Kingdom of Cambodia

Nation Religion King

Cambodia Malaria Survey 2010

Implemented by:

National Centre for Parasitology, Entomology and Malaria Control (CNM)

Design, Analysis, and Report by:

Malaria Consortium

In Collaboration with:

Ministry of Health, Cambodia
Institut Pasteur Cambodia
London School of Hygiene and Tropical Medicine

With Funding Support from:

Global Fund to Fight AIDS/HIV, Tuberculosis and Malaria
Bill & Melinda Gates Foundation
World Health Organization
PSI Cambodia

Report of the Cambodia Malaria Survey 2010

Authors

National Centre for Parasitology, Entomology and Malaria Control (CNM)
Dr. Lek Dysoley
Dr. Leang Rithea
Dr. Tol Bunkea
Dr. Seshu Babu
Dr. Kheng Sim
Dr. Chea Nguon
Dr. Duong Socheat

Malaria Consortium
Ms. Michelle Thompson
Ms. Jane Bruce
Ms. Celine Zegers de Beyl
Dr. Jonathan Cox
Dr. David Sintasath
Dr. Sylvia Meek

Acknowledgements

The authors would like to thank the Director and staff of the National Centre for Parasitology, Entomology and Malaria Control (CNM), the Ministry of Health of Cambodia (MoH) and partners for their dedication to the malaria control programme and their commitment to contain artemisinin resistance and eliminate malaria in Cambodia. Special thanks to the Global Fund for funding this survey, with additional support from the Bill & Melinda Gates Foundation (BMGF), the World Health Organization (WHO) and Population Services International (PSI).

We would also like to express our sincere appreciation to all the members of the Cambodia Malaria Survey (CMS 2010) teams and technical partners, in particular WHO-Cambodia, PSI and Institut Pasteur Cambodia (IPC), who provided invaluable technical support and assurance that fieldwork and laboratory analyses were undertaken to the highest quality standards.

Finally, a special thanks to the many field interviewers and blood takers who worked arduously for data collection, as well as laboratory technicians who read and rechecked all the blood slides, without whose commitment and dedication we would not have been able to produce the following results.

Table of Contents

List of Tables

List of Figures

List of Acronyms

A+M	Artesunate + Mefloquine
AMT	Artesunate monotherapies
AMFm	Affordable Medicines Facility - Malaria
BCC	Behaviour Change Communication
BMGF	Bill & Melinda Gates Foundation
CI	Confidence Interval
CMBS 2004	Cambodian Malaria Baseline Survey 2004
CMS 2007	Cambodia Malaria Survey 2007
CMS 2010	Cambodia Malaria Survey 2010
CNM	National Centre for Parasitology, Entomology and Malaria Control
DBS	Dried Blood Spots
DE	Design effect
DHA-PIP	Dihydroartemisinin-piperaquine
ELISA	Enzyme-linked Immunosorbent assay
FDH	Former District Hospital
FSAT	Focal Screening and Treatment
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GIS	Geographic Information System
GPS	Global Positioning System
HH	Household
HIS	Health Information System
HU	Health Unlimited
IEC	Information, Education and Communication
IMCI	Integrated Management of Childhood Illness
IPC	Institut Pasteur Cambodia
ITN	Insecticide treated net
LLIN	Long Lasting Insecticide-Treated Net
LSHTM	London School of Hygiene and Tropical Medicine
JICA	Japanese International Cooperation Agency
KABP	Knowledge, Attitude, Behaviour and Practice
MC	Malaria Consortium
MDG	Millennium Development Goals
MMW	Mobile Malaria Worker
NGO	Non-governmental Organisation
NIPH	National Institute of Public Health
NMCP	National Malaria Control Programme
OD	Operational District
PCA	Principle Component Analysis
PCR	Polymerase Chain Reaction
Pf	*Plasmodium falciparum*
PFD	Partners for Development
PHD	Provincial Health Department
PSI	Population Services International
Pv	*Plasmodium vivax*
RBM	Roll Back Malaria
RCC	Rolling Continuation Channel
RDT	Rapid Diagnostic Test
SSF	Single Stream Funding
SES	Socioeconomic status
TORs	Terms of Reference
USAID	United States Agency for International Development
VHV	Village Health Volunteer
VMW	Village Malaria Worker
WHO	World Health Organization

Executive summary

The Cambodia Malaria Survey 2010 (CMS 2010) was conducted from October to November 2010 during 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 survey was funded by the Global Fund to Fight AIDS, Tuberculosis, and Malaria (GFATM) Round 6 Phase II, however, it addresses indicators beyond this grant in order to cover different aspects of the national programme and to enable CNM to evaluate activities included in the performance frameworks of the Single-Stream Funding (SSF) consolidated grant (which includes GFATM Round 9 Phase I, Rolling Continuation Channel (RCC) Round 2, Affordable Medicines Facility – Malaria (AMFm)), the Containment Project Monitoring and Evaluation Framework (funded by the Bill & Melinda Gates Foundation), as well as other national, and regional indicators.

The main purpose of the CMS 2010 was to assess the performance and impact of malaria control activities in Cambodia as compared to 2004 and 2007, while monitoring and evaluating activities funded by GFATM as well as the Containment Project. The objectives of the survey were to:

- Update the malaria epidemiological situation and assess whether malaria prevalence has declined since the previous Cambodia Malaria Survey in 2007
- Determine coverage of key interventions
- Track key knowledge, attitude, behaviour and practice indicators to assess the outcomes of behavior change communication strategies
- Assess current strategies for malaria control
- Assess performance of the programme implemented by government and partners
- Assess strategic and operational options and recommend mid-course corrections and improvements where needed
- Serve as baseline data for Global Fund SSF Phase I
- Assess the impact of the Containment Project in Zones 1 and 2 as compared to the baseline survey in 2009

While every attempt was made to ensure comparability among the three longitudinal prevalence surveys, a number of changes were introduced to maximise the useful of information from the subsequent surveys. This was largely in response to observations in the baseline on areas of malaria risk, so one domain of negligible risk was omitted, whilst an additional risk zone from 2 to 5 kilometres from forest was added to determine more precisely the limits to risk of transmission. Some questions were adapted on the basis of lessons learned in 2004 and 2007, particularly related to capturing indicators for mobile populations (including temporary visitors, forest-goers, and travelers). The CMS 2010 also sought to improve the methodology for assessing quality of malaria care and services at public and private sector facilities.

This survey is not nationwide, as malaria transmission rates are very heterogeneous, so the survey focused on populations at highest risk stratifying first by higher risk provinces and then by distance from forest. A total of **3,802 households** were visited and interviewed in the CMS 2010 survey (40 households x 48 clusters x 2 domains). However, excluding households in the non-targeted villages which were purposely sampled to assess PSI's mosquito net bundling strategy, a total of 3,164 households were represented in target villages less than 2km from the forest (risk categories 1 to 3).

A total of **183 net outlets** and **187 drug outlets** were surveyed for the net and outlet survey component. For the health facility survey, **73 health facilities** (37 public and 36 private),

989 patients presenting at health facilities with fever and administered exit interviews, and 427 patients with malaria diagnoses were followed up to their village.

