN on the previous night. This association was also seen between use of any type of net on the previous night and increased odds of fever in Domain 1, although in Domain 2 fever was less common among individuals using any type of net.

Table 2.8: Distribution of fever by age/sex, socioeconomic group and risk category

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Age/sex		**Pr < 0.001**		**Pr < 0.001**		**Pr < 0.001**
<5 years	1,602	25.8 [22.7, 29.2]	750	24.4 [21.2, 28.0]	852	27.0 [21.9, 32.8]
5-14 years	3,886	15.5 [12.9, 18.4]	1,939	13.6 [10.5, 17.4]	1,947	17.3 [13.4, 22.0]
Male 15+ years	5,350	5.6 [4.7, 6.6]	2,664	5.9 [5.0, 6.9]	2,686	5.3 [3.9, 7.2]
Female 15+ years	5,860	6.0 [5.2, 7.0]	2,936	6.7 [5.7, 7.9]	2,924	5.3 [4.0, 7.0]
SES group (p-value)		**Pr < 0.001**		**Pr = 0.003**		**Pr = 0.018**
Q1 (poorest)	3,284	12.8 [10.4, 15.7]	1,628	12.0 [10.2, 14.0]	1,656	13.7 [9.5, 19.4]
Q2	3,341	10.0 [8.8, 11.4]	1,646	9.1 [7.7, 10.8]	1,695	10.9 [9.0, 13.2]
Q3	3,376	9.1 [7.5, 11.0]	1,673	8.2 [6.1, 10.8]	1,703	10.1 [7.8, 13.0]
Q4	3,316	10.0 [8.7, 11.5]	1,644	10.7 [9.0, 12.8]	1,672	9.3 [7.3, 11.7]
Q5 (least poor)	3,341	7.5 [6.5, 8.6]	1,698	7.8 [6.8, 8.9]	1,643	7.2 [5.6, 9.2]
Risk category (p-value)		**Pr = 0.069**		**Pr = 0.342**		**Pr = 0.035**
1 (<500m)	692	10.5 [9.1, 12.2]	3,193	10.5 [9.2, 12.0]	3,088	10.6 [8.0, 13.8]
2 (500m-<1km)	372	9.1 [7.7, 10.7]	1,983	10.2 [8.0, 13.1]	2,090	8.4 [6.7, 10.4]
3 (1km-<2km)	275	7.6 [6.2, 9.4]	1,784	7.9 [6.4, 9.6]	1,738	7.3 [4.8, 10.9]
4 (>2km)	318	11.4 [8.8, 14.7]	1,329	9.4 [7.1, 12.4]	1,493	13.7 [9.4, 19.5]
VMW present (p-value)						
No	12,081	9.8 [8.5, 11.4]	5,538	9.0 [7.7, 10.6]	6,543	10.6 [8.4, 13.2]
Yes	4617	10.2 [8.8, 11.7]	2,751	10.9 [9.8, 12.2]	1,866	9.2 [6.7, 12.5]

Table 2.9: Determinants of fever in the previous two weeks

	Domain 1			Domain 2		
	Odds ratio (N)	95% CI	P-value	Odds ratio (N)	95% CI	P-value
Age/sex						
<5 years	1.00	-		1.00	-	
5-14 years	0.49	0.35, 0.67	<0.001	0.57	0.42, 0.76	<0.001
Male 15+ years	0.19	0.15, 0.25	<0.001	0.15	0.11, 0.22	<0.001
Female 15+ years	0.22	0.18, 0.28	<0.001	0.15	0.10, 0.23	<0.001
SES group						
Q1 (poorest)	1.00	-		1.00	-	
Q2	0.74	0.59, 0.93	0.013	0.37	0.28, 0.49	<0.001
Q3	0.65	0.47, 0.92	0.016	0.77	0.54, 1.10	0.143
Q4	0.88	0.69, 1.12	0.304	0.71	0.44, 1.14	0.152
Q5 (least poor)	0.62	0.49, 0.78	<0.001	0.64	0.41, 1.01	0.056
Forest-goer						
Yes	1.10	0.72, 1.66	0.660	0.49	0.30, 0.79	0.005
No	1.00	-		1.00	-	
Traveller						
Yes	0.47	0.35, 0.65	<0.01	0.84	0.66, 1.08	0.172
No	1.00	-		1.00	-	
Residence						
Usual resident	6.51	1.68, 25.30	0.008	2.27	0.62, 8.36	0.211
Temporary visitor	1.00	-		1.00	-	
Slept under net last night						
Any net						
Yes	3.94	2.64, 5.88	<0.001	0.52	0.37, 0.72	<0.001
No	1.00	-		1.00	-	
LLIN						
Yes	1.50	1.21, 1.85	<0.001	2.27	0.62, 8.36	0.211
No	1.00	-		1.00	-	
Risk category						
1 (<500m)	1.00	-		1.00	-	
2 (500m-<1km)	0.97	0.71, 1.33	0.848	2.57	1.77, 3.74	<0.001
3 (1km-<2km)	0.73	0.56, 0.95	0.021	1.22	0.95, 1.57	0.115
4 (>2km)	0.88	0.62, 1.25	0.475	0.10	0.08, 0.13	<0.001
VMW present						
Yes	1.24	0.99, 1.54	0.058	0.77	0.52, 1.13	0.182
No	1.00	-		1.00	-	

Part 3: Knowledge

Respondent knowledge that malaria is transmitted through mosquito bites was very high, as in previous CMSs. Reported knowledge of a mosquito net and at least one other prevention method was moderate, at 51.2% overall. Less than half of respondents (41.8%) reported that ITNs specifically can be used to prevent malaria, a decline from the 49.8% value for this indicator in the CMS 2010. Recall of at least three of the key messages for malaria prevention was very low, at 1.4%.

Table 3.1: Knowledge of malaria transmission and prevention by domain, risk categories 1-4

	Total		Domain 1		Domain 2		
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	P-value
Knowledge of:							
Transmission[1]	3,177	96.3 [95.0, 97.3]	1,656	97.2 [95.7, 98.2]	1,521	95.3 [93.0, 96.9]	Pr = 0.076
Prevention 1[2]	1,653	51.2 [46.4, 56.0]	779	48.0 [40.1, 56.0]	874	54.8 [49.7, 59.7]	Pr = 0.156
Prevention 2[3]	1,425	41.8 [38.1, 45.7]	879	49.6 [43.9, 55.2]	546	33.3 [28.6, 38.3]	Pr <0.001
Recalls hearing 3 key messages about malaria in previous 6 months[4]	40	1.4 [0.9, 2.2]	23	1.6 [0.9, 2.8]	17	1.2 [0.5, 2.7]	Pr = 0.517

Notes: 1) Knowledge that mosquito bites can transmit malaria; 2) knowledge of a mosquito net and one other prevention method; 3) knowledge of ITNs; 4) sleep under an ITN; sleep under a net when travelling; sleep under a net when visiting the forest; seek treatment from VMW or health centre; seek treatment within 24 hours; complete antimalarial treatment; get a blood test before taking medicine.

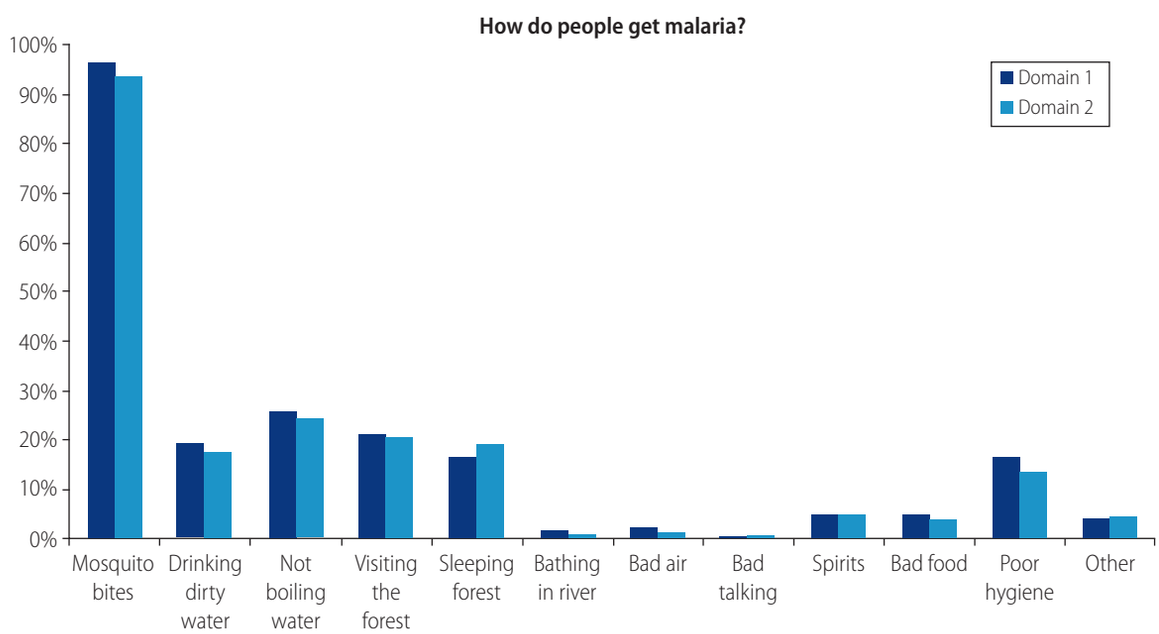

Figure 3.1: Knowledge of malaria transmission by domain

While the majority of respondents reported that mosquito bites caused malaria, there are persistent beliefs that malaria is associated with drinking dirty water or not boiling water. Sleeping in the forest was only infrequently reported as a cause of malaria.

Figure 3.2 shows the distribution of responses from survey participants on how they prevent malaria. Sleeping under a mosquito net was more frequently reported as a malaria prevention method in Domain 2 sites, but the need to sleep under an ITN was reported more often at Domain 1 sites. Use of other personal protection such as mosquito coils, repellent and insecticide spray was rare, as was avoiding the forest.

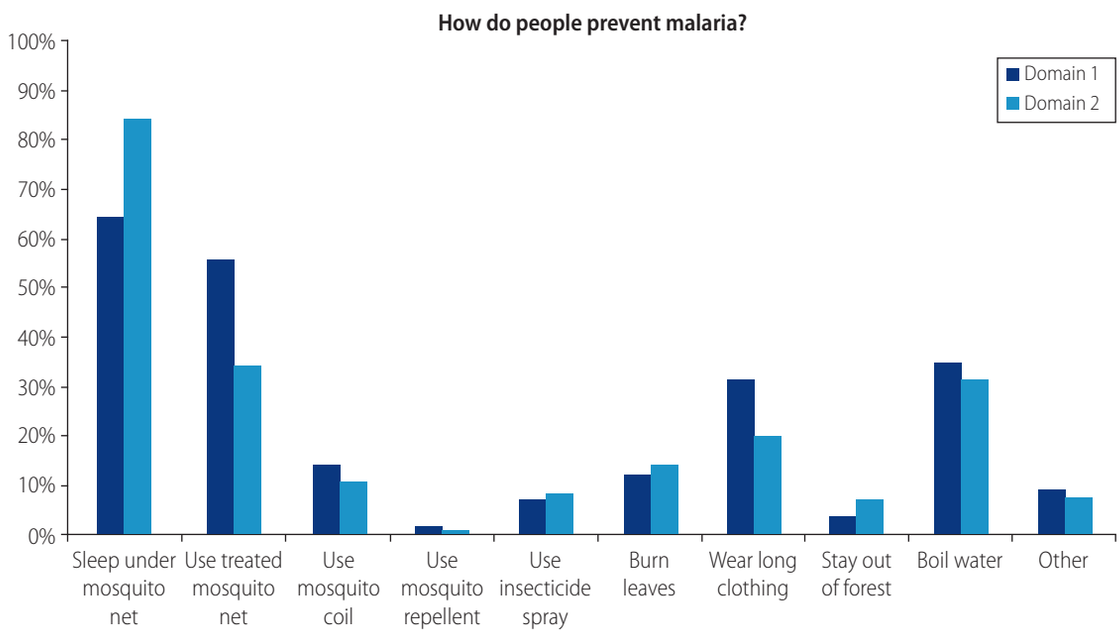

Figure 3.2: Knowledge of malaria prevention by domain

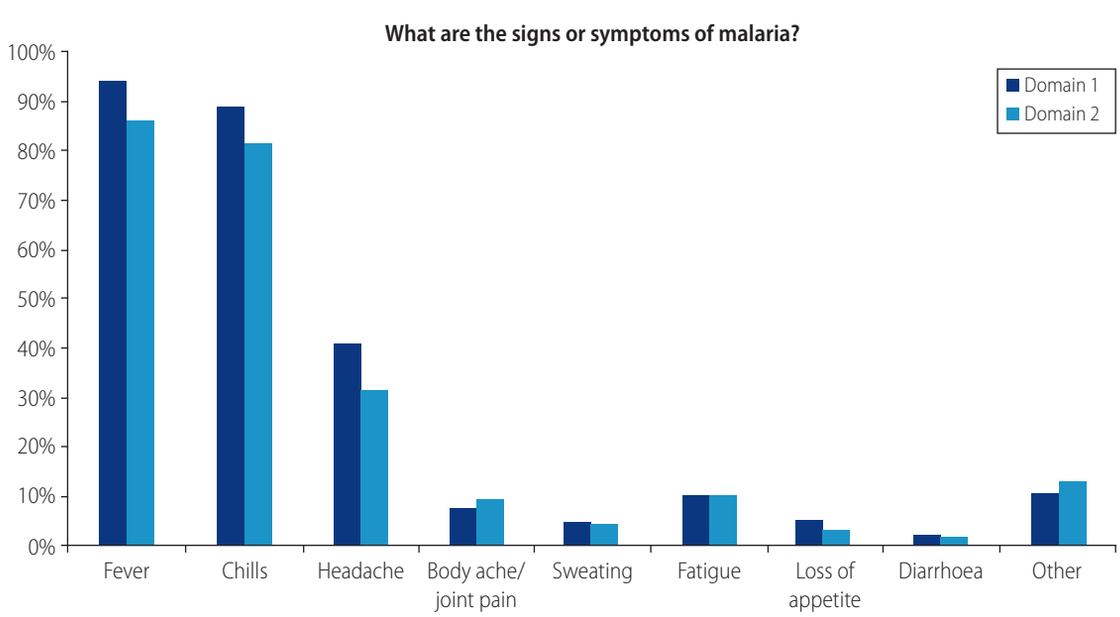

Figure 3.3: Knowledge of signs or symptoms of malaria by domain

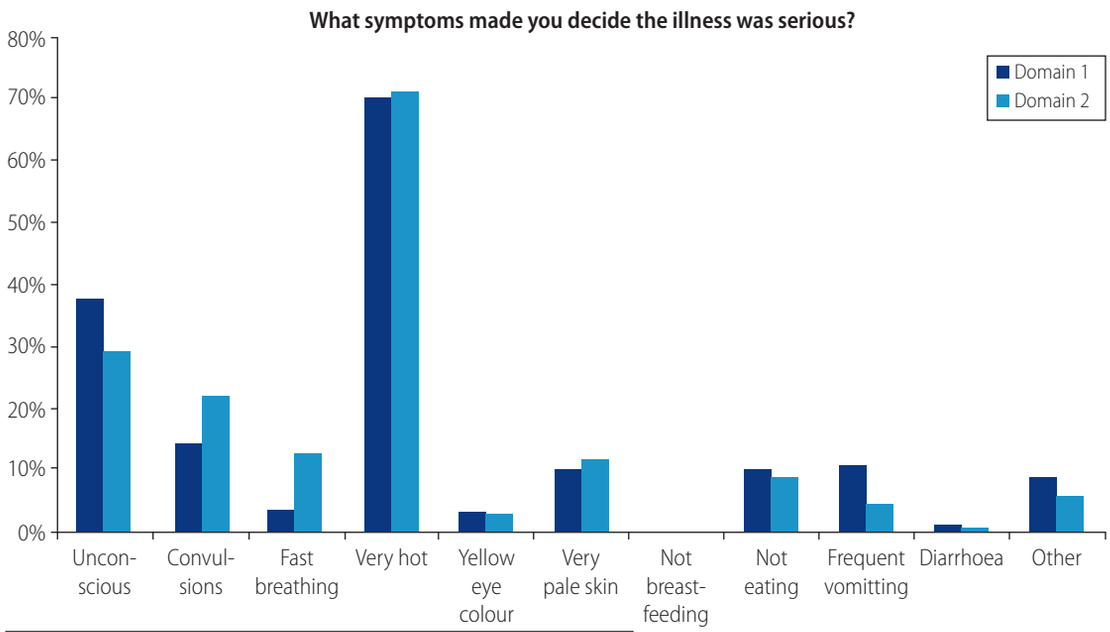

Figure 3.4: Knowledge of signs or symptoms of serious fever by domain

Approximately one-third of respondents reported that boiling water was a method to prevent malaria. This is likely to be linked with cultural beliefs in some parts of the country that drinking unboiled water may lead to fever.

Fever and chills were the best-known signs of malaria, with knowledge of the symptoms significantly higher in Domain 1 than in Domain 2 (p=0.004 and p=0.006, respectively). A high fever was the most reported sign of severe malaria, while being unconscious was better known in Domain 1 and convulsions in Domain 2.

Knowledge of malaria symptoms among individuals interviewed during household surveys was generally good, at 80.3%, but higher in Domain 1 areas than in Domain 2 (p=0.001). Fewer than half of respondents could correctly identify the signs of serious fever, indicating that there may be challenges in identifying potential severe malaria cases in the community. Almost all respondents knew where they could access advice, testing and treatment from trained providers, at 97%, with this knowledge being similar across both domains.

When investigating in more detail the places that community members identified to go for a malaria test (Table 3.3), the most common location reported in both domains was the health centre. A private health provider was the next most popular location for testing. Only a small proportion of individuals reported VMWs as a source of malaria testing, although this level was higher in Domain 1 than in Domain 2 (p=0.008). Very few individuals mentioned a private laboratory, a pharmacy, a shop or self-treating as ways to access a malaria test. Looking in more depth at reported knowledge of VMWs for malaria testing, when restricting to Domain 1 and sites with VMWs in place since 2012 or earlier (26 clusters), 28.7% of householders (95% CI 21.9, 36.6%) identified VMWs for provision of malaria testing.

Table 3.2: Household respondents' knowledge of providers for malaria diagnosis and treatment

	Total		Domain 1		Domain 2		P-value
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Total	3,286		1,702		1,584		
Know malaria symptoms	2,623	80.3 [76.9, 83.3]	1,436	84.9 [82.5, 87.0]	1,187	75.2 [68.8, 80.7]	Pr = 0.001
Know symptoms of serious fever	1,573	48.6 [44.6, 52.5]	826	49.7 [44.0, 55.5]	747	47.3 [42.0, 52.6]	Pr = 0.537
Know where to go for advice, testing and treatment from trained provider	3,196	96.9 [95.3, 98.0]	1,671	98.4 [96.9, 99.2]	1,525	95.3 [92.1, 97.2]	Pr = 0.009
Know appropriate diagnosis and treatment[1]	379	11.1 [9.0, 13.6]	198	11.7 [8.8, 15.4]	181	10.4 [7.9, 14.1]	Pr = 0.570
Know antimalarials	936	27.5 [23.8, 31.5]	545	31.9 [26.0, 38.5]	391	22.5 [18.5, 27.1]	Pr = 0.014
Know ACTs	643	18.9 [16.0, 22.1]	344	20.6 [16.4, 25.7]	299	16.9 [13.4, 21.1]	Pr = 0.214
Know antimalarials are effective if all treatment taken	39	1.2 [0.8, 1.7]	30	1.7 [1.1, 2.6]	9	0.6 [0.3, 1.2]	Pr = 0.011

Note: 1) Confirm with test, go to trained provider, can name antimalarials and know how to take antimalarials for three days.

A similar pattern was seen for reported place to go for advice or treatment related to malaria, with the health centre most commonly reported in both domains. Private health providers were the first choice for 9% of individuals in Domain 1 and 18% in Domain 2. Only 6% of individuals in Domain 1 and 2% in Domain two reported VMWs as a place to go for advice on or treatment of malaria. Restricting this analysis to Domain 1 sites with VMWs since 2012 or earlier, 14.4% (95% CI 10.1, 20.2) reported VMWs as the place for malaria treatment or advice.

Tables 3.4 and 3.5 show knowledge of different antimalarial drugs among household respondents. Of 3,286 individuals interviewed, only 36% were able to name any specific antimalarial drug. The most commonly mentioned category of drugs known was ACTs, but only by 19% of those interviewed. Malarine was the best-known ACT, and the second-most mentioned drug was quinine.

Table 3.3: Knowledge of providers for malaria diagnosis and treatment

	Domain 1		Domain 2		P-value
	N	% [95% CI]	N	% [95% CI]	
Place to go for a test[1]					
Total	1,702		1,584		
VMW	272	11.6 [8.7, 15.32]	95	5.0 [2.8, 8.9]	Pr = 0.008
Health centre/former district hospital	1,345	81.2 [75.4, 85.9]	1,115	70.3 [65.4, 74.9]	Pr = 0.005
Referral hospital	240	13.1 [9.2, 18.4]	327	21.4 [16.0, 27.9]	Pr = 0.031
Private health provider	499	29.8 [23.1, 37.4]	601	38.9 [31.2, 47.3]	Pr = 0.098
Private laboratory	63	4.2 [2.3, 7.6]	39	2.7 [2.0, 3.5]	Pr = 0.167
Pharmacy	6	0.4 [0.2, 1.1]	14	1.0 [0.5, 2.0]	Pr = 0.134
Shop/market	10	0.6 [0.2, 1.6]	14	0.9 [0.5, 1.9]	Pr = 0.428
Self-treat	1	0.0 [0.0, 0.3]	6	0.3 [0.1, 1.0]	Pr = 0.033
Other source	0		0		
Places to go for advice or treatment[2]					
Total	1,676		1,531		
VMW	137	6.1 [4.3, 8.7]	47	2.4 [1.4, 4.3]	
Health centre/former district hospital	1,304	80.2 [75.2, 84.4]	1,052	69.0 [62.9, 74.6]	
Referral hospital	88	4.4 [2.5, 7.6]	131	9.0 [5.2, 14.9]	
Private health provider	137	8.7 [5.5, 13.5]	280	18.2 [13.7, 23.7]	
Private laboratory	5	0.2 [0.1, 0.7]	14	0.7 [0.4, 1.4]	Pr = 0.001
Pharmacy	2	0.2 [0.0, 1.2]	2	0.2 [0.1, 0.9]	
Shop/market	1	0.1 [0.0, 0.6]	2	0.2 [0.0, 1.0]	
Self-treat	0		0		
Other source	2	0.3 [0.1, 2.4]	3	0.2 [0.0, 1.2]	

Notes: 1) Interviewees able to mention more than one option; 2) interviewees allowed to name one location only.

Table 3.4: Household respondents' knowledge of named antimalarials

	Total		Domain 1		Domain 2		P-value
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Total (N)	3,286		1702		1584		
A+M (AS-MQ)	88	2.5 [1.8, 3.4]	59	2.9 [2.0, 4.3]	29	2.0 [1.1, 3.3]	Pr = 0.226
Malarine (AS-MQ)	561	16.4 [13.7, 19.6]	292	17.9 [14.0, 22.6]	269	14.9 [11.5, 19.1]	Pr = 0.307
Other AS-MQ	13	0.3 [0.2, 0.6]	7	0.3 [0.1, 0.7]	6	0.3 [0.1, 0.8]	Pr = 0.942
Duo-Cotecxin (DHA-pip)	47	1.6 [0.9, 2.6]	37	2.5 [1.4, 4.5]	10	0.5 [0.3, 1.1]	Pr = 0.000
Other DHA-pip	12	0.3 [0.1, 0.5]	6	0.3 [0.1, 0.7]	6	0.3 [0.1, 0.7]	Pr = 0.968
Artemisinin-piperaquine	6	0.3 [0.1, 0.8]	5	0.4 [0.1, 1.4]	1	0.1 [0.0, 0.8]	Pr = 0.218
Dihydro-artemisinin	5	0.2 [0.1, 0.5]	3	0.2 [0.1, 0.8]	2	0.2 [0.0, 0.7]	Pr = 0.733
Plasmotrim (artesunate)	16	0.5 [0.2, 1.0]	13	0.8 [0.4, 1.8]	3	0.1 [0.0, 0.4]	Pr = 0.003
Other artesunate	19	0.6 [0.2, 1.3]	14	0.9 [0.3, 2.4]	5	0.2 [0.1, 0.6]	Pr = 0.024
Artemether	6	0.1 [0.1, 0.4]	6	0.3 [0.1, 0.7]	0	0.0	Pr = 0.070
Artemisinin	0		0		0	0.0	
Mefloquine	16	0.5 [0.3, 1.0]	9	0.4 [0.2, 1.1]	7	0.6 [0.3, 1.5]	Pr = 0.573
Quinine	325	9.7 [7.7, 12.2]	225	13.1 [9.8, 17.3]	100	6.0 [4.3, 8.2]	Pr = 0.000
Chloroquine	71	2.2 [1.4, 3.2]	54	3.1 [1.9, 5.0]	17	1.1 [0.5, 2.2]	Pr = 0.015
Primaquine	3	0.1 [0.0, 0.3]	2	0.1 [0.0, 0.4]	1	0.1 [0.0, 0.5]	Pr = 0.631
Malarone (atovaquone-proguanil)	2	0.1 [0.0, 0.2]	2	0.1 [0.0, 0.4]	0	0.0	Pr = 0.157
Coartem (artemether-lumefantrine)	0	0.0	0	0.0	0	0.0	
Drug cocktail for fever or malaria	7	0.2 [0.1, 0.6]	1	0.0 [0.0, 0.3]	6	0.4 [0.1, 1.3]	Pr = 0.024

Table 3.5: Household respondents' knowledge of grouped antimalarials

	Total		Domain 1		Domain 2		P-value
Drug type	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Total	3,286		1,702		1,584		
ACTs	643	18.9 [16.0, 22.1]	344	20.6 [16.4, 25.7]	299	16.9 [13.4, 21.1]	Pr = 0.214
Artemisinin monotherapy	60	1.7 [1.1, 2.5]	44	2.4 [1.5, 3.9]	16	0.8 [0.4, 1.4]	Pr = 0.002
Other antimalarial drugs	372	11.1 [8.9, 13.7]	258	14.7 [11.0, 19.4]	114	7.0 [5.3, 9.3]	Pr < 0.001

Part 4: Prevention

Household ownership of at least one mosquito net of any type (either insecticide-treated or untreated) is high in both Domain 1 and Domain 2. However, this high coverage incorporates a mixture of untreated and insecticide-treated nets in communities.

Household ownership of at least one ITN in risk categories 1-3 has increased from the CMS 2010 (74.7% in 2010, 89.5% in 2013), but continues to be slightly lower than targeted coverage levels. Coverage with LLINs has substantially increased: where only 51.7% of households had at least one LLIN in 2010, 87.9% of households in targeted risk areas less than two kilometres from the forest had one or more LLIN in 2013.

In 2013, the proportions of households with at least one ITN and at least one LLIN were comparable, suggesting ITNs have been replaced in households with LLINs, or, at the least, households that previously had only ITNs requiring retreatment now also have access to LLINs. Although LLIN coverage has increased since the previous CMS in 2010 as a result of LLIN distribution at a ratio of one net to one person, the household LLIN ownership level remains slightly below the national target of 95%.

Ownership of LLINs is similar between domains, but lower in the risk category 4 areas, situated at more than two kilometres from the forest. Household ownership of LLINs appears equitable, being comparable across the socioeconomic status range.

Table 4.1: Summary of household ownership of *at least one* mosquito net, risk categories 1-4

		Any type		ITN		LLIN	
	N	% [95% CI]	P-value	% [95% CI]	P-value	% [95% CI]	P-value
Total	3,286	99.7 [99.5, 99.9]		77.8 [69.7, 84.2]		75.4 [66.6, 82.5]	
Domain							
1	1,702	99.9 [99.7, 100.0]	0.027	79.5 [66.7, 88.3]	0.613	75.6 [61.5, 85.8]	0.946
2	1,584	99.5 [99.0, 99.8]		75.8 [65.0, 84.1]		75.1 [64.1, 83.6]	
Risk category							
1 (<500m)	1,206	99.8 [99.5, 100.0]	0.708	90.9 [87.7, 93.3]	< 0.001	88.6 [83.8, 92.1]	< 0.001
2 (500m-<1km)	840	99.6 [98.7, 99.9]		88.7 [79.7, 94.0]		88.5 [79.3, 93.9]	
3 (1km-<2km)	680	99.7 [99.1, 99.9]		88.5 [80.5, 93.4]		86.0 [77.4, 91.7]	
4 (>=2km)	560	99.7 [98.9, 99.9]		51.7 [29.4, 73.4]		47.6 [24.5, 71.8]	
SES group							
Q1 (poorest)	657	99.8 [98.8, 100.0]	0.002	78.6 [65.7, 87.5]	0.992	77.6 [64.6, 86.8]	0.864
Q2	655	100.0 [99.8, 100.0]		78.1 [64.1, 87.7]		75.2 [60.8, 85.5]	
Q3	656	99.7 [99.0, 99.9]		77.4 [67.1, 85.2]		73.0 [61.1, 82.3]	
Q4	655	100		77.0 [65.8, 85.3]		74.5 [63.6, 83.1]	
Q5 (least poor)	655	99.0 [98.0, 99.5]		77.9 [67.5, 85.7]		76.9 [66.7, 84.7]	

Table 4.2: Summary of household ownership of 'sufficient' mosquito nets

		Any type		ITN		LLIN	
	N	% [95% CI]	P-value	% [95% CI]	P-value	% [95% CI]	P-value
Total	3,286	78.2 [74.5, 81.5]		53.5 [46.2, 60.7]		51.0 [43.6, 58.5]	
Domain							
1	1,702	79.6 [73.6, 84.5]	0.411	56.0 [44.4, 67.0]	0.471	52.6 [40.8, 64.2]	0.651
2	1,584	76.6 [72.1, 80.6]		50.8 [42.1, 59.3]		49.3 [40.7, 57.9]	
Risk category							
1 (<500m)	1,206	80.4 [76.7, 83.6]	0.003	63.8 [57.8, 69.4]	0.021	59.8 [52.9, 66.3]	0.038
2 (500m-<1km)	840	84.0 [79.0, 88.0]		63.1 [53.1, 72.0]		61.1 [50.8, 70.6]	
3 (1km-<2km)	680	82.7 [77.8, 86.7]		58.7 [49.1, 67.7]		56.3 [46.2, 65.9]	
4 (>=2km)	560	69.1 [58.4, 78.1]		34.1 [16.4, 57.8]		32.6 [14.9, 57.2]	
SES group							
Q1 (poorest)	657	74.3 [67.4, 80.2]	0.001	53.7 [42.5, 64.5]	0.849	51.9 [40.6, 63.0]	0.778
Q2	655	73.7 [67.8, 78.9]		52.3 [42.5, 61.9]		49.9 [39.9, 59.9]	
Q3	656	76.1 [71.0, 80.5]		52.9 [43.3, 62.3]		50.2 [40.4, 60.0]	
Q4	655	83.0 [79.0, 86.3]		52.2 [42.1, 62.1]		49.0 [39.5, 58.6]	
Q5 (least poor)	655	84.8 [78.8, 89.3]		57.1 [47.9, 65.8]		54.8 [45.7, 63.6]	

Note: 'Sufficient' means two persons or fewer per mosquito net.

The proportion of households with at least one net for every two people, deemed 'sufficient' nets, is substantially lower than targeted especially given the mass distribution campaigns in 2011/12 using a distribution ratio of one net per person. Overall ownership of sufficient nets of any type across all risk categories is 78.2%, but drops to 53.5% and 51.0% for ITNs and LLINs, respectively. When comparing ownership of sufficient ITNs and LLINs between the 2010 and 2013 national surveys in households in the targeted risk categories 1-3, the results indicate there has been a switch from households having a combination of both ITNs and LLINs to the majority of ITNs in households being of a long-lasting type. This is also reflected in the substantial increases in ownership of at least one LLIN per household (Table 4.1) as well as the large increase in the proportion of households in risk categories 1-3 with sufficient LLINs (22.8% in 2010, 59.3% in 2013).

Untreated nets are still found and in use in households, reflected in the difference between proportion of households with sufficient ITN/LLINs and households with sufficient nets of any type. Table 4.3 indicates the ongoing presence of untreated nets in risk categories 1-4, since households have on average 2.50 ITNs (most being LLINs), but 3.57 nets of any type, meaning an average of one untreated net in each household.

When investigating ownership of sufficient ITNs or LLIN in all risk categories included in the survey, this indicator was similar across the socioeconomic status range, but there was a statistically significant relationship between increasing socioeconomic status and increasing proportion of households with sufficient nets of any type. This finding indicates a tendency for the least poor households to purchase additional untreated mosquito nets, but these more affluent households do not buy ITNs or LLINs.

Table 4.3: Inventory of household mosquito nets, risk categories 1-4

	Total	Domain 1	Domain 2
	Mean [95%]	Mean [95%]	Mean [95%]
Nets in household			
Any nets	3.57 [3.36, 3.78]	3.54 [3.22, 3.87]	3.60 [3.36, 3.85]
ITNs	2.50 [2.16, 2.84]	2.53 [2.01, 3.04]	2.47 [2.03, 2.90]
LLINs	2.39 [2.04, 2.74]	2.37 [1.83, 2.90]	2.42 [1.99, 2.86]

Table 4.4: Characteristics of household mosquito nets, risk categories 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Age of net	**11,966**		**6,191**		**5,775**	
<6 months	510	4.5 [3.5, 5.8]	320	5.7 [4.1, 7.8]	190	3.3 [2.2, 4.8]
6 months-<1 year	2,398	19.2 [16.2, 22.5]	1,351	20.2 [15.7, 25.4]	1,047	18.1 [14.5, 22.4]
>=1 year	5,291	44.1 [40.3, 47.9]	2,708	43.9 [38.1, 49.9]	2,583	44.3 [39.6, 49.0]
2 years-<3 years	2,584	21.9 [19.8, 24.2]	1,235	20.2 [17.3, 23.5]	1,349	23.8 [20.9, 26.9]
3 years-<5 years	877	7.3 [6.3, 8.5]	426	7.2 [5.6, 9.1]	451	7.5 [6.2, 8.9]
≥5 years	306	3.0 [2.3, 3.8]	151	2.9 [1.9, 4.3]	155	3.1 [2.4, 3.8]
Source of net	**11,959**		**6,184**		**5,775**	
Gift (family/friend)	287	3.2 [2.1, 4.8]	104	2.2 [1.3, 3.7]	183	4.4 [2.5, 7.4]
Government/NGO	8,554	67.5 [60.7, 73.7]	4,521	68.6 [57.7, 77.8]	4,033	66.4 [58.2, 73.7]
Shop/market	2,150	20.1 [16.0, 24.9]	1,175	21.5 [15.4, 29.2]	975	18.5 [13.6, 24.6]
Itinerant seller	914	8.7 [6.2, 12.1]	353	7.2 [4.8, 10.8]	561	10.4 [6.3, 16.6]
Other	54	0.5 [0.3, 0.8]	31	0.5 [0.2, 1.2]	23	0.4 [0.2, 0.9]
Price of net[1] (KHR)	**3,673**		**1,662**		**2,011**	
No cost	287	9.4 [6.4, 13.7]	104	7.0 [4.4, 10.9]	183	11.6 [6.7, 19.3]
<12,000	625	14.9 [11.1, 19.6]	184	10.3 [7.6, 13.7]	441	18.9 [12.8, 27.2]
12,000-<40,000	2,574	71.0 [64.5, 76.7]	1,321	79.6 [74.2, 84.1]	1,253	63.2 [52.9, 72.4]
≥40,000	187	4.8 [3.5, 6.5]	53	3.1 [1.9, 5.1]	134	6.2 [4.3, 9.0]
Type of net	**11,878**		**6,128**		**5,750**	
LLIN	8,396	67.6 [60.8, 73.7]	4,379	67.5 [57.1, 76.4]	4,017	67.7 [58.8, 75.5]
Conventional	3,398	31.6 [25.7, 38.1]	1,691	31.3 [22.9, 41.2]	1,707	31.8 [24.2, 40.6]
Bundled	84	0.8 [0.5, 1.4]	58	1.2 [0.6, 2.4]	26	0.5 [0.3, 0.7]
LLIN	**8,396**		**4,379**		**4,017**	
Olyset	3,816	42.5 [33.1, 52.5]	1,021	20.9 [13.2, 31.5]	2,795	65.9 [51.1, 78.2]
PermaNet	3,186	41.7 [30.9, 53.3]	2,588	62.4 [46.9, 75.7]	598	19.3 [9.2, 36.0]
NetProtect	1,160	12.8 [7.5, 20.9]	703	15.1 [7.3, 28.7]	457	10.2 [4.7, 20.6]
Malanet (bed)	143	2.2 [1.1, 4.2]	53	1.3 [0.5, 3.1]	90	3.1 [1.3, 7.3]
Malanet (hammock)	85	0.8 [0.4, 1.5]	13	0.3 [0.1, 0.6]	72	1.4 [0.7, 2.8]
Global Fund/Ministry of Health logo	6	0.0 [0.0, 0.1]	1	0.0 [0.0, 0.1]	5	0.1 [0.0, 0.3]

(cont.)