Key findings and recommendations:

Household Survey

- ***Improve targeted BCC/IEC strategies and messages***. Since CMBS 2004 and CMS 2007 surveys, knowledge about malaria transmission and prevention has remained generally high among respondents. However, there is still a great need for improvement of treatment-seeking knowledge and behaviour. Knowledge of Malarine for the treatment of malaria is still robust, but more effective strategies for BCC/IEC regarding compliance and full treatment courses may still needed. Regarding the use of ITNs and LLINs, improved BCC/IEC strategies and messages targeted for people going to the forest is critical – as these still remain the most at-risk population. Going forward, as malaria infection and transmission decreases in Cambodia, it will be important to ensure that BCC strategies and messages are appropriate in a malaria elimination context.

- ***Further increase ITN/LLIN coverage of sufficient nets.*** Efforts by the national malaria programme to increase coverage of ITN and LLIN have largely been successful due to the intensive distribution programmes supported by the Global Fund, Bill & Melinda Gates Foundation, and other key stakeholders. Despite these efforts, the programme should aim to ensure that sufficient ITN/LLIN coverage (at least one ITN/LLIN for every two persons and at least one ITN/LLIN per person in priority artemisinin resistance containment zones) is met, particularly among larger households in targeted at-risk villages.

- ***Increase and maintain the use of ITNs and LLINs.*** The CMS 2010 has shown that the overall proportion of those who slept under an ITN/LLIN the previous night has increased to more than 50% from a baseline of 29% in 2004 and 25% in 2007. Efforts must be strengthened to maintain these substantial gains in ITN/LLIN use among all target groups. Furthermore, as malaria prevalence and incidence continues to decline, more effective strategies will be needed to promote the continued use of ITNs and LLINs.

- ***Promote strategies targeting vulnerable groups including forest goers.*** Forest goers have a three-fold increased risk of malaria compared to those who do not go to the forest. *The national programme should address this vulnerable risk group as a matter of priority throughout the country*. Although this survey did not purposefully sample military personnel, it is not unrealistic to assume that this population (primarily based in the forested areas along the borders) would also be at risk for malaria.

Net and Drug Outlet Survey

- ***Consider more emphasis on mosquito net retreatment.*** According to the CMS 2010 survey, the availability of insecticides for the retreatment of mosquito nets was found to be low. Nearly 20% of LLINs had been reported to have been retreated within the past 12 months. Coupled with the frequent washing of mosquito nets (i.e., more than 40% of nets were washed at least once a month), a more robust strategy to ensure that mosquito nets (particularly conventional nets) are impregnated with insecticides should be emphasized. In an attempt to address this issue, PSI has piloted a national programme for bundling mosquito nets with treatment kits, in 2010

and 2011 678,000 and 700,000 kits respectively were distributed; this programme will continue through to 2013.

- ***Further reinforce and promote the ban on oral artemisinin monotherapies.*** Drug outlet sellers had limited knowledge about the ban on oral artemisinin monotherapies. Despite the intensive efforts to enforce the ban on the importation of oral artemisinin monotherapies in the country, the availability of some such monotherapies in 9% and 23% of private sector outlets in Domain 1 and Domain 2, respectively, highlights the need to maintain drug regulatory efforts and enforcement.

- ***Promote training and refresher trainings for health facility providers and private drug outlet prescribers, particularly on the diagnosis and treatment for P. vivax***. Prescriber knowledge about treatment for *P. vivax* continues to be low, and more information for the treatment of *P. vivax* should be included in the training modules for case management of malaria. As the case load for *P. falciparum* is decreasing relative to *P. vivax*, it will be important to ensure that health staff in public, private, and communities, are better equipped to diagnosis and treat non-Pf malaria, including increasingly non-malaria fevers.

Health facility Survey

- ***Ensure availability of antimalarials and RDTs.*** The issue of stock-outs of antimalarial drugs and RDTs in public health facilities of more than 1 week within the past 3 months should be addressed. Public health facilities reported stockouts of drugs (28%) and RDTs (16%) for more than one week during the past 3 months. It is especially important to ensure that effective antimalarials, supplies and regents are available and adequately stocked at point of care, particularly for health facilities offering in-patient care where more severe cases would likely be seen.

- ***Manage the over-use of antibiotics and intravenous infusions for the treatment fever and malaria.*** The over-reliance on the use of antibiotics and intravenous infusions for the treatment of fevers and malaria should be assessed. Particularly as malaria declines in the country, more fevers presented at public and private health facilities will be non-malaria related. Improved and more sensitive algorithms and training for the treatment of these non-malaria fevers should be developed and implemented.

Operational Research

- ***Promote further operational research addressing the changing epidemiology of malaria.*** The epidemiology of malaria will likely change as the incidence of malaria continues to decline in the region. More research may be needed to evaluate the impact of changing species distributions (i.e., increasing *P. vivax* burden) on disease transmission dynamics. There is also a need for more information on the effect of the rapidly changing environment on malaria vector behaviour and possible secondary malaria species.

Table 1a. Cambodia Malaria Survey 2010 Key Global Fund Indicators

No.	Indicator as specified in GF performance frameworks	Indicator as measured in CMS2010	TOTAL		DOMAIN 1		DOMAIN 2		
			% (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 % malaria positive - PCR	0.9 (77) -	0.6,1.3 -	0.5 (23) -	0.3,0.8 -	1.3 (54) -	0.9,2.0 -	**<0.01** -
1.2	% of households living in targeted, at-risk villages* with at least one ITN/LLIN	% households ITNs % households LLINs	74.7 (2411) 51.7 (1677)	66.8,81.3 43.6,59.6	77.6 (1243) 51.6 (840)	67.2,85.3 40.4,62.7	71.9 (1168) 51.8 (827)	59.4,81.7 40.4,62.9	0.43 0.98
1.3	% of households living in targeted, at-risk villages* that have sufficient treated mosquito nets (i.e., at least one ITN/LLIN for 2 persons)	% sufficient ITNs % sufficient LLINs	37.7 (1206) 22.8 (730)	32.3,43.4 18.3,28.1	42.4 (673) 24.3 (381)	34.7,50.5 18.0,31.9	32.9 (533) 21.4 (349)	25.7,41.0 15.3,29.0	0.09 0.54
1.4	% population living in targeted, at-risk villages who slept under an ITN/LLIN the previous night	% slept under an ITN Total (risk cat 1-3) Children < 5 years Pregnant women	 52.6 (8922) 56.3 (1005) 59.1 (96)	 46.3,58.8 49.3,63.2 48.9,68.6	 53.0 (4501) 55.9 (466) 56.7 (45)	 45.1,60.7 45.7,65.5 41.6,70.7	 52.2 (4421) 56.8 (539) 61.6 (51)	 42.5,61.8 46.9,66.1 47.8,73.8	 0.90 0.90 0.62
		% slept under a LLIN Total (risk cat 1-3) Children < 5 years Pregnant women	 31.5 (5366) 34.5 (618) 35.7 (55)	 26.1,37.4 28.3,41.3 25.7,47.2	 29.3 (2490) 31.1 (260) 32.7 (24)	 22.6,37.1 22.9,40.6 19.7,48.9	 33.6 (2876) 37.6 (358) 39.0 (31)	 25.5,42.9 28.7,47.4 24.7,55.4	 0.45 0.32 0.56
1.5	% population living in non-targeted, at-risk villages** who slept under an ITN during the previous night	% population in risk cat 4 slept under an ITN	10.6 (284)	5.1,20.6	6.6 (113)	3.3,12.7	13.8 (171)	5.2,31.6	0.18
1.6	% forest goers living in targeted, at-risk villages* who slept under an ITN the last time they were in the forest.	% forest goers slept under ITN last night in forest	37.1 (471)	31.1,43.5	41.6 (284)	33.3,50.3	32.0 (187)	23.7,41.6	0.13
1.7	% of households living 2+ km from the forest (risk category 4) who bought a conventional net “bundled” with SuperMalatab insecticide kit and then treated the net	% households who bought a bundled net & treated it with SuperMalatab Risk Category 1-3 Risk Category 4	 1.8 (53) 1.3 (8)	 1.2,2.5 0.7,2.3	 2.3 (34) 1.4 (4)	 1.5,3.5 0.7,3.0	 1.2 (19) 1.2 (4)	 0.6,2.4 0.5,2.9	 0.12 0.74

		% bundled nets treated with Super Malatab:							
		<= 2 km from forest	57.4 (81)	44.0,69.7	64.6 (51)	51.9,75.5	46.9 (30)	23.9,71.3	0.21
		> 2km from forest	42.2 (10)	24.9,61.6	34.8 (4)	13.6,64.3	50.9 (6)	25.6,75.7	0.39
1.8	% population living in targeted, at-risk villages who had fever in the last two weeks and received antimalarial treatment according to national policy within 24 hours of the 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	41.2 (15)	25.5,58.9	37.3 (18)	19.5,59.4	0.77
1.9	% target population who can explain how malaria is prevented through the use of ITN	% respondents in risk cat 1-3 stated ITN as a prevention method against malaria	49.8 (1524)	45.9,53.7	46.9 (767)	40.9,52.9	53.6 (869)	48.5,58.6	0.09
	Drug Outlet								
2.1	% of private sector outlets in endemic provinces not selling artemisinin monotherapy	% drug outlets not selling oral artemisinin monotherapy	84.5 (158)	79.2,89.7	91.5 (86)	85.7,97.2	77.4 (72)	68.7,86.1	**0.01**
2.2	% private drug sellers who are aware of appropriate malaria diagnosis and treatment	% drug sellers who sell or sell and test with RDTs when clients ask for a malaria test	75.3 (67)	66.1,84.4	72.7 (24)	56.7,88.8	76.8 (43)	65.4,88.2	0.67
		% aware of national treatment guidelines and can state the correct drug treatment for:							
		Pf (AS-MQ)	85.3 (87)	78.3,92.3	88.6 (39)	78.9,98.4	82.8 (48)	72.7,92.8	0.41
		Pv (Chloroquine)	34.7 (34)	25.1,44.3	14.3 (6)	3.2,25.3	50.0 (28)	36.5,63.5	**<0.001**
2.3	% private drug sellers recommending the appropriate malaria treatment	% recommending the correct drug treatment for:							
		Pf (AS-MQ)	84.9(135)	79.3,90.5	90.9 (70)	84.3,97.5	79.3 (65)	70.3,88.2	**0.04**
		Pv (Chloroquine)	35.2 (57)	27.8,42.6	22.4 (17)	12.8,31.9	46.5 (40)	35.8,57.3	**<0.01**
	Health Facility								
3.1	% of public health facilities with no reported stock-outs lasting more than one week during the past 3 months	% facilities without any stock out of more than 1 week:			-	-	-	-	-
		Any drug	72.2 (52)	61.6,82.8					
		Any RDT	84.3 (59)	75.5,93.0					

Background

Despite the decreasing trends in malaria morbidity and mortality for the past 10 years, malaria remains a public health concern in Cambodia. In order to track progress of the work implemented by the National Center for Parasitology, Entomology, and Malaria Control (CNM) during the period of support from the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM), Cambodia undertook a comprehensive and rigorously conducted Baseline Survey in 2004 and a follow up national malaria survey in 2007. These surveys served as useful tools to monitor and evaluate the impact of national malaria control programme's (NMCP) activities on malaria prevalence and incidence over time. In 2009, the strategy to contain artemisinin resistance was implemented in ten provinces in Western Cambodia and a survey was conducted to serve as baseline to evaluate the intensive activities to contain artemisinin resistance.

Continued funding from GFATM has allowed the NMCP to improve their monitoring and evaluation (M&E) efforts, which are needed to assess the impact of activities in the long-term, including impact on antimalarial drug resistance and access to diagnosis and prevention. As much as possible, CNM aims to use data collected through routine information systems and with funding from GFATM and other sources, including the Bill & Melinda Gates Foundation (BMGF) and United States Agency for International Development (USAID), the NMCP has been able to prioritize and strengthen their malaria surveillance systems. National malaria surveys are important components of the Cambodia National Malaria M&E Plan, and such household (malariometric), outlet, and health facility surveys are planned for 2010, 2012, and 2014.

The Cambodia Malaria Survey 2010 (CMS 2010) was funded by GFATM Round 6 Phase II, however, it addresses indicators beyond those under this funding mechanism in order to cover different aspects of the national programme and to enable the NMCP to evaluate activities included in the performance frameworks of the GFATM Round 6, single-stream funding (SSF) consolidation (GFATM Round 9 Phase I, Rolling Continuation Channel (RCC) Round 2, and the Affordable Medicines Facility – Malaria (AMFm), the Containment Project (funded by the Bill & Melinda Gates Foundation), as well as national, and regional indicators.

Under the strategy to contain artemisinin resistance initiated in January 2009, the areas where evidence of artemisinin resistance has been detected and confirmed were designated as Zone 1, which covers administrative districts in 4 provinces - namely, Pailin, Battambang, Pursat, and Kampot. Intensive strategies and activities were piloted and implemented in Zone 1 to eliminate artemisinin resistant malaria parasites. Containment Zone 2, are the designated districts in 9 provinces - namely, Battambang, Pursat, Kampot, Koh Kong, Kampong Speu, Banteay Meanchey, Oddar Meanchey, Preah Vihear, and Siem Reap - which buffers Zone 1 and where malaria control efforts were strengthened with the aim to "contain" artemisinin resistance.

National Programme goals and objectives

CNM has developed a new National Malaria Strategic Plan (2011-2015) as well as a National Malaria Monitoring and Evaluation Plan that will include a consolidation of the objectives and indicators of current funding in the country.

The long-term goal of CNM is to move towards phased elimination of malaria in Cambodia with an initial focus on *P. falciparum* malaria. The medium-term goal is to move

towards pre-elimination of malaria across Cambodia with special efforts to contain artemisinin-resistant malaria.