Table 4.4 (cont)

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Conventional	**3,398**		**1,691**		**1,707**	
B52	1,673	50.0 [46.3, 53.7]	812	48.6 [43.8, 53.5]	861	51.5 [45.8, 57.3]
No logo	1,355	39.7 [35.8, 43.8]	693	40.8 [36.0, 45.9]	662	38.6 [32.4, 45.1]
Hammock	324	8.6 [6.5, 11.4]	163	8.8 [6.0, 12.9]	161	8.4 [5.6, 12.5]
Other	46	1.6 [0.8, 3.2]	23	1.7 [0.6, 5.0]	23	1.5 [0.7, 3.2]
Bundled[2]	**81**		**56**		**25**	
B52	38	46.2 [33.2, 59.9]	26	42.8 [29.1, 57.7]	12	55.3 [28.7, 79.1]
No logo	25	32.2 [21.2, 45.6]	16	30.7 [18.5, 46.5]	9	36.1 [16.1, 62.3]
Hammock	10	10.7 [5.9, 18.8]	7	12.4 [6.3, 23.0]	3	6.2 [1.3, 24.6]
Other	8	10.9 [3.9, 27.0]	7	14.0 [5.1, 33.2]	1	2.5 [0.3, 17.6]
Net treated past 12 months	**11,856**		**6,114**		**5,742**	
LLINs	8,383	6.4 [4.3, 9.5]	4,370	8.0 [4.6, 13.6]	4,013	4.7 [2.9, 7.6]
Conventional nets	3,390	4.7 [3.0, 7.5]	1,687	7.1 [4.0, 12.3]	1,703	2.2 [1.4, 3.5]
Bundled nets	83	29.4 [16.1, 47.6]	57	29.7 [13.5, 53.4]	26	28.6 [13.2, 51.4]
Holes in net	**11,970**		**6,193**		**5,777**	
Yes	3,988	33.5 [29.8, 37.4]	1,980	33.3 [28.0, 39.1]	2,008	33.8 [28.9, 39.0]
Net repaired	**11,918**		**6,164**		**5,754**	
Yes	1,531	13.3 [11.2, 15.7]	759	13.0 [10.1, 16.6]	772	13.6 [10.8, 16.9]
Frequency washed	**11,899**		**6,159**		**5,740**	
Monthly	3,696	30.6 [27.8, 33.5]	1,874	31.4 [27.1, 36.1]	1,822	29.6 [26.4, 33.1]
Twice a year	3,749	32.4 [29.7, 35.2]	1,774	29.5 [26.1, 33.1]	1,975	35.6 [31.4, 40.0]
Once a year	407	3.2 [2.7, 3.8]	207	3.0 [2.4, 3.7]	200	3.5 [2.7, 4.5]
More than once a year	299	2.2 [1.5, 3.2]	225	3.1 [1.9, 5.0]	74	1.2 [0.8, 1.8]
Never	3,748	31.6 [28.0, 35.5]	2,079	33.0 [27.2, 39.4]	1,669	30.1 [26.2, 34.3]
Used net last night	**11,868**		**6,117**		**5,751**	
Yes	6,985	59.3 [56.1, 62.5]	3,588	59.6 [54.0, 64.9]	3,397	59.1 [55.8, 62.3]
Old nets not used to sleep	**3,286**		**1,702**		**1,584**	
Yes	629	19.2 [16.7, 21.9]	295	18.2 [14.8, 22.1]	334	20.3 [16.9, 24.1]
Unused new nets	**3,286**		**1,702**		**1,584**	
Yes	1,231	37.4 [31.9, 43.3]	588	34.4 [25.4, 44.6]	643	40.8 [35.3, 46.5]
Why aren't the new nets used?	**1,231**		**588**		**643**	
Saving for visitors	577	44.2 [37.1, 51.4]	275	43.7 [34.4, 53.5]	302	44.6 [34.4, 55.3]
Saving for future	561	47.5 [41.3, 53.8]	264	48.2 [38.5, 58.0]	297	46.9 [39.3, 54.8]
No place to hang	3	0.2 [0.1, 0.6]	1	0.1 [0.0, 0.9]	2	0.3 [0.1, 1.1]
Have enough nets	83	7.5 [4.4, 12.5]	44	7.0 [4.6, 10.5]	39	8.0 [3.2, 18.4]
Other	6	0.6 [0.3, 1.3]	4	1.0 [0.4, 2.6]	2	0.2 [0.0, 0.7]

Notes: 1) Exchange rate approximately USD1 to KHR4,000; 2) a conventional mosquito net packaged and sold with a SuperMalatab insecticide kit, and age of net under one year.

Table 4.5: Characteristics of bought nets identified in households, risk categories 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total bought nets	**3,330**					
Net type	**3,330**					
LLIN: Olyset	229	4.8 [2.6, 8.6]	30	1.8 [0.8, 4.1]	199	7.6 [3.7, 15.1]
LLIN: Permanet	154	4.6 [2.1, 9.5]	69	3.1 [1.3, 7.2]	85	5.9 [2.1, 15.7]
LLIN: Malanet	31	0.9 [0.4, 2.3]	10	0.9 [0.2, 4.5]	21	1.0 [0.4, 2.4]
LLIN: Netprotect	16	0.6 [0.3, 1.4]	5	0.3 [0.1, 0.9]	11	0.9 [0.3, 2.5]
LLIN: Global Fund/Ministry of Health label	2	0.0 [0.0, 0.2]	0	0.0	2	0.1 [0.0, 0.5]
Untreated net: B52	1,616	50.0 [46.4, 53.6]	782	51.7 [47.2, 56.3]	834	48.4 [43.0, 53.7]
Untreated net: no label	1,108	33.6 [29.1, 38.5]	571	37.1 [31.3, 43.3]	537	30.3 [23.7, 37.9]
Hammock: Malanet LLIHN	8	0.1 [0.1, 0.3]	1	0.0 [0.0, 0.3]	7	0.2 [0.1, 0.5]
Hammock: untreated	135	4.0 [3.1, 5.3]	47	3.6 [2.7, 4.8]	88	4.5 [2.9, 6.8]
Other net	31	1.3 [0.5, 3.1]	14	1.4 [0.4, 5.7]	17	1.1 [0.4, 3.1]
Net colour	**3,321**		**1,526**		**1,795**	
Blue	1,218	36.4 [32.9, 40.0]	548	36.3 [31.9, 40.9]	670	36.5 [31.3, 42.1]
Pink	1,292	38.2 [34.5, 42.0]	596	37.6 [33.3, 42.1]	696	38.7 [32.9, 44.8]
Green	412	12.8 [11.3, 14.5]	167	12.0 [10.6, 13.5]	245	13.6 [11.1, 16.6]
White	215	7.2 [5.5, 9.3]	108	7.5 [5.1, 11.0]	107	6.9 [4.9, 9.6]
Red	85	2.4 [1.7, 3.4]	53	3.4 [2.3, 4.9]	32	1.5 [0.9, 2.6]
Yellow	23	0.6 [0.4, 1.1]	9	0.4 [0.2, 1.1]	14	0.8 [0.5, 1.5]
Mixed	2	0.1 [0.0, 0.2]	2	0.1 [0.0, 0.4]	0	0.0
Other	74	2.3 [1.5, 3.7]	43	2.8 [1.6, 4.6]	31	1.9 [0.8, 4.4]
Net size	**3,370**		**1,552**		**1,818**	
Single size	105	3.8 [2.4, 5.9]	49	3.7 [2.1, 6.5]	56	3.9 [2.0, 7.5]
Family size	3,062	90.3 [88.1, 92.2]	1,433	91.2 [87.9, 93.7]	1,629	89.5 [86.3, 92.1]
Hammock	203	5.9 [4.6, 7.4]	70	5.1 [3.7, 6.9]	133	6.6 [4.7, 9.1]

The most common age of nets was between one and two years old, likely corresponding with mass net distributions. Few nets identified in households were three years old or more. Approximately two-thirds of all nets were provided by the government or a non-governmental organisation (NGO), but the next most frequent source of nets was from a shop or market (20% overall). Interestingly, the proportion of nets reported to have been purchased from a shop, market or trader and the proportion of nets that were of the conventional, untreated type, were very similar. This perhaps indicates either that LLINs are not available for purchase or a consumer preference for untreated nets.

Olyset nets were found to be the more common LLIN type in Domain 2 areas, and PermaNet in Domain 1. A small proportion of other LLIN types were found, but very few hammock-type LLINs were identified. Hammock nets comprised 9% of all untreated nets found in households. One-third of all nets (34%) were found to have holes, while only 13% of nets were found to have evidence of repair.

Table 4.6: Household ownership of mosquito nets by province

	Clusters	Households	≥1 net (any type)	≥ 1 LLIN	*Sufficient* LLINs
	N	N	% [95% CI]	% [95% CI]	% [95% CI]
Domain 1					
Banteay Meanchey	4	160	100.0	45.5 [10.8, 85.2]	31.5 [7.9, 71.1]
Battambang	10	400	100.0	88.2 [83.3, 91.8]	57.5 [46.1, 68.2]
Kampong Speu	5	200	99.9 [99.1, 100.0]	98.5 [91.5, 99.7]	74.5 [65.7, 81.7]
Kampot	7	280	100.0	81.7 [41.5, 96.6]	60.6 [26.5, 86.7]
Koh Kong	3	120	99.2 [95.7, 99.8]	93.2 [84.6, 97.2]	75.0 [55.4, 87.9]
Oddar Meanchey	3	120	100.0	75.3 [63.3, 84.3]	44.5 [32.4, 57.3]
Pailin	2	80	100.0	87.5 [81.9, 91.5]	69.2 [65.9, 72.2]
Preah Vihear	2	62	100.0	90.6 [78.3, 96.3]	58.8 [37.1, 77.5]
Pursat	2	80	100.0	96.8 [91.2, 98.9]	81.8 [78.3, 84.9]
Siem Reap	5	200	99.8 [98.1, 100.0]	34.3 [13.3, 63.9]	15.3 [4.8, 39.2]
Domain 2					
Kampong Cham	12	480	99.7 [98.1, 100.0]	67.9 [41.5, 86.3]	37.9 [23.9, 54.3]
Kampong Chhnang	2	80	100.0	93.2 [91.6, 94.6]	66.6 [52.2, 78.5]
Kampong Thom	6	240	99.0 [97.0, 99.7]	69.1 [35.1, 90.3]	44.8 [22.1, 69.8]
Kep	1	40	100.0	100.0	80.0 [80.0, 80.0]
Kratie	5	200	99.7 [97.5, 100.0]	56.2 [18.4, 87.9]	26.8 [8.1, 60.3]
Mondulkiri	2	64	100.0	87.8 [75.4, 94.4]	47.4 [31.2, 64.2]
Rattanakiri	3	120	99.3 [96.0, 99.9]	91.6 [79.2, 96.9]	68.4 [59.8, 75.8]
Sihanoukville	4	160	98.9 [93.2, 99.8]	78.2 [26.0, 97.3]	72.3 [26.7, 94.9]
Stung Treng	3	120	99.0 [95.7, 99.8]	91.7 [84.2, 95.8]	65.6 [51.2, 77.7]
Takeo	2	80	100.0	78.1 [19.9, 98.1]	62.0 [21.0, 90.9]

Across all domains, only 59% of nets owned by households had been used for sleeping on the previous night. Reported reasons for nets not being used included that they were saved for visitors (44%) or being saved for the future (48%). Only a minority of households (8%) reported that nets were not being used because they already had enough nets.

Considering that some households continue to purchase mosquito nets, in addition to receiving donated nets, investigating the characteristics of these nets households choose and buy may reveal some preferred net characteristics. The vast majority of bought nets were of the untreated type (either B52 brand or unlabelled), and family sized. Only 5.9% of bought nets that were of the hammock type. The most common colours of bought nets were blue and pink.

Because of the sampling frame used for this study, estimates of mosquito net ownership are not representative at province level, therefore should be interpreted conservatively. It should also be noted that mosquito net use was reported for each individual by the head of household.

Table 4.7: Summary of mosquito net usage (previous night) by target populations, risk categories 1-4

	Total		Domain 1		Domain 2		P-value
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	
Any net							
All people	16,698	84.7 [83.3, 86.0]	8,289	85.3 [83.5, 86.9]	8,409	84.1 [81.9, 86.0]	Pr = 0.362
Under 5 years	1,602	94.7 [93.1, 95.9]	750	95.9 [94.0, 97.2]	852	93.7 [91.2, 95.5]	Pr = 0.096
Pregnant women	173	91.3 [85.4, 95.0]	75	93.8 [83.2, 97.9]	98	89.2 [80.6, 94.2]	Pr = 0.355
Forest-goers	879	68.6 [61.9, 74.7]	378	66.3 [56.0, 75.3]	501	70.7 [61.6, 78.4]	Pr = 0.498
Travellers	3,906	52.2 [48.0, 56.3]	2,013	52.0 [46.4, 57.5]	1,893	52.4 [46.0, 58.6]	Pr = 0.925
Visitors	167	94.1 [87.8, 97.2]	101	94.7 [85.9, 98.1]	66	93.2 [81.2, 97.7]	Pr = 0.739
ITN							
All people	16,698	52.4 [46.2, 58.4]	8,289	53.0 [43.8, 62.0]	8,409	51.7 [43.7, 59.7]	Pr = 0.837
Under 5 years	1,602	57.7 [50.8, 64.4]	750	58.6 [47.6, 68.9]	852	56.9 [48.1, 65.4]	Pr = 0.811
Pregnant women	173	57.2 [47.2, 66.6]	75	53.6 [37.4, 69.2]	98	60.2 [48.7, 70.7]	Pr = 0.508
Forest-goers	879	48.5 [41.1, 55.9]	378	51.2 [41.1, 61.2]	501	46.0 [35.9, 56.5]	Pr = 0.484
Travellers	3,906	31.8 [26.9, 37.1]	2,013	30.9 [24.1, 38.7]	1,893	32.8 [26.0, 40.4]	Pr = 0.718
Visitors	167	58.7 [46.9, 69.6]	101	59.3 [43.5, 73.3]	66	57.9 [40.4, 73.6]	Pr = 0.905
LLIN							
All people	16,698	49.9 [43.6, 56.2]	8,289	49.1 [39.5, 58.8]	8,409	50.6 [42.6, 58.7]	Pr = 0.817
Under 5 years	1,602	54.9 [47.7, 61.8]	750	54.1 [42.4, 65.2]	852	55.6 [46.9, 63.9]	Pr = 0.833
Pregnant women	173	53.1 [42.0, 64.0]	75	47.6 [29.0, 66.9]	98	58.0 [46.9, 68.3]	Pr = 0.363
Forest-goers	879	45.3 [37.8, 53.1]	378	45.0 [34.3, 56.2]	501	45.7 [35.4, 56.4]	Pr = 0.928
Travellers	3,906	30.1 [25.3, 35.4]	2,013	28.4 [21.6, 36.4]	1,893	32.0 [25.5, 39.4]	Pr = 0.483
Visitors	167	54.9 [42.7, 66.5]	101	55.8 [39.8, 70.8]	66	53.5 [35.9, 70.2]	Pr = 0.844

No differences in net use were seen among each of the target populations between Domain 1 and Domain 2. However, there are differences in levels of net use between the target population groups. Reported use of any type of mosquito net on the previous night was very high in children under five years of age (95%), and high among pregnant women (91%). However, when restricting this to use of LLINs, the use levels are disappointing (55% and 53%, respectively). Use of any net was higher than use of LLIN for other target groups such as forest-goers, indicating access to and use of untreated nets by these populations.

Figure 4.1 shows differences in use of any mosquito net and type of net used between different populations. The proportion of children under five years and temporary visitors to a household not using any type of net are very low. However, use of any net on the previous night by people who are travellers is the lowest of any demographic or risk group. Across all groups, very few individuals are using ITNs.

Although there continues to be use of untreated nets among many of the target populations in Cambodia, more than 90% of individuals interviewed reported that prevention of mosquito bites was a benefit of using insecticide-treated rather than untreated nets. Knowledge of insecticide-treated nets to protect

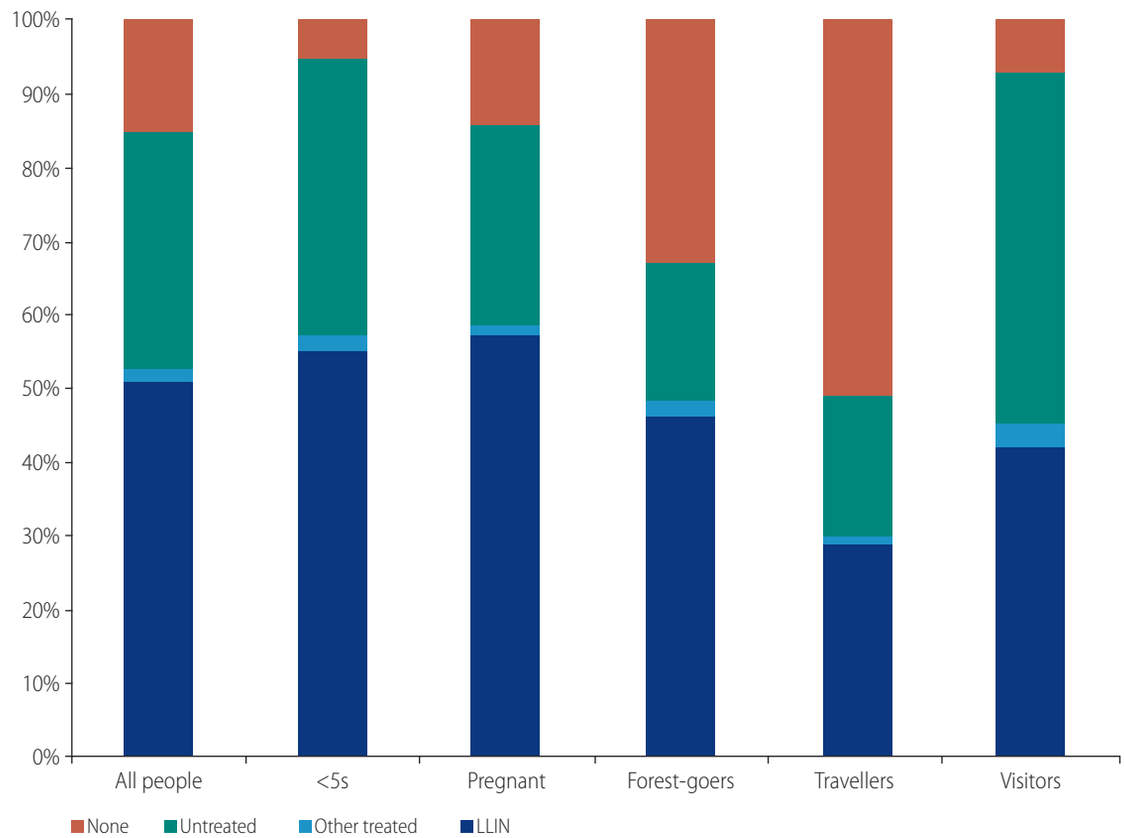

Figure 4.1: Net use and type of net used by specific risk populations

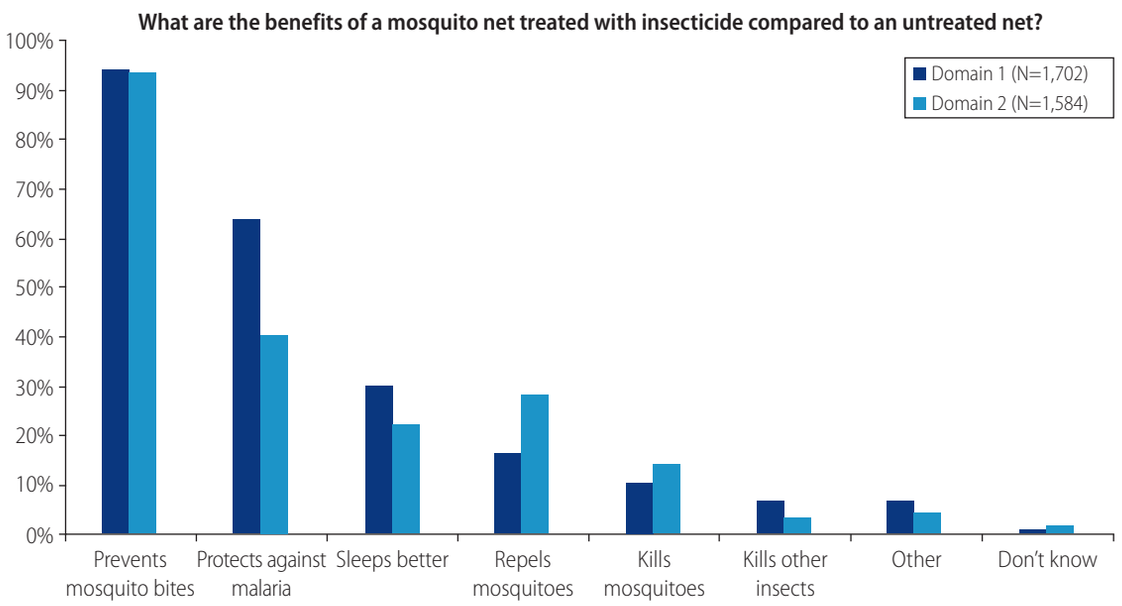

Figure 4.2: Attitudes regarding benefits of insecticide-treated mosquito nets by domain

Table 4.8: Use of any mosquito nets and long lasting insecticide-treated nets the previous night, risk category 1-4

		Any net		LLIN		Untreated net	
	N	% [95% CI]	P-value	% [95% CI]	P-value	% [95% CI]	P-value
Total	**16,698**	**84.7 [83.3, 86.0]**		**49.9 [43.6, 56.2]**		**32.3 [26.3, 39.0]**	
Domain							
1	8,289	85.3 [83.5, 86.9]	Pr = 0.362	49.1 [39.5, 58.8]	Pr = 0.817	32.3 [23.1, 43.1]	Pr = 0.994
2	8,409	84.1 [81.9, 86.0]		50.6 [42.6, 58.7]		32.3 [25.0, 40.6]	
Risk category							
1 (<500m)	6,038	86.2 [83.9, 88.2]	Pr = 0.222	59.3 [52.1, 66.2]	Pr = 0.029	22.9 [17.1, 29.9]	Pr = 0.010
2 (500m-<1km)	4,316	82.8 [80.4, 84.9]		57.2 [49.9, 64.3]		24.1 [18.6, 30.6]	
3 (1km-<2km)	3,522	85.8 [83.4, 87.8]		54.5 [46.7, 62.2]		29.1 [22.0, 37.3]	
4 (≥2km)	2,822	84.3 [80.9, 87.2]		33.3 [17.3, 54.5]		48.7 [30.1, 67.7]	
SES group							
Q1 (poorest)	3,284	83.8 [81.2, 86.2]	Pr = 0.803	54.0 [45.8, 61.9]	Pr = 0.435	28.5 [20.5, 38.1]	Pr = 0.499
Q2	3,341	84.7 [82.1, 87.0]		52.2 [42.4, 61.9]		30.1 [21.5, 40.5]	
Q3	3,376	84.6 [81.7, 87.2]		47.7 [39.1, 56.3]		33.8 [26.0, 42.5]	
Q4	3,316	85.8 [83.3, 88.0]		47.2 [39.7, 54.9]		35.3 [27.3, 44.3]	
Q5 (least poor)	3,341	84.3 [82.0, 86.3]		48.2 [40.3, 56.1]		33.9 [27.0, 41.6]	
Age/sex							
<5 years	1,602	94.7 [93.1, 95.9]	Pr < 0.001	54.9 [47.7, 61.8]	Pr < 0.001	37.0 [30.6, 43.8]	Pr < 0.001
5-<15 years	3,886	92.8 [91.3, 94.1]		56.1 [48.5, 63.4]		34.0 [27.1, 41.8]	
Male ≥15 years	5,350	75.7 [73.4, 77.9]		44.3 [38.8, 49.9]		28.9 [23.3, 35.2]	
Female ≥15 years	5,860	85.0 [83.2, 86.5]		49.6 [43.1, 56.2]		33.1 [26.8, 40.1]	
Forest-goer							
Yes	879	68.6 [61.9, 74.7]	Pr < 0.001	45.3 [37.8, 53.1]	Pr = 0.144	20.1 [14.6, 27.0]	Pr < 0.001
No	15,819	85.6 [84.2, 86.8]		50.1 [43.7, 56.5]		33.0 [26.7, 39.9]	
Traveller							
Yes	3,906	52.2 [48.0, 56.3]	Pr < 0.001	30.1 [25.3, 35.4]	Pr < 0.001	20.4 [16.2, 25.3]	Pr < 0.001
No	12,792	94.5 [93.5, 95.4]		55.9 [48.6, 62.9]		35.9 [29.1. 43.3]	
Residence							
Usual resident	16,531	84.6 [83.2, 85.9]	Pr = 0.007	49.8 [43.5, 56.2]	Pr = 0.359	32.3 [26.2, 39.0]	Pr = 0.576
Temporary visitor	167	94.1 [87.8, 97.2]		54.9 [42.7, 66.5]		35.3 [24.9, 47.3]	
Fever							
Yes	1,657	94.0 [92.1, 95.5]	Pr < 0.001	56.6 [48.6, 64.3]	Pr < 0.001	34.4 [27.2, 42.4]	Pr = 0.232
No	15,041	83.7 [82.2, 85.0]		49.1 [42.9, 55.4]		32.1 [26.1, 38.8]	
Sufficient LLINs							
Yes	8,562	86.7 [85.1, 88.1]	Pr = 0.002	73.6 [71.1, 76.0]	Pr < 0.001	11.8 [9.7,1 4.2]	Pr < 0.001
No	8,136	82.9 [80.6, 85.0]		27.9 [22.6, 33.9]		51.4 [44.5, 58.2]	
Heard key message[1]							
Yes	7,284	84.8 [83.3, 86.3]	Pr = 0.637	48.0 [41.0, 55.0]	Pr = 0.008	34.2 [27.5, 41.7]	Pr = 0.007
No	9,414	84.3 [82.1, 86.2]		56.4 [50.6, 62.0]		26.0 [20.8, 31.9]	

Note: 1) Key message as 'sleep under an insecticide-treated net'.

against malaria was much higher in Domain 1 than in Domain 2. However, in both domains, few people reported that ITNs were better than untreated nets because of their ability to repel or kill mosquitoes.

No differences in use of any type of mosquito net or LLINs were seen between Domain 1 and Domain 2. However, differences in use of LLINs were observed between risk categories. Use of LLINs in households in risk category 1 (less than 500 metres from the forest, defined in 2007) was highest, at 59%, and use of LLINs decreased with increasing distance from the forest. Significant differences were also seen in use of LLINs by age and sex, with use highest in children (both under five and five to 15 years) but use lowest among adult males.

Use of any type of mosquito net was significantly lower ($p<0.001$) among forest-goers than among those who did not visit the forest, but no comparable differences in LLIN use by forest-going habits were observed. Use of any net and of LLINs was significantly higher among individuals who reported experiencing fever ($p<0.001$ for both). Tables 4.10 and 4.11 present more details of net use among the forest-going population. Key indicators of net use are also presented for risk zones 1-3 only in Table 0.1.

Evidence was found for an association between increasing household size and decreasing proportion of households with sufficient ITNs or LLINs (Table 4.9), indicating an unmet gap in net ownership in larger households. It should be noted, however, that the proportion of households with more than six members is small (20%).

Table 4.9: Relationship between households with sufficient nets (ITNs, LLINs) and household size

	Total	Sufficient LLINs			Sufficient ITNs		
	N	N	% [95% CI]	P-value[1]	N	% [95% CI]	P-value
Total	3,286	1,796	51.0 [43.6, 58.5]		1,874	53.5 [46.2, 60.7]	
Household size[2]							
1	49	35	64.3 [44.5, 80.2]	<0.001	36	68.8 [52.8, 81.4]	<0.001
2	205	148	68.4 [57.7, 77.5]		155	70.9 [59.9, 79.8]	
3	423	241	52.6 [43.7, 61.3]		256	56.1 [47.1, 64.7]	
4	700	439	58.8 [48.3, 68.7]		454	61.1 [50.6, 70.7]	
5	707	370	48.2 [40.6, 55.8]		385	50.6 [43.2, 57.9]	
6	533	292	50.7 [42.2, 59.2]		308	53.7 [45.0, 62.1]	
7	301	130	40.7 [31.5, 50.7]		133	41.5 [32.2, 51.4]	
8	172	72	39.1 [29.7, 49.3]		77	42.9 [34.4, 51.8]	
9	101	43	44.8 [32.8, 57.5]		43	44.8 [32.8, 57.5]	
≥10	95	26	25.4 [17.5, 35.4]		27	25.8 [17.9, 35.7]	

Notes: 1) P value for trend fitted by logistic regression; 2) household size includes usual and temporary residents enumerated during the survey.

Table 4.10: Net use among individuals reported to visit the forest, risk categories 1-4

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Last visit to forest	**879**		**378**		**501**	
Last night	28	3.4 [2.1, 5.5]	13	2.9 [1.3, 6.3]	15	3.8 [2.0, 7.1]
<1 week	239	26.2 [20.9, 32.4]	99	22.9 [15.5, 32.5]	140	29.2 [21.9, 37.7]
1-<4 weeks	239	26.5 [21.2, 32.7]	118	28.9 [20.8, 38.7]	121	24.4 [17.4, 33.0]
≥4 weeks	357	41.7 [35.4, 48.2]	147	45.2 [36.3, 54.3]	210	38.5 [30.2, 47.5]
Not sure	16	2.2 [0.9, 5.4]	1	0.1 [0.0, 0.4]	15	4.1 [1.7, 9.9]
Nights in forest						
1-2	185	21.8 [16.3, 28.5]	87	21.4 [13.8, 31.5]	98	22.1 [14.8, 31.6]
3-5	213	23.0 [17.4, 29.6]	78	18.0 [11.1, 28.0]	135	27.4 [19.6, 36.9]
6-10	193	21.7 [17.1, 27.1]	78	18.5 [11.8, 27.8]	115	24.6 [19.4, 30.6]
>10	272	31.7 [23.4, 41.5]	128	39.7 [25.7, 55.7]	144	24.5 [16.5, 34.7]
Not specified	16	1.9 [0.8, 4.5]	7	2.3 [0.6, 8.9]	9	1.4 [0.7, 3.1]
Net use (last time in forest)	**871**		**373**		**498**	
Any net	645	71.5 [63.4, 78.4]	266	69.6 [55.6, 80.7]	379	73.3 [64.6, 80.5]
Treated net (reported by head of household)	418	42.8 [35.6, 50.2]	188	45.6 [35.9, 55.6]	230	40.2 [29.8, 51.6]
Type of net used (last time in forest)	**644**		**266**		**378**	
Hammock	236	35.8 [27.7, 44.7]	115	42.3 [29.9, 55.7]	121	30.2 [20.4, 42.1]
Mosquito	408	64.2 [55.3, 72.3]	151	57.7 [44.3, 70.1]	257	69.8 [57.9, 79.6]
Source of net used in forest	**677**					
Home	634	89.5 [83.5, 93.4]	260	85.5 [73.3, 92.7]	374	92.9 [88.8, 95.6]
Shop near home	3	1.0 [0.2, 4.4]	1	0.7 [0.1, 5.3]	2	1.3 [0.2, 8.7]
Shop near forest	1	0.2 [0.0, 1.1]	1	0.3 [0.0, 2.4]	0	0.0
Co-workers	27	6.9 [3.4, 13.3]	19	11.5 [5.0, 24.4]	8	2.8 [0.9, 8.3]
Other	12	1.8 [0.6, 5.1]	4	1.6 [0.5, 5.3]	8	1.9 [0.4, 9.4]
Reasons to not take a net or use a net in forest						
Didn't realise I had to use one	31	13.7 [8.0, 22.4]	18	15.5 [6.7, 31.7]	13	12.0 [6.1, 22.0]
Forgot to take	34	12.4 [6.3, 22.9]	18	11.5 [3.5, 31.8]	16	13.2 [6.3, 25.6]
Not enough nets in house	60	36.3 [27.5, 46.0]	26	39.8 [27.1, 54.0]	34	32.7 [23.0, 44.2]
Don't have hammock net	30	16.2 [11.0, 23.1]	18	20.7 [12.4, 32.5]	12	11.6 [7.0, 18.6]
Nowhere to hang in forest	7	4.9 [1.5, 14.9]	2	3.8 [0.9, 14.8]	5	6.0 [1.0, 28.2]
No money to buy	6	2.5 [0.5, 12.4]	1	0.2 [0.0, 1.7]	5	4.8 [0.9, 21.4]
Other	32	14.1 [8.0, 23.7]	8	8.5 [4.0, 17.4]	24	19.7 [9.8, 35.6]

(cont.)

Other actions taken in forest to prevent malaria?						
Mosquito coil	77	8.9 [5.6, 13.9]	34	8.7 [4.8, 15.4]	43	9.1 [4.5, 17.4]
Repellent	13	1.2 [0.5, 2.7]	5	0.8 [0.2, 2.5]	8	1.5 [0.5, 4.4]
Boiled water	119	13.4 [8.9, 19.8]	22	6.5 [3.1, 13.3]	97	19.7 [12.2, 30.4]
Burned leaves	444	47.4 [40.1, 54.8]	191	46.1 [36.5, 55.9]	253	48.5 [37.9, 59.3]
Took medication	4	0.3 [0.1, 0.7]	2	0.3 [0.1, 1.1]	2	0.3 [0.1, 1.0]
Wore long clothes	389	48.4 [38.9, 58.0]	193	58.4 [41.7, 73.3]	196	39.3 [31.0, 48.3]
No action taken	142	16.4 [11.2, 23.3]	54	14.4 [6.9, 27.6]	88	18.2 [12.1, 26.4]
Other	26	2.3 [1.4, 3.9]	5	0.9 [0.3, 2.2]	21	3.6 [2.0, 6.4]

Table 4.11: Net use at previous visit to forest and number of nights spent in the forest, risk categories 1-4

		Used any net		P-value	Used treated net *		P-value
	N	N	% [95% CI]		N	% [95% CI]	
Nights in forest							
1-2	184	123	60.3 [42.8, 75.5]		73	32.2 [18.9, 49.2]	
3-5	211	154	69.7 [55.3, 81.0]		117	49.6 [35.2, 64.0]	
6-10	191	161	83.8 [72.7, 91.0]	Pr = 0.016	92	43.0 [33.5, 53.1]	Pr = 0.194
>10	270	201	74.6 [63.0, 83.5]		131	46.0 [37.8, 54.4]	
Not specified	15	6	26.5 [7.3, 62.5]		5	23.0 [6.5, 56.3]	
Last visit to forest							
Last night	28	17	66.4 [45.8, 82.2]		8	27.3 [10.2, 55.6]	
<1 week	238	167	63.7 [46.8, 77.7]		105	38.3 [26.5, 51.6]	
1-<4 weeks	238	172	73.1 [60.6, 82.8]	Pr = 0.321	101	37.1 [25.6, 50.1]	Pr = 0.118
≥4 weeks	353	278	75.6 [67.9, 81.9]		199	51.4 [42.9, 60.0]	
Not sure	14	11	78.0 [48.2, 93.1]		5	23.6 [3.8, 70.9]	

Among those individuals reported to go to the forest, nearly three-quarters reported using any type of mosquito net during their last overnight visit to the forest, and 43% of forest-goers used an ITN. However, it should be noted that these data were gathered by interviewing the head of household, who may not be the forest-going individual. Of those forest-goers who did use a net on their last trip to the forest, 36% used a hammock net with the remainder (64%) using a bed net. Of the hammock nets used by forest-goers, 57% were insecticide-treated, while 71% of bed nets forest-goers used were insecticide-treated types. Use of nets by forest-goers resident in categories 1-3 is reported in Table 0.1.