The National Malaria Strategic Plan objectives are the following:

1. To improve 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 and *P. falciparum* gametocyte clearance.
2. To decrease 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 improve access to preventive measures and specifically prevent transmission of artemisinin resistant malaria parasites among target populations (including mobile/migrant populations) by mosquito control and personal protection.
4. To increase community awareness and behavior change among the population at risk and support the containment of artemisinin resistant parasites through comprehensive behavior change communication (BCC), community mobilization, and advocacy.
5. To provide effective management (including information systems and surveillance) and coordination to enable rapid and high quality implementation of the strategy

Purpose and objectives of the CMS 2010

The main purpose of the CMS 2010 was to assess the performance and impact of malaria control activities in Cambodia as compared to 2004 and 2007, while monitoring and evaluating activities funded by GFATM as well as the Containment Project. The objectives of the survey were to:

- Update the malaria epidemiological situation and assess whether malaria prevalence has declined since the previous Cambodia Malaria Survey in 2007
- Determine coverage of key interventions
- Track key knowledge, attitude, behaviour and practice indicators to assess the outcomes of behavior change communication strategies
- Assess current strategies for malaria control
- Assess performance of the programme implemented by government and partners
- Assess strategic and operational options and recommend mid-course corrections and improvements where needed
- Serve as baseline data for Global Fund Single Stream Funding (SSF) Phase I
- Assess the impact of the Containment Project in Zones 1 and 2 as compared to the baseline survey in 2009

The survey was undertaken in the twenty malaria endemic provinces of Cambodia. Four provinces that have continuously shown low malaria incidence were excluded from this survey: Kandal, Phnom Penh, Prey Veng, and Svay Rieng.

As in the CMS 2004 & CMS 2007 surveys, data collection took place at the end of the rainy season (peak malaria transmission), allowing key estimates from this survey to be compared to estimates from previous surveys. CMS 2010 will also be used as a baseline for future surveys.

The results in this report are presented according to two Domains: Domain 1 includes the 10 provinces in western Cambodia where the Containment Project was implemented, while Domain 2 covers the additional 10 provinces in eastern and southern Cambodia. These Domain designations were similar to those in CMS 2007 to allow for adequate

comparison between the national surveys, while also providing end of project evaluations for the Containment Project.

National and regional indicators

As much as possible, the CMS 2010 survey aimed to address the key indicators which the national malaria programme are required to report, including national and regional indicators as well as Global Fund and other project-based indicators. The following are some of the selected outcome and process indicators which national malaria surveys aim to address.

Global Fund Round 6

- % of families living in high malaria endemic areas (<2km from the forest) of 20 provinces that have sufficient treated mosquito nets (1 ITNs/LLINs for 2 persons).
- % of general population living in high malaria endemic areas (<2km from the forest) of 20 provinces sleeping under a treated mosquito net the previous night.
- % of children <5 years living in high malaria endemic areas (<2km from the forest) of 20 provinces sleeping under a treated mosquito net the previous night.
- % of pregnant women living in high malaria endemic areas (<2km from the forest) of 20 provinces sleeping under a treated mosquito net the previous night.
- % of people in the target areas with fever in the last two weeks who received antimalarial treatment according to national policy within 24 hours of the onset of fever.

Single Stream Funding (SSF) Consolidated Performance Framework

Outcome indicators

- % of households at risk of malaria living in the targeted villages with at least one insecticide-treated net (LLIN/conventional treated net) and/or sprayed by IRS in the last 12 months.
- % of population at risk of malaria living in target villages who slept under an ITN (LLIN/LLIHN/ conventional treated net) during the previous night.
- % of population living in villages located between 2-5km from the forest who slept under an ITN (LLIN/LLIHN/conventional treated net) during the previous night.
- % of forest visitors in the targeted villages who reported sleeping under an ITN (LLIHN/LLIN/conventional treated net) the last time they slept in the forest.
- % of private sector outlets in endemic provinces not selling artemisinin monotherapy.
- % of population who treated their net with Super Malatab kit among those who purchased a bundled net within the past 6 months, in villages located more than 2 km from the forest.

Process indicators

- Number and % of health facilities with no reported stock-outs of nationally recommended antimalarial drugs (ACTs) lasting more than 1 week at any time during the past 3 months.
- Number and % of health facilities with no reported stock-outs of RDTs lasting more than 1 week at any time during the past 3 months.
- % of target population who can explain how malaria is prevented through the use of ITN.

Containment Project M&E Framework

Household survey

- Malaria prevalence among residents and visitors within the Containment Project area.
- 100% coverage of resident population (2 persons per net) with long-lasting insecticide-treated mosquito nets (LLINs) in Zone 1.
- >90% coverage of population <2km of a forest in Zone 2 with ITNs.
- Population sleeping under LLINs/LLIHN/ITNs the previous night increased to >90% in Zone 1 and areas <2km of forest.
- Proportion of household respondents in Zone 1 aware of key messages increased to 50% by end 2009 and >90% by end 2010.
- % of respondents in Zone 1 and Zone 2 who are aware of new treatment policy and appropriate malaria diagnosis and treatment.

Mobile / Migrant Groups

- At least 80% of temporary forest workers/mobile populations sleeping under an ITN the last time the person spent the night in the forest.
- % of contact points (based on initial situational analysis) providing malaria diagnosis, treatment, prevention, and messages to mobile/migrant populations.
- Proportion of cross-border mobile/migrant populations aware of key messages at least 30% by end of 2009 and at least 50% by end of 2010.

Drug Outlets

- % of recognized private sector outlets not selling artemisinin monotherapy in Zone 1.
- In Cambodia, a) % of recognized private drug sellers who are aware of new treatment policy in Zone 1 and b) % of recognized private drug sellers aware of appropriate malaria diagnosis and treatment in Zones 1 and 2: at least 50% by end of 2009 and >80% by 2010.

Health Facility

- At least 95% of Pf malaria in the target zones by public, community and recognized private providers are parasitologically diagnosed.
- 90% symptomatic Pf cases effectively treated according to Zone protocol in public (and private sector).
- 100% of health centres and hospitals are fully functioning in Zone 1.
- All peripheral staff (health facility and community level) are fully trained according to plan by June 2009.
- Diagnosis and new treatment available at 100% of health facilities (all levels), and vector control supplies also available at all health facilities.

Regional Mekong Malaria M&E Framework

- % of households living in endemic areas with at least one ITN/LLIN and/or sprayed by IRS in the last 12 months
- % of population at risk who know the cause of, symptoms of, treatment for, or preventive measures for malaria
- % of individuals in areas at high risk of malaria who slept under an ITN/LLIN the previous night
- % of individuals residing in areas at risk of malaria with fever in the last two weeks who sought health care within 48 hours of onset of fever
- % of health facilities without stock-outs of 1st line antimalarial medicines and diagnostics during the last 12 months (based on monthly reporting)

Annex 1 provides a table with all indicators together with related survey components.

Survey Methodology

The CMS 2010 survey was composed of three components, namely:

1. Household survey (including prevalence survey)
2. Outlet (drugs and nets) survey (in parallel with the household survey)
3. Health facility survey

These surveys used a combination of survey techniques to obtain data that allowed key indicators to be estimated and the provider/user situation to be assessed. Figure 1 shows the different survey components of CMS 2010.