A statistical association was seen between increasing use of any type of net and increasing number of nights reportedly spent in the forest (p=0.016). However, no association was found between duration of time spent in the forest and use of ITNs.

Table 4.12: Details and characteristics of outlets selling nets

	Total % (N)	Domain 1 % (N)	Domain 2 % (N)
Total	**100 (82)**	**52.4 (43)**	**47.6 (39)**
Respondent's position			
Owner	92.7 (76)	90.7 (39)	94.9 (37)
Employee	- (0)	- (0)	- (0)
Family member	7.3 (6)	9.3 (4)	5.1 (2)
Other	- (0)	- (0)	- (0)
Respondent's sex			
Male	17.7 (14)	21.4 (9)	13.5 (5)
Female	82.3 (65)	78.6 (33)	86.5 (32)
Outlet located in selected cluster			
Yes	13.6 (11)	14.3 (6)	12.8 (5)
No	86.4 (70)	85.7 (36)	87.2 (34)
Type of outlet			
General store/shop	26.8 (22)	14.0 (6)	41.0 (16)
Net seller in market	72.0 (59)	83.7 (36)	59.0 (23)
Other	1.2 (1)	2.3 (1)	- (0)
Outlet age			
<1 year	6.1 (5)	4.7 (2)	7.7 (3)
1-3 years	24.4 (20)	18.6 (8)	30.8 (12)
3-5 years	14.6 (12)	20.9 (9)	7.7 (3)
5+ years	54.9 (45)	55.8 (24)	53.9 (21)
Where do you buy your nets?			
Market in Phnom Penh	67.1 (55)	51.2 (22)	84.6 (33)
Local market	28.0 (23)	44.2 (19)	10.3 (4)
Travelling sales person (Population Services International)	1.2 (1)	2.3 (1)	- (0)
Hawker/iterant seller	3.7 (3)	- (0)	7.7 (3)
Distributor	11.0 (9)	9.3 (4)	12.8 (5)
Government or NGO	- (0)	- (0)	- (0)
Other	3.7 (3)	7.0 (3)	- (0)
Sales of nets compared with last year			
Selling more	7.3 (6)	9.3 (4)	5.1 (2)
Selling same	20.7 (17)	16.3 (7)	25.6 (10)
Selling less	64.6 (53)	69.8 (30)	59.0 (23)
Don't know	- (0)	- (0)	- (0)
N/A (didn't sell last year)	7.3 (6)	4.7 (2)	10.3 (4)
Sell insecticide for treating nets	**81**	**42**	**39**
Yes – SuperMalatab or Malatab	12.3 (10)	16.7 (7)	7.7 (3)
Yes – other brand	1.2 (1)	2.4 (1)	- (0)
No	86.4 (70)	81.0 (34)	92.3 (36)

Table 4.13: Types of nets sold by mosquito net outlet

	Total % (N)	Domain 1 % (N)	Domain 2 % (N)
Total number of outlets	100 (82)	100 (43)	100 (39)
LLIN/LLIHN			
Any LLIN/LLIHN	28.1 (23)	32.7 (14)	23.1 (9)
Olyset	3.7 (3)	4.7 (2)	2.6 (1)
Permanet	3.7 (3)	2.3 (1)	5.1 (2)
Malanet – bed net	14.6 (12)	27.9 (12)	- (0)
Malanet – hammock net	6.1 (5)	9.3 (4)	2.6 (1)
NetProtect	7.3 (6)	2.3 (1)	12.8 (5)
Global Fund/Ministry of Health logo	- (0)	- (0)	- (0)
Conventional			
Any untreated net	100 (82)	100 (43)	100 (39)
B52	84.1 (69)	81.4 (35)	87.2 (34)
No logo	46.8 (37)	44.2 (19)	50.0 (18)
Hammock	67.9 (55)	67.4 (29)	68.4 (26)
Other	46.8 (36)	39.0 (16)	55.6 (20)
Bundled			
Any bundled net	66.3 (53)	69.8 (30)	62.2 (23)
B52	31.3 (25)	44.2 (19)	16.2 (6)
No logo	41.3 (33)	30.2 (13)	54.1 (20)
Hammock	15.8 (12)	16.7 (7)	14.7 (5)
Other	7.4 (6)	4.7 (2)	10.5 (4)

Among the net outlet interviews, the majority of respondents were owners of the outlet, and were female. More than half of outlets had been operating for more than five years. In Domain 1, approximately half of outlets purchased their nets from markets in Phnom Penh, but this source of nets was much more common for outlets in Domain 2, at 85%. The second-most common source of nets in Domain 1 was from local markets. Few outlets sourced nets from the government, NGOs or hawkers or direct from distributors. The majority of outlets reported selling fewer nets than during the comparable time period last year.

Few of the outlets supplied any type of LLIN or LLIHN (28%), but all outlets sold conventional, untreated nets, the most common type being B52 nets. Two-thirds of outlets reported selling untreated hammock nets, but only 16% of outlets sold hammock nets bundled with insecticide. The proportion of outlets selling any type of insecticide (whether bundled or not) to treat mosquito nets was low in both Domain 1 (19%) and Domain 2 (8%).

Table 4.14: Cost to buy and sell nets for mosquito net providers

		Buying price (KHR)			Selling price (KHR)		
	Outlets (N)	Mean	Median	Min, Max	Mean	Median	Min, Max
LLIN/LLIHN							
Olyset	2	14,000	14,000	8,000, 20,000	17,500	17,500	12,000, 23,000
Permanet	3	7,500	8,500	5,000, 9,000	13,125	12,000	6,500, 22,000
Malanet – bed net	12	13,500	13,000	7,000, 20,000	15,909	15,000	12,000, 25,000
Malanet – hammock net	5	7,460	7,500	6,000, 9,000	9,000	9,000	6,500, 11,000
NetProtect	5	11,100	10,000	7,500, 17,000	14,583	14,500	8,500, 20,000
Global Fund/Ministry of Health logo	0	-	-	-	-	-	-
Conventional							
B52	67	25,545	20,000	14,500, 240,000	29,213	24,000	18,000, 280,000
No logo	35	15,629	12,000	5,500, 85,000	16,667	15,000	7,000, 40,000
Hammock	52	31,337	40,000	5,500, 80,000	35,726	45,000	7,500, 85,000
Other	35	31,257	38,000	5,000, 55,000	33,944	40,500	5,000, 60,000
Bundled							
B52	25	16,880	20,000	6,500, 22,000	19,188	23,000	2,200, 26,000
No logo	33	11,107	10,000	15, 20,000	14,212	14,000	9,000, 24,000
Hammock	12	27,333	25,000	6,000, 55,000	31,708	28,500	8,000, 65,000
Other	6	21,417	19,750	6,000, 39,000	25,333	22,500	9,000, 45,000

At outlets selling LLINs, the median price for outlets to purchase LLINs was substantially lower than the cost to purchase conventional nets. LLINs generally also had a lower selling price than most conventional nets, with the exception of untreated nets that do not have any label or brand. The cheapest median selling price of all nets was for LLIHNs (KHR9,000). This is in sharp contrast with the high median selling price for untreated hammock nets (KHR45,000).

The difference in price of treated and untreated hammock nets is particularly surprising when considering that, of all the forest-goers who reported using a hammock-style net (n=236), only 57% of the hammock nets were insecticide-treated, the remainder being untreated-type hammock nets.

Part 5: Treatment

The CMS 2013 survey household component assessed treatment-seeking behaviour, in relation to fever cases occurring in the two weeks prior to the interviews. Estimates of treatment knowledge and practice among health providers were measured in the drug outlet survey.

Among the 1,657 individuals in the household survey who reported experiencing a fever in the previous two weeks, 59% sought treatment within 24 hours (defined as the same or next day as symptoms appeared), but only 12% of people had a malaria test. This indicates that health service providers do not consider malaria in the differential diagnosis of all febrile patients. Very few of the people reporting fever received antimalarial treatment, given the small proportion of malaria-attributable fevers.

Almost all drug outlets interviewed stocked some type of artemisinin-based combination therapy for malaria, and a large proportion (84%) stocked RDTs for malaria. None of the outlets reported selling any oral artemisinin monotherapy during the previous six months. However, while knowledge of banned drugs was good, knowledge of the first-line drugs for *P. falciparum* and *P. vivax* treatment was disappointing (69.2% and 67.5%, respectively).

Table 5.1a: Summary of treatment-seeking indicators

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total fever cases	1,657		810		847	
Seek treatment <24 hours	979	59.4 [53.8, 64.8]	490	61.4 [55.9, 66.6]	489	57.6 [48.4, 66.3]
Have malaria test	219	11.6 [9.0, 14.9]	87	9.9 [6.8, 14.2]	132	13.2 [9.1, 18.7]
Antimalarial <24 hours	11	0.8 [0.3, 2.1]	7	1.2 [0.3, 4.2]	4	0.4 [0.1, 1.2]
ACT <24 hours	3	0.1 [0.0, 0.4]	2	0.1 [0.0, 0.5]	1	0.1 [0.0, 1.0]

Table 5.1b: Summary of drug outlet indicators

	Total		Domain 1		Domain 2	
	% (N)	95% CI	% (N)	95% CI	% (N)	95% CI
Total drug outlets[1]	100 (79)	-	100 (41)	-	100 (38)	-
Stocks ACTs	97.5 (77)	91.2, 99.7	95.1 (39)	83.5, 99.4	100 (38)	90.7, 100
Stocks RDTs	83.5 (66)	73.5, 90.9	78.1 (32)	62.4, 89.4	89.5 (34)	75.2, 97.1
Has not sold any artemisinin monotherapy in past 6 months	100 (79)	95.4, 100	100 (41)	91.4, 100	100 (38)	90.7, 100
Knows national policy for uncomplicated Pf (DHA-pip or AS-MQ)[2]	69.2 (54)	57.8, 79.2	60.0 (24)	43.3, 75.1	78.9 (30)	62.7, 90.4
Knows national policy for uncomplicated Pv (DHA-pip or AS-MQ)	67.5 (77)	55.9, 77.8	59.0 (23)	42.1, 74.4	76.3 (29)	59.8, 88.6

Notes: 1) Drug outlets include shops/markets, drug stores, pharmacies, grocery stores and cabinets; 2) while DHA-pip was first-line P. falciparum and P. vivax treatment nationwide during the survey, AS-MQ was not contraindicated by the National Treatment Guidelines for Malaria, so is included here as a correct response for both P. falciparum and P. vivax.

Table 5.2: Details of fever cases and type of fever

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total	1,657		810		847	
Age/sex						
<5 years	415	24.6 [21.7, 27.7]	180	22.4 [18.8, 26.4]	235	26.6 [22.2, 31.6]
5-14 years	579	35.8 [32.0, 39.8]	272	32.6 [27.2, 38.4]	307	38.8 [33.9, 44.0]
Male, 15+ years	296	18.1 [16.1, 20.4]	154	19.9 [16.9, 23.3]	142	16.5 [13.8, 19.6]
Female, 15+ years	367	21.5 [18.8, 24.5]	204	25.2 [22.5, 28.1]	163	18.0 [13.9, 23.1]
Type of fever						
Malaria	19	1.1 [0.5, 2.4]	8	1.5 [0.5, 4.2]	11	0.8 [0.3, 2.0]
Intermittent fever	92	7.2 [4.7, 11.0]	66	10.4 [6.1, 17.1]	26	4.3 [1.8, 9.9]
Other fever	998	59.8 [53.4, 66.0]	425	50.5 [42.3, 58.6]	573	68.7 [59.0, 76.9]
Other	525	30.5 [23.8, 38.2]	300	36.5 [28.7, 45.1]	225	24.9 [15.4, 37.7]
Not specified	23	1.3 [0.7, 2.5]	11	1.1 [0.5, 2.4]	12	1.4 [0.5, 3.9]
Risk category						
<500m	666	28.0 [23.0, 33.7]	312	30.3 [23.9, 37.6]	354	25.9 [18.9, 34.4]
500m-<1km	398	22.2 [18.0, 27.1]	225	20.1 [15.3, 25.9]	173	24.2 [17.5, 32.6]
1km-<2km	275	14.2 [11.3, 17.7]	141	16.9 [13.3, 21.2]	134	11.6 [7.7, 17.2]
≥2km from forest	318	35.6 [27.5, 44.6]	132	32.7 [26.2, 40.0]	186	38.2 [24.8, 53.8]
SES						
Total	1,655		810		845	
Q1 (poorest)	405	25.8 [19.1, 33.9]	190	25.5 [19.4, 32.8]	215	26.1 [15.3, 40.8]
Q2	360	21.4 [18.2, 25.0]	173	20.0 [15.8, 24.9]	187	22.8 [18.2, 28.1]
Q3	323	19.1 [16.0, 22.8]	146	18.6 [15.0, 22.7]	177	19.7 [14.7, 25.9]
Q4	312	20.0 [15.4, 25.5]	170	21.4 [16.8, 26.8]	142	18.7 [11.6, 28.7]
Q5 (least poor)	255	13.6 [9.6, 19.0]	131	14.6 [9.6, 21.4]	124	12.8 [7.2, 21.6]

The highest levels of reported recent fever were among children aged from five to 15 years, with the lowest levels among adult males. Very few of the instances of fever were reported as malaria-attributable fever by the interviewees.

Almost all reported cases of fever were among individuals who sought treatment, but only 59% within 24 hours of fever onset (Table 5.3). Very few of the individuals with fever sought treatment from VMWs, likely because very few of the febrile patients suspected malaria to be the cause. The most common locations to seek treatment were from a private facility (25%), health centre or health post (26%) or pharmacy (24%). Half of all febrile individuals sought treatment from private health facilities only (58%), while far fewer (24%) sought treatment only from public health facilities. These proportions appear similar across both domains.

Almost all febrile individuals reported that they took drugs (91%); 62% of all febrile individuals took drugs within 24 hours of fever onset.

Table 5.3: Treatment-seeking for fever by domain

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total	1,657		810		847	
Seek treatment						
Seek any treatment	1,480	89.7 [86.9, 91.9]	720	89.4 [84.3, 93.0]	760	89.9 [86.9, 92.4]
Seek first treatment within 24 hours	979	59.4 [53.8, 64.8]	490	61.4 [55.9, 66.6]	489	57.6 [48.4, 66.3]
First place treatment sought						
Referral hospital	31	2.3 [1.4, 3.6]	6	0.9 [0.4, 2.1]	25	3.6 [2.2, 5.9]
Health centre/post, former district hospital	370	25.5 [20.0, 31.8]	190	26.8 [18.5, 37.1]	180	24.2 [17.4, 32.7]
VMW/VHV	21	1.0 [0.6, 1.7]	12	0.7 [0.2, 1.9]	9	1.3 [0.7, 2.4]
Other public service	5	0.4 [0.1, 1.7]	1	0.1 [0.0, 0.8]	4	0.7 [0.1, 3.1]
Private facility	399	24.7 [19.9, 30.3]	201	27.4 [20.0, 36.3]	198	22.2 [16.7, 28.8]
Pharmacy/drug shop	353	24.1 [19.3, 29.5]	143	21.4 [14.5, 30.4]	210	26.5 [20.3, 33.8]
Mobile provider	79	5.6 [3.0, 10.5]	45	5.8 [3.1, 10.4]	34	5.5 [1.8, 15.9]
Shop/market	160	11.3 [8.4, 15.1]	99	13.4 [8.9, 19.8]	61	9.4 [5.9, 14.7]
Other	28	2.2 [0.8, 5.9]	21	3.3 [0.9, 10.8]	7	1.2 [0.3, 5.5]
Number of places treatment sought						
None	211	12.9 [10.0, 16.5]	92	10.8 [7.1, 15.9]	119	15.0 [10.8, 20.4]
One	1319	77.6 [72.5, 82.1]	661	81.3 [76.2, 85.6]	658	74.2 [65.8, 81.1]
Two	115	8.6 [5.6, 13.0]	50	7.1 [5.1, 9.8]	65	10.0 [5.2, 18.5]
Three	12	0.8 [0.5, 1.6]	7	0.8 [0.3, 2.2]	5	0.8 [0.4, 1.8]
Type of provider for all treatment sought						
Public only	389	23.5 [19.1, 28.6]	189	23.1 [16.6, 31.1]	200	24.0 [18.4, 30.6]
Private trained only	817	47.8 [40.1, 55.7]	379	47.4 [36.9, 58.2]	438	48.2 [37.1, 59.5]
Private non-trained only	172	10.5 [7.8, 13.9]	117	14.5 [10.2, 20.2]	55	6.8 [4.3,1 0.6]
Public and private	68	5.2 [2.7, 9.8]	33	4.3 [2.7, 6.9]	35	6.1 [2.2,1 5.8]
None	211	12.9 [10.0, 16.5]	92	10.8 [7.1, 15.9]	119	15.0 [10.8, 20.4]
Drugs taken						
Any drugs	1,514	91.1 [88.6, 93.2]	744	91.3 [87.2, 94.2]	770	91.0 [87.5, 93.6]
Drugs within 24 hours	1,019	61.6 [58.0, 65.2]	512	63.1 [58.3, 67.6]	507	60.3 [54.9, 65.4]

When comparing treatment seeking by risk category (Table 5.4), no differences were seen in the proportion of individuals seeking treatment within 24 hours of fever onset. The most popular locations to first seek treatment also appear to be similar across risk categories, with health centres, private health facilities and pharmacies the most common. Treatment-seeking from VMWs was low in all risk categories. The proportion of people not seeking treatment at all was highest in risk category 4 (more than two kilometres from the forest, 18%).

Table 5.4: Treatment-seeking for fever by risk category

	Total		Risk category 1 (<500m)		Risk category 2 (500m-<1km)		Risk category 3 (1km-<2km)		Risk category 4 (>=2km)	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total (N)	1,657		692		398		275		318	
Seek treatment										
Seek any treatment	1,480	89.7 [86.9, 91.9]	618	90.6 [86.4, 93.6]	331	89.8 [84.0, 93.7]	252	91.6 [85.4, 95.4]	279	88.1 [81.9, 92.4]
Seek first treatment within 24 hours	979	59.4 [53.8, 64.8]	390	58.2 [51.7, 64.3]	221	59.4 [53.9, 64.6]	173	63.3 [52.8, 72.7]	195	58.9 [45.1, 71.5]
First place treatment sought										
Referral hospital	31	2.3 [1.4, 3.6]	12	1.5 [0.7, 3.4]	6	2.2 [1.1, 4.4]	4	1.6 [0.6, 4.2]	9	3.2 [1.5, 6.8]
Health centre/post, FDH	370	25.5 [20.0, 31.8]	157	27.6 [20.1, 36.6]	63	19.4 [13.6, 27.0]	81	30.9 [16.4, 50.5]	69	25.3 [14.5, 40.3]
VMW/VHV	21	1.0 [0.6, 1.7]	16	1.9 [0.9, 4.0]	2	0.5 [0.1, 3.3]	0	0.0	3	1.0 [0.4, 2.3]
Other public service	5	0.4 [0.1, 1.7]	3	0.4 [0.1, 1.5]	0	0.0	0	0.0	2	0.8 [0.1, 4.7]
Private facility	399	24.7 [19.9, 30.3]	182	28.5 [21.2, 37.1]	83	25.3 [18.6, 33.3]	92	37.9 [26.1, 51.3]	42	15.9 [7.9, 29.3]
Pharmacy/drug shop	353	24.1 [19.3, 29.5]	136	22.8 [16.0, 31.4]	100	28.6 [21.2, 37.3]	46	17.7 [8.6,33.2]	71	24.8 [15.4, 37.6]
Mobile provider	79	5.6 [3.0, 10.5]	29	4.0 [1.9, 8.2]	19	5.7 [2.3, 13.4]	6	2.4 [1.0, 5.5]	25	8.3 [2.5, 23.8]
Shop/market	160	11.3 [8.4, 15.1]	67	11.1 [6.7, 17.9]	48	15.8 [10.1, 23.9]	18	7.6 [4.3, 13.3]	27	10.2 [5.0, 19.6]
Other	28	2.2 [0.8, 5.9]	11	1.8 [0.5, 6.2]	5	0.9 [0.3, 3.1]	1	0.5 [0.1, 3.7]	11	4.1 [0.9, 16.3]
Number of places treatment sought										
None	211	12.9 [10.0, 16.5]	75	9.7 [6.4, 14.5]	46	11.7 [7.6,17.6]	27	9.6 [5.4, 16.5]	59	17.5 [11.1, 26.6]
One	1319	77.6 [72.5, 82.1]	567	83.1 [76.9, 87.8]	301	80.3 [72.6,86.2]	227	82.1 [73.5, 88.3]	224	69.9 [59.0, 79.0]
Two	115	8.6 [5.6, 13.0]	41	6.4 [4.1, 9.9]	23	7.4 [4.4,12.3]	19	7.5 [4.2, 13.1]	32	11.5 [5.2, 23.4]
Three	12	0.8 [0.5, 1.6]	5	0.8 [0.3, 2.4]	2	0.6 [0.1,2.8]	2	0.8 [0.2, 3.1]	3	1.0 [0.4, 2.8]
Type of provider for all treatment sought										
Public only	389	23.5 [19.1, 28.6]	173	26.1 [19.8, 33.5]	65	18.2 [12.7, 25.4]	77	26.6 [14.3, 43.9]	74	23.6 [15.3, 34.6]
Private trained only	817	47.8 [40.1, 55.7]	339	48.5 [41.1, 55.9]	204	54.3 [47.3, 61.1]	140	51.6 [34.6, 68.3]	134	41.7 [24.9, 60.7]

(cont.)

Private non-trained only	172	10.5 [7.8, 13.9]	77	11.6 [7.2, 18.2]	48	13.2 [7.9, 21.2]	18	7.1 [4.1, 12.1]	29	9.3 [5.0, 16.6]
Public and private	68	5.2 [2.7, 9.8]	24	4.1 [2.3, 7.1]	9	2.6 [1.3, 5.4]	13	5.1 [2.6, 9.8]	22	7.8 [2.5, 21.6]
None	211	12.9 [10.0, 16.5]	79	9.7 [6.4, 14.5]	46	11.7 [7.6, 17.6]	27	9.6 [5.4, 16.5]	59	17.5 [11.1, 26.6]
Drugs taken										
Any drugs	1514	91.1 [88.6, 93.2]	641	93.0 [90.4, 95.0]	346	92.9 [87.1, 96.3]	248	90.6 [84.0, 94.7]	279	88.7 [82.2, 93.1]
Drugs within 24 hours	1019	61.6 [58.0, 65.2]	419	61.4 [56.7, 65.8]	231	61.5 [53.7, 68.7]	172	63.1 [53.1, 72.1]	197	61.4 [54.1, 68.2]

Table 5.5: Test for malaria, type of test, providers and test results as reported by household respondents

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total	**1,657**		**810**		**847**	
Had diagnostic test	219	11.6 [9.0, 14.9]	87	9.9 [6.8, 14.2]	132	13.2 [9.1, 18.7]
Place of test	**219**		**87**		**132**	
VMW	14	4.2 [2.2, 8.0]	7	4.5 [1.8, 10.9]	7	4.0 [1.6, 9.8]
Health facility	75	35.7 [25.9, 46.9]	31	39.2 [27.3, 52.4]	44	33.3 [19.6, 50.5]
Private clinic	112	48.0 [36.1, 60.1]	35	34.2 [21.7, 49.3]	77	57.8 [40.5, 73.4]
Pharmacy/shop	7	4.8 [2.3, 10.0]	5	7.9 [3.6, 16.3]	2	2.7 [0.6, 10.9]
Other	7	3.6 [1.3, 9.2]	5	5.4 [1.6, 16.9]	2	2.2 [0.4, 10.6]
Who was tested	**219**		**87**		**132**	
<5 years	53	24.6 [19.4, 30.6]	17	21.8 [14.0, 32.4]	36	26.6 [20.3, 33.9]
5-14 years	84	39.3 [31.7, 47.5]	33	35.3 [22.9, 50.1]	51	42.1 [33.2, 51.6]
Male, 15+ years	43	20.5 [14.8, 27.8]	20	26.4 [17.5, 37.7]	23	16.4 [10.3, 25.3]
Female, 15+ years	39	15.6 [10.1, 23.3]	17	16.5 [7.9, 31.4]	22	14.9 [8.7, 24.3]
Type of test	**219**		**87**		**132**	
RDT	133	61.5 [52.4, 69.9]	64	71.0 [60.6, 79.6]	69	54.9 [40.9, 68.1]
Slide	72	31.1 [22.7, 40.9]	18	17.3 [10.3, 27.6]	54	40.7 [27.9, 54.9]
Test before any treatment	177	77.2 [68.2, 84.3]	69	79.0 [67.2, 87.4]	108	76.0 [62.3, 85.8]
Test positive	30	11.8 [7.6, 17.8]	12	16.6 [11.7, 23.1]	18	8.4 [3.6, 18.2]
Species for positive result	**30**		**12**		**18**	
P. falciparum	1	2.4 [0.3, 15.9]	0	0.0	1	5.7 [0.7, 34.2]
P. vivax	7	33.7 [15.1, 59.2]	5	46.6 [18.8, 76.6]	2	15.5 [3.1, 51.3]
Mixed	2	5.7 [0.7, 33.2]	2	9.8 [1.2, 48.8]	0	0.0
Not told	20	58.2 [34.2, 78.9]	5	43.6 [17.4, 74.0]	15	78.8 [45.3, 94.3]

Table 5.6: Malaria test and positivity by type of fever

	Total				Domain 1				Domain 2			
	Had malaria test		Test result positive		Had malaria test		Test result positive		Had malaria test		Test result positive	
	N	%	N	%	N	%	N	%	N	%	N	%
Type of fever												
Malaria	18	81.5	16	97.3	7	69.5	5	100	11	100	11	94.5
Intermittent fever	91	5.0	7	0.0	65	5.9	6	0.0	26	3.0	1	0.0
Other fever	985	12.6	138	8.0	421	11.6	52	14.4	564	13.3	86	4.3
Other	517	9.5	52	0.0	293	7.3	20	0.0	224	12.4	32	0.0
Total	1611	11.8	213	12.3	786	10.2	83	18.2	825	13.3	130	8.5

Table 5.7: Antimalarials and other treatments taken for fever

	Total		Domain 1		Domain 2	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Total	1,657		810		847	
ACT	7	0.5 [0.2, 1.2]	3	0.6 [0.2, 1.8]	4	0.5 [0.2, 1.4]
Artesunate monotherapy	3	0.3 [0.1, 1.5]	1	0.1 [0.0, 0.9]	2	0.5 [0.1, 3.0]
Other non-artemisinin antimalarials	12	1.0 [0.4, 2.9]	6	1.2 [0.2, 5.8]	6	0.9 [0.3, 2.6]
Cocktail	12	0.5 [0.3, 1.1]	2	0.2 [0.0, 0.9]	10	0.8 [0.4, 1.9]
Antibiotics	171	9.1 [6.4, 12.8]	91	9.5 [5.9, 15.0]	80	8.7 [5.2, 14.4]
Other non-antimalarials	1,392	83.0 [77.1, 87.6]	688	84.4 [78.8, 88.7]	704	81.6 [70.8, 89.1]

It should be noted that the head of household responded to these questions regarding treatment-, not the individual with fever. Therefore, there is the potential for inaccurate responses regarding treatment-seeking for fever.

Few febrile individuals had a diagnostic test performed for malaria (11.6%), but most of those who had a diagnostic test received it at a private clinic (48%) or health facility (36%). RDT was more commonly used than microscopy for malaria diagnosis. Among those with a malaria-type fever, 96% received a diagnostic test. Again, it should be noted that the head of household responded to these questions, not necessarily the individual with fever.

The majority of people reporting fever took drugs other than antimalarials, since their fever was suspected/confirmed not to be a result of malaria. However, among the small number of people taking drugs for malaria, not all took an ACT, with two individuals reporting taking artesunate monotherapy, three taking artemether monotherapy and 12 drug cocktails. The drug reportedly taken by interviewed household members was not verified by examination of packaging.

Outlets included in the drug outlet survey included pharmacies, private clinics, village drug outlets, general stores and health cabinets at health workers' homes. The majority of outlets were staffed by individuals with some medical

Table 5.8: Specific drugs taken for fever

	Total		Domain 1		Domain 2	
Drug	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
A+M[1]	0	0		0		
Malarine[2]	2	0.0 [0.0, 0.2]	0	0	2	0.1 [0.0, 0.3]
DHA-pip	3	0.3 [0.1, 1.0]	2	0.5 [0.1, 1.8]	1	0.1 [0.0, 1.1]
Plasmotrim[3]	0	0	0	0	0	0
Other artesunate only	2	0.3 [0.0, 1.7]	0	0	2	0.5 [0.1, 3.0]
Artemether only	3	0.3 [0.1, 1.5]	1	0.1 [0.0, 0.9]	2	0.5 [0.1, 3.0]
Mefloquine	2	0.2 [0.0, 0.6]	0	0.0	2	0.3 [0.1, 1.1]
Quinine	5	0.4 [0.1, 1.4]	2	0.2 [0.1, 0.9]	3	0.6 [0.1, 2.9]
Primaquine	1	0.1 [0.0, 0.5]	0	0.0	1	0.1 [0.0, 1.0]
Cocktail	12	0.5 [0.3, 1.1]	2	0.2 [0.0, 0.9]	10	0.8 [0.4, 1.9]
Other antimalarial drug	5	0.5 [0.1, 3.3]	4	1.0 [0.1, 6.7]	1	0.0 [0.0, 0.3]
Tetracycline/doxycycline	22	1.4 [0.6, 3.1]	16	1.7 [0.8, 3.4]	6	1.1 [0.2, 5.7]
Other antibiotics	152	8.0 [5.7, 11.2]	77	8.3 [5.1, 13.0]	75	7.8 [4.8, 12.6]
Paracetamol/aspirin	416	23.4 [19.2, 28.3]	191	22.0 [16.3, 28.9]	225	24.8 [19.0, 31.7]
Vitamins/tonics	9	0.4 [0.1, 1.1]	7	0.7 [0.2, 2.2]	2	0.1 [0.0, 0.4]
Infusion/IV fluids	53	3.2 [2.0, 4.9]	17	1.9 [0.9, 4.3]	36	4.3 [2.6, 7.0]
Traditional herbal	2	0.1 [0.0, 0.3]	1	0.1 [0.0, 0.4]	1	0.1 [0.0, 0.6]
Other non-antimalarials	1,042	63.8 [56.5, 70.6]	527	66.7 [56.4, 75.6]	515	61.2 [50.7, 70.7]

Notes: 1) ACT: brand name for AS-MQ distributed by CNM to public health facilities and VMWs in Domain 2 and the rest of the country for treatment of P. falciparum malaria; ACT: brand name for AS-MQ marketed and distributed by Population Services International to private outlets throughout the country for treatment of P. falciparum malaria; 3) artemisinin-based monotherapy.

Table 5.9: Proportion of fever type by drugs taken

	Total	Malaria		Intermittent fever		Other fever		Other		Not specified	
	N	N	%	N	%	N	%	N	%	N	%
ACT	7	3	39.7 [9.1, 81.1]	0	0	3	54.0 [15.5, 88.2]	1	6.4 [0.8, 37.8]	0	0
Artesunate monotherapy	3	1	18.5 [1.3, 79.2]	0	0	2	81.5 [20.8, 98.7]	0	0	0	0
Other non-artemisinin antimalarials	12	3	34.7 [7.7, 77.3]	0	0	9	65.3 [22.7, 92.3]	0	0	0	0
Cocktail	12	7	51.3 [16.3, 85.1]	0	0	4	42.3 [11.2, 81.1]	1	6.4 [0.8, 37.2]	0	0
Antibiotics	171	0	0	6	3.8 [1.2, 11.2]	120	72.9 [57.9, 84.0]	42	21.7 [11.9, 36.3]	3	1.5 [0.3, 7.6]
Other antimalarials	1,392	4	0.2 [0.1, 0.6]	69	6.3 [4.2, 9.5]	842	59.5 [52.8, 65.9]	462	32.8 [25.7, 40.9]	15	1.1 [0.5, 2.5]

or health training (doctor, pharmacist, medical assistant or nurse). Almost all outlets reported providing consultations for malaria, and 90% were licensed to sell drugs. Very few of these outlets, however, keep records of malaria cases identified and treated.

Table 5.10: Details of private drug outlets selling antimalarials and outlet respondents

	Total	Domain 1	Domain 2
	% (N)	% (N)	% (N)
Total outlets	100 (79)	100 (41)	100 (38)
Respondent's position			
Owner	91.1 (72)	87.8 (36)	94.7 (36)
Family member	8.9 (7)	12.2 (5)	5.3 (2)
Respondent's sex			
Male	61.5 (48)	57.5 (23)	65.8 (25)
Female	38.5 (30)	42.5 (17)	34.2 (13)
Respondent's training			
Doctor	22.4 (17)	15.8 (6)	29.0 (11)
Pharmacist	11.8 (9)	10.5 (4)	13.2 (5)
Medical assistant	34.2 (26)	42.1 (16)	26.3 (10)
Nurse	11.8 (9)	5.3 (2)	18.4 (7)
Midwife	- (0)	- (0)	- (0)
Other health training	7.9 (6)	10.5 (4)	5.3 (2)
No health training	11.8 (9)	15.8 (6)	7.9 (3)
Location of outlet			
Village	35.1 (27)	42.5 (17)	27.0 (10)
Town	64.9 (50)	57.5 (23)	73.0 (27)
Type of outlet			
Village drug outlet	5.1 (4)	4.9 (2)	5.3 (2)
Private clinic	13.9 (11)	4.9 (2)	23.7 (9)
Health cabinet/worker's home	34.2 (27)	39.0 (16)	29.0 (11)
Pharmacy	35.4 (28)	39.0 (16)	31.6 (12)
General store/shop	5.1 (4)	9.8 (4)	- (0)
Drug seller in market	5.1 (4)	2.4 (1)	7.9 (3)
Other	1.3 (1)	- (0)	2.6 (1)
Offer consultations[1]			
General consultations	78.5 (62)	73.2 (30)	84.2 (32)
Consultations for malaria	93.6 (58)	93.3 (28)	93.8 (30)
Licence to sell drugs	89.9 (71)	85.4 (35)	94.7 (36)
Keep records of malaria cases	16.7 (13)	12.5 (5)	21.1 (8)
Ever referred cases of malaria	63.3 (50)	58.5 (24)	68.4 (26)
Attended malaria training past 6 months[2]	67.1 (53)	63.4 (26)	71.1 (27)
Inspection past 6 months	67.1 (51)	72.5 (29)	61.1 (22)

Notes: 1) Some outlets missing data on selected variables; 2) specifically training or workshop about malaria.

Table 5.11: Details of stock management of ACTs in drug outlets

	Malarine % (N)	A + M % (N)	Duo-Cotecxin % (N)	Eurartesim % (N)
Heard of drug	92.4 (73)	93.7 (74)	68.0 (53)	83.5 (66)
Sells drug	32.9 (24)	- (0)	13.0 (7)	92.4 (61)
Price for a box (KHR)				
Median	4,500	-	5,000	6,000
Minimum	2,500	-	4,800	2,000
Maximum	60,000	-	41,500	96,000
Number of boxes sold previous week				
Median	0	-	0	0
Minimum	0	-	0	0
Maximum	5	-	3	24
When last bought stock				
Within 1 week	- (0)	-	- (0)	14.3 (8)
Within 1 month	- (0)	-	- (0)	23.2 (13)
>1 month	60.9 (14)	-	75.0 (3)	55.4 (31)
Not sure	39.1 (9)	-	25.0 (1)	7.1 (4)

The most commonly sold ACT at drug outlets was Eurartesim (DHA-pip), with more than 90% of outlets stocking this drug. At the time of the survey, DHA-pip was the first-line treatment for both *P. falciparum* and *P. vivax* in all provinces except Pailin, where Malarone was the first-line treatment for *P. falciparum*. In addition, artesunate-mefloquine was not contraindicated by the National Treatment Guidelines for Malaria.

Outlets reported that most clients do not request a malaria test, but 81% of outlets stated they always conducted a test before providing antimalarials to individuals with suspected malaria.

Knowledge of the recommended first-line drugs (DHA-pip or AS-MQ)[3] for uncomplicated *P. falciparum* was moderate at 69.2%, but 88.3% of outlets recommended the correct drugs for treatment of *P. falciparum*. Knowledge of the recommended first-line drugs (DHA-pip or AS-MQ) for *P. vivax* was similar (67.5%) to that of *P. falciparum* and again a higher proportion of outlets (84.4%) routinely recommend the appropriate drugs for *P. vivax.* Most outlets reported that they were aware of malaria drug resistance, and that some antimalarials were banned, but few could correctly name the banned drugs.

While the most common drug requested from patients was artesunate-mefloquine, there are still reportedly requests from patients for oral artemisinin-based monotherapies, although no outlet reported stocking or selling these drugs.

3 While DHA-pip is the named first-line treatment for both *P. falciparum* and *P. vivax,* AS-MQ is not contraindicated by the National Treatment Guidelines for Malaria.

Table 5.12: Details of antimalarials sold in private drug outlets in previous six months

	Total	Domain 1	Domain 2
		% (N)	% (N)
Drugs			
A+M1 (child)	- (0)	- (0)	- (0)
A+M2 (infant)	- (0)	- (0)	- (0)
A+M3 (adolescent)	- (0)	- (0)	- (0)
A+M4 (adult) [old formulation]	- (0)	- (0)	- (0)
A+M5 (adult)	- (0)	- (0)	- (0)
Malarine (adult)	27.9 (22)	36.6 (15)	18.4 (7)
Malarine (child)	13.9 (11)	17.1 (7)	10.5 (4)
Malarine (adolescent)	24.1 (19)	19.5 (8)	29.0 (11)
Eurartesim (adult)	67.1 (53)	65.9 (27)	68.4 (26)
Eurartesim (adolescent)	62.0 (49)	43.9 (18)	81.6 (31)
Eurartesim (child)	48.1 (38)	36.6 (15)	60.5 (23)
Artequin (AS-MQ)	1.3 (1)	- (0)	2.6 (1)
Duo-Cotecxin (DHA-pip)	7.6 (6)	7.3 (3)	7.9 (3)
Artekin (DHA-pip)	1.3 (1)	2.4 (1)	- (0)
Artequick (artemisinin-piperaquine)	2.5 (2)	- (0)	5.3 (2)
Cotecxin[1] (dihydroartemisinin only)	- (0)	- (0)	- (0)
Artesunate tablet[1]	- (0)	- (0)	- (0)
Artesunate injection	1.3 (1)	2.4 (1)	- (0)
Artesunate suppository	- (0)	- (0)	- (0)
Artemether tablet[1]	- (0)	- (0)	- (0)
Artemether injection	3.8 (3)	4.9 (2)	2.6 (1)
Artemisinin tablet[1]	- (0)	- (0)	- (0)
Artemisinin suppository	- (0)	- (0)	- (0)
Mefloquine	- (0)	- (0)	- (0)
Quinine tablet	- (0)	- (0)	- (0)
Quinine injection	- (0)	- (0)	- (0)
Chloroquine	1.3 (1)	2.4 (1)	- (0)
Primaquine	- (0)	- (0)	- (0)
Malarone (atovaquone-proguanil)	- (0)	- (0)	- (0)
Other malaria drug	1.3 (1)	2.6 (1)	- (0)
Drug cocktail	2.7 (2)	5.4 (2)	- (0)
Antibiotics	92.2 (71)	85 (34)	100 (37)
Paracetamol/aspirin	93.7 (74)	90.2 (37)	97.4 (37)
RDT kits			
CareStart (combo test)	3.9 (3)	4.9 (2)	2.8 (1)
First Response	7.7 (6)	7.3 (3)	8.1 (3)
Paracheck	10.3 (8)	14.6 (6)	5.4 (2)
Malacheck	75.3 (58)	70.7 (29)	80.6 (29)
Optimal	2.6 (2)	4.9 (2)	- (0)
Other test for malaria	7.6 (6)	12.2 (5)	2.6 (1)
Malatab	2.6 (2)	5.0 (2)	- (0)

Note: 1) Oral artemisinin-based monotherapy.

Table 5.13: Details of diagnostics sold and test performance in drug outlets

	Total % (N)	Domain 1 % (N)	Domain 2 % (N)
Total	100 (79)	100 (41)	100 (38)
Facility can provide diagnostic testing for malaria	73.4 (58)	75.6 (31)	71.1 (27)
Type of diagnostic testing provided			
RDT	87.5 (49)	93.6 (29)	80.0 (20)
Blood slide/microscopy	7.1 (4)	6.5 (2)	8.0 (2)
Both RDT and microscopy	5.4 (3)	- (0)	12.0 (3)
Clients ask for malaria test	38.5 (30)	39.0 (16)	37.8 (14)
Percentage of clients per outlet who have a test before receiving antimalarials			
0%	- (0)	- (0)	- (0)
<10%	7.0 (4)	13.3 (4)	- (0)
10%-<50%	3.5 (2)	3.3 (1)	3.7 (1)
50%-<100%	7.0 (4)	6.7 (2)	7.4 (2)
100%	80.7 (46)	73.3 (22)	88.9 (24)
Don't know	1.8 (1)	3.3 (1)	- (0)

Table 5.14: Antimalarials – outlet respondents' knowledge and practice

	Total % (N)	Domain 1 % (N)	Domain 2 % (N)
Knows recommended drug for uncomplicated *P. falciparum* (DHA-pip or AS-MQ)	69.2 (54)	60.0 (24)	78.9 (29)
Knows recommended drug for uncomplicated *P. vivax* (DHA-pip or AS-MQ)	67.5 (77)	59.0 (23)	76.3 (29)
Recommends correct drug for uncomplicated *P. falciparum* (DHA-pip or AS-MQ)	88.3 (68)	84.6 (33)	87.5 (35)
Recommends correct drug for uncomplicated *P. vivax* (DHA-pip or AS-MQ)	84.4 (65)	76.9 (30)	92.1 (35)
Heard about activities to stop resistance	85.7 (66)	90.2 (37)	80.6 (29)
Aware some antimalarials are banned	86.7 (65)	84.6 (33)	88.9 (32)
Knows which antimalarials are banned (any oral artemisinin-based monotherapy)	28.8 (19)	30.0 (10)	27.3 (9)
Heard about fake drugs	83.5 (66)	82.9 (34)	84.2 (32)
Seen fake drugs	50.0 (33)	61.8 (21)	37.5 (12)

Table 5.15: Most common drugs sold and requested from drug outlets

	Most common drugs sold	Most common drugs requested
	% (N)	% (N)
Total[1]	100 (123)	100 (33)
A+M (child)	30.1 (37)	- (0)
A+M (infant)	0.8 (1)	- (0)
A+M (adolescent)	3.3 (4)	- (0)
A+M (adult) (AS-MQ)	54.5 (67)	12.1 (4)
Malarine (adult) (AS-MQ)	2.4 (3)	48.5 (16)
Malarine (child)	1.6 (2)	- (0)
Malarine (adolescent)	2.4 (3)	- (0)
Eurartesim (adult) (DHA-pip)	1.6 (2)	6.1 (2)
Eurartesim (adolescent)	0.8 (1)	- (0)
Eurartesim (child)	0.8 (1)	- (0)
Artequin (AS-MQ)	- (0)	- (0)
Duo-Cotecxin (DHA-pip)	- (0)	3.0 (1)
Artekin (DHA-pip)	- (0)	- (0)
Artequick (artemisinin-piperaquine)	1.6 (2)	- (0)
Cotecxin[2] (DHA only)	- (0)	- (0)
Artesunate tablet	- (0)	15.2 (5)
Artesunate injection	- (0)	- (0)
Artesunate suppository	- (0)	- (0)
Artemether tablet	- (0)	3.0 (1)
Artemether injection	- (0)	- (0)
Artemisinin tablet	- (0)	- (0)
Artemisinin suppository	- (0)	- (0)
Mefloquine	- (0)	- (0)
Quinine tablet	- (0)	3.0 (1)
Quinine injection	- (0)	- (0)
Chloroquine	- (0)	6.1 (2)
Primaquine	- (0)	- (0)
Malarone (atovaquone-proguanil)	- (0)	- (0)
Other malaria drug	- (0)	3.0 (1)

Notes: 1) Total reflects multiple drug outlets who gave up to three responses to questions on common and popular drugs; 2) oral artemisinin-based monotherapy.

Table 5.16: Drug outlet respondents' knowledge of antimalarial drugs reported as banned

	Total % (N)	Domain 1 % (N)	Domain 2 % (N)
Oral monotherapy		0	0
Artesunate tablet	14.7 (19)	9.2 (6)	20.3 (13)
Artemether tablet	3.1 (4)	3.1 (2)	3.1 (2)
Artemisinin tablet	- (0)	- (0)	- (0)
Cotecxin (DHA only)	- (0)	- (0)	- (0)
Other monotherapy			
Artesunate injection	- (0)	- (0)	- (0)
Artesunate suppository	4.7 (6)	7.7 (5)	1.6 (1)
Artemether injection	- (0)	- (0)	- (0)
Artemether suppository	- (0)	- (0)	- (0)
ACT			
A+M (AS-MQ)	5.4 (7)	6.2 (4)	4.7 (3)
Malarine (AS-MQ)	3.1 (4)	3.1 (2)	3.1 (2)
Arequin (AS-MQ)	5.4 (7)	6.2 (4)	4.7 (3)
Duo-Cotecxin (DHA-pip)	7.0 (9)	9.2 (6)	4.7 (3)
Artekin (DHA-pip)	- (0)	- (0)	- (0)
Artequick (artemisinin-piperaquine)	- (0)	- (0)	- (0)
Coartem (AS-lumefantrine)	- (0)	- (0)	- (0)
Other antimalarials			
Quinine tablet	20.9 (27)	24.6 (16)	17.2 (11)
Quinine injection	- (0)	- (0)	- (0)
Chloroquine	27.1 (35)	24.6 (16)	29.7 (19)
Mefloquine	7.8 (10)	6.2 (4)	9.4 (6)
Primaquine	0.8 (1)	- (0)	1.6 (1)

Health facility survey

The HF survey included a total of 31 public health facilities and 31 private health facilities. To ascertain the quality of malaria services received, malaria cases identified at the public health facilities were followed up from case records within the previous three months, to administer a questionnaire based on their experiences. However, this patient follow-up activity was limited by the small number of confirmed malaria patients, as well as refusals and loss to follow-up. To assess quality of services received, exit interviews were carried out among fever patients (or their caregivers) at both public and private health facilities.

Part 6: Inventory of health facilities

Almost all private facilities surveyed were cabinet-type, with a small number of private polyclinics. None of the private facilities reported having supervisory visits, and only a minority had registers of outpatient visits, although 84% reported providing outpatient services. However, all of the public facilities had

received a supervisory visit within the previous six months and kept an outpatient register in the standard Ministry of Health format. A minority of public health facilities (16%) reported providing treatment for severe malaria, the majority (80%) referring these patients. In contrast, a similarly low proportion of private facilities treat severe malaria (13%), but only 58% reportedly refer severe cases. The majority of severe malaria patients from public (96%) and private (83%) health facilities would be referred to the referral hospital.

Table 6.1: Details of the health facilities sampled

	Public		Private	
	N	%	N	%
All facilities	**31**		**31**	
Type of facility				
Reference hospital				
Former district hospital	4	12.9		
Health centre	27	87.1		
Polyclinic			2	6.5
Cabinet			29	93.5
Services provided				
Malaria case management	25	80.6	19	61.3
Inpatient department	6	19.4	5	16.1
Outpatient department	31	100	26	83.9
Malaria diagnosis	14	45.2	21	67.7
ITN distribution	1	3.2	1	3.2
Malaria health education	6	19.4	0	0
Antenatal screening for malaria	9	29	3	9.7
Integrated management of childhood illness	13	41.9	4	12.9
Blood bank	0	0	0	0
Days per week (median (minimum, maximum))	5	(5, 7)	7	(5, 7)
Hours per day (median (minimum, maximum))	8	(3, 24)	8	(3, 24)
Facility had a supervisory visit in previous 6 months (2010)/ previous 3 months (2013)	31	100	-	
Facilities with supervisory visits	**31**		**-**	
Visit by Province Health Department	19	61.3	-	
Visit by Operational District	24	77.4	-	
National	9	29	-	
All facilities	**31**		**31**	
Has copy of the National Treatment Guidelines for Malaria	20	64.5	7	22.6
Treat severe cases of malaria	5	16.1	4	12.9
Refer severe cases of malaria	25	80.6	18	58.1
Has outpatient register	31	100	5	16.1
Facilities with outpatient register	**31**		**5**	
Outpatient register in standard or Ministry of Health format	31	100	2	40
Outpatient register up to date	30	96.8	4	80

Table 6.2: Health facility staff characteristics (respondents)

	Public		Private	
	N	%	N	%
All facilities	**31**		**31**	
Respondent's position				
HF chief	23	74.2	26	83.9
Deputy chief	7	22.6	2	6.5
Acting officer	1	3.2	2	6.5
Other	0	0	1	3.2
Respondent's sex				
Male	26	83.9	25	80.6
Female	5	16.1	6	19.4
Not specified				
Respondent's age				
20-<40 years	9	29	16	51.6
40-49 years	14	45.2	12	38.7
≥50 years	7	22.6	3	9.7
Not specified	1	3.2	0	0
Formal training				
Doctor	3	9.7	11	35.5
Pharmacist	0	0	3	9.7
Nurse	17	54.8	10	32.3
Midwife	2	6.5	1	3.2
Other	8	25.8	5	16.1
No health training	1	3.2	1	3.2
Knowledge of antimalarials				
Knows recommended drug for uncomplicated *P. falciparum* (DHA-pip or AS-MQ)	20	64.5	14	45.2
Knows recommended drug for uncomplicated *P. vivax* (DHA-pip or AS-MQ)	15	48.4	7	22.6
Heard about activities to stop resistance	25	80.6	24	77.4
Aware that some antimalarials are banned	27	87.1	19	61.3
Knows which drugs are banned (any oral artemisinin-based monotherapy)	3	9.7	3	9.7
Heard about fake drugs	29	93.5	22	71
Seen fake drugs	9	31	7	31.8
Had malaria related training in 2013	**18**	**58.1**	**12**	**38.7**

Table 6.3: Health facility staff characteristics

	Public		Private	
	N	%	N	%
All facilities	**31**		**31**	
Number of staff per facility				
Mean	8.3		1.6	
Median	8		1	
Minimum	4		1	
Maximum	14		9	
All staff	**257**		**49**	
Highest qualification				
Medical doctor	3	1.2	17	34.7
Medical assistant	5	1.9	4	8.2
Pharmacist	5	1.9	1	2
Laboratory technician	0	0	1	2
Nurse	126	49	17	34.7
Midwife	106	41.2	3	6.1
Other	9	3.5	6	12.2
Not specified	3	1.2	0	0
Present on day of survey				
In facility	215	83.7	42	85.7
In field	37	14.4	6	12.2
Not specified	5	1.9	1	2
Years in service				
<5 years	97	37.7	26	53.1
5-<15 years	61	23.7	10	20.4
15+years	88	34.2	8	16.3
Not specified	11	4.3	5	10.2
Reported in service malaria related training	**103**	**40.1**	**10**	**20.4**
Staff with training	**103**		**10**	
Type of last malaria related training				
Case management	14	13.6	1	10
Malaria laboratory	22	21.4	1	10
Health education	0	0	0	0
ITN distribution	0	0	0	0
Epidemiology	0	0	0	0
Rational antimalarial drug use	4	3.9	3	30
Management of severe malaria	3	2.9	2	20
VHV training	1	1	0	0
Other (not specified)	59	57.3	3	30

Table 6.4: Summary of ACTs, antimalarials and RDTs in stock at health facilities

	Public		Private	
	N	%	N	%
Any antimalarial	27	87	18	58
ACTs	24	77	15	48
AMT (artemisinin-based monotherapy) tablets	5	16	1	3
AMT (artemisinin-based monotherapy) injections/suppositories	0	0	0	0
Non-artemisinin antimalarials	14	45	3	10
Unspecified antimalarials or drug cocktail	0	0	0	0
Other non-antimalarials	31	100	30	97
Antibiotics	31	100	30	97
Any RDTs	21	68	22	71

Note: Complete data were not available on stock levels from all HFs for all drugs.

Table 6.5: Laboratory services and equipment available at health facilities

	Public		Private	
	N	%	N	%
All facilities	**31**		**31**	
Malaria service				
Microscopy and RDT	8	25.8	4	12.9
Microscopy only	0	0	2	6.5
RDT only	19	61.3	21	67.7
Facilities that use microscopy	**8**		**6**	
Has laboratory technician				
Full-time technician	8	100	3	50
Part time technician	0	0	3	50
None	0	0	0	0
Has working microscope	7	87.5	5	83.3
Stockout				
>1 week with no microscope in previous 3 months	0	0	0	0
>1 week with no slides in previous 3 months	0	0	0	0
>1 week with no Giemsa stain in previous3 months	0	0	0	0
Facilities that use RDTs	**27**		**25**	
Availability of RDT				
Carestart	20	100	2	100
Paracheck	20	100	2	100
Malacheck	2	100	2	100
Optimal	1	1.5	0	100
Other	0	0	0	0
>1 week with no RDTs in previous 3 months	**6**	**22.2**	**10**	**40**
All facilities	**31**		**31**	
Has laboratory register/book	22	81.5	3	11.1
Facilities with laboratory register	**22**		**3**	
Laboratory register/book up to date	22	100	2	66.7
Has laboratory manual for malaria	7	31.8	1	33.3

A higher proportion of doctors were interviewed at private health facilities, while nurses were most commonly interviewed at public facilities. More staff at public than private facilities were aware some antimalarials were banned (87% in public, 61% in private) and were aware of fake drugs (94% vs. 71%). The proportion of staff interviewed at public or private health facilities able to correctly name the first-line drugs recommended for *P. falciparum* or *P. vivax* at the time of the survey was disappointingly low. Either DHA-pip or AS-MQ were considered correct responses for both *P. falciparum* and *P. vivax*, since AS-MQ is not contraindicated by the National Treatment Guidelines for Malaria, whereas DHA-pip is named as the first-line drug for sites not including Pailin.

A staffing review was conducted for all facilities in the survey. Public facilities had more staff than private facilities, but fewer medical doctors. A higher proportion of nurses and midwives were found at public health facilities, as well as a larger proportion of long-serving staff, compared with in private facilities. Very few of the private facility staff had received any malaria-related training.

Both public and private health facilities were found to have instances of stockouts of any antimalarial drugs. Only 77% of public and 66% of public health facilities had any type of ACT in stock at the time of the HF survey.

Although oral artemisinin monotherapy is banned in Cambodia, one public and one private HF were found to have a drug of this type in stock. Stockouts of other non-antimalarials and antibiotics were rare among sampled HFs. A minority of public and private health facilities had stock outs of malaria RDTs.

Part 7: Assessment of health facility services for malaria and fever

In an effort to assess the delivery of services for fever and malaria cases within the HF system, two additional surveys were conducted in communities to find out more about services received from HFs. Exit interviews with all fever cases were used to obtain a proxy measure of service delivery, but, considering the likely small number of malaria cases that exit interviews would identify, additional interviews were conducted with confirmed malaria cases identified at public HFs, by using records at the HF to trace these patients at their home.

Table 7.1: Details of malaria cases followed up and exit interview patients

	Case follow-up (malaria cases)		Exit interviews (fever cases)			
	Public facilities (N=48)		Public facilities (N=364)		Private facilities (N=445)	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Age/sex						
Under 5 years	1	2.1 [0.4, 10.6]	148	40.7 [35.3, 46.3]	186	41.8 [35.7, 48.2]
5-14 years	6	12.5 [6.5, 22.6]	72	19.8 [15.2, 25.3]	134	30.1 [25.8, 34.8]
15+years male	32	66.7 [52.4, 78.4]	42	11.5 [8.5, 15.5]	55	12.4 [9.3, 16.2]
15+ years female	9	18.8 [11.3, 29.6]	101	27.7 [22.7, 33.4]	70	15.7 [12.1, 20.3]
Education						
Child <5years	6	12.5 [6.2, 23.4]	201	55.2 [49.2, 61.1]	234	52.6 [47.1, 58.0]
No school	27	56.3 [38.7, 72.4]	123	33.8 [28.5, 39.5]	170	38.2 [33.5, 43.1]
Primary	15	31.3 [16.7, 50.7]	39	10.7 [7.7, 14.7]	41	9.2 [7.0, 12.0]
Secondary	0	0	1	0.3 [0.0, 2.0]	0	0
Above secondary						
Occupation	1	2.1 [0.4, 10.6]	166	45.6 [39.6, 51.7]	212	47.6 [41.3, 54.1]
Child	10	20.8 [13.1, 31.6]	65	17.9 [12.9, 24.2]	116	26.1 [21.9, 30.7]
Student	26	54.2 [44.9, 63.2]	79	21.7 [17.0, 27.3]	63	14.2 [9.8, 20.1]
Farmer	4	8.3 [3.0, 21.1]	10	2.7 [1.3, 5.5]	9	2.0 [0.8, 5.0]
Labourer	1	2.1 [0.3, 14.1]	1	0.3 [0.0, 1.9]	1	0.2 [0.0, 1.6]
Fisherman	2	4.2 [0.9, 16.8]	8	2.2 [0.8, 6.1]	21	4.7 [3.2, 7.0]
Merchant	2	4.2 [1.2, 13.4]	16	4.4 [2.6, 7.4]	8	1.8 [0.6, 5.3]
Housewife	0	0	1	0.3 [0.0, 1.9]	0	0
Soldier	2	4.2 [1.0, 15.5]	18	4.9 [3.1, 7.9]	15	3.4 [1.9, 6.0]
Other						
Time at current address						
<6 months	2	4.2 [1.0, 15.5]	21	5.8 [4.0, 8.2]	28	6.3 [3.7, 10.6]
6 months-<1 year	3	6.3 [2.0, 18.1]	20	5.5 [3.1, 9.6]	28	6.3 [3.6, 10.8]
More than 1 year	43	89.6 [79.7, 95.0]	323	88.7 [84.1, 92.1]	389	87.4 [79.7, 92.5]
Slept in forest in previous 6 months	36	75.0 [64.1, 83.4]	65	17.9 [12.1, 25.7]	61	13.7 [10.2, 18.2]
Travelled in 2 weeks prior to illness	24	50.0 [34.6, 65.4]	0	0	0	0
Sleep under net previous night	25	52.1 [35.9, 67.8]	359	98.6 [96.9, 99.4]	435	97.8 [95.5, 98.9]

Table 7.2: Assessment and antimalarials received by cases and exit interview patients

	Case follow-up (malaria cases)		Exit interviews (fever cases)			
	Public facilities (N=48)		Public facilities (N=364)		Private facilities (N=445)	
	N	% [95% CI]	N	% [95% CI]	N	% [95% CI]
Saw health worker and had blood test	48	100	29	8.0 [3.9, 15.6]	54	12.1 [7.7, 18.6]
Saw health worker and received ACTs	23	47.9 [28.2, 68.3]	2	0.5 [0.1, 3.7]	2	0.4 [0.1, 1.8]
Saw health worker and received antimalarials	34	70.8 [56.8, 81.8]	6	1.6 [0.5, 5.2]	9	2.0 [1.1, 3.5]
Reported all 3 key assessments performed by health worker[1]	17	35.4 [23.8, 49.0]	11	3.0 [1.4, 6.2]	14	3.1 [1.7, 5.8]
Reported all 3 key assessments performed by health worker (excluding travel)[2]	23	47.9 [34.7, 61.5]	14	3.8 [2.1, 7.0]	40	9.0 [5.7, 14.0]
If given antimalarials health worker advised how to take them	33	97.1 [80.1, 99.6]	3	50.0 [7.5, 92.5]	5	55.6 [24.5, 82.8]

Notes: 1) Health care provider asked about travel and fever, auxiliary temperature taken and tested;
2) health care provider asked about travel and fever, auxiliary temperature taken and tested.

Exit interviews were conducted with 364 febrile patients at public HFs and 445 patients at private HFs. In addition, follow-up interviews were completed for 48 confirmed malaria patients identified at public HFs.

The majority of follow-up interviews were conducted with adult males, although this group was the least common group in exit interviews with febrile patients. Of the confirmed malaria patients followed up for interview, 50% had travelled in the two weeks prior to illness and 75% had slept in the forest in the previous six months, both known risk factors for malaria in Cambodia. Use of a mosquito net by the malaria patients followed-up on at home was similar to net use reported by the fever patients.

Among the malaria cases followed up on at home, only half reported seeing a health worker and receiving ACTs, while 66% recalled seeing the health worker and receiving antimalarials, indicating a lack of knowledge of the different malaria treatments. Less than half of the malaria patients reported that the health worker performed all three key assessments, but 99% of those receiving drugs reported that the health worker advised them how to take the medication.

Among the patients with fever interviewed at public and private HFs, few received the three key assessments, or had a blood test or received antimalarials, likely because of the predominance of other causes of fever. However, among those who did receive antimalarials, almost all reported that the health worker explained how to take the drugs.

Nearly half of confirmed malaria cases followed up at home reported receiving the correct treatment for either *P. falciparum* or *P. vivax* (DHA-pip or AS-MQ, 48%), although this may reflect recall error by the patients, as many reported taking another antimalarial, or could not specify the type.

Table 7.3: Treatment prescribed at public and private health facilities among malaria and fever cases

	Case follow-up (malaria cases)	Exit interviews (fever cases)	
	Public facilities (N=48)	Public facilities (N=364)	Private facilities (N=445)
	N (%)	N (%)	N (%)
A+M (AS-MQ)	5 (10)	0 (0)	0 (0)
Malarine (AS-MQ)	2 (4)	0 (0)	0 (0)
Eurartesim (DHA-pip)	9 (19)	2 (1)	2 (0)
Other A+M	0 (0)	0 (0)	0 (0)
Duo-Cotecxin (DHA-pip)	7 (15)	0 (0)	0 (0)
Other DHA-pip	0 (0)	0 (0)	0 (0)
Artemisinin-piperaquine	0 (0)	0 (0)	0 (0)
DHA only	0 (0)	0 (0)	1 (0)
Plasmotrim	0 (0)	0 (0)	0 (0)
Other artesunate only	0 (0)	0 (0)	0 (0)
Artemether only	0 (0)	0 (0)	0 (0)
Artemisinin only	0 (0)	0 (0)	0 (0)
Mefloquine only	0 (0)	0 (0)	0 (0)
Quinine	0 (0)	0 (0)	0 (0)
Chloroquine	1 (2)	0 (0)	0 (0)
Primaquine	0 (0)	0 (0)	0 (0)
Malarone	0 (0)	0 (0)	0 (0)
Coartem	0 (0)	0 (0)	0 (0)
Drug cocktail	6 (13)	4 (1)	6 (1)
Other antimalarials	4 (8)	0 (0)	1 (0)
Tetracycline/Doxycycline	0 (0)	1 (0)	1 (0)
Other antibiotics	0 (0)	38 (10)	44 (10)
Paracetamol	29 (60)	175 (48)	91 (20)
Vitamins	0 (0)	8 (2)	23 (5)
Infusion/IV fluids	0 (0)	1 (0)	56 (13)
Traditional herbs	0 (0)	0 (0)	0 (0)
Other unspecified antimalarials	7 (15)	291 (80)	346 (78)

Table 7.4: Comparison of follow-up interviews and case registers among public health facilities

	Reported by patient	Recorded in case register
	% (N)	% (N)
Total	100 (48)	100 (48)
Mean age (years)	25.2	25.5
Diagnosed with malaria	100 (48)	87.5 (42)
Had blood test	100 (48)	97.9 (47)
Type of test		
RDT	83.3 (40)	83.0 (39)
Slide	14.6 (7)	14.9 (7)
Not sure	2.1 (1)	2.1 (2)
Malaria species		
P. falciparum	6.3 (3)	27.1 (13)
P. vivax	37.5 (18)	56.3 (27)
Mixed	8.3 (4)	10.4 (5)
Not told/don't know	47.9 (23)	6.3 (3)

Table 7.5: Reported diagnosis and treatment among exit interview fever patients

Diagnosis		Treatment received			
		ACT	Any antimalarial	Any antibiotic	Infusion
		% Receiving treatment	% Receiving treatment	% Receiving treatment	% Receiving treatment
	N	(N)	(N)	(N)	(N)
Public HF					
Malaria	4	50 (2)	75 (3)	0 (0)	0 (0)
Acute/upper respiratory infection	8	0 (0)	0 (0)	50 (4)	0 (0)
Cold/'flu	99	0 (0)	1.0 (1)	9.1 (9)	2.0 (2)
GI infection	4	0 (0)	0 (0)	0 (0)	0 (0)
Other	75	0 (0)	0 (0)	12.0 (9)	2.7 (2)
Private HF					
Malaria	7	28.6 (2)	71.4 (5)	0 (0)	28.6 (2)
Acute/upper respiratory infection	45	0 (0)	4.4 (2)	15.6 (7)	37.8 (17)
Cold/'flu	80	0 (0)	1.3 (1)	3.8 (3)	17.5 (14)
GI infection	2	0 (0)	0 (0)	0 (0)	0 (0)
Other	196	0 (0)	0 (0)	11.2 (22)	28.6 (56)

Table 7.4 shows the discrepancy between patient recall and data recorded in HF records: almost half of patients could not recall or were not told the malaria species, and many remembered incorrectly. Worryingly, not all of the malaria cases identified for follow-up at home were correctly recorded as confirmed malaria in HF records, perhaps reflecting discrepancies between outpatient registers and laboratory records.

Table 7.5 reports the diagnoses and treatment fever patients received. Among the small number of individuals reporting a malaria diagnosis, 50% and 29% reported receiving an ACT from public and private facilities, respectively. However, these numbers increased to 75% and 71% for any antimalarial, indicating that some patients were unaware of the exact type of antimalarial drugs they had been prescribed.

Discussion

Household survey key findings

The household survey with a malariometric component aimed to collect information on malaria prevalence, key household characteristics, mosquito net coverage and use, treatment-seeking behaviour for fever and knowledge of malaria prevention and treatment among the community.

Very few individuals tested were found to have malaria, either by microscopy or by PCR. As a result, few risk factors for malaria could be identified. In contrast with previous surveys, no strong associations malaria and age or sex and malaria were seen. However, forest-goers and travellers were seen to have higher odds of infection (by microscopy or PCR), and those living furthest from the forest (at one kilometre or more) had lower odds of infection by PCR than those living close to the forest. These findings indicate the NMCP should continue to target those individuals known to be at increased risk of malaria: those who travel to the forest and who live close to the forest. It should also be noted that risk categories presented in this survey are defined by forest coverage in 2007, and changing forest extent necessitates a restratification of risk according to current ecological and environmental indicators, to better target future malaria intervention to those populations at highest risk living close to malaria vector habitats.

Regarding mosquito net coverage, the proportions of households in risk categories 1-4 with at least one net of any type (99.7%) and at least one ITN (77.8%) are both high. The proportion of households with at least one ITN was also found to be similar between Domains 1 and 2. However, indicators of households with 'sufficient' nets (one net for every two people) are not so strong: only 53.5% of households in risk categories 1-4 have sufficient ITNs; 78.2% have sufficient nets of any type. A greater proportion of households of higher socioeconomic status were observed to have sufficient nets of any type, indicating that more affluent households are purchasing additional conventional mosquito nets. No comparable association was seen between households with sufficient ITNs or LLINs and socioeconomic status.

The low proportion of households with sufficient ITNs or LLINs is particularly surprising considering the mass distribution of LLINs that took place from 2011 to 2012 at a ratio of one net to one person, but indicators are improved

if estimating coverage among targeted villages in risk categories 1-3 only, located less than two kilometres from the forest (89.5% households have at least one ITN and 62.2% households have sufficient ITNs). Comparing household net ownership reported in the CMS 2010 and 2013, it appears that mass LLIN distribution has resulted in a replacement of almost all ITNs with LLINs, but ownership of conventional, untreated mosquito nets has remained stable. Furthermore, 37.4% of all households surveyed were reported to have unused new nets, the majority reportedly being saved for visitors or for future use; very few of these households reported saving nets because they currently had enough or had no further space to hang them. Only 59.3% of all nets owned by households across all risk categories were used for sleeping on the previous night.

The high proportion of all people (across risk categories 1-4) reported to have slept under a net on the previous night (84.7%) is encouraging, but a substantial proportion of these are using untreated nets. Only 49.9% of all people surveyed slept under an LLIN on the previous night, although when restricting this indicator to targeted villages less than two kilometres from the forest, 57.3% of people were estimated to have slept under an LLIN on the previous night. Net use among pregnant women and children under five years is high. Among forest-goers, identified as a high-risk population, 71.5% reported using a net and 42.8% used a treated net (ITN or LLIN, bed or hammock net, reported by head of household) on their previous visit to the forest. Of forest-goers who did use a net on their last travel to the forest, 35.8% used a hammock-type net.

General knowledge of the cause of malaria is very high and knowledge of mosquito nets for malaria prevention is good, but knowledge of other strategies to prevent malaria (avoiding the forest, wearing long clothing to avoid mosquito bites) is relatively low.

While almost all respondents know where they can access advice, testing and treatment from trained providers, the majority reported that they would attend a health centre or private HF, with few naming the VMW as a place to go for advice, a test or treatment. For individuals with fever, 90% reported seeking treatment, but only 59% sought treatment within 24 hours. Most seek treatment for fever from a health centre, private facility or pharmacy; very few go to a VMW. We expect this is because of the very low proportion of fevers being a result of malaria, and because the service a VMW provides is limited to malaria diagnosis and treatment.

Recall of malaria-specific messages heard or seen within the previous three months was very low, indicating that BCC approaches previously used may require revision to maximise uptake and recall of key messaging among the target population.

Drug and outlet survey key findings

An added value of the CMS survey is the sampling within the household survey activities of mosquito net and drug outlets from the private sector. The mosquito net and drug outlet surveys sought to assess the knowledge and behaviours of providers of antimalarial drugs, RDTs and LLINs in Cambodia.

Access to ACTs and RDTs at drug outlets is good, although not all outlets stocking ACTs have RDTs. The ban on the sale of oral artemisinin monotherapy has been very successful, with none of the surveyed drug outlets reporting that they sold oral artemisinin monotherapy in the previous six months, or that they had these drugs in stock. A small number of private outlets had injectable artemisinin monotherapies in stock.

Of the outlets visited, 90% had a licence to sell drugs and 93.6% offered consultations for malaria. While most (73.4%) drug outlets provide malaria diagnostic testing, demand from clients is relatively low, with only 38.5% asking for a malaria test. Only 16.7% of outlets keep records of malaria cases. If comprehensive data on all malaria diagnoses made nationally are to be available in the future as part of improved malaria surveillance, the proportion of private sector facilities and pharmacies maintaining records of malaria diagnosis must be improved, and these data should be reported in a systematic way.

Knowledge of the National Treatment Guidelines for Malaria for each species of malaria by drug outlet staff was low. At the time of the survey, DHA-pip was the first-line treatment for both *P. falciparum* and *P. vivax* and AS-MQ was not contraindicated by the National Treatment Guidelines, but only 69% and 68% of outlet staff interviewed correctly named either of these drugs as the nationally recommended treatment for each species. While most outlet staff knew some malaria were banned (87%), few know which specific drugs (29%). Worryingly, half of all interviewed outlet staff reported that they had seen fake drugs.

Net outlets were found to sell a variety of conventional, bundled and long-lasting net types, both bed net and hammock net styles. A larger proportion of outlets sold conventional nets than LLIN or LLIHN types, with B52 nets being the most commonly sold. Very few outlets surveyed sold LLIHNs (6.7%), but 67.9% sold untreated hammock nets; however, untreated hammock nets were on average much more expensive than LLIHNs.

Health facility survey key findings

The aim of the HF survey is to assess the delivery of services for fever and malaria cases within the public and private sectors. Given the relatively low incidence of malaria throughout the country, it is increasingly difficult to conduct research dependent on prospective malaria cases. As a result, the CMS 2013 used a combination of prospective and retrospective interviews to obtain better estimates for the availability and quality of delivery of malaria-related services, using exit interviews for fever cases and follow-up of malaria cases previously identified at the HFs.

Among the malaria cases seen at public HFs and followed up for interview, almost all received either AS-MQ or DHA-pip, in accordance with the National Treatment Guidelines for Malaria. One patient reported receiving chloroquine and others a drug cocktail. Information yielded from exit interviews with fever patients was less clear, with 80% at public and 78% at private facilities reporting receiving an unspecified antimalarial treatment.

Comparison of CMS 2013 and CMS 2010 findings

While a comparison of findings from the CMS 2013 survey with those of 2010 is not the primary scope of this report, it is valuable to review progress and indicator values, particularly since the survey methodologies are comparable. A detailed evaluation of trends in CMS findings since 2004 is due to be presented in a separate publication.