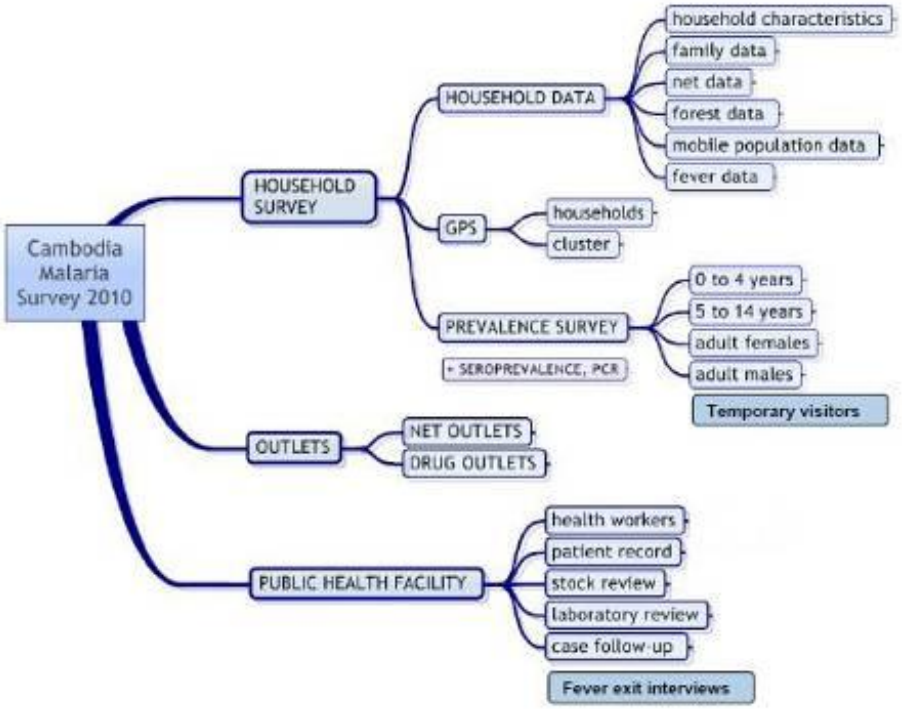
The household survey provides information about current knowledge, attitude, behaviour, and practices (KABP) of people in villages at risk of malaria in prevention and treatment. Additionally, the prevalence of *Plasmodium* infection and malaria illness was estimated by a malariometric survey at household level. Blood samples were collected for preparation of smears and dried blood spots to be used for: 1) detection and species identification for malaria measures, 2) seroprevalence analysis, and 3) remaining blood spots have been 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. Brands and types of antimalarial medicines, diagnostics, and mosquito nets were recorded and enabled estimation of the key provider indicators.

The health facility survey was conducted in public and private health facilities in malaria endemic areas. It will provide an overview of malaria-related health care services in target provinces and assess the capacity of the health facilities to provide appropriate diagnosis and treatment of malaria. The survey included an audit of malaria-related services, including availability of antimalarial medicines, treatment guidelines, health worker training, and laboratory diagnostic capacity. Exit interviews with current fever cases and follow-up interviews with malaria cases recently listed in the case register (public health facilities only) were also conducted to assess the quality of services and care provided at these health facilities.

Similar to the CMS 2004 and CMS 2007 surveys, data collection for all CMS 2010 components took place after the rainy season (7 November-9 December 2010).

Figure 1. Components of the CMS 2010 Survey



Study site, geographical Domains and risk stratification

The sampling universe for this national malaria survey was slightly modified from that previously used in CMS 2004 and CMS 2007. There are two Domains as shown in Table 1: Domain 1 includes the 10 provinces in western Cambodia where the Containment Project has been implemented, and Domain 2 includes the 10 additional malaria endemic provinces in eastern and southern Cambodia. This selection was based on a review of previous Domain boundaries, the boundaries of provinces under the Global Fund SSF area, andthe boundaries of provinces currently under the Containment Project area. Figure 2 shows a map with Domains and provinces for the CMS 2010 survey.

Based on knowledge of malaria incidence and estimated distance from the forest, CNM has categorized all at-risk villages into four strata (risk categories):

1) less than 500m from the forest
2) 500m to less than 1km from the forest
3) 1km to 2km from the forest
4) non-targeted areas >2km from the forest

The villages in risk categories 1, 2, and 3 are located less than 2km from the forest and have been targeted for interventions through the public health sector, e.g. distribution of long-lasting insecticide-treated nets (LLINs) and Village Malaria Workers (VMWs). Risk category 4 is beyond 2km from the forest and is not targeted for interventions by the public sector, however these areas have access to treated nets through the private sector, e.g. PSI bundling of retail conventional nets with insecticide retreatment kits (SuperMalatab).

Table 1b. Distribution of Provinces in the two geographical Domains

Domain 1 (West – Containment areas)	Domain 2 (East and South)
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 2. Map of CMS 2010 Domains

Survey Design and Sample Size

Household survey

The household survey design is multi-stage, sampling clusters at the first stage, households within each cluster at the second stage, and then individuals within each household. The target sample size was 1,920 households per domain (**3840 households total**), which is able to detect a change in malaria prevalence from 2% to 0.5%, with a design effect (DE) of 1.75, 80% power and assuming 10% non response. To achieve this sample, a target of 40 households in 48 clusters was required in each of the 2 domains.

Within each village cluster, 40 households 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-based volunteers (i.e. VMWs, MMWs and VHVs) and other key informants.

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

Malaria prevalence survey

A finger prick blood sample was taken from a sub-sample of four individuals in the household, one person was randomly sampled from each of the following groups: 1) aged 0 to 4 years, 2) aged 5-14 years, 3) adult female (15+ years), and 4) adult male (15+ years), to assess malaria risk in these groups. The individuals for whom blood samples were taken were marked in the household listing in the household questionnaire. A household survey blood sample sheet was used to record details to identify and link samples taken. Blood slides were prepared for microscopy, and two dried blood spots (DBS) for molecular analysis using polymerase chain reaction (PCR) and serology were collected on filter paper. If there were pregnant women in the household who were not included in the blood taking sample, their blood was also collected. Blood samples were also taken from temporary visitors residing in the household; up to four people in each household were randomly selected for this group. Additionally if there were any people in the household who appeared to be symptomatic for malaria (fever), they were given a rapid diagnostic test (RDT) and those with a positive result were treated with the appropriate first-line antimalarial drug: dihydroartemisinin-piperaquine (DHA-Pip) in Containment Zone 1 villages and artesunate-mefloquine (A+M) in all other villages.

Microscopic examinations of Giemsa-stained blood smears were performed to determine the presence of malaria parasites. An extensive training and quality assurance programme was implemented to best ensure accuracy of prevalence data. Blood takers were trained in smear preparation and smear staining procedures and microscopists were required to pass a blinded practical qualifying examination before reading smears obtained from the survey. All smears judged positive by readers were re-checked by a senior microscopist at CNM who was blinded to the results of the first reader. Additionally, 10% of all smears judged negative by the first microscopist were double-checked by a senior microscopist. In the event of non-concordance of paired readings, the senior microscopist reading will be used.