- **Declining malaria prevalence.** Prevalence of *Plasmodium* infection by microscopy has declined in each successive national survey. Weighted national prevalence by microscopy was 4.4% in 2004, 2.6% in 2007 and 0.9% in 2010 and had declined to 0.1% in 2013 (or 0.1% if estimated for risk categories 1-3 only). Prevalence by PCR in 2013 was also very low, at 1.1% across all risk categories and 1.5% in risk categories 1-3.
- **Increased ownership of LLINs.** Mass distributions of LLINs in Cambodia at one net to one person have resulted in an increased proportion of households (all risk categories) with any LLINs (52% in 2010, 75% in 2013) and with sufficient LLINs (23% in 2010, 51% in 2013). However, further progress to achieve universal coverage with LLINs is needed.
- **Increased proportion of the at-risk population sleeping under LLINs.** In the targeted at-risk villages (those in risk categories 1-3, located less than two kilometres from the forest), use of LLINs increased from 32% in 2010 to 57% in 2013. However, the main reason for this increase was a switch in use from ITNs to LLINs
- **Stability in the proportion of the at-risk population sleeping under untreated nets or no net.** While LLIN use has increased, the proportion of all people surveyed (risk categories 1-4) who reported not using a net remained similar from 2010 to 2013 (both 15%), as did the proportion of people using an untreated net on the previous night (33% to 32%).
- **Net use among forest-goers has increased.** Of participants included in the household survey who reported sleeping overnight in the forest in the previous six months and who are resident in the targeted at-risk villages, the proportion reporting they used an ITN on their last trip to the forest increased moderately from 37% in 2010 to 43% in 2013. Use of any net on last visit to the forest has remained stable (74% in 2010, 72% in 2013), indicating increased use of ITNs/LLINs among those taking nets to the forest.
- **Proportion of fevers attributable to malaria has decreased.** Of all participants in the household survey who reported experiencing fever, the proportion who described the fever as 'malaria-like' reduced from 7.5% to 0.9%. This likely reflects a reduction in the burden of malaria, but also a perception among the population that malaria is a less likely cause of fever.

- **Knowledge of malaria prevention methods has not increased.** While 50% of the population in 2010 could explain how malaria is prevented through use of ITNs, this indicator had reduced to 42% in 2013, but knowledge was significantly higher in Domain 1 than 2. Knowledge of mosquito nets (when type not specified) was higher (74%), but there appears to have been less retention by the population of messaging around the insecticidal nature of ITNs and LLINs. This is reflected in poor indicator values for other key malaria prevention messages.
- **Successful removal of oral artemisinin monotherapy.** While in 2010 85% of private drug outlets reported not selling oral artemisinin monotherapy, in the 2013 survey this had increased to 100% of outlets.
- **Knowledge of recommended first-line treatment for malaria.** The recommended treatment for both *P. vivax* and *P. falciparum* has changed from the 2010 (CQ and AS-MQ, respectively) to the 2013 (DHA-pip or AS-MQ for both) survey periods. The treatment for *P. falciparum* is again in the process of changing, with draft revised National Treatment Guidelines for Malaria produced in January 2014. These changes in policy have not been comprehensively communicated and remembered by drug outlet staff, with just over half of interviewed drug outlet staff able to correctly identify the appropriate drug during the 2013 survey.

Conclusions and recommendations

The CMS 2013 is useful to monitor and evaluate the impact of CNM and partner activities by measuring indicators of coverage, access to and use of key malaria interventions, as well as generating a national estimate of malaria prevalence. Conducted since 2004 at three-year intervals, the CMS allows for a longitudinal comparison and tracking of malaria indicators by the NMCP. Additionally, the survey generates weighted estimates for domains, allowing monitoring of activities to contain artemisinin resistance in target areas of the country.

The malariometric results from the CMS 2013 indicate that prevalence of *Plasmodium* infection continues to decline, with very low prevalence detected by both microscopy (0.1%) and PCR (0.8%). The declining burden of malaria is also supported by decreasing trends in incidence reported by MIS and Health Information System (HIS) surveillance.

The CMS 2013 allows for comparison between Domain 1 (containment categories in western Cambodia) and Domain 2 (the remaining eastern and southern provinces of Cambodia), to assess the impact of artemisinin resistance containment and elimination activities targeted to Domain 1 compared with the rest of the country. In addition, results are presented according to existing risk strata (1-4), defined in 2007 by distance of villages from the forest.

The CMS 2013 highlights the following key findings and recommendations.

Household survey

- **Hold intensive BCC/information, education and communication strategies and messaging to optimise use of LLINs, following the success in increasing household ownership of LLINs.** Mass distributions of LLINs have been effective in increasing ownership of LLINs, and these have replaced almost all ITNs in the country. However, the proportion of individuals purchasing and using conventional, untreated nets is consistent with that seen in the CMS2010. Further investigation is needed to explore the factors contributing to the decisions to purchase and use particular types of nets and the specific preferences of the population to ensure nets distributed in the future are consistently used. BCC messaging relating to use of mosquito nets should have an increased emphasis on the benefits of an insecticide-treated versus a conventional net.

- **Continue to target the forest-going population as a high-risk group, enhancing knowledge, access to prevention and treatment.** The CMS 2013 indicated that forest-goers had significantly higher odds of malaria than individuals who had not visited the forest. While some success has been seen in the use of mosquito nets by this population when they visit the forest, net use is not yet universal. Further vulnerable populations that should be targeted include travellers (also at increased odds of malaria in the survey) as well as other mobile populations such as military and security personnel who visit forested areas.
- **Conduct an in-depth investigation of motivations and reasons for accessing different types of service for malaria diagnosis and treatment.** The proportion of individuals who reported that they would access a VMW for malaria diagnosis and treatment was much lower than expected, and this does not concur with the high proportion of all confirmed malaria cases reported through public health surveillance as being diagnosed by VMWs. It is recommended to revise questions for the next CMS to understand more about qualitative factors relating to factors influencing where people choose to go for malaria diagnosis and treatment. Specifically, the CMS 2015 should include a question on when and why the interviewee would choose to go to a VMW, as well as the circumstances in which they would choose not to visit a VMW.

Net and drug outlet survey

- **Cascade the National Treatment Guidelines for Malaria to all drug outlets that are registered and that sell antimalarial medicines.** Given the presence of artemisinin resistance, malaria treatment policies must be responsive to data from therapeutic efficacy studies and other studies to ensure treatment remains effective. Considering that the private sector continues to be a source of malaria treatment for a significant proportion of the Cambodian population, these drug outlets must be kept informed of the currently recommended treatment for malaria.

Health facility survey

- **Ensure the availability of antimalarials and RDTs.** While drug stockouts were rare among surveyed public and private HFs, the continued availability of diagnostic tools and treatment is essential.
- **Cascade the updated National Treatment Guidelines for Malaria effectively to all public and private HFs.** Given the presence of artemisinin resistance, malaria treatment policies must be responsive to data from therapeutic efficacy studies and other studies to ensure treatment remains effective. Knowledge of currently recommended treatment for malaria was disappointing at both public and private HFs, and should be improved to ensure patients receive the correct, most effective treatment.

Annexes

Annex 1: Household questionnaire

Annex 2: Drug outlet questionnaire

Annex 3: Net outlet questionnaire

Annex 4: Health facility questionnaire (includes follow-up interview and exit interview)

Annex 1 : Household questionnaire

IDENTIFICATION

Cluster code (1-42): ..... ☐☐	Household ID: ..... ☐☐☐☐
Household Number (1-40): ..... ☐☐	Zone: ..... ☐
Province: _____	Province code: ..... ☐☐
District: _____	District code: ..... ☐☐☐
Commune: _____	Commune code: ..... ☐☐☐☐☐☐
Village: _____	Head of Household: _____

HOUSEHOLD VISITS	Visit 1	Visit 2	Visit 3	Final Visit
Date:	_ _ / _ _ / _ _	_ _ / _ _ / _ _	_ _ / _ _ / _ _	Date: __ __ / __ __ / __ __
Interviewer's Name:	_____	_____	_____	Interviewer ID: ☐☐☐☐
Result code:	_____	_____	_____	Result code: ☐
Next planned visit: Date:	_ _ / _ _ / _ _	_ _ / _ _ / _ _	Total number of visits: ☐	
Time:	_____	_____		

* Result Codes:
1 = Completed
2 = No one (or no potential respondent) at home
3 = Refused
4 = Dwelling not found
5 = Other

COMPLETE AFTER HOUSEHOLD LISTING

Total members in household: ☐☐

Total visitors in the household: ☐☐

Line code of respondent: ☐☐

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	DATA ENTRY
Name: _____	Name: _____	Name: _____	Name: _____
Code: ☐☐☐☐	Code: ☐☐☐☐	Code: ☐☐☐☐	Code: ☐☐☐☐
Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _

Section 1: Household Listing

"We would first like to ask you some information about the members of your household and any temporary visitors to your household."

LINE NO.	USUAL RESIDENTS AND TEMPORARY VISITORS	RELATIONSHIP TO HEAD OF HOUSEHOLD	SEX	AGE		EDUCATION	
Circle the line number if blood samples taken	Give the names of people who usually live in the house and visitors last night	What is the relationship of (NAME) to the head of household?	Is (NAME) male or female?	How old is (NAME)? [*If <1 year, write "00" for years and record number of months]*		Has (NAME) ever attended school?	What is the highest level of education attained?
Q1	Q2	Q3	Q4	Q5		Q6	Q7
Line code	Name	Code*	Male Female	Years	Months	Yes No	Code**
01			1 2			1 2	
02			1 2			1 2	
03			1 2			1 2	
04			1 2			1 2	
05			1 2			1 2	
06			1 2			1 2	
07			1 2			1 2	
08			1 2			1 2	
09			1 2			1 2	
10			1 2			1 2	
11			1 2			1 2	
12			1 2			1 2	
13			1 2			1 2	
14			1 2			1 2	

* Codes for relationship to head of household (Q3):
- 01 = Head of household
- 02 = Spouse (wife/husband/partner)
- 03 = Son or daughter
- 04 = Son or daughter-in-law
- 05 = Grandchild
- 06 = Parent
- 07 = Parent in-law
- 08 = Brother or sister
- 09 = Niece or nephew
- 10 = Other relative
- 11 = Adopted/foster/stepchild
- 12 = Not related

** Codes for level of education (Q7):
- 0 = Never attended school
- 1 = Some primary
- 2 = Completed primary (Grade 6)
- 3 = Some secondary
- 4 = Completed secondary (Grade 12)
- 5 = More than secondary
- 8 = Don't know

LINE NO.	USUAL RESIDENTS AND TEMPORARY VISITORS		PERSON WHO TRAVELS AWAY FROM HOME		SLEPT HERE LAST NIGHT		REASON FOR ABSENCE LAST NIGHT	CURRENTLY PREGNANT		
Circle the line number if blood samples taken	Is (NAME) a usual resident of the household or a temporary visitor?		During the past 6 months, did (NAME) travel away from home and stay overnight?		Did (NAME) sleep here last night?		If (NAME) did not sleep here last night, what was the reason?	FOR ELIGIBLE WOMEN: Is (NAME) currently pregnant?		
Q1	Q8		Q9		Q10		Q11	Q12		
Line code	Resident	Visitor	Yes	No	Yes	No	Code***	Yes	No	DK
01	1	2	1	2	1	2		1	2	8
02	1	2	1	2	1	2		1	2	8
03	1	2	1	2	1	2		1	2	8
04	1	2	1	2	1	2		1	2	8
05	1	2	1	2	1	2		1	2	8
06	1	2	1	2	1	2		1	2	8
07	1	2	1	2	1	2		1	2	8
08	1	2	1	2	1	2		1	2	8
09	1	2	1	2	1	2		1	2	8
10	1	2	1	2	1	2		1	2	8
11	1	2	1	2	1	2		1	2	8
12	1	2	1	2	1	2		1	2	8
13	1	2	1	2	1	2		1	2	8
14	1	2	1	2	1	2		1	2	8

*** Codes for reason for absence last night (Q11):

1 = Working on chamkar or plantation in this province
2 = Working on chamkar/plantation in another province
3 = Working in forest in this province
4 = Working in forest in another province
5 = Working in another province
6 = Working in Thailand
7 = Away at school / studying
8 = Holidays / visiting relatives or friends
9 = Hospitalized or caretaker of a patient
10 = Other (specify)
98 = Don't know

"Just to make sure that I have a complete listing, are there any other persons living in your household that we have not listed, such as small children or infants?"

→ *If yes, add these individuals to the two tables above*

"Are there any other people living or staying here who may not be members of your family, such as visitors or friends or temporary workers?"

→ *If yes, add these individuals to the two tables above*

Tick here if more than 14 people in the house and continuation sheet used: ☐

Section 2: Household Details

"Now I would like to ask you some general questions about this household."

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q13	What is the main source of drinking water in your household? (multiple response possible)	Piped water into house or yard .....1 Rain water/gutter pipe.....2 Tube well or borehole .....3 Public tap/standpipe.....4 Protected well/Spring .....5 Cart or truck with tank .....6 River/Stream/Pond/Lake.....7 Other .....8 Specify:_____	
Q14	What kind of toilet facility does your household use?	Flush or pour toilet .....1 Pit latrine- ventilated or with slab .....2 Open pit (no slab) .....3 No facility/field/forest.....4 Other .....5 Specify:_____	
Q15	Does your dwelling have electricity?	Yes (public/private/generator).....1 No 2	
Q16	Does your household have any of the following assets? ASK ABOUT EACH OF THE ASSESTS AND CIRCLE "YES" IF THEY OWN IT OR "NO" IF THEY DO NOT	Yes No Radio..... 1 2 Television..... 1 2 DVD player..... 1 2 Mobile phone ..... 1 2 Freezer/refrigerator ..... 1 2 Water storage jar ..... 1 2 Bed..... 1 2 Electric Kettle ..... 1 2 Plastic bucket..... 1 2 Sewing machine/loom..... 1 2 Battery (≥12v) ..... 1 2 Floor mat..... 1 2 Pigs ..... 1 2 Cows/Buffalo/Goats ..... 1 2 Chickens/Ducks 1 2	
Q17	What type of fuel does your household mainly use for cooking?	Electricity.....1 Gas/kerosene.....2 Charcoal.....3 Firewood/straw.....4 Other .....5 Specify:_____	
Q18	What is the main material of the roof? (DO NOT ASK. OBSERVE.)	Plastic sheet/tent.....1 Thatch/palm/bamboo .....2 Fibre glass/iron/aluminum.....3 Tiles/cement.....4 Other .....5 Specify:_____	
Q19	What is the main material of the floor? (DO NOT ASK. OBSERVE.)	Bamboo.....1 Wood.....2 Tiles/cement.....3 Earth .....4 Other .....5 Specify:_____	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q20	Does any household member own the following types of transport? ASK ABOUT EACH AND CIRCLE "YES" IF THEY OWN IT OR "NO" IF THEY DO NOT	Yes No Ox or horse cart ..... 1 2 Bicycle..... 1 2 Motorcycle or scooter ..... 1 2 Car or truck ..... 1 2 Boat..... 1 2	
Q21	Does your household use metal or plastic screens on your windows to keep mosquitoes out?	Yes .....1 No 2	
Q22	Does your household use any chemicals to keep mosquitoes away (e.g., spray, coil or repellent)?	Yes .....1 No 2	➔ **Q24**
Q23	In the past month, how much did your household spend on chemicals to keep mosquitoes away?	Riel: ..... ☐☐☐☐☐ Not Sure 98	
Q24	During the past 12 months, has anyone sprayed the interior walls of your home against mosquitoes?	Yes .....1 No .....2 Don't know 8	➔ **Q27** ➔ **Q27**
Q25	Who sprayed the house?	Government worker/program .....1 NGO worker/program.....2 Private company .....3 Household member.....4 Other .....5 Specify:_____ Not sure 8	
Q26	Did you pay for the spraying?	Yes .....1 No .....2 Don't know 8	
Q27	How many separate sleeping spaces are there in your household? INCLUDE ALL SLEEPING SPACES, INCLUDING IF THERE IS MORE THAN ONE SLEEPING SPACE IN EACH ROOM USED FOR SLEEPING	Number of sleeping spaces ..... ☐☐	

Section 3: Household Nets

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q28	Does your household have any mosquito nets (bed nets or hammock nets) that can be used while sleeping?	Yes .....1 No .....2 Not sure 8	➔ **Q52** ➔ **Q52**
Q29	How many mosquito nets does your household have? ALSO INCLUDE ANY THAT ARE NOT CURRENTLY IN USE	Number of bed nets: ..... ☐☐ Number of hammock nets:..... ☐☐ Total number of mosquito nets: ..... ☐☐	

NO.	QUESTIONS	Net 1	Net 2	Net 3
Q30	Ask to see the nets in the household.	Observed................1 Not observed 2	Observed................1 Not observed 2	Observed................1 Not observed 2
NOTE: IF THERE ARE MORE THAN THREE NETS IN THE HOUSEHOLD, USE ADDITIONAL SHEETS. FIRST ASK Q30-Q48 FOR NET 1, THEN Q30-Q48 FOR NET 2, THEN Q30-Q48 FOR NET 3, …				
Q31	How long ago did your household obtain this net?	< 6 months.............1 6 mo to <1 year ......2 1 yr to < 2 yr ....3 2 yr to < 3 yr ....4 3 yr to < 5 yr ....5 ≥ 5 years................6 Don't know.............8	< 6 months ....1 6 mo to <1 year ......2 1 yr to < 2 yr ....3 2 yr to < 3 yr ....4 3 yr to < 5 yr ....5 ≥ 5 years................6 Don't know.............8	< 6 months ....1 6 mo to <1 year ......2 1 yr to < 2 yr ....3 2 yr to < 3 yr ....4 3 yr to < 5 yr ....5 ≥ 5 years ....6 Don't know 8
Q32	Where did your household obtain this net?	Gift (family/friend) ...1 Government...........2 NGO ....3 Shop/Market...........4 Itinerant seller.........5 Other......................6 Spec_______________ Don't know.............8 **IF GIFT, SKIP TO Q34**	Gift (family/friend) ...1 Government ....2 NGO ....3 Shop/Market...........4 Itinerant seller.........5 Other ....6 Spec_______________ Don't know.............8 **IF GIFT, SKIP TO Q34**	Gift (family/friend)...1 Government ....2 NGO ....3 Shop/Market...........4 Itinerant seller.........5 Other ....6 Spec_______________ Don't know ....8 **IF GIFT, SKIP TO Q34**
Q33	How much did you pay for this net?	Riel: _____________ Don't know.............8	Riel: _____________ Don't know.............8	Riel: _____________ Don't know 8
Q34	Observe or ask the brand of the mosquito net. If brand is unknown, and you cannot observe the net, show pictures of typical net types/brands to respondent.	Olyset ....1 Permanet................2 Malanet-bed ....3 Malanet-hammock..4 GF/MoH logo ....5 Netprotect..............6 Untreated nets: B52 ....7 No logo ....8 Hammock ....9 Other.....................10 Spec_______________ Don't know...........98	Olyset ....1 Permanet................2 Malanet-bed ....3 Malanet-hammock..4 GF/MoH logo ....5 Netprotect..............6 Untreated nets: B52 ....7 No logo ....8 Hammock ....9 Other ....10 Spec_______________ Don't know...........98	Olyset ....1 Permanet................2 Malanet-bed ....3 Malanet-hammock .4 GF/MoH logo..........5 Netprotect..............6 Untreated nets: B52 ....7 No logo.................8 Hammock.............9 Other ....10 Spec_______________ Don't know 98
Q35	Observe or ask the size of the mosquito net.	Single size ....1 Family size ....2 Hammock 3	Single size ....1 Family size ....2 Hammock 3	Single size.............1 Family size ....2 Hammock...............3
Q36	Observe or ask the colour of the mosquito net.	White ....1 Blue ....2 Green......................3 Pink.........................4 Other......................5 Spec_______________ Don't know.............8	White ....1 Blue ....2 Green ....3 Pink ....4 Other ....5 Spec_______________ Don't know.............8	White ....1 Blue ....2 Green ....3 Pink ....4 Other ....5 Spec_______________ Don't know 8
Q37	Does the net have any holes?	Yes ....1 No 2	Yes ....1 No..........................2	Yes ....1 No..........................2
Q38	Has the net been repaired?	Yes ....1 No 2	Yes ....1 No..........................2	Yes ....1 No..........................2

NO.	QUESTIONS	Net 1	Net 2	Net 3
Q39	When you got the mosquito net was it already treated with an insecticide to kill or repel mosquitoes?	Yes .....1 No .....2 Not sure 8	Yes .....1 No .....2 Not sure 8	Yes .....1 No .....2 Not sure 8
Q40	When you got the mosquito net was there any packet of insecticide inside the packaging?	Yes .....1 No .....2 Not sure 8	Yes .....1 No .....2 Not sure 8	Yes .....1 No .....2 Not sure 8
Q41	Since you have had the net, has it ever been soaked or dipped in a liquid to kill/repel mosquitoes?	Yes .....1 No .....2 Not sure .....8 **IF NO OR NOT SURE, SKIP TO Q45**	Yes .....1 No .....2 Not sure .....8 **IF NO OR NOT SURE, SKIP TO Q45**	Yes .....1 No .....2 Not sure .....8 **IF NO OR NOT SURE, SKIP TO Q45**
Q42	Has your net been treated with Super Malatab in the last 6 months?	Yes .....1 No .....2 Not sure 8	Yes .....1 No .....2 Not sure 8	Yes .....1 No .....2 Not sure 8
Q43	The last time you treated your net, how much did your household pay for dipping the net, if it paid anything?	Riel: _____ Don't know 8	Riel: _____ Don't know 8	Riel: _____ Don't know 8
Q44	How long since the net was last soaked or dipped in a liquid to kill/repel mosquitoes? IF LESS THAN ONE MONTH, WRITE "00"	Months: ..... ☐☐ Not sure .....88 More than 3 years (36 months) ago 99	Months: ..... ☐☐ Not sure .....88 More than 3 years (36 months) ago 99	Months: ..... ☐☐ Not sure .....88 More than 3 years (36 months) ago 99
Q45	How frequently has this net been washed since you received it?	Weekly .....1 Monthly .....2 Every 2-3 months ...3 Twice per year .....4 Once per year .....5 < Once a year .....6 Never .....7 Not sure 8	Weekly .....1 Monthly .....2 Every 2-3 months ...3 Twice per year .....4 Once per year .....5 < Once a year .....6 Never .....7 Not sure 8	Weekly .....1 Monthly .....2 Every 2-3 months ...3 Twice per year .....4 Once per year .....5 < Once a year .....6 Never .....7 Not sure 8
Q46	Did anyone sleep under this mosquito net last night?	Yes .....1 No .....2 Not sure .....8 **IF NO OR NOT SURE, SKIP TO Q48**	Yes .....1 No .....2 Not sure .....8 **IF NO OR NOT SURE, SKIP TO Q48**	Yes .....1 No .....2 Not sure .....8 **IF NO OR NOT SURE, SKIP TO Q48**

NO.	QUESTIONS	Net 1	Net 2	Net 3
Q47	Who slept under this mosquito net last night? ASK FOR THE NAME AND AGE OF EACH PERSON WHO SLEPT UNDER THE NET, THEN CHECK SECTION 1 FOR THE LIST OF HOUSEHOLD MEMBERS AND VISITORS AND WRITE THEIR LINE CODE (Q1)	1) Name________ Line code:..... ☐☐ 2) Name________ Line code:..... ☐☐ 3) Name________ Line code:..... ☐☐ 4) Name________ Line code:..... ☐☐ 5) Name________ Line code:..... ☐☐	1) Name________ Line code:..... ☐☐ 2) Name________ Line code:..... ☐☐ 3) Name________ Line code:..... ☐☐ 4) Name________ Line code:..... ☐☐ 5) Name________ Line code:..... ☐☐	1) Name________ Line code:...... ☐☐ 2) Name________ Line code:...... ☐☐ 3) Name________ Line code:...... ☐☐ 4) Name________ Line code:...... ☐☐ 5) Name________ Line code:...... ☐☐

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q48	Do you have any old nets that you are not using to sleep under?	Yes ....1 No 2	 ➔ Q50
Q49	What are you using these old nets for? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Saving for visitors....................................1 Fishing ....2 Protect garden ....3 Protect animals 4	
Q50	Do you have any new nets that you are not using to sleep under when you are at home or when at the forest or elsewhere?	Yes ....1 No 2	 ➔ Q52
Q51	Why aren't you using these new nets?	Saving for visitors....................................1 Saving for future use................................2 No place to hang up.................................3 Currently have enough nets in use ....4 Other ....5 Specify:____________________	
Q52	If you need to buy a net where would you go to buy one?	Shop or seller in village.............................1 Nearest market ....2 Itinerant seller ....3 Would not buy- wait for distribution............4 Would not buy- other ....5 Other ....6 Specify:____________________ Don't know 8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q53	If you decided you needed to treat or re-treat a net (i.e., soaking or dipping in a liquid), where would you go?	Wait for project/health staff .....1 Health center/hospital .....2 Private health facility .....3 NGO office .....4 Pharmacy .....5 Market/shop .....6 VMW/VHV .....7 Nets are all pre-treated .....8 Don't want insecticide .....9 Have no nets .....10 Other .....11 Specify:_____ Don't know 98	
Q54	What are the benefits of a mosquito net treated with insecticide compared to an untreated net? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Prevents mosquito bites .....1 Repels mosquitoes .....2 Kills mosquitoes .....3 Kills other insects .....4 Sleep better .....5 Protects against malaria .....6 Other .....7 Specify:_____ Don't know 8	

Section 4: People who go to the forest

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q55	Does anyone in your household sometimes go to the forest and sleep there overnight? (Prey Klang)?	Yes .....1 No .....2 Don't know 8	 ➔ **Q69** ➔ **Q69**
Q56	How many people in your household sometimes go to the forest and sleep there overnight?	Number of people: ..... ☐☐	

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q57	Who in your household sometimes go to the forest and sleeps there overnight? ASK FOR NAME, CHECK SECTION 1 FOR THEIR LINE CODE (Q1) *(Use additional sheets if more than 3 persons)*	Name _____ Line code:..... ☐☐	Name _____ Line code:..... ☐☐	Name _____ Line code:..... ☐☐
Q58	When was (NAME) last in the forest?	Last night .....1 < 1 week .....2 1 to < 4 weeks .....3 ≥ 4 weeks .....4 Not sure 8	Last night .....1 < 1 week .....2 1 to < 4 weeks .....3 ≥ 4 weeks .....4 Not sure 8	Last night .....1 < 1 week .....2 1 to < 4 weeks .....3 ≥ 4 weeks .....4 Not sure 8
Q59	How many nights did (NAME) stay in the forest on their last visit?	Nights: ..... ☐☐ Not sure 98	Nights: ..... ☐☐ Not sure 98	Nights: ..... ☐☐ Not sure 98

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q60	Did (NAME) take a mosquito net with them the last time they went to the forest?	Yes ....1 No ....2 Not sure ....8 **IF YES, SKIP TO Q62**	Yes ....1 No..........................2 Not sure.................8 **IF YES, SKIP TO Q62**	Yes ....1 No..........................2 Not sure.................8 **IF YES, SKIP TO Q62**
Q61	If (NAME) did not take a net with them to the forest last time or did not use it, what was the reason why?	Didn't realize I had to use one..................1 Forgot to take ....2 Not enough nets in house...................3 Don't have hammock net........................4 Nowhere to hang in forest.....................5 No money to buy ....6 Other......................7 Don't know.............8	Didn't realize I had to use one..................1 Forgot to take ....2 Not enough nets in house...................3 Don't have hammock net ....4 Nowhere to hang in forest ....5 No money to buy ....6 Other ....7 Don't know.............8	Didn't realize I had to use one ....1 Forgot to take ....2 Not enough nets in house ....3 Don't have hammock net ....4 Nowhere to hang in forest ....5 No money to buy ....6 Other ....7 Don't know 8
Q62	From where did (NAME) obtain the net?	Home ....1 Shop near home.....2 Shop near forest.....3 Co-workers ....4 Other......................5 Spec_______________ Don't know.............8	Home.....................1 Shop near home.....2 Shop near forest.....3 Co-workers............4 Other ....5 Spec_______________ Don't know.............8	Home.....................1 Shop near home ....2 Shop near forest ....3 Co-workers............4 Other ....5 Spec_______________ Don't know 8
Q63	Did (NAME) use a mosquito net in the forest last time?	Yes ....1 No ....2 Not sure ....8 **IF NO OR NOT SURE, SKIP TO Q66**	Yes ....1 No..........................2 Not sure.................8 **IF NO OR NOT SURE, SKIP TO Q66**	Yes ....1 No..........................2 Not sure.................8 **IF NO OR NOT SURE, SKIP TO Q66**
Q64	What type of net did (NAME) use in the forest last time?	Hammock net ....1 Bed net ....2 Not sure 8	Hammock net.........1 Bed net..................2 Not sure.................8	Hammock net.........1 Bed net..................2 Not sure.................8
Q65	Was the net that (NAME) used last time treated to kill/repel mosquitoes?	Yes ....1 No ....2 Not sure ....8 **SKIP TO Q66**	Yes ....1 No..........................2 Not sure.................8 **SKIP TO Q66**	Yes ....1 No..........................2 Not sure.................8 **SKIP TO Q66**
Q66	Did (NAME) take any other action to avoid getting malaria? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED PROBE: ANYTHING ELSE?	Mosquito coil ....1 Repellent ....2 Boiled water............3 Burned leaves ....4 Took medication .....5 Wore long clothes...6 No action taken ......7 Other......................8 Spec_______________ Don't know.............9	Mosquito coil ....1 Repellent ....2 Boiled water ....3 Burned leaves ....4 Took medication.....5 Wore long clothes ..6 No action taken ......7 Other ....8 Spec_______________ Don't know.............9	Mosquito coil ....1 Repellent................2 Boiled water ....3 Burned leaves ....4 Took medication.....5 Wore long clothes ..6 No action taken ......7 Other ....8 Spec_______________ Don't know 9
Q67	Did (NAME) get sick while away from home?	Yes ....1 No ....2 Don't know.............8 **IF NO OR DON'T KNOW, SKIP TO Q69**	Yes ....1 No..........................2 Don't know.............8 **IF NO, SKIP TO Q69**	Yes ....1 No..........................2 Don't know ....8 **IF NO, SKIP TO Q69**

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q68	Where did (NAME) get treatment when they were sick while away from home?	Facility/Provider code:..... ☐☐ No treatment.....00 Other.....97 Spec_____ Not sure.....98	Facility/Provider code:..... ☐☐ No treatment .....00 Other .....97 Spec_____ Not sure.....98	Facility/Provider code: ..... ☐☐ No treatment .....00 Other .....97 Spec_____ Not sure.....98

Section 5: People who are temporary visitors

"I would now like to ask you about the temporary visitors in your household."

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q69	Are any people in your household temporary visitors? CHECK Q8 (SECTION 1) TO VERIFY THEIR ANSWER WITH WHAT THEY SAID BEFORE, AND CORRECT ANY INCONSISTENCIES	Yes.....1 No 2	➔ **Q80**
Q70	How many people in your household are temporary visitors? COUNT THE NUMBER OF LINE CODES WITH "VISITOR" CIRCLED FOR Q8	Number of people: ..... ☐☐	

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q71	WRITE THE NAME AND LINE CODE OF THE TEMPORARY VISITORS FROM Q8 *[Use additional sheets if more than 3 persons]*	Name _____ Line code:..... ☐☐	Name _____ Line code:..... ☐☐	Name _____ Line code:..... ☐☐
Q72	How long has (NAME) stayed here in this village? IF < ONE MONTH, WRITE "00"	Months:..... ☐☐ Not sure.....98	Months:..... ☐☐ Not sure.....98	Months: ..... ☐☐ Not sure 98
Q73	Where does (NAME) come from (i.e., permanent address)? WRITE THE NAMES OF THE PROVINCE, DISTRICT, COMMUNE, AND VILLAGE OR TOWN. (FILL IN CODES LATER TO SAVE TIME)	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country.....97 _____ Not sure.....98	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country .....97 _____ Not sure.....98	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country .....97 _____ Not sure.....98

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q74	For what reason did (NAME) travel to this village?	Work (arranged before arrival) .....1 Look for work.....2 Make new home.....3 Visit relatives .....4 Other.....5 Spec_____ Don't know.....8	Work (arranged before arrival) .....1 Look for work.....2 Make new home.....3 Visit relatives .....4 Other .....5 Spec_____ Don't know.....8	Work (arranged before arrival) .....1 Look for work.....2 Make new home.....3 Visit relatives .....4 Other .....5 Spec_____ Don't know 8
Q75	How long does (NAME) intend to stay here in this village?	< 2 weeks .....1 2-4 weeks .....2 1-3 months .....3 3-6 months .....4 6-12 months .....5 > 12 months.....6 Not sure 8	< 2 weeks .....1 2-4 weeks .....2 1-3 months .....3 3-6 months .....4 6-12 months .....5 > 12 months .....6 Not sure.....8	< 2 weeks .....1 2-4 weeks .....2 1-3 months .....3 3-6 months .....4 6-12 months .....5 > 12 months .....6 Not sure.....8
Q76	Where does (NAME) plan to travel to next?	Return home (Q73) 1 Another place of work in this province .....2 Work in another province .....3 Other.....4 Spec_____ Don't know.....8	Return home (Q73) 1 Another place of work in this province .....2 Work in another province.....3 Other .....4 Spec_____ Don't know.....8	Return home (Q73) 1 Another place of work in this province .....2 Work in another province.....3 Other .....4 Spec_____ Don't know 8
Q77	What is the name of the place where (NAME) plans to travel to next? WRITE THE NAMES OF THE PROVINCE, DISTRICT, COMMUNE, AND VILLAGE OR TOWN. (FILL IN CODES LATER TO SAVE TIME)	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country.....97 _____ Not sure 98	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country .....97 _____ Not sure.....98	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country .....97 _____ Not sure.....98
Q78	Has (NAME) traveled to Thailand/Vietnam/Laos during 2009?	Yes .....1 No.....2 Don't know.....8	Yes .....1 No.....2 Don't know.....8	Yes .....1 No.....2 Don't know 8
Q79	Has (NAME) taken any actions during their travels to avoid getting malaria? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED (IF MOSQUITO NET MENTIONED, ASK WHAT TYPE TO DETERMINE IF IT WAS AN INSECTICIDE-TREATED NET) PROBE: ANYTHING ELSE?	Traveled with a mosquito net.....1 Traveled with a treated net (ITN).....2 Mosquito coil .....3 Repellant .....4 Boiled water.....5 Burned leaves .....6 Took medication .....7 Wore long clothes...8 No action taken .....9 Other.....10 Spec_____ Don't know.....98	Traveled with a mosquito net.....1 Traveled with a treated net (ITN).....2 Mosquito coil .....3 Repellant .....4 Boiled water .....5 Burned leaves .....6 Took medication.....7 Wore long clothes ..8 No action taken .....9 Other .....10 Spec_____ Don't know.....98	Traveled with a mosquito net..... 1 Traveled with a treated net (ITN)..... 2 Mosquito coil ..... 3 Repellant ..... 4 Boiled water ..... 5 Burned leaves ..... 6 Took medication..... 7 Wore long clothes .. 8 No action taken ..... 9 Other ..... 10 Spec_____ Don't know 98

Section 6: People who travel and sleep away from home

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q80	Has anyone currently staying in your household traveled away from home and stayed overnight during the past 6 months? CHECK Q9 (SECTION 1) TO VERIFY THEIR ANSWER WITH WHAT THEY SAID BEFORE, AND CORRECT ANY INCONSISTENCIES	Yes .....1 No 2	➔ **Q89**
Q81	How many people in your household traveled away from home and stayed overnight during the past 6 months? COUNT THE NUMBER OF LINE CODES WITH "YES" CIRCLED FOR Q9	Number of people: ..... ☐☐	

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q82	WRITE THE NAME AND LINE CODE OF THOSE WHO TRAVEL AWAY FROM HOME *[Use additional sheets if more than 3 persons]*	Name _____ Line code:..... ☐☐	Name _____ Line code:..... ☐☐	Name _____ Line code:..... ☐☐
Q83	When did (NAME) last travel away from home? (don't include the last time that they were in the forest)	Last night .....1 < 1 week .....2 1 to < 4 weeks .....3 ≥ 4 weeks .....4 Not sure 8	Last night .....1 < 1 week .....2 1 to < 4 weeks .....3 ≥ 4 weeks .....4 Not sure 8	Last night .....1 < 1 week .....2 1 to < 4 weeks .....3 ≥ 4 weeks .....4 Not sure 8
Q84	Where did (NAME) last travel to? WRITE THE NAMES OF THE PROVINCE, DISTRICT, COMMUNE AND VILLAGE OR TOWN. (FILL IN CODES LATER TO SAVE TIME)	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country.....97 _____ Not sure 98	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country .....97 _____ Not sure 98	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Other country .....97 _____ Not sure 98
Q85	For what reason did (NAME) travel away from home? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED PROBE: ANYWHERE ELSE?	Work in forest .....1 Work on chamkar ...2 Work on plantation .3 Work in Thailand ....4 Visit relatives .....5 Other.....6 Spec_____ Don't know.....8	Work in forest .....1 Work on chamkar ...2 Work on plantation .3 Work in Thailand ....4 Visit relatives .....5 Other .....6 Spec_____ Don't know.....8	Work in forest .....1 Work on chamkar ...2 Work on plantation .3 Work in Thailand ....4 Visit relatives .....5 Other .....6 Spec_____ Don't know 8
Q86	In the past 3 months, how many times has (NAME) traveled away from home?	Trips:..... ☐☐ Not sure 98	Trips: ..... ☐☐ Not sure 98	Trips: ..... ☐☐ Not sure 98

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q87	Has (NAME) traveled to Thailand/Vietnam/Laos during 2011-12?	Yes .....1 No .....2 Don't know.....8	Yes .....1 No .....2 Don't know.....8	Yes .....1 No .....2 Don't know 8
Q88	Has (NAME) taken any actions during their travels to avoid getting malaria? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED (IF MOSQUITO NET MENTIONED, ASK WHAT TYPE TO DETERMINE IF IT WAS AN INSECTICIDE-TREATED NET) PROBE: ANYTHING ELSE?	Traveled with a mosquito net.....1 Traveled with a treated net (ITN).....2 Mosquito coil .....3 Repellant .....4 Boiled water.....5 Burned leaves .....6 Took medication .....7 Wore long clothes...8 No action taken .....9 Other.....10 Spec_____ Don't know.....98	Traveled with a mosquito net.....1 Traveled with a treated net (ITN).....2 Mosquito coil .....3 Repellant .....4 Boiled water .....5 Burned leaves .....6 Took medication .....7 Wore long clothes ..8 No action taken .....9 Other .....10 Spec_____ Don't know.....98	Traveled with a mosquito net..... 1 Traveled with a treated net (ITN)..... 2 Mosquito coil ..... 3 Repellant ..... 4 Boiled water ..... 5 Burned leaves ..... 6 Took medication..... 7 Wore long clothes .. 8 No action taken ..... 9 Other ..... 10 Spec_____ Don't know 98

Section 7: Malaria Knowledge and Recognition

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q89	Have you ever heard of an illness called malaria?	Yes.....1 No 2	 ➔ **Q109**
Q90	What are the signs and symptoms of malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Fever.....1 Chills .....2 Headache.....3 Body ache .....4 Sweating .....5 Fatigue .....6 Loss of appetite.....7 Diarrhoea .....8 Other .....9 Specify:_____ Don't know 98	 ➔ **Q93**
Q91	How can you be sure that you or someone in your household with these signs and symptoms has malaria and not another illness?	Previous experience .....1 Symptoms .....2 Doctor's examination .....3 Blood test (slide).....4 RDT or dipstick) .....5 Other .....6 Specify:_____ Don't know 8	
Q92	What signs and symptoms make you decide the illness is serious? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Unconscious .....1 Convulsions .....2 Fast breathing .....3 Very hot.....4 Yellow eye color.....5 Very pale skin .....6 Not breastfeeding.....7 Not eating.....8 Frequent vomiting .....9 Diarrhoea .....10 Other .....11 Specify:_____ Don't know 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q93	How do people get malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Mosquito bites.....1 Drinking dirty water.....2 Not boiling water.....3 Visiting forest.....4 Staying/sleeping in forest.....5 Bathing in river.....6 Bad air.....7 Bad talking.....8 Spirits.....9 Bad food.....10 Poor hygiene.....11 Other.....12 Specify:_____ Don't know.....98	
Q94	How do people prevent malaria? (NOTE: If they say "mosquito net", ask about the characteristic of net to assess if they know about treated nets or not) MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Sleep under a mosquito net.....1 Insecticide-treated net.....2 Mosquito coil.....3 Mosquito repellent.....4 Insecticide spray.....5 Burn leaves.....6 Wear covered clothing.....7 Stay out of forest.....8 Boil water.....9 Other.....10 Specify:_____ Don't know.....98	
Q95	If you suspect someone in your household has malaria, where would you go for advice or treatment?	VMW/MMW/Village Health Volunteer.....1 Health Center/FDH.....2 Referral/Provincial Hospital.....3 Private health provider.....4 Private laboratory.....5 Pharmacy.....6 Shop/market.....7 Self treat with drugs at home.....8 Other source.....9 Specify:_____ Don't know.....98	
Q96	If you suspect someone in your household might have malaria, where would you go to get a test to find out if it really is malaria? (multiple response possible)	VMW/MMW/Village Health Volunteer.....1 Health Center/FDH.....2 Referral/Provincial Hospital.....3 Private health provider.....4 Private laboratory.....5 Pharmacy.....6 Shop/market.....7 Other source.....8 Specify:_____ Don't know about malaria test.....97 Don't know where to get a test.....98	
Q97	In the past 6 months, have you heard or seen any messages or information about malaria?	Yes.....1 No.....2	➔ **Q102**
Q98	How long ago did you first see or hear these messages?	Months: ..... ☐☐ Not Sure.....98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q99	What messages or information related to malaria did you see or hear in the last 6 months? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Sleeping under a mosquito net is important .....1 Sleep under an insecticide-treated net (ITN) .....2 Carry and sleep under a mosquito net when traveling .....3 Carry and sleep under a mosquito net when visiting the forest .....4 Seek treatment for malaria from a VMW or health facility .....5 Seek treatment for malaria promptly/within 24 hours .....6 Complete antimalarial treatment .....7 Get a blood test before taking antimalarial drugs .....8 Malaria is dangerous .....9 Malaria can kill .....10 Mosquitoes spread malaria .....11 Other .....12 Specify:_____ Don't Remember 98	
Q100	Where or from whom did you see or hear these messages/information about malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	VMW/VHV .....1 Health facility staff .....2 Private health provider .....3 Pharmacy .....4 Teachers .....5 Religious leaders/Monks .....6 Family members .....7 Friends/neighbours .....8 TV .....9 Radio .....10 Mobile video units .....11 Posters .....12 Leaflets/Brochures .....13 Billboards .....14 SMS text message .....15 Other .....16 Specify:_____ Don't Remember 98	
Q101	What is the MOST common or popular source of information or advice on malaria? What is the SECOND most common or popular source of information or advice on malaria? WRITE "1" NEXT TO THE CATEGORY THAT IS THE MOST COMMON AND "2" NEXT TO THE CATEGORY THAT IS THE SECOND MOST COMMON	VMW/VHV ..... Health facility staff ..... Private health provider ..... Pharmacy ..... Teachers ..... Religious leaders/Monks ..... Family members ..... Friends/neighbours ..... TV ..... Radio ..... Mobile video units ..... Posters ..... Leaflets/Brochures ..... Billboards ..... SMS text message ..... Other ..... Specify:_____ Don't Know 98	
Q102	Do you know the names of any specific antimalarial drugs?	Yes .....1 No 2	➔ **Q104**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q103	Of the antimalarial drugs you know, tell me the names of the three that you are most familiar with? IF < 3, WRITE THE ONES THAT THEY KNOW (FILL IN THE DRUG CODES LATER TO SAVE TIME)	Name / Code Antimalarial 1: _____ ☐☐ Antimalarial 2: _____ ☐☐ Antimalarial 3: _____ ☐☐	
Q104	Do you know how many days *most* antimalarial drugs should be taken? NOT SPECIFIC TO EACH DRUG THEY KNOW	Number of days: ..... ☐☐ Don't know 98	
Q105	What happens if you don't take antimalarial drugs for the recommended number of days?	Nothing ..... 1 Patient gets sick again ..... 2 Patient does not recover ..... 3 Other ..... 4 Specify: _____ Don't know 8	
Q106	What happens if you don't take all the tablets (i.e., total number of tablets prescribed)? (MULTIPLE RESPONSES POSSIBLE)	Nothing ..... 1 Patient gets sick again ..... 2 Patient does not recover ..... 3 Parasite becomes resistant..... 4 Transmission continues……..5	
Q107	Do you know of any antimalarial drugs that should no longer be used to treat malaria?	Yes ..... 1 No..... 2	➔ **Q109**
Q108	What are the names of the drugs that should no longer be used to treat malaria? IF < 3, WRITE THE ONES THAT THEY KNOW (FILL IN THE DRUG CODES LATER TO SAVE TIME)	Name / Code Antimalarial 1: _____ ☐☐ Antimalarial 2: _____ ☐☐ Antimalarial 3: _____ ☐☐	

Section 8: Malaria Diagnosis and Treatment

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q109	Has anyone in the household been ill with a fever during the last two weeks?	Yes.....1 No 2	➔ **END**
Q110	How many people in the household have been ill with fever during the last two weeks? *(Use additional sheets if more than 2 persons)*	Number ill with fever: ..... ☐☐	

NO.	QUESTIONS	Person 1	Person 2
Q111	Who was ill with fever in the last two weeks?	Name: _____ Line code: ..... ☐☐	Name: _____ Line code: ..... ☐☐

NO.	QUESTIONS	Person 1	Person 2
Q112	What type of fever did (NAME) have?	Krung janh ..... 1 Krung gadow/kluan..... 2 Krung looa ..... 3 Dengue fever (chhiem)..... 4 Night fever (yop)..... 5 Other..... 6 Specify: _____ Don't know.....8	Krung janh ..... 1 Krung gadow/kluan..... 2 Krung looa ..... 3 Dengue fever (chhiem)..... 4 Night fever (yop)..... 5 Other..... 6 Specify: _____ Don't know.....8
Q113	Did (NAME) seek advice or treatment outside of the home for the fever?	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF YES, SKIP TO Q115**	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF YES, SKIP TO Q115**
Q114	Why didn't (NAME) seek treatment outside the home? MULTIPLE RESPONSES CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Waited for fever to go away .. 1 No money for treatment..... 2 No transport..... 3 Not sure where to get drugs.. 4 Didn't feel ill enough ..... 5 Spiritual treatment ..... 6 Traditional medicine ..... 7 Other..... 8 Specify: _____ Don't know..... 9 **SKIP TO Q127**	Waited for fever to go away .. 1 No money for treatment..... 2 No transport..... 3 Not sure where to get drugs.. 4 Didn't feel ill enough ..... 5 Spiritual treatment ..... 6 Traditional medicine ..... 7 Other..... 8 Specify: _____ Don't know..... 9 **SKIP TO Q127**
Q115	Where did (NAME) first seek advice or treatment for the fever? (1st facility/provider)	Facility/Provider code: . ☐☐ Other.....97 Specify: _____ Not sure 98	Facility/Provider code: . ☐☐ Other.....97 Specify: _____ Not sure 98
Q116	How long after the fever started did (NAME) first seek advice or treatment from this facility/provider?	Same day ..... 1 Day after..... 2 Two days after..... 3 Three or more days ..... 4 Don't know..... 8	Same day ..... 1 Day after..... 2 Two days after..... 3 Three or more days ..... 4 Don't know..... 8
Q117	Did (NAME's) fever go away after they sought advice or treatment from this 1st facility/provider?	Yes ..... 1 No 2	Yes ..... 1 No 2
Q118	Did (NAME) seek advice or treatment for the fever anywhere else?	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF NO OR NOT SURE, SKIP TO Q127**	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF NO OR NOT SURE, SKIP TO Q127**
Q119	Why did (NAME) seek advice or treatment elsewhere for the fever?	Not getting better..... 1 Symptoms getting worse..... 2 To buy/get medication ..... 3 Other..... 4 Specify: _____	Not getting better..... 1 Symptoms getting worse..... 2 To buy/get medication ..... 3 Other..... 4 Specify: _____
Q120	Where did (NAME) next seek advice or treatment for the fever? (2nd facility/provider)	Facility/Provider code: . ☐☐ Other.....97 Specify: _____ Not sure 98	Facility/Provider code: . ☐☐ Other.....97 Specify: _____ Not sure 98

NO.	QUESTIONS	Person 1	Person 2
Q121	How long after the fever started did (NAME) seek advice or treatment from this second facility/provider?	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8
Q122	Did (NAME's) fever go away after they sought advice or treatment from this 2nd facility/provider?	Yes ..... 1 No 2	Yes ..... 1 No 2
Q123	Did (NAME) seek advice or treatment for the fever anywhere else?	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF NO OR NOT SURE, SKIP TO Q127**	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF NO OR NOT SURE, SKIP TO Q127**
Q124	Why did (NAME) seek advice or treatment elsewhere for the fever?	Not getting better ..... 1 Symptoms getting worse ..... 2 To buy/get medication ..... 3 Other ..... 4 Specify: _____	Not getting better ..... 1 Symptoms getting worse ..... 2 To buy/get medication ..... 3 Other ..... 4 Specify: _____
Q125	Where did (NAME) next seek advice or treatment for the fever? (3rd facility/provider)	Facility/Provider code: . ☐☐ Other ..... 97 Specify: _____ Not sure 98	Facility/Provider code: . ☐☐ Other ..... 97 Specify: _____ Not sure 98
Q126	How long after the fever started did (NAME) seek advice or treatment from this third facility/provider?	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8
Q127	Did (NAME) take drugs for the fever?	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF NO OR NOT SURE, SKIP TO Q163**	Yes ..... 1 No ..... 2 Not sure ..... 8 **IF NO OR NOT SURE, SKIP TO Q163**
Q128	Where did these drugs come from? MULTIPLE RESPONSES CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	At home ..... 1 Health facility (public) ..... 2 Pharmacy ..... 3 Shop/market ..... 4 Other ..... 5 Specify: _____ Don't know 8	At home ..... 1 Health facility (public) ..... 2 Pharmacy ..... 3 Shop/market ..... 4 Other ..... 5 Specify: _____ Don't know 8
Q129	How long after the fever started did (NAME) first take drugs?	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8

NO.	QUESTIONS	Person 1	Person 2
Q130	What drugs did (NAME) take for the fever? *(Include any drugs that were from self-medication and/or from a health service provider)* RECORD THE DRUG CODE AND NAME, TICK THE BOX IF THE DRUG IS AN ANTIMALARIAL (AM)	Code / Name / anti-malarial? Drug 1: ☐☐ _____ ❑ Drug 2: ☐☐ _____ ❑ Drug 3: ☐☐ _____ ❑ Drug 4: ☐☐ _____ ❑ Drug 5: ☐☐ _____ ❑ Drug 6: ☐☐ _____ ❑ Drug 7: ☐☐ _____ ❑ Drug 8: ☐☐ _____ ❑	Code / Name / anti-malarial? Drug 1: ☐☐ _____ ❑ Drug 2: ☐☐ _____ ❑ Drug 3: ☐☐ _____ ❑ Drug 4: ☐☐ _____ ❑ Drug 5: ☐☐ _____ ❑ Drug 6: ☐☐ _____ ❑ Drug 7: ☐☐ _____ ❑ Drug 8: ☐☐ _____ ❑
GO THROUGH THE LIST ABOVE (Q130) AND NOTE THE ANTIMALARIAL DRUGS. IF NO ANTIMALARIAL DRUGS RECORDED, SKIP TO **Q163**. IF ANTIMALARIAL DRUGS RECORDED, ASK THE FOLLOWING QUESTIONS ABOUT EACH ANTIMALARIAL DRUG TAKEN FOR EACH PERSON:			
Q131	What was the first antimalarial drug that (NAME) took?	Drug code: ..... ☐☐ Not sure 98	Drug code: ..... ☐☐ Not sure 98
Q132	What was the form of this first antimalarial drug?	Tablets ..... 1 Syrup ..... 2 Suppository ..... 3 Injection ..... 4 Don't know 8	Tablets ..... 1 Syrup ..... 2 Suppository ..... 3 Injection ..... 4 Don't know 8
Q133	Where did (NAME) get this first antimalarial drug? *(Supervisor note: should match the codes listed in Q115, Q120 or Q125)*	Facility/Provider code: . ☐☐ Other ..... 97 Specify: _____ Not sure 98	Facility/Provider code: . ☐☐ Other ..... 97 Specify: _____ Not sure 98
Q134	How long after their fever began did (NAME) start taking this first antimalarial drug?	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't know 8
Q135	How many times a day did (NAME) take this first antimalarial drug?	Times per day: ..... ☐☐ Not sure 98	Times per day: ..... ☐☐ Not sure 98
Q136	How many tablets/spoons did (NAME) take each time?	Dose each time: ..... ☐☐ Not sure 98	Dose each time: ..... ☐☐ Not sure 98
Q137	For how many days did (NAME) take this first antimalarial drug?	Number of days: ..... ☐☐ Not sure 98	Number of days: ..... ☐☐ Not sure 98
Q138	Did (NAME) take all the prescribed/purchased tablets or syrup of this antimalarial drug?	Yes ..... 1 No ..... 2 Still taking the drug ..... 3 Not sure ..... 8 **IF NO 2ND ANTIMALARIAL, SKIP TO Q163**	Yes ..... 1 No ..... 2 Still taking the drug ..... 3 Not sure ..... 8 **IF NO 2ND ANTIMALARIAL, SKIP TO Q163**

NO.	QUESTIONS	Person 1	Person 2
Q139	What was the second antimalarial drug that (NAME) took? (CROSS CHECK WITH Q130)	Drug code: ☐☐ Not sure ... 98	Drug code: ☐☐ Not sure ... 98
Q140	What was the form of this second antimalarial drug?	Tablets ... 1 Syrup ... 2 Suppository ... 3 Injection ... 4 Don't know ... 8	Tablets ... 1 Syrup ... 2 Suppository ... 3 Injection ... 4 Don't know ... 8
Q141	Where did (NAME) get this second antimalarial drug? *(Supervisor note: should match the codes listed in Q115, Q120 or Q125)*	Facility/Provider code: ☐☐ Other ... 97 Specify: _____ Not sure ... 98	Facility/Provider code: ☐☐ Other ... 97 Specify: _____ Not sure ... 98
Q142	How long after their fever began did (NAME) start taking this second antimalarial drug?	Same day ... 1 Day after ... 2 Two days after ... 3 Three or more days ... 4 Don't know ... 8	Same day ... 1 Day after ... 2 Two days after ... 3 Three or more days ... 4 Don't know ... 8
Q143	How many times a day did (NAME) take this second antimalarial drug?	Times per day: ☐☐ Not sure ... 98	Times per day: ☐☐ Not sure ... 98
Q144	How many tablets/spoons did (NAME) take each time?	Dose each time: ☐☐ Not sure ... 98	Dose each time: ☐☐ Not sure ... 98
Q145	For how many days did (NAME) take this second antimalarial drug?	Number of days: ☐☐ Not sure ... 98	Number of days: ☐☐ Not sure ... 98
Q146	Did (NAME) take all the prescribed/purchased tablets or syrup of this antimalarial drug?	Yes ... 1 No ... 2 Still taking the drug ... 3 Not sure ... 8 **IF NO 3RD ANTIMALARIAL, SKIP TO Q163**	Yes ... 1 No ... 2 Still taking the drug ... 3 Not sure ... 8 **IF NO 3RD ANTIMALARIAL, SKIP TO Q163**
Q147	What was the third antimalarial drug that (NAME) took? (CROSS CHECK WITH Q130)	Drug code: ☐☐ Not sure ... 98	Drug code: ☐☐ Not sure ... 98
Q148	What was the form of this third antimalarial drug?	Tablets ... 1 Syrup ... 2 Suppository ... 3 Injection ... 4 Don't know ... 8	Tablets ... 1 Syrup ... 2 Suppository ... 3 Injection ... 4 Don't know ... 8
Q149	Where did (NAME) get this third antimalarial drug? *(Supervisor note: should match the codes listed in Q115, Q120 or Q125)*	Facility/Provider code: ☐☐ Other ... 97 Specify: _____ Not sure ... 98	Facility/Provider code: ☐☐ Other ... 97 Specify: _____ Not sure ... 98
Q150	How long after their symptoms began did (NAME) start taking this third antimalarial drug?	Same day ... 1 Day after ... 2 Two days after ... 3 Three or more days ... 4 Don't know ... 8	Same day ... 1 Day after ... 2 Two days after ... 3 Three or more days ... 4 Don't know ... 8

NO.	QUESTIONS	Person 1	Person 2
Q151	How many times a day did (NAME) take this third antimalarial drug?	Times per day:..... ☐☐ Not sure..... 98	Times per day:..... ☐☐ Not sure..... 98
Q152	How many tablets/spoons did (NAME) take each time?	Dose each time: ..... ☐☐ Not sure..... 98	Dose each time: ..... ☐☐ Not sure..... 98
Q153	For how many days did (NAME) take this third antimalarial drug?	Number of days: ..... ☐☐ Not sure..... 98	Number of days: ..... ☐☐ Not sure..... 98
Q154	Did (NAME) take all the prescribed/purchased tablets or syrup of this antimalarial?	Yes ..... 1 No..... 2 Still taking the drug..... 3 Not sure..... 8 **IF NO 4TH ANTIMALARIAL, SKIP TO Q163**	Yes ..... 1 No..... 2 Still taking the drug..... 3 Not sure..... 8 **IF NO 4TH ANTIMALARIAL, SKIP TO Q163**
Q155	What was the fourth antimalarial drug that (NAME) took? (CROSS CHECK WITH Q130)	Drug code:..... ☐☐ Not sure..... 98	Drug code:..... ☐☐ Not sure..... 98
Q156	What was the form of this fourth antimalarial drug?	Tablets..... 1 Syrup ..... 2 Suppository ..... 3 Injection ..... 4 Don't know..... 8	Tablets..... 1 Syrup ..... 2 Suppository ..... 3 Injection ..... 4 Don't know..... 8
Q157	Where did (NAME) get this fourth antimalarial drug? *(Supervisor note: should match the codes listed in Q115, Q120 or Q125)*	Facility/Provider code: . ☐☐ Other.....97 Specify: _____ Not sure..... 98	Facility/Provider code: . ☐☐ Other.....97 Specify: _____ Not sure..... 98
Q158	How long after their symptoms began did (NAME) start taking this fourth antimalarial drug?	Same day ..... 1 Day after..... 2 Two days after..... 3 Three or more days ..... 4 Don't know..... 8	Same day ..... 1 Day after..... 2 Two days after..... 3 Three or more days ..... 4 Don't know..... 8
Q159	How many times a day did (NAME) take this fourth antimalarial drug?	Times per day:..... ☐☐ Not sure..... 98	Times per day:..... ☐☐ Not sure..... 98
Q160	How many tablets/spoons did (NAME) take each time?	Dose each time: ..... ☐☐ Not sure..... 98	Dose each time: ..... ☐☐ Not sure..... 98
Q161	For how many days did (NAME) take this fourth antimalarial drug?	Number of days: ..... ☐☐ Not sure..... 98	Number of days: ..... ☐☐ Not sure..... 98
Q162	Did (NAME) take all the prescribed/purchased tablets or syrup of this antimalarial?	Yes ..... 1 No..... 2 Still taking the drug..... 3 Not sure..... 8	Yes ..... 1 No..... 2 Still taking the drug..... 3 Not sure..... 8
Q163	Did (NAME) have a blood test for malaria?	Yes ..... 1 No..... 2 Not sure..... 8 **IF NO OR NOT SURE, SKIP TO Q169**	Yes ..... 1 No..... 2 Not sure..... 8 **IF NO OR NOT SURE, SKIP TO Q169**

NO.	QUESTIONS	Person 1	Person 2
Q164	Did (NAME) have the malaria test before or after taking drugs?	Before taking drugs ..... 1 After taking drugs ..... 2 Not sure 8	Before taking drugs ..... 1 After taking drugs ..... 2 Not sure 8
Q165	What type of malaria test did (NAME) have?	RDT/dipstick ..... 1 Blood slide/microscopy..... 2 Not sure 8	Dipstick ..... 1 Blood slide ..... 2 Not sure 8
Q166	Where did (NAME) get the malaria test done?	VMW/MMW/Village Volunteer……..1 Health Center/FDH……..2 Referral/Prov. Hospital……3 Private health provider……4 Private laboratory……5 Pharmacy……..6 Shop/market……7 Other source……8 Specify:_____ _____ Don't know about malaria test……97 Don't know where to get a test ……..98	VMW/MMW/Village Volunteer……..1 Health Center/FDH……..2 Referral/Prov. Hospital……3 Private health provider……4 Private laboratory……5 Pharmacy……..6 Shop/market……7 Other source……8 Specify:_____ _____ Don't know about malaria test……97 Don't know where to get a test ……..98
Q167	What was the result of the malaria test?	Positive ..... 1 Negative ..... 2 Don't know..... 8 **IF NEGATIVE, SKIP TO Q169**	Positive ..... 1 Negative ..... 2 Don't know..... 8 **IF NEGATIVE, SKIP TO Q169**
Q168	What type of malaria did (NAME) have?	Not told species ..... 1 Falciparum (Pf)..... 2 Vivax (Pv) ..... 3 Mixed (both Pf & Pv) 4	Not told species ..... 1 Falciparum (Pf)..... 2 Vivax (Pv) ..... 3 Mixed (both Pf & Pv) 4
Q169	Does (NAME) still have a fever?	Yes ..... 1 No ..... 2 Not sure 8	Yes ..... 1 No ..... 2 Not sure 8

Section 9. Client satisfaction

No.	QUESTION	
Q170	Did anyone in your household visit a health facility in the last 6 months?	Yes……1 No……..2 **IF NO, END OF QUESTIONNAIRE**
Q171	Is the facility public or private?	Public facility……1 Private facility (for profit)……2 Private facility (not for profit)……3 Other……4 Specify_____
Q172	What type of facility?	Referral hospital……1 Former district hospital / HC (with beds)……2 Health centre (without beds)……3 Polyclinic / private hospital……..4 Cabinet / private clinic……..5 Other……6 Specify_____

Q173	Was the health facility clean and neat?	Yes to a great extent……..1 No, not at all ……2 Yes, to some extent ……..…3
Q174	Were drugs available?	Yes, all available ……...1 No, some not available……2 None available ……..3
Q175	Were diagnostic tests available?	Yes, all available……..1 No, some not available…….2 None available..……..……..3
Q176	Did the health staff pay sufficient attention to you?	Yes, very well..……..1 No, not at all ……2 Moderately…..……..3
Q177	Did you feel you had to wait long?	Yes……..1 No, not at all..……2 Only slightly……..3
Q178	Did you feel you were properly examined?	Yes……..1 No, not at all..……2 Only slightly……..3
Q179	Were health staff friendly?	Yes, very friendly……..1 No, not at all..……2 Only slightly……..3
Q180	Did they address all your questions?	Yes……..1 No, not at all..……2 Only some ..……..3

END INTERVIEW

Thank respondent for taking the time to be interviewed.

Annex 2: Drug outlet questionnaire

IDENTIFICATION

	Outlet ID: ☐☐☐
Cluster code (1-48): ☐☐	Outlet Number (1-2): ☐
Province: _____	Province code: ☐☐
District: _____	District code: ☐☐☐
Commune: _____	Commune code: ☐☐☐☐☐
Village: _____	Zone: ☐

Where is the outlet located?	Village .....1 Town 2
What is the sex of the respondent?	Male .....1 Female 2
What is the age of the respondent?	Age in years: ☐☐
What is the respondent's role? NOTE: THE RESPONDENT MUST BE SOMEONE WHO SELLS DRUGS IN THIS OUTLET	Owner .....1 Employee .....2 Family member .....3 Other .....4 Specify: _____
What formal health training has the respondent had?	Doctor .....1 Pharmacist .....2 Medical assistant .....3 Nurse .....4 Midwife .....5 Other health training .....6 Specify: _____ No health training 7
How many years of formal training did you receive?	Years of training: ☐☐

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	DATA ENTRY
Name: _____	Name: _____	Name: _____	Name: _____
Code: ☐☐☐☐	Code: ☐☐☐☐	Code: ☐☐☐☐	Code: ☐☐☐☐
Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _

Section 1: Details of Outlet

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q1	Type of outlet	Village drug outlet ..... 1 Private clinic ..... 2 Health cabinet/worker's home ..... 3 Pharmacy ..... 4 General store/shop ..... 5 Drug seller in market ..... 6 Other ..... 7 Specify:_____	
Q2	Do you offer consultations?	Yes ..... 1 No 2	➔ **Q6**
Q3	Approximately how many consultations do you provide each day?	< 1 per week ..... 1 1 to 5 per day ..... 2 6 to 10 per day ..... 3 > 10 per day ..... 4 Don't know 8	
Q4	Do you offer consultations for malaria?	Yes ..... 1 No 2	
Q5	Approximately how many consultations for malaria do you provide each week?	< 1 per week ..... 1 1 to 5 per day ..... 2 6 to 10 per day ..... 3 > 10 per day ..... 4 Don't know 8	
Q6	What are your normal hours of operation for this drug outlet, that is what time do you open and what time do you close?	Open: ..... __ __:__ __ Close: ..... __ __:__ __	
Q7	Do you distribute or display any information for your clients about malaria? *Check this box if they were able to show any education materials about malaria* →	Yes ..... 1 No ..... 2 ☐	

Section 2: Malarine, A+M, Duo-Cotecxin and Eurartesim

"I would first like to ask you about four specific drugs."

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q8	Have you heard of a drug called Malarine?	Yes ..... 1 No 2	➔ **Q16**
Q9	Do you sell Malarine?	Yes ..... 1 No 2	➔ **Q15**
Q10	How much do you sell one box of Malarine for (box or dispenser)?	Riel: ..... ☐☐☐☐☐	
Q11	How much Malarine did you sell last week? (i.e., number of blister packets)	Number of packets: ..... ☐☐☐ Don't know 888	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q12	When did you last buy stock of Malarine?	Within last week ..... 1 Within last month..... 2 More than a month ago ..... 3 Not sure..... 8	
Q13	How much Malarine did you buy the last time you bought stock? (i.e., number of blister packets) *Note: one dispenser = 12 blister packets*	Number of packets: ..... ☐☐☐ Don't know..... 888	
Q14	When will you buy your next stock of Malarine?	Within next week ..... 1 Within next month ..... 2 In more than a month ..... 3 No plans to buy ..... 4 Not sure..... 8	**Skip to Q17**
Q15	Why don't you sell Malarine? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Not available ..... 1 Too expensive to buy stock ..... 2 No demand..... 3 People don't know it ..... 4 Don't know where to buy drug..... 5 Other ..... 6 Specify:_____ Not sure..... 8	
Q16	Have you heard of a drug called A+M?	Yes ..... 1 No..... 2	➔ **Q24**
Q17	Do you sell A+M?	Yes ..... 1 No..... 2	➔ **Q23**
Q18	How much do you sell one box of A+M for?	Riel: ..... ☐☐☐☐☐	
Q19	How much A+M did you sell last week? (i.e., number of blister packets)	Number of packets: ..... ☐☐☐ Don't know..... 888	
Q20	When did you last buy stock of A+M?	Within last week ..... 1 Within last month..... 2 More than a month ago ..... 3 Not sure..... 8	
Q21	How much A+M did you buy the last time you bought stock? (i.e., number of blister packets)	Number of packets: ..... ☐☐☐ Don't know..... 888	
Q22	When will you buy your next stock of A+M?	Within next week ..... 1 Within next month ..... 2 In more than a month ..... 3 No plans to buy ..... 4 Not sure..... 8	**Skip to Q24**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q23	Why don't you sell A+M? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Not available ..... 1 Too expensive to buy stock ..... 2 No demand..... 3 People don't know it ..... 4 Don't know where to buy drug..... 5 Other ..... 6 Specify:_____ Not sure..... 8	
Q24	Have you heard of a drug called Duo-Cotecxin?	Yes ..... 1 No..... 2	➔ **Q32**
Q25	Do you sell Duo-Cotecxin?	Yes ..... 1 No..... 2	➔ **Q31**
Q26	How much do you sell one box of Duo-Cotecxin for?	Riel: ..... ☐☐☐☐☐	
Q27	How much Duo-Cotecxin did you sell last week? (i.e., number of blister packets)	Number of packets: ..... ☐☐☐ Don't know..... 888	
Q28	When did you last buy stock of Duo-Cotecxin?	Within last week ..... 1 Within last month..... 2 More than a month ago ..... 3 Not sure..... 8	
Q29	How much Duo-Cotecxin did you buy the last time you bought stock? (i.e., number of blister packets)	Number of packets: ..... ☐☐☐ Don't know..... 888	
Q30	When will you buy your next stock of Duo-Cotecxin?	Within next week ..... 1 Within next month ..... 2 In more than a month ..... 3 No plans to buy ..... 4 Not sure..... 8	**Skip to Q32**
Q31	Why don't you sell Duo-Cotecxin? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Not available ..... 1 Too expensive to buy stock ..... 2 No demand..... 3 People don't know it ..... 4 Don't know where to buy drug..... 5 Other ..... 6 Specify:_____ Not sure..... 8	
Q32	Have you heard of a drug called Eurartesim?	Yes ..... 1 No..... 2	➔ **Q40**
Q33	Do you sell Eurartesim?	Yes ..... 1 No..... 2	➔ **Q39**
Q34	How much do you sell one box of Eurartesim for?	Riel: ..... ☐☐☐☐☐	
Q35	How much Eurartesim did you sell last week? (i.e., number of blister packets)	Number of packets: ..... ☐☐☐ Don't know..... 888	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q36	When did you last buy stock of Eurartesim?	Within last week ..... 1 Within last month..... 2 More than a month ago ..... 3 Not sure..... 8	
Q37	How much Eurartesim did you buy the last time you bought stock? (i.e., number of blister packets)	Number of packets:..... ☐☐☐ Don't know..... 888	
Q38	When will you buy your next stock of Eurartesim?	Within next week ..... 1 Within next month ..... 2 In more than a month ..... 3 No plans to buy ..... 4 Not sure..... 8	**Skip to Q40**
Q39	Why don't you sell Eurartesim? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Not available ..... 1 Too expensive to buy stock ..... 2 No demand..... 3 People don't know it ..... 4 Don't know where to buy drug..... 5 Other ..... 6 Specify:_____ Not sure..... 8	

Section 3: Antimalarials and diagnostics sold

"I would now like to ask you about all the antimalarial drugs and diagnostics you provide. I would like you to list all the drugs and Rapid Diagnostic Tests (RDTs) that you sell. If possible can I check your current stock?"