Drug outlet and Net outlet surveys

For each selected household survey cluster (village), two drug outlets and two net outlets that serve the village were sampled. Note that the drug outlets do not include any form of health facilities, they are simple a non facility outlet where drugs can be obtained. These outlets were located within the village or in the nearest/most easily accessible market or town. Upon arrival in the village, the field staff put together a list of all of the outlets used by the residents that sell antimalarial drugs and mosquito nets. This information came from national and provincial lists, as well as interviews of VMWs and other malaria workers/volunteers at the community level, village/commune chiefs and/or healthcare workers. The fieldworkers also did a check for any outlets missed through these specified sources.

A structured questionnaire was used to document details of the outlet and the respondent. For drug outlets information on sales and stock management of ACTs, other antimalarials and RDT's were recorded, together with knowledge of 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 and referral practices for potential severe malaria cases.

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

Health facility survey

A target of 38 public and 38 private health facilities were to be sampled. This assumed 70% of public facilities to be fully functioning, with 30% precision and a design effect of 1.75. Because of the lack of a structured list for private health facilities in Cambodia, the sampling of private facilities was paired with the sampled public facility. Prior to the fieldwork, the public health facilities were sampled from a structured list of health facilities in malaria endemic areas. At each public health facility a geographical assessment of neighbouring private facilities (polyclinics and health cabinets) was compiled. One private health facility was then sampled. To avoid bias from neighbouring facilities, private health facilities were only selected if it were more than 5km from the selected public health facility.

In Cambodia, it is often difficult to undertake structured observations of health workers treating malaria cases due to the low frequency of cases. However, it was important to assess the delivery of services to patients for malaria or any febrile episode within the health facility system. Therefore exit interviews with all fever cases were used to obtain a proxy measure of health worker assessment and service delivery. In addition, in public health facilities only (as they keep records of malaria cases), details of the most recent 20 malaria cases recorded were obtained and an attempt was made to carry out a follow-up interview at their homes/work locations wherever feasible.

Up to twenty (20) interviews were conducted in each facility and each health facility was visited for a maximum of 5 days or until the number of fever cases for the exit interview was met.

Fieldwork process

Household and outlet component

The sampling design was 48 clusters in each of two Domains, a total of 96 clusters.

96 clusters x 40 households / cluster = 3,840 households

There were 7 teams used to conduct all of the household and outlets surveys in the 20 provinces. It was anticipated that each team could complete three to four clusters per week. They would visit a cluster for two days and one night to avoid bias from people absent during the day, and to ensure that all of the required blood samples were taken..

96 clusters @ 3 clusters per week = approximately 32 team weeks

Each team for the household and net/drug outlet components was made up of 13 members as follows:

- Interviewer supervisor (1)
- Blood taker supervisor (1)
- Household interviewers (4)
- Blood takers (4)
- Outlet interviewer (1)
- Drivers (2)

The four household interviewers were assigned 6-8 household's interviews per day. The outlet interviewer was assigned 4 interviews per cluster, two drug outlets and two net outlets. For the seven teams of 13 field workers, it was calculated that 32 team weeks, or approximately five calendar weeks, would be required to complete data collection, however the teams were able to finish all 96 clusters in 4 weeks. Households with individuals absent during the time of the visit were revisited by the survey team up to three times. This happened quite frequently for the blood takers and they would often have to return to the households during the evening in order to take blood samples from selected individuals who had been away during the day, most often because they were working on their farms. The supervisors also took GPS coordinates for a central point in the village.

Health facility component

The sample was comprised of 76 health facilities, which included 38 public health facilities (referral hospitals, former district hospitals and health centres) and 38 private health facilities (polyclinics and health cabinets).

There were 5 teams used to conduct all of health facility surveys. The team composition for the health facility component was made up of 5 members as follows:

- Survey supervisor (1)
- Health facility interviewer (1)
- Exit interviewer (1)
- Follow-up interviewer (1)
- Driver (1)

It was anticipated that on average each team could cover three public health facilities and 3 private facilities per week. Therefore to survey all health facilities, approximately 22 team weeks (approximately 5 calendar weeks) was required. In fact it took the 5 teams four weeks to complete the fieldwork. Note that even though one person was designated the

facility or exit or follow-up interviewer, in actual fact all three of them helped to do the various interviews, but they were responsible for checking their separate group of questionnaires.

Ethical Considerations

Individual informed consent was sought from all respondents before interviews were conducted. Before each interviewee was asked to give consent, the interviewer gave a brief description of the study objectives, the data collection procedure, the expected benefits, and the voluntary nature of participation at all stages of the interview.

Community consent was obtained by holding a meeting with the 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.

Assurances were given to all participants that data would be kept private and confidential.

Sample weights

Within each Domain the sampling of clusters was non-proportional across risk categories, therefore the sample data for the household survey is non self-weighting. All household survey analysis accounts for sample weights within each Domain together with adjustment for clusters and sampling strata, i.e. risk category strata. In addition, for the prevalence survey where individuals were sampled for 4 different age and sex groups (under 5 years, 5 to 14 year olds, adult males (15+ years), and adult females (15+ years)), additional weighting was required. Analysis of prevalence survey data accounts for these individual weights. One-third of the villages in Cambodia are currently at risk of malaria. The sampling frame included 4,846 at-risk villages (population of 3,995,323) out of 14,717 total villages in Cambodia.

Data processing and analysis

Data entry for all survey data was done using Epidata 3.1, with the exception of slide readings which were recorded in Microsoft Excel. Double entry was done for all data and appropriate verification and validation carried out. All data was transferred to Stata 11 (StataCorp LP, College Station, TX USA) for data processing and analysis.

After initial data cleaning and consistency checks, data were re-coded and key indicators generated using pre-defined definitions. After this re-code stage, all household data analysis were adjusted for the survey design, i.e. clustering, and sample strata and sample weights at the household level and individual level were applied as appropriate. Analyses focused on key indicators providing overall estimates by background characteristics including Domain, risk category and socioeconomic status (wealth quintiles). 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 principle components analysis (PCA). All variables input to the PCA were itemized and the first component was used as the wealth index. Households were then classified into five wealth index quintiles and these were used as the relative socioeconomic groups. Wealth quintiles were calculated separately for each Domain. The household quintile was applied to an individual for individual level analysis.

Results

HOUSEHOLD AND OUTLET SURVEYS

Part 1: Background and Demographics

A total of 3,802 households were visited and interviewed in the CMS 2010 survey. However, excluding households in the non-targeted villages which were purposely sampled to assess PSI's mosquito net bundling strategy, a total of **3,164 households** were represented in target villages less than 2km from the forest (risk categories 1 to 3).