Q40 Code	Drug / Test Name	Sold in past 6 months?		In stock now?		Have you ever been out of stock of this drug?		If YES, within the past 3 months, was this drug/test out of stock for more than 1 week?		
		Yes	No	Yes	No	Yes	No	Yes	No	Not Known
1	A+M *(Artesunate-Mefloquine)*									
2	A+M1 (CHILDREN)	1	2	1	2	1	2	1	2	8
3	A+M2 (INFANT)	1	2	1	2	1	2	1	2	8
4	A+M3 (ADOLESCENT)	1	2	1	2	1	2	1	2	8
5	A+M4 (ADULT)	1	2	1	2	1	2	1	2	8
6	A+M5 (ADULT)	1	2	1	2	1	2	1	2	8
7	MALARINE *(Artesunate-Mefloquine)*									
8	MALARINE (CHILD)	1	2	1	2	1	2	1	2	8
9	MALARINE (ADOLESCENT)	1	2	1	2	1	2	1	2	8
10	MALARINE (ADULT)	1	2	1	2	1	2	1	2	8
11	EURARTESIM *(Dihydroartemisinin Piperaquine Tetraphosphate)*									
12	EURARTESIM (CHILD)	1	2	1	2	1	2	1	2	8
13	EURARTESIM (ADOLESCENT)	1	2	1	2	1	2	1	2	8
14	EURARTESIM (ADULT)	1	2	1	2	1	2	1	2	8
15	ARTEQUIN *(Artesunate-Mefloquine)*	1	2	1	2	1	2	1	2	8

Q40 Code	Drug / Test Name	Sold in past 6 months?		In stock now?		Have you ever been out of stock of this drug?		If YES, within the past 3 months, was this drug/test out of stock for more than 1 week?		
		Yes	No	Yes	No	Yes	No	Yes	No	Not Known
16	DUO-COTECXIN *(Dihydroartemisinin-Piperaquine)*	1	2	1	2	1	2	1	2	8
17	CV ARTECOM (*Dihydroartemisinin complex*)									
18	ARTEKIN *(DHA-piperaquine)*	1	2	1	2	1	2	1	2	8
19	ARTEQUICK *(Artemisinin-Piperaquine)*	1	2	1	2	1	2	1	2	8
20	COTECXIN *(Dihydroartemisinin only)*	1	2	1	2	1	2	1	2	8
21	ARTESUNATE TABLET	1	2	1	2	1	2	1	2	8
22	ARTESUNATE INJECTION	1	2	1	2	1	2	1	2	8
23	ARTESUNATE SUPPOSITORY	1	2	1	2	1	2	1	2	8
24	ARTEMETHER TABLET	1	2	1	2	1	2	1	2	8
25	ARTEMETHER INJECTION	1	2	1	2	1	2	1	2	8
26	ARTEMISININ TABLET	1	2	1	2	1	2	1	2	8
27	ARTEMISININ SUPPOSITORY	1	2	1	2	1	2	1	2	8
28	MEFLOQUINE	1	2	1	2	1	2	1	2	8
29	QUININE TABLET	1	2	1	2	1	2	1	2	8
30	QUININE INJECTION	1	2	1	2	1	2	1	2	8
31	CHLOROQUINE	1	2	1	2	1	2	1	2	8
32	PRIMAQUINE	1	2	1	2	1	2	1	2	8
33	MALARONE *(Atovaquone-Proguanil)*	1	2	1	2	1	2	1	2	8
34	OTHER DRUG FOR MALARIA *Specify: _____*	1	2	1	2	1	2	1	2	8
35	DRUG COCKTAIL FOR MALARIA	1	2	1	2	1	2	1	2	8
36	ANTIBIOTICS	1	2	1	2	1	2	1	2	8
37	PARACETAMOL / ASPIRIN	1	2	1	2	1	2	1	2	8
38	CARESTART (COMBO TEST)	1	2	1	2	1	2	1	2	8
39	FIRST RESPONSE	1	2	1	2	1	2	1	2	8
40	PARACHECK	1	2	1	2	1	2	1	2	8
41	MALACHECK	1	2	1	2	1	2	1	2	8
42	OPTIMAL	1	2	1	2	1	2	1	2	8
43	OTHER TEST FOR MALARIA	1	2	1	2	1	2	1	2	8
44	MALATAB	1	2	1	2	1	2	1	2	8

Section 4: Knowledge, practice, inspections and training

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q41	What are the signs or symptoms of malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Fever ..... 1 Chills ..... 2 Headache ..... 3 Body ache ..... 4 Sweating ..... 5 Fatigue ..... 6 Loss of appetite ..... 7 Diarrhoea ..... 8 Other ..... 9 Specify: _____ Don't know 98	➔ **Q43**
Q42	What do you do if you suspect the patient has malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Examine patient ..... 1 Sell/perform blood test (slide or dipstick) ..... 2 Refer to health facility ..... 3 Sell antimalarial drugs ..... 4 Other ..... 5 Specify: _____ Don't know 98	
Q43	What are the three most common drugs you sell for malaria? How much do you sell a single complete treatment course for? USE DRUG CODES FROM SECTION 3	Drug 1st : ☐☐ Price (Riel) : _____ Drug 2nd : ☐☐ Price (Riel) : _____ Drug 3rd : ☐☐ Price (Riel) : _____	
Q44	In your opinion, what is the most effective antimalarial medicine?	Drug Name: _____ Drug Code: ..... ☐☐ Other ..... 97 Specify: _____ Don't know 98	
Q45	Which drug do you most recommend for *P. falciparum*?	Drug Code: ..... ☐☐ Other ..... 97 Specify: _____ Don't know 98	
Q46	Which drug do you most recommend for *P. vivax*?	Drug Code: ..... ☐☐ Other ..... 97 Specify: _____ Don't know 98	
Q47	What is the nationally recommended drug for *P.falciparum*?	Drug Code: ..... ☐☐ Other ..... 97 Specify: _____ Don't know 98	
Q48	What is the nationally recommended drug for *P. vivax*?	Drug Code: ..... ☐☐ Other ..... 97 Specify: _____ Don't know 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q49	How do you typically decide which antimalarial drugs to stock? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Most profitable ..... 1 Recommended by government ..... 2 Lowest priced ..... 3 Drug company/Sales rep influence ..... 4 Consumer demand ..... 5 Brand reputation ..... 6 Dosage form ..... 7 Easily available ..... 8 Prescribed most often by doctors ..... 9 Other ..... 10 Specify:_____ Not sure 98	
Q50	Where do you normally obtain your antimalarial drugs? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Phnom Penh wholesaler ..... 1 Province wholesaler ..... 2 District wholesaler ..... 3 Medical detailer ..... 4 Province pharmacy (government) ..... 5 District pharmacy ..... 6 Non-government supplier ..... 7 Other ..... 8 Specify_____ Don't know 9	
Q51	Do your customers usually ask for a specific antimalarial drug by name?	Yes ..... 1 No 2	➔ **Q53**
Q52	What are the three most common antimalarial drugs that people ask for by name?	NAME / CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐	
Q53	In the past week, approximately how many people bought or were dispensed an antimalarial drug from your outlet?	Number of people: ..... ☐☐☐ Don't know 888	
Q54	Compared to this same time last year, would you say that you are selling more antimalarial drugs, about the same amount, or fewer antimalarial drugs?	Selling more ..... 1 Selling same ..... 2 Selling less ..... 3 Don't know ..... 8 N/A (didn't sell last year) 9	
Q55	In the past month, did you ever cut blisters or sell partial packs of antimalarials for customers who cannot afford to buy the entire pack?	Yes ..... 1 No ..... 2 Don't know 8	
Q56	Do you sell drug cocktails for malaria?	Yes ..... 1 No ..... 2 Don't know 8	➔ **Q58** ➔ **Q58**
Q57	In the past week, approximately how many people bought or were dispensed a drug cocktail from your outlet?	Number of people: ..... ☐☐☐ Don't know 888	
Q58	Does your drug outlet provide diagnostic testing for malaria?	Yes ..... 1 No 2	➔ **Q63**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q59	Which type of diagnostic testing for malaria does your outlet provide?	RDT/dipstick.....1 Blood slide/microscopy.....2 Both RDT and microscopy.....3	
Q60	In the past week, approximately how many people bought or were dispensed a RDT from your outlet?	Number of people: ..... ☐☐☐ Don't know 888	
Q61	What percentage (%) of customers to whom you sell antimalarial drugs have a parasite diagnosis first?	0%.....1 Less than 10% .....2 10% to <50% .....3 50% to <100% .....4 100%.....5 Don't know 8	
Q62	Compared to this same time last year, would you say that you are selling more RDTs, about the same amount, or fewer RDTs?	Selling more.....1 Selling same .....2 Selling less.....3 Don't know .....8 N/A (didn't sell last year).....9	
Q63	Do your customers ever ask for a malaria test?	Yes.....1 No 2	➔ **Q65**
Q64	What do you do or tell your customers who ask for a malaria test?	Sell them a RDT only.....1 Sell AND test them with RDT.....2 Take a blood slide.....3 Refer them to public health facility.....4 Refer them to private provider or lab .....5 Sell them drugs for malaria.....6 Other .....7 Specify:_____ Not sure 8	
Q65	Have you ever referred suspected cases of malaria for treatment?	Yes.....1 No 2	➔ **Q68**
Q66	What types of cases do you refer? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHERS?	Children < 5 years.....1 Children < 2 years.....2 Pregnant women.....3 Symptoms of severe malaria .....4 Previously treated but symptoms persist.....5 Other .....6 Specify:_____	
Q67	Where do you refer suspected cases of malaria?	Referral/Provincial hospital .....1 Health Center/FDH .....2 VMW .....3 Private laboratory.....4 Other .....5 Specify: _____	
Q68	Do you keep records or a register of the malaria cases that you diagnose or treat? *Check this box if they were able to show records or a register* →	Yes.....1 No .....2 ☐	➔ **Q70**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q69	What type of records do you keep of malaria cases tested and/or treated? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Age ..... 1 Sex ..... 2 Test result (pos or neg) ..... 3 Type of malaria (species) ..... 4 Severity of malaria ..... 5 Treatment given ..... 6 Referrals ..... 7 Date of visit 8	
Q70	During 2011-12, have you attended any trainings or workshops about malaria?	Yes ..... 1 No 2	➔ **Q73**
Q71	What topics were discussed during these trainings/workshops? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Diagnosis ..... 1 RDTs ..... 2 Treatment ..... 3 ACTs ..... 4 Drug resistance ..... 5 Ban on monotherapy ..... 6 Signs and symptoms ..... 7 How to recognize fake drugs ..... 8 New treatment policies ..... 9 Other ..... 10 Specify: _____ Don't know 98	
Q72	Who conducted these trainings? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYONE ELSE?	Health Center/Hospital ..... 1 Province (PHD)/OD ..... 2 Government-MoH/CNM ..... 3 Government-DDF ..... 4 NGO ..... 5 Other ..... 6 Specify: _____ Not sure 8	
Q73	Have you heard about the activities to stop the spread of drug resistance in this area of Cambodia?	Yes ..... 1 No 2	
Q74	Are you aware that some antimalarial drugs are banned in Cambodia?	Yes ..... 1 No 2	➔ **Q77**
Q75	Which antimalarial drugs are banned in Cambodia?	NAME / CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐ Other ..... 97 Specify: _____ Don't know 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q76	Where did you hear about the ban on these antimalarial drugs? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	TV/Radio ..... 1 Training ..... 2 Health Center/Hospital staff ..... 3 Provincial/OD staff ..... 4 NGO staff ..... 5 Drug inspector ..... 6 Other ..... 7 Specify:_____ Not sure 98	
Q77	Have you heard about fake/counterfeit drugs?	Yes ..... 1 No 2	➔ **Q79**
Q78	Have you seen any fake/counterfeit drugs?	Yes ..... 1 No ..... 2 Don't know 8	
Q79	In the past 6 months, has anyone come to inspect your outlet?	Yes ..... 1 No 2	➔ **Q82**
Q80	Who came to inspect your outlet? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYONE ELSE?	Health authorities (PHD/OD/MoH) ..... 1 Inspection committee ..... 2 DDF Inspector ..... 3 Police ..... 4 Other government official ..... 5 NGO ..... 6 Other ..... 7 Specify:_____ Not sure 8	
Q81	What action did they take if any? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Took away some drugs ..... 1 Threw away some drugs ..... 2 Administered a fine ..... 3 Discussed the problem of fake drugs ..... 4 Wrote a report ..... 5 Took photographs ..... 6 Did nothing ..... 7 Other ..... 8 Specify:_____ Not sure 98	
Q82	Do you have a license to sell drugs? *Check this box if their license is displayed on the wall:* →	Yes ..... 1 No ..... 2 ☐	

Annex 3: Net outlet questionnaire

IDENTIFICATION

	Outlet ID: ☐☐☐
Cluster code (1-82): ☐☐	Outlet Number (1-2): ☐
Province: _____	Province code: ☐☐
District: _____	District code: ☐☐☐
Commune: _____	Commune code: ☐☐☐☐☐
Village: _____	Domain: ☐

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	DATA ENTRY
Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q1	Is this outlet located in the selected cluster?	Yes ..... 1 No 2	➔ Q4
Q2	Is this outlet located in the nearest market or town?	Yes ..... 1 No 2	
Q3	How far away from the selected cluster to the outlet?	Distance (Km): ☐☐	
Q4	Type of outlet	General store (outside market) ..... 1 Net seller in market ..... 2 Other ..... 3 Specify: _____	
Q5	What is the sex of the respondent?	Male ..... 1 Female 2	
Q6	What is the age of the respondent?	Age: ☐☐	
Q7	What is the respondent's role? NOTE: THE RESPONDENT MUST BE SOMEONE WHO SELLS DRUGS IN THIS OUTLET	Owner ..... 1 Employee ..... 2 Family member ..... 3 Other ..... 4 Specify: _____	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q8	How long has this outlet been selling mosquito nets?	< 1 year ..... 1 1-3 years ..... 2 3-5 years ..... 2 ≥ 5 years..... 2	

NET OUTLET STOCK LIST

	Q9	Q10	Q11	Q12	Q13
Type/Brand of nets & insecticide	**Normally sell? 1: Yes 2:No**	**In stock today? 1: Yes 2:No**	**Number in stock**	**Price to buy (Riel)**	**Price to sell (Riel)**
Long-lasting nets:					
Olyset	1 2	1 2			
Permanet	1 2	1 2			
Malanet-bed	1 2	1 2			
Malanet-hammock	1 2	1 2			
GF/MoH logo	1 2	1 2			
NetProtect	1 2	1 2			
Untreated nets:					
B-52 *Specify:* _____	1 2	1 2			
No logo	1 2	1 2			
Hammock	1 2	1 2			
Other *Specify:* _____	1 2	1 2			
Nets bundled (packaged) with Super Malatab:					
B-52 *Specify:* _____	1 2	1 2			
No logo	1 2	1 2			
Hammock	1 2	1 2			
Other *Specify:* _____	1 2	1 2			
Insecticide:					
Super Malatab (alone)	1 2	1 2			
Malatab	1 2	1 2			
IconMaxx	1 2	1 2			
Fendona	1 2	1 2			
Other *Specify:* _____	1 2	1 2			

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q14	Where do you buy your mosquito nets and hammock nets? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Local market ..... 1 Government or NGO ..... 2 Hawker/itinerant seller (commercial) ..... 3 Traveling sales person (PSI) ..... 4 Market in Phnom Penh ..... 5 Distributor ..... 6 Other ..... 7 Specify:_____	
THE FOLLOWING QUESTIONS (Q15-Q26) REFER TO MOSQUITO NETS ONLY, DO NOT INLCUDE HAMMOCK NETS. IF THEY DON'T SELL MOSQUITO NETS (CHECK THE STOCK TABLE), SKIP TO Q27.			
Q15	How many **mosquito nets** did you sell last week?	Mosquito nets sold: ..... ☐☐☐ Don't know 888	
Q16	When did you last buy stock of mosquito nets?	Within last week ..... 1 Within last month ..... 2 More than a month ago ..... 3 Not sure 8	
Q17	How many mosquito nets did you buy the last time?	Mosquito nets bought: ..... ☐☐☐ Don't know 888	
Q18	When will you buy your next stock of mosquito nets?	Within next week ..... 1 Within next month ..... 2 More than a month ..... 3 Not sure 8	
Q19	Compared to this same time last year, would you say that you are selling more mosquito nets, about the same number, or fewer mosquito nets?	Selling more ..... 1 Selling same ..... 2 Selling less ..... 3 Don't know ..... 8 N/A (didn't sell last year) 9	
Q20	Have you ever bought nets that were "bundled" (packaged) with Super Malatab? (These are nets that have an insecticide kit included inside the packet or comes with the net)	Yes ..... 1 No 2	➔ **Q25**
Q21	How did the mosquito nets with Super Malatab arrive?	Kit & net in the same packet ..... 1 Kit & net together but not in same packet ..... 2 Other ..... 3 Specify:_____	
Q22	How do you sell mosquito nets with Super Malatab?	Kit & net in the same packet ..... 1 Kit & net together but not in same packet ..... 2 Other ..... 3 Specify:_____	
Q23	When did you first start selling these mosquito nets bundled with Super Malatab? WRITE DATE AS MONTH AND YEAR	Date started selling bundled mosquito nets: __ __ / __ __ __ __ Month Year	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q24	Where did you get these bundled mosquito nets? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Local market ..... 1 Government or NGO ..... 2 Hawker/itinerant seller (commercial) ..... 3 Team with green uniform (PSI) ..... 4 Market in Phnom Penh ..... 5 Distributor/Wholesaler ..... 6 Other ..... 7 Specify:_____	
Q25	Which is the most popular brand/type of net that you sell?	*Long-lasting nets*: Olyset ..... 1 Permanet ..... 2 Malanet-bed ..... 3 Malanet-hammock ..... 4 GF/MoH logo ..... 5 Netprotect ..... 6 *Untreated nets*: B52 ..... 7 Specify: _____ No logo ..... 8 Hammock ..... 9 Other ..... 10 Specify: _____ Don't know 98	
Q26	Why do people buy one net brand/type versus another? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	Price ..... 1 Size ..... 2 Effectiveness ..... 3 Quality ..... 4 Insecticide ..... 5 Color/pattern ..... 6 Other ..... 7 Specify: _____ Don't know 8	
THE FOLLOWING QUESTIONS (Q27-Q36) REFER TO HAMMOCK NETS ONLY, DO NOT INLCUDE MOSQUITO NETS. IF THEY DON'T SELL HAMMOCK NETS (CHECK THE STOCK TABLE), SKIP TO Q37.			
Q27	How many **hammock nets** did you sell last week?	Hammock nets sold: ..... ☐☐☐ Don't know 888	
Q28	When did you last buy stock of hammock nets?	Within last week ..... 1 Within last month ..... 2 More than a month ago ..... 3 Not sure 8	
Q29	How many hammock nets did you buy the last time?	Hammock nets bought: ..... ☐☐☐ Don't know 888	
Q30	When will you buy your next stock of hammock nets?	Within next week ..... 1 Within next month ..... 2 More than a month ..... 3 Not sure 8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q31	Compared to this same time last year, would you say that you are selling more hammock nets, about the same number, or fewer hammock nets?	Selling more ..... 1 Selling same ..... 2 Selling less ..... 3 Don't know ..... 8 N/A (didn't sell last year) 9	
Q32	Have you ever bought hammock nets that were "bundled" (packaged) with Super Malatab?	Yes ..... 1 No 2	➔ **Q37**
Q33	How did the hammock nets with Super Malatab arrive?	Kit & net in the same packet ..... 1 Kit & net together but not in same packet ..... 2 Other ..... 3 Specify:_____	
Q34	How do you sell hammock nets with Super Malatab?	Kit & net in the same packet ..... 1 Kit & net together but not in same packet ..... 2 Other ..... 3 Specify:_____	
Q35	When did you first start selling these hammock nets bundled (packaged) with Super Malatab? WRITE DATE AS MONTH AND YEAR	Date started selling bundled hammock nets: __ __ / __ __ __ __ Month Year	
Q36	Where did you get these bundled hammock nets? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Local market ..... 1 Government or NGO ..... 2 Hawker/itinerant seller (commercial) ..... 3 Team with green uniform (PSI) ..... 4 Market in Phnom Penh ..... 5 Distributor/Wholesaler ..... 6 Other ..... 7 Specify:_____	
THE FOLLOWING QUESTIONS (Q37-Q41) REFER TO INSECTICIDE ONLY AND NOT WHEN BUNDLED WITH A NET. IF THEY DON'T SELL INSECTICIDE (CHECK THE STOCK TABLE), SKIP TO THE END OF THE INTERVIEW.			
Q37	Where do you buy your insecticide treatments? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Local market ..... 1 Government or NGO ..... 2 Hawker/Itinerant seller (commercial) ..... 3 Team with green uniform (PSI) ..... 4 Market in Phnom Penh ..... 5 Distributor ..... 6 Manufacturer ..... 7 Other ..... 8 Specify:_____	
Q38	How many insecticide treatments did you sell last week?	Insecticide sold: ..... ☐☐☐ Don't know 888	
Q39	When did you last buy stock of insecticide treatments?	Within last week ..... 1 Within last month ..... 2 More than a month ago ..... 3 Not sure 8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q40	How many insecticide treatments did you buy the last time?	Number of insecticide bought:..... ☐☐☐ Don't know.....888	
Q41	When will you buy your next stock of insecticide treatments?	Within next week..... 1 Within next month..... 2 More than a month..... 3 Not sure 8	

END INTERVIEW

Thank respondent for taking the time to be interviewed.

Annex 4: Health facility questionnaire, Part 1

Facility Identification Details

Health Facility Cluster: [____|____] (01-31)

Health Facility Name: _____ Service Type [_____] (1: Public, 2 Private)	Date of interview: __ __ / __ __ / __ __ __ __
Health Facility Type: [_____] 1: Referral hospital, 2: Health center (with beds)/FDH 3: Health center (without beds), 4: Polyclinic, 5: Cabinet / private clinic 6: Other *Specify:*_____	Facility Code: [____|____] [____] Cluster Number Service Type *(Example: Cluster Number = 01, Service Type = 1 so Facility Code = 011)*
Province: _____	Province code:..... ☐☐
Operational District: _____	OD code:..... ☐☐☐☐
Town/Village name: _____	GPS coordinates Latitude: _____ Longitude: _____

Primary respondent's position	Chief of Health Facility.....1 Deputy chief.....2 Acting officer in charge.....3 Other.....4 *Specify :*_____
What is the sex of the respondent?	Male .....1 Female.....2
What is the age of the respondent?	Age in years: ..... ☐☐
What formal health training has the respondent had?	Doctor..... 1 Pharmacist..... 2 Medical assistant ..... 3 Nurse ..... 4 Midwife ..... 5 Other health training..... 6 Specify: _____ No health training..... 7
How many years of formal training did you receive? If it was less then one year, fill in month box.	Years of training:..... ☐☐ Month of training:..... ☐☐

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	DATA ENTRY
Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _

Section 1: Description of the health facility

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q1	Is the facility public or private?	Public facility .....1 Private facility (for profit) .....2 Private facility (not for profit) .....3 Other.....4 *Specify:*_____	
Q2	Type of health facility:	Referral hospital .....1 Former district hospital / HC (with beds).....2 Health centre (without beds) .....3 Polyclinic / private hospital .....4 Cabinet / private clinic .....5 Other.....6 *Specify:*_____	
Q3	What services does the health facility provide? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHERS?	Malaria case management .....1 IPD .....2 OPD.....3 Malaria diagnosis .....4 ITN distribution.....5 Malaria health education .....6 Antenatal screening for malaria.....7 IMCI.....8 Blood bank .....9 Referral of severe malaria .....10 Other.....11 *Specify:*_____	
Q4	How many days per week is the facility open?	Days: ..... ☐.	
Q5	How many hours per day is the facility open?	Hours: ..... ☐☐.	
Q6	Please, indicate what assessment tasks are made by a health worker?	Take history of fever and travel.....1 Record temperature .....2 Check presence of danger signs…….3 Perform RDT or microscopy…….4	
Q7	Has this health facility received a supervisory visit/Government staff inspection in the last 3 months? **IF PRIVATE FACILITY, SKIP TO Q14**	Yes.....1 No.....2 Not sure 8	**➔ Q12** **➔ Q12**
Q8	Who came to supervise in the last 6 months? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED	PHD.....1 OD.....2 National .....3 Other.....4 *Specify:*_____	
Q9	When was the date of the last supervisory visit? IF THEY CAN'T REMEMBER THE DAY, JUST FILL IN THE MONTH	__ __ / __ __ / __ __ __ __ DD MM YYYY	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q10	What did the supervisors do during their visit? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED	Checked records/reports ..... 1 Checked supplies ..... 2 Observed work ..... 3 Provided feedback ..... 4 Gave praise ..... 5 Provided updates ..... 6 Discussed problems and solutions ..... 7 Other ..... 8 *Specify:*_____	
Q11	Did you get any feedback about the results of the supervisory visit?	Yes ..... 1 No ..... 2 Not sure 8	
Q12	Does this facility supervise any health posts, or village malaria workers (VMWs), or mobile malaria workers (MMWs) or village health volunteers (VHVs)? ***PUBLIC HEALTH FACILITIES ONLY***	Yes No No. Health post ..... 1 2 __ __ VMW ..... 1 2 __ __ MMW ..... 1 2 __ __ VHV ..... 1 2 __ __	**IF NO, SKIP TO Q14**
Q13	When was the date of the last VMW/MMW/VHV meeting at the health center? ***PUBLIC HEALTH FACILITIES ONLY***	VMW/MMW: __ __ / __ __ / __ __ __ __ VHV: __ __ / __ __ / __ __ __ __	
Q14	Does the health facility have a copy of the National Treatment Guidelines for Malaria?	Yes ..... 1 No 2	➔ **Q16**
Q15	What version of the National Treatment Guidelines for Malaria does this facility have? ASK THEM TO SHOW YOU A COPY OF THE GUIDELINES	__ __ / __ __ __ __ MM YYYY Shown a copy *(tick this box)* ..... ☐	
Q16	Does this facility treat severe or complicated cases of malaria?	Yes ..... 1 No 2	
Q17	Does this facility refer severe or complicated cases of malaria?	Yes ..... 1 No 2	➔ **Q22**
Q18	Do you issue the patient a referral card? ASK THEM TO SHOW YOU A COPY OF THE REFERRAL CARD	Yes ..... 1 No ..... 2 Shown a copy *(tick this box)* ..... ☐	
Q19	When you refer cases, do you provide transport?	Yes ..... 1 No ..... 2 Not sure 8	➔ **Q21** ➔ **Q21**
Q20	Do the patients have to pay for this transport?	Yes ..... 1 No ..... 2 Not sure 8	
Q21	What type of transport is used?	Ambulance from health facility ..... 1 Ambulance from OD/referral hospital ..... 2 Self/patient organized transport ..... 3 Other ..... 4 *Specify:*_____	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q22	Where do you refer severe or complicated cases of malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	Referral hospital ..... 1 Former district hospital / HC (with beds) ..... 2 Health centre (without beds) ..... 3 Polyclinic / private hospital ..... 4 Cabinet / private clinic ..... 5 Other ..... 6 *Specify:* _____	
Q23	Approximately how many kilometres away is the nearest referral hospital to this health facility? LEAVE BLANK IF REFERRAL HOSPITAL	Distance (km): ..... ☐☐☐	
Q24	Do you know the currently recommended drug for uncomplicated *P.falciparum*?	Yes ..... 1 No 2	➔ **Q26**
Q25	What is the currently recommended drug for uncomplicated *P.falciparum*?	Drug Code: ..... ☐☐ Other ..... 87 *Specify:* _____	
Q26	Do you know the currently recommended drug for uncomplicated *P.vivax*?	Yes ..... 1 No 2	➔ **Q28**
Q27	What is the currently recommended drug for uncomplicated *P.vivax*?	Drug Code: ..... ☐☐ Other ..... 97 *Specify:* _____	
Q28	During 2011-12, have you attended any trainings or workshops about malaria?	Yes ..... 1 No 2	➔ **Q31**
Q29	What topics were discussed during these trainings/workshops? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Case management ..... 1 Laboratory diagnosis ..... 2 Rational antimalarial drug use ..... 3 Management of severe malaria ..... 4 Epidemiology ..... 5 ITN ..... 6 Health education ..... 7 Microplanning ..... 8 VMW/MMW training ..... 9 VHV training ..... 10 Other ..... 11 *Specify:* _____ Don't know 98	
Q30	Who conducted these trainings? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYONE ELSE?	Health Center/Hospital ..... 1 Province (PHD) ..... 2 OD ..... 3 MoH/CNM ..... 4 DDF ..... 5 NGO ..... 6 Other ..... 7 *Specify:* _____ Don't remember 8	
Q31	Have you heard about activities in the past year to stop the spread of drug resistance in Cambodia?	Yes ..... 1 No 2	
Q32	Are you aware that some antimalarial drugs are banned in Cambodia?	Yes ..... 1 No 2	➔ **Q35**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q33	Which antimalarial drugs are banned in Cambodia? USE THE CODES FROM THE STOCK REVIEW IN SECTION 3.	NAME CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐ Other ..... 97 *Specify:* _____ Don't know 98	
Q34	Where did you hear about the ban on these antimalarial drugs? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYWHERE ELSE?	TV/Radio ..... 1 Training ..... 2 Health Center/Hospital staff ..... 3 Provincial/OD staff ..... 4 NGO staff ..... 5 Drug inspector ..... 6 Other ..... 7 Specify: _____ Not sure 98	
Q35	Have you heard about fake/counterfeit drugs?	Yes ..... 1 No 2	➔ **Q37**
Q36	Have you seen any fake/counterfeit drugs?	Yes ..... 1 No ..... 2 Don't know 8	

Section 2: Review of health facility staff

The interviewer should ask the head of the health facility about all current staff positions. For current staff details of length of service and training should be recorded. If referral hospital, list only health workers in the Outpatient Department (OPD).

	Q37	Q38	Q39	Q40	Q41	Q42		
No.	**Staff Name**	**Position**	**Highest Qualification** Code for qualification: 1 = Medical doctor 2 = Medical assistant 3 = Pharmacist 4 = Pharmacist assist. 5 = Lab tech 6 = Secondary nurse 7 = Primary nurse 8 = Secondary midwife 9 = Primary midwife 10 = Other	**Is the staff member present in the facility or engaged in field work today?** 1 = Yes 2 = No	**Years in service** (leave blank for vacant posts)	**Last malaria-related in service training** Code for type of training: Case management.....1 Laboratory diagnosis.....2 Rational antimalarial drug use.....3 Management of severe malaria.....4 Epidemiology.....5 ITN.....6 Health education.....7 Microplanning.....8 VMW/MMW training.....9 VHV training.....10 Other.....11 *Specify:*_____ Don't know.....98		
						Type of training	**Date (MM/YY**	**Duration (days)**
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

Section 3: Pharmacy Stock Review

The interviewer visits the facility's pharmacy, and checks stock levels of all antimalarial drugs and expiry dates on each type.

		Q43		Q44	Q45	Q46	Q47	
Code	**Stock item**	**Usually in stock**		**Quantity currently in stock**		**No. of stockout* of >7days in last 3 months**	**Any items past expiry?**	
		Yes	No	Units	Number		Yes	No
1	A+M *(Artesunate-Mefloquine)*	1	2				1	2
2	A+M1 (CHILDREN)	1	2				1	2
3	A+M2 (INFANT)	1	2				1	2
4	A+M3 (ADOLESCENT)	1	2				1	2
5	A+M4 (ADULT)	1	2				1	2
6	A+M5 (ADULT)	1	2				1	2
7	MALARINE *(Artesunate-Mefloquine)*	1	2				1	2
8	MALARINE (ADULT)	1	2				1	2
9	MALARINE (CHILD)	1	2				1	2
10	MALARINE (ADOLESCENT)	1	2				1	2
11	EURARTESIM	1	2				1	2
12	EURARTESIM (CHILD)	1	2				1	2
13	EURARTESIM (ADOLESCENT)	1	2				1	2
14	EURARTESIM (ADULT)	1	2				1	2
15	ARTEQUIN *(Artesunate-Mefloquine)*	1	2				1	2
16	DUO-COTECXIN *(DHA-piperaquine)*	1	2				1	2
17	ARTEKIN *(DHA-piperaquine)*	1	2				1	2
18	ARTEQUICK *(Artemisinin-Piperaquine)*	1	2				1	2
19	COTECXIN *(Dihydroartemisinin only)*	1	2				1	2
20	ARTESUNATE TABLET	1	2				1	2
21	ARTESUNATE INJECTION	1	2				1	2
22	ARTESUNATE SUPPOSITORY	1	2				1	2
23	ARTEMETHER TABLET	1	2				1	2
24	ARTEMETHER INJECTION	1	2				1	2
25	ARTEMISININ TABLET	1	2				1	2
26	ARTEMISININ SUPPOSITORY	1	2				1	2
27	CV ARTECAM (*Dihydroartemisinin complex*)	1	2				1	2

		Q43		Q44	Q45	Q46	Q47	
Code	**Stock item**	**Usually in stock**		**Quantity currently in stock**		**No. of stockout* of >7days in last 3 months**	**Any items past expiry?**	
		Yes	No	Units	Number		Yes	No
28	MEFLOQUINE	1	2				1	2
29	QUININE TABLET	1	2				1	2
30	QUININE INJECTION	1	2				1	2
31	CHLOROQUINE	1	2				1	2
32	PRIMAQUINE	1	2				1	2
33	MALARONE *(Atovaquone-Proguanil)*	1	2				1	2
34	COARTEM *(Artemether-Lumefantrine)*	1	2				1	2
35	OTHER DRUG FOR MALARIA *Specify:* _____	1	2				1	2
36	DRUG COCKTAIL FOR FEVER OR MALARIA	1	2				1	2
37	TETRACYCLINE/DOXYCYCLINE	1	2				1	2
38	OTHER ANTIBIOTICS	1	2				1	2
39	PARACETAMOL / ASPIRIN	1	2				1	2
40	CARESTART (COMBO TEST)	1	2				1	2
41	PARACHECK	1	2				1	2
42	MALACHECK	1	2				1	2
43	OTHER TEST FOR MALARIA	1	2				1	2
44	THERMOMETER	1	2					
45	MOSQUITO NETS Specify brand: _____	1	2	Net				

* *The definition of Stockout is out of stock of a drug for more than a week in the past 3 months*

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q48	Did this health facility have stockouts of any drugs during the past 3 months	Yes.....1 No.....2	➔ **Q50**
Q49	What were the reasons for the stockouts?	No supply from CMS .....1 No supply from OD.....2 Unexpected demand .....3 Other.....4 Specify:_____	
Q50	Are the stock records up-to-date? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q51	Do they tally with the stocks on hand? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	
Q52	Does the facility use the first in-first out and first-expiry principles for managing their drug stocks?	Yes.....1 No.....2 Don't know.....8	

Section 4a: Review of outpatient services

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q53	Are there malaria-related summary tables or graphs displayed in the OPD? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	
Q54	Does this health facility have an outpatient register or book?	Yes.....1 No.....2	➔ **Q59**
Q55	Is the outpatient register in MoH or standard format? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	
Q56	Is the outpatient register up to date? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	
Q57	Is the health facility filling out the monthly line list of cases by village for CNM?	Yes.....1 No.....2	➔ **Q59**
Q58	When did they last send a copy of the monthly line list to the PHD?	Date line list sent: __ __ / __ __ __ __ MM YYYY	

Section 4b: Review of 2013 OPD and IPD register records

Use the clinical case registers in the OPD and IPD to fill out the health facility case register sheet for all treated malaria cases from 01/08/2013, up to the present, beginning with the most recent.