Table 1.1a Denominators for households and sampled individuals

	TOTAL	DOMAIN 1	DOMAIN 2
	N (%)	N (%)	N (%)
Households[1]	3164 (100)	1575 (49.8)	1589 (50.2)
People in households	16459 (100)	8253 (50.1)	8206 (49.8)
Age / Sex			
Under 5 years	1745 (10.5)	820 (9.9)	925 (11.1)
5 to 14 year olds	4157 (25.0)	2071 (24.7)	2086 (25.2)
Male adults, 15+ years	5160 (31.5)	2631 (32.0)	2529 (31.0)
Female adults, 15+ years	5397 (33.0)	2731 (33.4)	2666 (32.6)
Currently pregnant (% of all eligible women)	161 (3.0)	83 (3.1)	78 (2.8)
Household nets:			
Any type of mosquito net	3143 (99.4)	1564 (99.4)	1579 (99.4)
ITN[2]	2411 (74.7)	1243 (77.6)	1168 (71.9)
LLIN[3]	1677 (51.7)	840 (51.6)	837 (51.8)
People who go to the forest and sleep overnight (past 6 months)	1304 (7.6)	704 (8.0)	600 (7.1)
People who travel and sleep away from home (past 6 months)	2525 (15.7)	1244 (15.16)	1281 (15.6)
Temporary visitors in the household	265 (1.6)	216 (2.6)	49 (0.6)
People in households who reported fever in the previous two weeks	1169 (7.1)	680 (8.2)	489 (6.0)
Blood samples taken for microscopy	9090 (100)	4585 (50.5)	4505 (49.5)
Blood samples taken for PCR[4]			
Risk category[5]			
1 (< 500m)	1417 (24.9)	706 (25.2)	711 (24.6)
2 (500m to < 1km)	955 (28.6)	475 (27.4)	480 (29.7)
3 (1km to < 2km)	792 (19.5)	394 (23.1)	398 (16.1)
4 (≥ 2km)	638 (24.3)	318 (29.6)	320 (27.0)
SES group			

[1] Note that in this table all of the data is **for risk categories 1-3 only**, apart from the risk category row. Sampling of risk category 4 was for assessing PSI mosquito net bundling indicators (8 clusters per Domain) only.
[2] ITN = insecticide-treated net, which includes recently treated and LLINs
[3] LLIN = long lasting insecticide-treated net, which includes both bed nets and hammock nets
[4] PCR results pending
[5] Proxy measure for distance from the forest and risk of local transmission of malaria; previously called "risk zone" in CMS 2007 and CMBS 2004.

Q1 (poorest)	761 (20.0)	379 (20.0)	382 (20.0)
Q2	761 (20.0)	379 (20.0)	382 (20.0)
Q3	760 (20.0)	378 (20.0)	382 (20.0)
Q4	761 (20.0)	379 (20.0)	382 (20.0)
Q5 (least poor)	759 (20.0)	378 (20.0)	382 (20.0)

Basic demographic characteristics and distribution were similar between Domains 1 and 2 in terms of age and sex distributions, household mosquito net and LLIN ownership, and forest-goers (Table 1.1a). However, there were five times more temporary visitors reported in the households from the Containment Project zones (Domain 1).

Table 1.1b Denominators for outlets and health facilities

	TOTAL	DOMAIN 1	DOMAIN 2
	N (%)	**N (%)**	**N (%)**
Drug outlets[1]	187	94 (50.3)	93 (49.7)
Mosquito net outlets[1]	183	93 (50.8)	90 (49.2)
Health Facilities:			
Public	37		
Private	36		
Follow-up interviews (public only)	427	218 (51.1)	209 (48.9)
Exit interviews:	989	541 (54.7)	448 (45.3)
Public	520 (52.6)	282 (52.1)	238 (53.1)
Private	469 (47.4)	259 (47.9)	210 (46.9)

Table 1.2 Age and sex distribution of residents, visitors, travellers, and forest goers

	TOTAL	< 5 years	5-14 years	15+ years Males	15+ years Females
	N	**% (N)**	**% (N)**	**% (N)**	**% (N)**
Residents	16194	10.6 (1728)	25.1 (4115)	31.3 (5041)	33.0 (5310)
Visitors[2]	265	6.1 (17)	16.2 (42)	46.0 (119)	31.7 (87)
Travellers[3]	2525	4.5 (121)	9.7 (257)	53.8 (1344)	32.0 (803)
Forest goers[4]	1304	3.5 (46)	6.0 (78)	69.9 (922)	20.6 (258)
Domain 1					
Residents	8037	10.0 (805)	24.9 (2034)	31.7 (2537)	33.4 (2661)
Visitors	216	6.9 (15)	16.9 (37)	44.0 (94)	32.3 (70)
Travellers	1244	4.2 (55)	8.9 (115)	53.4 (662)	33.4 (412)
Forest goers	704	4.3 (29)	7.5 (52)	65.2 (470)	23.0 (153)
Domain 2					
Residents	8157	11.2 (923)	25.3 (2081)	30.9 (2504)	32.6 (2649)
Visitors	49	2.5 (2)	13.5 (5)	55.1 (25)	28.9 (17)
Travellers	1281	4.7 (66)	10.5 (142)	54.2 (682)	30.6 (391)
Forest goers	600	2.6 (17)	4.3 (26)	75.2 (452)	17.9 (105)

[1] Located in or near the selected clusters for all four risk categories
[2] temporary visitors in the household at the time of the survey (risk cat 1-3)
[3] people who travelled and slept away from home during the past 6 months (risk cat 1-3)
[4] people who went to the forest and slept overnight during the past 6 months (risk cat 1-3)

Table 1.3 Details of forest goers

	TOTAL	DOMAIN 1	DOMAIN 2
	% (N)	% (N)	% (N)
Last visit to the forest			
Last night	3.9 (53)	2.0 (17)	6.0 (36)
< 1 week	34.1 (439)	30.4 (215)	38.4 (224)
1 to < 4 weeks	27.6 (363)	28.8 (203)	26.4 (160)
≥ 4 weeks	32.8 (426)	37.2 (257)	27.7 (169)
Not sure	1.5 (21)	1.5 (11)	1.6 (10)
Nights in the forest			
1–2	22.4 (280)	23.3 (165)	21.5 (115)
3–5	30.6 (398)	31.1 (214)	30.1 (184)
6–10	18.7 (234)	18.0 (122)	19.6 (112)
> 10	28.2 (367)	27.6 (191)	28.8 (176)

Nearly two-thirds of those who responded as forest-goers last visited the forest within the last month. The distribution was similar between Domain 1 and Domain 2. Half of these respondents spent 5 nights or less in the forest during their last trip. However, nearly one-third of these respondents reported spending more than 10 nights in the forest, which increases their exposure risks to malaria significantly.