Section 5a: Review of Laboratory Services (OPD)

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q59	Does the health facility provide laboratory services for malaria, meaning microscopy and/or RDTs? (Microscope or RDT)	Yes - microscopy & RDT.....1 Yes - microscopy only.....2 Yes - RDT only.....3 No.....4	➔ **Q69** ➔ **END**
Q60	Do they have a trained lab technician who is able to perform microscopy?	Yes-full time.....1 Yes-part time.....2 No.....3	➔ **Q62**
Q61	In the past 3 months have you had more than a week without a trained lab technician who is able to perform microscopy?	Yes.....1 No.....2 Not sure.....8	
Q62	Do they have a microscope in good working order?	Yes.....1 No.....2	➔ **Q64**
Q63	In the past 3 months have you had more than a week without a microscope in good working order?	Yes.....1 No.....2 Not sure.....8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q64	In the past 3 months have you had more than a week without enough slides?	Yes.....1 No.....2 Not sure.....8	
Q65	In the past 3 months have you had more than a week without enough Giemsa stain?	Yes.....1 No.....2 Not sure.....8	
Q66	When did you last send slides for quality control?	Date sent slides: __ __ / __ __ __ __ MM YYYY	
Q67	Where did you send slides for quality control?	Province.....1 CNM.....2 Both Province & CNM.....3 Other.....4 Specify:_____	
Q68	Did you receive any feedback on the quality control of slides?	Yes.....1 No.....2 Not sure.....8	
Q69	Which brand of RDT do you currently use? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	Carestart (Combo).....1 Paracheck.....2 Malacheck.....3 Optimal.....4 Other.....5 Specify:_____	
Q70	In the past 3 months have you had more than a week without enough RDTs?	Yes.....1 No.....2 Not sure.....8	
Q71	Where do you keep the RDTs? OBSERVE	On the counter.....1 In a cooler box.....2 In the refrigerator.....3 Other.....4 Specify:_____	
Q72	Does this health facility have a laboratory register or book?	Yes.....1 No.....2	➔ **Q75**
Q73	Is the laboratory register up to date? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	
Q74	Is the laboratory register in MoH format? DO NOT ASK, OBSERVE ONLY	Yes.....1 No.....2	
Q75	Does the health facility have National Laboratory Diagnosis Manual for Malaria? *Ask to see a copy for verification*	Yes.....1 No.....2 Shown a copy *(tick this box)* ..... ☐	

Section 5b: Review of 2012 Laboratory Register

NO.	QUESTIONS AND FILTERS	Month		
		August	September	October
Q76	Number of slides positive for *P. falciparum*			
Q77	Number of slides positive for *P. vivax*			
Q78	Number of slides positive for Mixed infections (Pf/Pv)			
Q79	Number of negative slides			
Q80	Number of RDTs positive for *P. falciparum*			
Q81	Number of RDTs positive for *P. vivax*			
Q82	Number of RDTs positive for Mixed infections			
Q83	Number of negative RDTs			

Section 6: List of malaria-related BCC/IEC materials at the health facility

	Q84	Q85	Q86
No.	**Type of IEC material** 1 = Poster 2 = Leaflet 3 = Calendar 4 = Flip chart 5 = T-shirt/hat 8 = Other (specify)	**Message**	**Location** 1 = Displayed on wall or table 2 = In store room 3 = Other (specify)

Health Facility questionnaire, Part 2 (Follow-up interview)

Patient Follow-up Interview Form

USE THIS FORM TO FOLLOW UP AND INTERVIEW PATIENTS WHO WERE TREATED FOR MALARIA AT THE PUBLIC HEALTH FACILITY IN THE PAST ONE MONTH

Health Facility Cluster: [____|____] (01-31)

Health Facility Name: _____	Date of interview: __ __ / __ __ / __ __ __ __
Health Facility Type: [_____] 1: Referral hospital, 2: Health center (with beds)/FDH 3: Health center (without beds) 4: Other *Specify:*_____	Facility Code: [____|____] [____] Cluster Number Service Type *(Example: Cluster Number = 01, Service Type = 1 so Facility Code = 011)*
Province: _____	Province code:..... ☐☐
Operational District: _____	OD code:..... ☐☐☐☐
Patient No.:..... ☐☐ USE THE LINE NUMBER FROM THE HEALTH FACILITY CASE RECORD SHEET	Patient ID: ☐ – ☐☐☐☐☐☐ – ☐☐ O=outpatient I=inpatient
Patient's name: _____	Carer's name: _____

HOUSEHOLD VISITS	Visit 1	Visit 2	Visit 3	Final Visit
Date:	_ _ / _ _ / _ _	_ _ / _ _ / _ _	_ _ / _ _ / _ _	Date: __ __ / __ __ / __ __
Interviewer's Name:	_____	_____	_____	Interviewer ID: ☐☐☐☐
Result code:	_____	_____	_____	Result code: ☐
Next planned visit: Date:		_ _ / _ _ / _ _	_ _ / _ _ / _ _	Total number of visits: ☐
Time:		_____	_____	

* Result Codes:

1 = Completed
2 = No one at home
3 = Refused
4 = Dwelling not found
5 = Patient away from village
6 = Could not locate patient
7 = Other

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	DATA ENTRY
Name: _____	Name: _____	Name: _____	Name: _____
Code: ☐☐☐☐	Code: ☐☐☐☐	Code: ☐☐☐☐	Code: ☐☐☐☐
Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _	Date: _ _ / _ _ / _ _

Section 1: Demographics of patient treated for malaria

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q1	How old is the patient who was treated for malaria at (HEALTH FACILITY NAME)? IF THE PATIENT IS A CHILD < 5 YEARS, RECORD THEIR AGE IN MONTHS	Age (years): ..... ☐☐ Age (months): ..... ☐☐	
Q2	What is the sex of the patient?	Male ..... 1 Female 2	➔ **Q4**
Q3	Is the patient currently pregnant? ONLY ASK IF THEY ARE FEMALE, AGED 15-49 YEARS	Yes ..... 1 No ..... 2 Don't know 8	
Q4	Was the patient taken to (HEALTH FACILITY NAME) in the past month by a carer?	Yes ..... 1 No 2	➔ **Q8**
Q5	What is the age of the patient's carer?	Age (years): ..... ☐☐	
Q6	What is the sex of the patient's carer?	Male ..... 1 Female 2	
Q7	What is the relationship of the carer to the patient treated for malaria?	Mother ..... 1 Father ..... 2 Sister/Brother ..... 3 Grandparent ..... 4 Other ..... 5 *Specify:*_____	
Q8	Where does the patient currently live? WRITE THE NAMES OF THE PROVINCE, DISTRICT, COMMUNE, AND VILLAGE OR TOWN. FILL IN CODES LATER TO SAVE TIME.	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Not sure 98	
Q9	Is the patient's current address also their permanent address?	Yes ..... 1 No 2	
Q10	How long has the patient been living at their current address?	< 2 weeks ..... 1 < 1 month ..... 2 1 to < 3 months ..... 3 3 to < 6 months ..... 4 6 months to < 1 year ..... 5 ≥ 1 year 6	
Q11	What is the highest level of education attained by the patient?	Child <5 years, not in school ..... 0 Never attended school ..... 1 Some primary ..... 2 Completed primary (Grade 6) ..... 3 Some secondary ..... 4 Completed secondary (Grade 12) ..... 5 More than secondary 6	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q12	What is the patient's primary profession or job?	Child, not in school ..... 1 Student ..... 2 Farmer ..... 3 Laborer ..... 4 Fisherman ..... 5 Merchant/Seller ..... 6 Housewife ..... 7 Soldier ..... 8 Other ..... 9 Specify: _____	
Q13	In the past 6 months, did the patient ever go to the forest and sleep there overnight?	Yes ..... 1 No 2	➔ **Q18**
Q14	When was the patient last in the forest?	Last night ..... 1 < 1 week ..... 2 1 to < 2 weeks ..... 3 2 to < 4 weeks ..... 4 ≥ 4 weeks ..... 5 Not sure 8	
Q15	How many nights did the patient stay in the forest on their last visit?	Nights: ..... ☐☐ Not sure 98	
Q16	Did the patient sleep overnight in the forest in the two weeks before they became ill?	Yes ..... 1 No ..... 2 Don't remember 8	➔ **Q18** ➔ **Q18**
Q17	Was the patient in the forest when they became ill?	Yes ..... 1 No ..... 2 Don't remember 8	
Q18	In the past 6 months, has the patient ever traveled away from home and stayed overnight?	Yes ..... 1 No 2	➔ **Q23**
Q19	When did the patient last travel away from home?	Last night ..... 1 < 1 week ..... 2 1 to < 2 weeks ..... 3 2 to < 4 weeks ..... 4 ≥ 4 weeks ..... 5 Not sure 8	
Q20	For what reason(s) did the patient last travel away from home? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED	Work in forest ..... 1 Work on chamkar ..... 2 Work in Thailand ..... 3 Work in Vietnam ..... 4 Visit relatives ..... 5 Other ..... 6 Specify: _____ Don't know 8	
Q21	Did the patient travel away from home in the two weeks before they became ill?	Yes ..... 1 No ..... 2 Don't remember 8	➔ **Q23** ➔ **Q23**
Q22	Was the patient traveling away from home when they became ill?	Yes ..... 1 No ..... 2 Don't remember 8	
Q23	Did the patient sleep under a LLIN net last night?	Yes ..... 1 No ..... 2 Not sure 8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q24	Does the patient's household own LLIN nets?	Yes ..... 1 No ..... 2 Not sure 8	

Section 2: Details of treatment seeking, symptoms, consultation and diagnosis

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q25	How long after the fever began did you/your child first seek advice or treatment?	Same day ..... 1 Day after ..... 2 Two days after ..... 3 Three or more days ..... 4 Don't remember 8	
Q26	Did you/your child seek treatment anywhere else before going to (HEALTH FACILITY NAME)?	Yes ..... 1 No ..... 2 Don't remember 8	 ➔ **Q34** ➔ **Q34**
Q27	Where else did you/your child seek treatment? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED PROBE: ANYWHERE ELSE?	Referral hospital ..... 1 Health centre or FDH ..... 2 Health post ..... 3 VMW/ VHV ..... 4 Polyclinic ..... 5 Cabinet ..... 6 Private laboratory ..... 7 Drug store ..... 8 Shop/market ..... 9 Traditional practitioner ..... 10 Other ..... 11 Specify: _____ Can't remember 98	
Q28	Why did you/your child go to that provider/facility/place for treatment? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED	To seek advice ..... 1 To buy/get medication ..... 2 Because it is close to my house ..... 3 To get a test ..... 4 To get traditional treatment ..... 5 Transport expensive to health facility ..... 6 Other ..... 8 Specify: _____	
Q29	Why didn't you first go to (HEALTH FACILITY NAME) for treatment? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED	Too far away ..... 1 Transport expensive to health facility ..... 2 Fees expensive at health facility ..... 3 Didn't think illness was serious ..... 4 To get traditional treatment ..... 5 Other ..... 8 Specify: _____	
Q30	Did you get drugs from that provider/facility/place?	Yes ..... 1 No ..... 2 Don't remember 8	 ➔ **Q32** ➔ **Q32**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q31	Which drugs did you get from that provider/facility/place? INCLUDE ALL DRUGS, SUCH AS ANTIMALARIALS, ANTIBIOTICS, PARACETAMOL, ETC. DON'T INCLUDE DRUGS THEY WERE PRESCRIBED FROM THE HEALTH FACILITY IF THEY DON'T KNOW OR CAN'T REMEMBER, WRITE "98" FOR THE DRUG 1 CODE TICK THE CHECKBOX IF THE DRUG IS AN ANTIMALARIAL ✓	Code Name anti-malarial? Drug 1: ☐☐ _____ ❑ Drug 2: ☐☐ _____ ❑ Drug 3: ☐☐ _____ ❑ Drug 4: ☐☐ _____ ❑ Drug 5: ☐☐ _____ ❑	
Q32	How much did you pay to get treatment from that provider/facility/place?	Riel: ..... ☐☐☐☐☐ Not Sure 98	
Q33	How long after you went to the other provider/facility/place did you go to (HEALTH FACILITY NAME) for treatment?	Number of days: ..... ☐☐	
Q34	Why did you decide to go to (HEALTH FACILITY NAME)? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED	Referred from public health facility ..... 1 Referred from private provider ..... 2 Because it is close to my house ..... 3 To get a test ..... 4 Symptoms were getting worse ..... 5 Other ..... 8 Specify: _____	
Q35	What signs and symptoms did you/your child have when you went to (HEALTH FACILITY NAME)? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER SYMPTOMS?	Fever ..... 1 Chills ..... 2 Sweating ..... 3 Headache ..... 4 Body ache/Joint pain ..... 5 Fatigue ..... 6 Loss of appetite ..... 7 Diarrhoea ..... 8 Vomiting ..... 9 Other ..... 10 Specify: _____ Don't remember 98	
Q36	By what means did you travel to (HEALTH FACILITY NAME)? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER SYMPTOMS?	Walked ..... 1 Motorcycle ..... 2 Car ..... 3 Boat ..... 4 Ambulance ..... 5 Taxi ..... 6 Other ..... 8 Specify: _____	
Q37	How long did it take you to travel to (HEALTH FACILITY NAME)?	Time (minutes): ..... ☐☐	
Q38	How much did you pay to travel to (HEALTH FACILITY NAME)?	Travel cost (Riel): ..... ☐☐☐☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q39	When you/your child arrived at the health facility, how long did you wait to see the nurse/doctor?	Time (minutes): ..... ☐☐	
Q40	How long did the consultation take, that is how much time did you/your child spend with the nurse/doctor?	Time (minutes): ..... ☐☐	
Q41	During the consultation did the nurse/doctor ask about your/your child's fever and travel history?	Yes No Fever history ..... 1 2 Travel history 1 2	
Q42	During the consultation did the nurse/doctor take your/your child's temperature or blood pressure or weight or height? ASK ABOUT EACH AND CIRCLE "YES" (1) IF IT WAS DONE OR "NO" (2) IF IT WASN'T	Yes No Temperature ..... 1 2 Blood pressure ..... 1 2 Weight ..... 1 2 Height 1 2	
Q43	Did the nurse/doctor give you a diagnosis for your/your child's illness?	Yes ..... 1 No ..... 2 Not sure 8	 ➔ **Q45** ➔ **Q45**
Q44	What diagnosis did the nurse/doctor give you/your child? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHERS?	Malaria ..... 1 Anaemia (short of blood) ..... 2 Dehydration ..... 3 Respiratory infection ..... 4 Cold/Flu ..... 5 Dengue ..... 6 Malnutrition ..... 7 Other ..... 8 Specify:_____	
Q45	Were you/your child given a blood test for malaria at the health facility?	Yes ..... 1 No 2	 ➔ **Q49**
Q46	What type of test?	RDT/dipstick ..... 1 Blood slide/microscopy ..... 2 Not sure 8	
Q47	Do you know the result of the test?	Positive ..... 1 Negative ..... 2 Not told result ..... 3 Not sure 8	 ➔ **Q49** ➔ **Q49** ➔ **Q49**
Q48	Do you know what type of malaria you/your child had?	Not told ..... 1 Falciparum ..... 2 Vivax ..... 3 Mixed (Pf & Pv) 4	

Section 3: Details of treatment

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q49	Did you/your child get an infusion?	Yes ..... 1 No 2	
Q50	Did the nurse/doctor prescribe any drugs for you/your child?	Yes ..... 1 No 2	 ➔ **Q63**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q51	What drugs were prescribed for you/your child? INCLUDE ALL DRUGS, SUCH AS ANTIMALARIALS, ANTIBIOTICS, PARACETAMOL, ETC. IF THEY DON'T KNOW OR CAN'T REMEMBER, WRITE "98" FOR THE DRUG 1 CODE	Code / Name / anti-malarial? Drug 1: ☐☐ _____ ❑ Drug 2: ☐☐ _____ ❑ Drug 3: ☐☐ _____ ❑ Drug 4: ☐☐ _____ ❑ Drug 5: ☐☐ _____ ❑	
Q52	Can you tell me why you/your child were prescribed these drugs? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	To treat malaria .....1 To reduce the fever .....2 To reduce body pain/joint ache .....3 To make stronger .....4 Other .....5 Specify: _____ Don't know 8	
Q53	Were you given any information about the drugs you/your child were prescribed by the nurse/doctor? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	Yes (verbally) .....1 Yes (written) .....2 Yes (verbally & written) .....3 No .....4 Not sure 8	
Q54	For antimalarials only, were you told how to take/administer the drug by the nurse/doctor? CHECK Q51 AND MENTION THE DRUGS BY NAME TO THE PATIENT/CARER	Yes .....1 No .....2 Not sure 8	
Q55	Can you show me the drugs you/your child were prescribed from (HEALTH FACILITY NAME)?	Yes .....1 No .....2 No more, take all 8	
Q56	Did you get these drugs from (HEALTH FACILITY NAME) or from another place?	Didn't buy antimalarials .....0 Referral hospital .....1 Health centre or FDH .....2 Health post .....3 VMW/ VHV .....4 Polyclinic .....5 Cabinet .....6 Private laboratory .....7 Drug store .....8 Shop/market .....9 Traditional practitioner .....10 Other .....11 Specify: _____	➔ **Q62**
Q57	How many tablets per dose did you/your child take of the antimalaria medicine? WRITE "98" IF THEY DON'T KNOW	No. tablets: ..... ☐☐	
Q58	How many times per day did you/your child take the antimalaria medication? WRITE "98" IF THEY DON'T KNOW	No. times/day: ..... ☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q59	How many days in total did you/your child take of the antimalaria medicine? WRITE "98" IF THEY DON'T KNOW	No. days:..... ☐☐	
Q60	Did you/your child finish taking all of the antimalaria medicine that you were prescribed by (HEALTH FACILITY NAME)?	Yes.....1 No.....2	➔ **Q63**
Q61	Why didn't you/your child finish taking all of the antimalaria medicine that you were prescribed?	Still taking the medication .....1 Had side effects .....2 Felt better.....3 Other.....4 Specify: _____ Don't know 8	**SKIP TO Q63**
Q62	Why didn't you get the antimalarial medicine that you/your child were prescribed at (HEALTH FACILITY NAME)?	Not available at health facility .....1 Didn't have enough money .....2 Didn't know where to buy.....3 Afraid of side effects .....4 Other.....5 Specify: _____ Don't know 8	
Q63	What happens if you don't take antimalarial drugs for the recommended number of days or don't take all of the tablets as prescribed? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	Nothing .....1 Parasite remains in the body.....2 Patient will continue to transmit malaria .....3 Parasite will become resistant .....4 Patient gets sick again .....5 Patient does not recover .....6 Other.....7 Specify:_____ Don't know 8	
Q64	Do you know of any antimalarial drugs that should no longer be used to treat malaria?	Yes.....1 No.....2	➔ **Q66**
Q65	What are the names of the drugs that should no longer be used to treat malaria? IF < 3, WRITE THE ONES THAT THEY KNOW (FILL IN THE DRUG CODES LATER TO SAVE TIME)	Name / Code Antimalarial 1: _____ ☐☐ Antimalarial 2: _____ ☐☐ Antimalarial 3: _____ ☐☐	
Q66	Why do you think you/your child became sick? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Mosquito bites .....1 Didn't sleep under net .....2 Stayed/slept in forest .....3 Stayed/slept in chamkar.....4 Drank dirty water.....5 Didn't boil water .....6 Bathed in river .....7 Bad air .....8 Bad talking .....9 Spirits .....10 Bad food.....11 Poor hygiene.....12 Other.....13 Specify:_____ Don't know 98	
Q67	Has anyone else in your household been sick with fever in the past two weeks?	Yes.....1 No.....2	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q68	Did you return to (HEALTH FACILITY NAME) for more treatment or advice after your/your child's first visit?	Yes.....1 No.....2	➔ **Q71**
Q69	How long after the first visit to (HEALTH FACILITY NAME) did you/your child return?	No. days:..... ☐☐ .	
Q70	Why did you/your child return to the health facility? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Fever returned .....1 Didn't feel better/symptoms got worse .....2 To get a test .....3 To get more medicine.....4 Health worker told me to return .....5 Other.....6 Specify:_____ Don't know 8	
Q71	Have you/your child recovered from the illness? Have you/your child been able to return to your normal activities and work/study?	Yes.....1 No.....2	➔ **Q73**
Q72	What symptoms do you/your child still have? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER SYMPTOMS?	Fever.....1 Chills .....2 Sweating.....3 Headache .....4 Body ache/Joint pain .....5 Fatigue.....6 Loss of appetite .....7 Diarrhoea.....8 Vomiting .....9 Other.....10 Specify: _____ Don't remember.....98	
Q73	Were you given any health education about your illness by the nurse/doctor at (HEALTH FACILITY NAME)?	Yes (verbally).....1 Yes (written).....2 Yes (verbally & written).....3 No.....4 Not sure 8	
Q74	How much did you pay for your/your child's treatment?	Cost of treatment (Riel):..... ☐☐☐☐☐ Not Sure 98	
Q75	Were you satisfied with the services that you/your child received at (HEALTH FACILITY NAME)?	Yes.....1 No.....2	
Q76	Are there any improvements that you would like to see at (HEALTH FACILITY NAME)? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	None, no improvements needed .....0 Reduce waiting times .....1 Reduce/eliminate user fees.....2 More explanation about illness.....3 Better staff attitude toward patients.....4 More time with health worker .....5 More detailed exam by health worker .....6 Availability of the prescribed drugs .....7 Better quality drugs .....8 Longer opening hours.....9 Cleaner facility or nicer building.....10 Other.....11 Specify: _____ Don't know 98	

END INTERVIEW

Thank respondent for taking the time to be interviewed.

Patient Information from the clinical register:
THIS INFORMATION SHOULD BE PROVIDED AND FILLED IN BY THE SUPERVISOR FROM THE HEALTH FACILITY CASE RECORD SHEET

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q77	Line number/ID from the case record sheet:	Line No. _____	
Q78	Register number from the case record sheet:	Register No. _____	
Q79	Date of treatment at health facility	Treatment date:..... __ __ / __ __ / __ __ __ __	
Q80	Age of the patient IF THE PATIENT IS A CHILD < 5 YEARS, RECORD THEIR AGE IN MONTHS	Age: ..... ☐☐ Age (months):..... ☐☐	
Q81	Sex of the patient	Male.....1 Female 2	
Q82	Diagnosis	Simple malaria.....1 Severe malaria .....2 Other.....3 Specify: _____	
Q83	Was the diagnosis confirmed by a blood test?	Yes.....1 No.....2 Don't know.....8	
Q84	What type of test was used to confirm the patient had malaria?	RDT/dipstick .....1 Blood slide/microscopy .....2 Don't know.....8	
Q85	What species of malaria did the patient have?	Falciparum .....2 Vivax .....3 Mixed (Pf & Pv) .....4 Don't know.....8	
Q86	What drug(s) was the patient treated with? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	AS-MQ.....1 DHA-Pip.....2 Chloroquine.....3 Quinine.....4 Artemether.....5 Infusion .....6 Paracetamol.....7 Antibiotics .....8 Other.....9 Specify: _____ Don't know.....98	

CODE	DRUG
Antimalarials:	
1	A+M (Artesunate-Mefloquine)
2	Malarine (Artesunate-Mefloquine)
3	Eurartesim
4	Other Artesunate-Mefloquine (e.g., Artequin)
5	Duo-Cotecxin (Dihydroartemisinin-Piperaquine)
6	Other Dihydroartemisinin-Piperaquine (e.g., Artekin, Artecan, Arterakine or p-Alaxin)
7	Artemisinin-Piperaquine (e.g., Artequick)
8	Dihydroartemisinin only (e.g., Cotecxin or Alaxin)
9	Dihydroartemisinin complex (e.g. CV artecam)
10	Plasmotrim (Artesunate)
11	Other Artesunate only (e.g., Arinate, Arquine or Artesunat)
12	Artemether only (e.g., Artemedine)
13	Artemisinin only
14	Mefloquine only (e.g., Lariam or Mephaquin)
15	Quinine
16	Chloroquine
17	Primaquine
18	Malarone (Atovaquone-Proguanil)
19	Coartem (Artemether-Lumefantrine)
20	Drug cocktail for fever or malaria
21	Other antimalarial drug
Non-malaria drugs:	
22	Tetracycline/Doxycycline
23	Other Antibiotics
24	Paracetamol / Aspirin
25	Vitamins / Tonics
26	Infusion / IV fluids
27	Traditional herbs
28	Other non-malaria drugs

Health Facility Part 3 (Exit interview) Questionnaire

Patient Exit Interview Form

USE THIS FORM TO INTERVIEW PATIENTS WHO WERE TREATED FOR FEVER
AT THE SELECTED PUBLIC/PRIVATE HEALTH FACILITY

Health Facility Cluster: [____|____] (01-31)

Health Facility Name: _____ Service Type [_____] (1: Public, 2 Private)	Date of interview: __ __ / __ __ / __ __ __ __
Health Facility Type: [_____] 1: Referral hospital, 2: Health center (with beds)/FDH 3: Health center (without beds), 4: Polyclinic, 5: Cabinet / private clinic 6: Other *Specify*:_____	Facility Code: [____|____] [____] Cluster Number Service Type *(Example: Cluster Number = 01, Service Type = 1 so Facility Code = 011)*
Province: _____	Province code:..... ☐☐
Operational District: _____	OD code: ..... ☐☐☐☐
Patient No.:..... ☐☐	
Interviewer's name: _____	Interviewer's code:..... ☐☐

SUPERVISOR	FIELD EDITOR	OFFICE EDITOR	DATA ENTRY
Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _

Section 1: Demographics of patient with fever

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q1	How old is the patient with fever? IF THE PATIENT IS A CHILD < 5 YEARS, RECORD THEIR AGE IN MONTHS	Age (years): ☐☐ Age (months): ☐☐	
Q2	What is the sex of the patient?	Male ..... 1 Female 2	➔ **Q4**
Q3	Is the patient currently pregnant? ONLY ASK IF THEY ARE FEMALE, AGED 15-49 YEARS	Yes ..... 1 No 2	
Q4	Is the patient visiting the health facility today with a carer?	Yes ..... 1 No 2	➔ **Q8**
Q5	What is the age of the patient's carer?	Age (years): ☐☐	
Q6	What is the sex of the patient's carer?	Male ..... 1 Female 2	
Q7	What is the relationship of the carer to the patient with fever?	Mother ..... 1 Father ..... 2 Sister/Brother ..... 3 Grandparent ..... 4 Other ..... 5 *Specify:*_____	
Q8	Where does the patient currently live? WRITE THE NAMES OF THE PROVINCE, DISTRICT, COMMUNE, AND VILLAGE OR TOWN. FILL IN CODES LATER TO SAVE TIME.	Province: ☐☐ _____ District: ☐☐☐☐ _____ Commune: ☐☐☐☐☐☐ _____ Village/Town: _____ Not sure 98	
Q9	Is the patient's current address also their permanent address?	Yes ..... 1 No 2	
Q10	How long has the patient been living at their current address?	< 2 weeks ..... 1 < 1 month ..... 2 1 to < 3 months ..... 3 3 to < 6 months ..... 4 6 months to < 1 year ..... 5 ≥ 1 year 6	
Q11	What is the highest level of education attained by the patient?	Child <5 years, not in school ..... 0 Never attended school ..... 1 Some primary ..... 2 Completed primary (Grade 6) ..... 3 Some secondary ..... 4 Completed secondary (Grade 12) ..... 5 More than secondary 6	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q12	What is the patient's primary profession or job?	Child, not in school ..... 1 Student ..... 2 Farmer ..... 3 Laborer ..... 4 Fisherman ..... 5 Merchant/Seller ..... 6 Housewife ..... 7 Soldier ..... 8 Other ..... 9 Specify: _____	
Q13	In the past 6 months, did the patient ever go to the forest and sleep there overnight?	Yes ..... 1 No 2	➔ **Q16**
Q14	When was the patient last in the forest?	Last night ..... 1 < 1 week ..... 2 1 to < 2 weeks ..... 3 2 to < 4 weeks ..... 4 ≥ 4 weeks ..... 5 Not sure 8	
Q15	How many nights did the patient stay in the forest on their last visit?	Nights: ..... ☐☐ Not sure 98	
Q16	In the past 6 months, has the patient ever travelled away from home and stayed overnight?	Yes ..... 1 No 2	➔ **Q19**
Q17	When did the patient last travel away from home?	Last night ..... 1 < 1 week ..... 2 1 to < 2 weeks ..... 3 2 to < 4 weeks ..... 4 ≥ 4 weeks ..... 5 Not sure 8	
Q18	For what reason(s) did the patient last travel away from home? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED	Work in forest ..... 1 Work on chamkar ..... 2 Work in Thailand ..... 3 Work in Vietnam ..... 4 Visit relatives ..... 5 Other ..... 6 Specify: _____ Don't know 8	
Q19	Did the patient sleep under a mosquito net last night?	Yes ..... 1 No ..... 2 Not sure 8	
Q20	Does the patient's household own any mosquito nets?	Yes ..... 1 No ..... 2 Not sure 8	

Section 2: Details of treatment seeking, symptoms, consultation and diagnosis

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q21	When did you/your child's fever begin?	Today....1 Yesterday....2 Two days ago....3 Three days ago....4 > 3 days ago....5 Don't remember....8	
Q22	Did you/your child seek treatment anywhere else before coming here today?	Yes....1 No....2	➔ **Q25**
Q23	Where else did you/you child seek treatment? MULTIPLE RESPONSES, CIRCLE ALL MENTIONED PROBE: ANYWHERE ELSE?	Referral hospital....1 Health centre or FDH....2 Health post....3 VMW/ VHV....4 Polyclinic....5 Cabinet....6 Private laboratory....7 Drug store....8 Shop/market....9 Traditional practitioner....10 Other....11 Specify: _____ Can't remember....98	
Q24	Why did you/your child go to that provider/facility/place for treatment? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED	To seek advice....1 To buy/get medication....2 Because it is close to my house....3 To get a test....4 To get traditional treatment....5 Transport expensive to health facility....6 Other....8 Specify: _____	
Q25	Why did you/your child come to (HEALTH FACILITY NAME) today?	Referred from public health facility....1 Referred from private provider....2 Because it is close to my house....3 To get a test....4 Symptoms were getting worse....5 To get medication....6 Other....8 Specify: _____	
Q26	What signs and symptoms do you/your child have today? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER SYMPTOMS?	Unconscious....1 Convulsions....2 Fast breathing....3 Very hot....4 Yellow eye color....5 Very pale skin....6 Not breastfeeding....7 Not eating....8 Frequent vomiting....9 Diarrhoea....10 Coughing....11 Other....12 Specify: _____ Don't know....98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q27	By what means did you travel to this health facility today?	Walked ..... 1 Motorcycle ..... 2 Car ..... 3 Boat ..... 4 Ambulance ..... 5 Taxi ..... 6 Other ..... 8 Specify: _____	
Q28	How long did it take you to travel to this health facility today?	Time (minutes): ..... ☐☐	
Q29	How much did you pay to travel to this health facility today?	Travel cost (Riel): ..... ☐☐☐☐☐	
Q30	When you/your child arrived at the health facility today, how long did you/your child wait to see the nurse/doctor?	Time (minutes): ..... ☐☐	
Q31	How long did the consultation take, that is how much time did you/your child spend with the nurse/doctor?	Time (minutes): ..... ☐☐	
Q32	During the consultation did the nurse/doctor ask about your/your child's fever and travel history?	Yes No Fever history ..... 1 2 Travel history 1 2	
Q33	During the consultation did the nurse/doctor take your/your child's temperature or blood pressure or weight or height? ASK ABOUT EACH AND CIRCLE "YES" (1) IF IT WAS DONE OR "NO" (2) IF IT WASN'T	Yes No Temperature ..... 1 2 Blood pressure ..... 1 2 Weight ..... 1 2 Height 1 2	
Q34	Did the nurse/doctor explain the test and procedures with words that you could understand?	Yes ..... 1 No ..... 2 To some extent 8	
Q35	Did the nurse/doctor give you/your child a diagnosis for your/your child's fever?	Yes ..... 1 No ..... 2 Not sure 8	 ➔ **Q40** ➔ **Q40**
Q36	Was the nurse/doctor accessible for you to ask questions?	Yes ..... 1 No 2	
Q37	Did the nurse/doctor explain how to avoid illness?	Yes ..... 1 No 2	
Q38	What diagnosis did the nurse/doctor give you for your/your child's fever?	Malaria ..... 1 Acute respiratory infection ..... 2 Upper respiratory infection ..... 3 Cold/Flu ..... 4 Dengue ..... 5 Diarrhoea ..... 6 Anaemia (short of blood) ..... 7 Dehydration ..... 8 Malnutrition ..... 9 Other ..... 10 Specify: _____	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q39	Did the nurse/doctor explain the disease that you suffer with words that you could understand?	Yes.....1 No.....2 To some extent 8	
Q40	Did you/your child have a blood test for malaria?	Yes.....1 No.....2	 ➔ **Q44**
Q41	What type of test?	RDT/dipstick .....1 Blood slide/microscopy .....2 Not sure 8	
Q42	Do you know the result of the test?	Positive .....1 Negative .....2 Not told result.....3 Not sure 8	 ➔ **Q44** ➔ **Q44** ➔ **Q44**
Q43	Do you know what type of malaria you/your child have?	Not told.....1 Falciparum.....2 Vivax .....3 Mixed (Pf & Pv).....4	

Section 3: Details of treatment

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q44	Did the nurse/doctor give you/your child an infusion today?	Yes.....1 No.....2	
Q45	Did the nurse/doctor prescribe any drugs for you/your child today?	Yes.....1 No.....2	 ➔ **Q55**
Q46	What drugs were prescribed for you/your child today? INCLUDE ALL DRUGS, SUCH AS ANTIMALARIALS, ANTIBIOTICS, PARACETAMOL, ETC. TICK THE CHECKBOX IF THE DRUG IS AN ANTIMALARIAL.	Code Name anti-malarial? Drug 1: ☐☐ _____ ❑ Drug 2: ☐☐ _____ ❑ Drug 3: ☐☐ _____ ❑ Drug 4: ☐☐ _____ ❑ Drug 5: ☐☐ _____ ❑	
Q47	Can you tell me why you/your child were prescribed these drugs today? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED	To treat malaria .....1 To reduce the fever.....2 To reduce body pain/joint ache .....3 To reduce coughing .....4 To make stronger.....5 Other.....6 Specify:_____ Don't know.....8	
Q48	Were you given any information about the drugs you/your child were prescribed by the nurse/doctor?	Yes (verbally).....1 Yes (written).....2 Yes (verbally & written).....3 No.....4 Not sure 8	
Q49	Can you show me the drugs you/your child were prescribed?	Yes.....1 No.....2	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q50	For antimalarials only, were you told how to take/administer the drug? CHECK Q42 AND MENTION THE DRUGS BY NAME TO THE PATIENT/CARER	Yes.....1 No.....2 Not sure.....8	
Q51	How many tablets per dose? FOR ANTIMALARIALS ONLY	No. tablets: ..... ☐☐	
Q52	How many times per day? FOR ANTIMALARIALS ONLY	No. times/day: ..... ☐☐	
Q53	How many days? FOR ANTIMALARIALS ONLY	No. days:..... ☐☐	
Q54	What happens if you don't take antimalarial drugs for the recommended number of days or don't take all of the tablets as prescribed? MULTIPLE RESPONSES POSSIBLE, CIRCLE ALL MENTIONED	Nothing.....1 Parasite remains in the body.....2 Patient will continue to transmit malaria.....3 Parasite will become resistant.....4 Patient gets sick again.....5 Patient does not recover.....6 Other.....7 Specify:_____ Don't know.....8	
Q55	Do you know of any antimalarial drugs that should no longer be used to treat malaria?	Yes.....1 No.....2	➔ Q57
Q56	What are the names of the drugs that should no longer be used to treat malaria? IF < 3, WRITE THE ONES THAT THEY KNOW (FILL IN THE DRUG CODES LATER TO SAVE TIME)	Name / Code Antimalarial 1: _____ ☐☐ Antimalarial 2: _____ ☐☐ Antimalarial 3: _____ ☐☐	
Q57	Why do you think you/your child became sick with fever? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Mosquito bites.....1 Didn't sleep under net.....2 Stayed/slept in forest.....3 Stayed/slept in chamkar.....4 Drank dirty water.....5 Didn't boil water.....6 Bathed in river.....7 Bad air.....8 Bad talking.....9 Spirits.....10 Bad food.....11 Poor hygiene.....12 Other.....13 Specify:_____ Don't know.....98	
Q58	Has anyone else in your household been sick with fever in the past two weeks?	Yes.....1 No.....2	
Q59	Were you given any health education about your/your child's illness by the nurse/doctor?	Yes (verbally).....1 Yes (written).....2 Yes (verbally & written).....3 No.....4 Not sure.....8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q60	How much did you pay for your/your child's treatment today?	Cost of treatment (Riel):..... ☐☐☐☐☐ Not Sure 98	
Q61	Were you satisfied with the treatment you received at the health facility today?	Fully satisfied .....1 Moderately satisfied .. ..2 Not at all satisfied.....3	
Q62	What sort of improvements would you like to see at this health facility? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	None, no improvements needed .....0 Reduce waiting times .....1 Reduce/eliminate user fees.....2 More explanation about illness.....3 Better staff attitude toward patients.....4 More time with health worker .....5 More detailed exam by health worker .....6 Availability of the prescribed drugs .....7 Better quality drugs .....8 Longer opening hours.....9 Cleaner facility or nicer building.....10 Other.....11 Specify: _____ Don't know 98	

END INTERVIEW

Thank respondent for taking the time to be interviewed.

CODE	DRUG
Antimalarials:	
1	A+M (Artesunate-Mefloquine)
2	Malarine (Artesunate-Mefloquine)
3	Eurartesim
4	Other Artesunate-Mefloquine (e.g., Artequin)
5	Duo-Cotecxin (Dihydroartemisinin-Piperaquine)
6	Other Dihydroartemisinin-Piperaquine (e.g., Artekin, Artecan, Arterakine or p-Alaxin)
7	Artemisinin-Piperaquine (e.g., Artequick)
8	Dihydroartemisinin only (e.g., Cotecxin or Alaxin)
9	Dihydroartemisinin complex (e.g. CV artecam)
10	Plasmotrim (Artesunate)
11	Other Artesunate only (e.g., Arinate, Arquine or Artesunat)
12	Artemether only (e.g., Artemedine)
13	Artemisinin only
14	Mefloquine only (e.g., Lariam or Mephaquin)
15	Quinine
16	Chloroquine
17	Primaquine
18	Malarone (Atovaquone-Proguanil)
19	Coartem (Artemether-Lumefantrine)
20	Drug cocktail for fever or malaria
21	Other antimalarial drug
Non-malaria drugs:	
22	Tetracycline/Doxycycline
23	Other Antibiotics
24	Paracetamol / Aspirin
25	Vitamins / Tonics
26	Infusion / IV fluids
27	Traditional herbs
28	Other non-malaria drugs