Table 1.4 Details of travellers

	TOTAL	DOMAIN 1	DOMAIN 2
	% (N)	% (N)	% (N)
Last travelled away from home			
Last night	6.5 (163)	6.1 (72)	7.0 (91)
< 1 week	25.4 (630)	22.1 (268)	28.7 (362)
1 to < 4 weeks	21.3 (561)	20.4 (264)	22.1 (297)
≥ 4 weeks	44.0 (1090)	48.2 (593)	39.7 (497)
Reasons for travel			
Work in forest	7.2 (195)	6.2 (83)	8.2 (112)
Work on chamkar (farm)	28.8 (692)	32.6 (392)	24.8 (300)
Visit relatives	21.2 (553)	18.9 (232)	23.6 (321)
Other	35.9 (935)	31.1 (418)	40.8 (517)
Trips away from home past 3 mo			
1–2	71.3 (1587)	74.1 (787)	68.6 (800)
3–5	18.9 (397)	18.4 (195)	19.4 (202)
6–10	4.7 (111)	4.3 (51)	5.2 (60)
> 10	5.0 (105)	3.2 (33)	6.8 (72)
Travelled to another country in 2010			
Yes	7.6 (176)	11.0 (127)	4.2 (49)
No	92.3 (2337)	89.0 (1112)	95.7 (1225)
Countries visited in 2010			
Thailand	81.5 (134)	95.9 (114)	45.7 (20)
Vietnam	9.4 (18)	0.4 (1)	31.1 (17)
Laos	5.0 (9)	0.6 (1)	15.6 (8)
Other	5.7 (11)	2.3 (5)	3.3 (6)

Table 1.4 describes the details of travellers in the survey. The majority of respondents in both Domain 1 and Domain 2 did not travel out of Cambodia the past year. Among those who did travel outside of Cambodia in the past year, 82% in Domain 1 travelled to Thailand; whereas, travellers in Domain 2 reported visiting other nearby countries including Thailand, Vietnam, and Lao PDR. Comparing travellers in Domain 1 and Domain 2, nearly one-third of reported travellers did so to work on farms (*chamkar*) in Domain 1 and nearly 40% of those

in Domain 2 travelled for "other" reasons. Further investigation into these other reasons may be warranted.

The average number of trips away from home in the past three months was not significantly different between travellers in Domain 1 and Domain 2 but the frequency of travel appeared to be higher in Domain 2 with higher proportions in recent duration categories compared to Domain 1.

Table 1.5 Details of visitors

	TOTAL	DOMAIN 1	DOMAIN 2
	% (N)	% (N)	% (N)
Length of time in the village			
< 1 month	43.8 (107)	40.3 (83)	58.6 (24)
1–2 months	27.9 (68)	28.6 (56)	25.1 (12)
3–6 months	22.6 (51)	24.1 (41)	16.3 (10)
> 6 months	5.6 (11)	7.0 (11)	- (0)
Reason for visit			
Work (arranged before arrival)	10.7 (31)	7.6 (21)	22.6 (10)
Look for work	26.5 (68)	**31.3** (64)	**6.2** (4)
Make new home	3.4 (9)	2.7 (5)	6.1 (4)
Visit relatives	40.7 (96)	**41.4** (77)	**37.8** (19)
Other	18.7 (40)	16.7 (30)	27.4 (10)
Intended length of stay			
< 2 weeks	27.3 (65)	**24.5** (49)	**39.0** (16)
2–4 weeks	11.1 (26)	11.1 (21)	10.7 (5)
1–3 months	16.4 (44)	19.1 (41)	5.2 (3)
3–6 months	3.4 (12)	3.3 (10)	3.5 (2)
6–12 months	3.5 (10)	2.9 (6)	6.1 (4)
> 12 months	12.1 (25)	13.6 (23)	5.9 (2)
Not sure	26.2 (61)	**25.4** (46)	**29.5** (15)
Next place of travel			
Return home	77.8 (188)	78.9 (154)	73.0 (34)
Work in this province	1.6 (4)	1.3 (3)	2.7 (1)
Work in another province	1.0 (2)	0.7 (1)	1.9 (1)
Other	0.3 (1)	0.4 (1)	- (0)
Don't Know	19.3 (49)	18.6 (38)	22.3 (11)
Travelled to another country in 2010			
Yes	4.2 (9)	5.3 (9)	- (0)
No	92.6 (229)	93.3 (186)	89.9 (43)
Not sure	3.1 (6)	1.5 (2)	10.1 (4)
Countries visited in 2010			
Thailand	88.1 (8)	88.1 (8)	- (0)
Vietnam	9.0 (1)	9.0 (1)	- (0)
Laos	11.9 (1)	11.9 (1)	- (0)
Other	9.0 (1)	9.0 (1)	- (0)

Visitors in both Domain 1 and Domain 2 generally did so to visit relatives. However, there were significantly more visitors who travelled to look for work (31%) in Domain 1 compared to Domain 2 (6%). This suggests that many of the visitors in the Containment zones are there for economic reasons – to look for temporary work compared to those visitors in eastern and southern Cambodia. One-quarter of the visitors in the Containment zones were short-term visitors – that is, they planned to stay less than two weeks. Interestingly, more than 25% of visitors in both domains were unsure about how long they planned to stay. This reinforces the transient nature of this highly mobile population.

Part 2: Prevalence

Table 2.1a Malaria prevalence by species and Domain in villages <2 km from the forest

	TOTAL		DOMAIN 1		DOMAIN 2		
	% (N)	95% CI	% (N)	95% CI	% (N)	95% CI	P-value[1]
Slides	(9091)		(4586)		(4505)		
Total Positive	0.9 (77)	0.6,1.3	**0.5** (23)	0.3,0.8	**1.3** (54)	0.9,2.0	0.004
P. falciparum	0.4 (33)	0.2,0.6	**0.2** (8)	0.1,0.5	**0.6** (25)	0.3,1.0	0.01
P. vivax	0.5 (44)	0.4,0.8	**0.3** (15)	0.2,0.6	**0.7** (29)	0.5,1.2	0.007
Pf + Pv	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Other	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
PCR[2]							
Total Positive							
P. falciparum							
P. vivax							
Pf + Pv							
Other							
Fever	9.1 (810)	8.0,10.3	**10.3** (463)	8.8,12.0	**7.8** (347)	6.3,9.7	0.04

Overall malaria prevalence using blood slides in 2010 was 0.9%, which has significantly decreased from 4.4% (CMS 2004) and 2.6% (CMS 2007). Comparing Domain 1 (Containment zones) to Domain 2 (eastern and southern Cambodia), prevalence of both species of malaria (Pf, p=0.01 and Pv, p=0.007) was significantly higher in Domain 2. This is not entirely unexpected since areas in Domain 2 remain largely forested.

Table 2.1b Malaria prevalence by species and Domain in villages ≥2 km from the forest

	TOTAL		DOMAIN 1		DOMAIN 2		
	% (N)	95% CI	% (N)	95% CI	% (N)	95% CI	P-value[1]
Slides							
Total Positive	0.4 (5)	0.1,1.1	0.1 (1)	0.0,0.7	0.6 (4)	0.2,1.7	0.04
P. falciparum	0.1 (1)	0.0,0.8	- (0)	-	0.2 (1)	0.0,1.3	0.21
P. vivax	0.3 (4)	0.1,0.7	0.1 (1)	0.0,0.7	0.5 (3)	0.2,1.1	0.21
Pf + Pv	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
Other	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
PCR[2]							
Total Positive							
P. falciparum							
P. vivax							
Pf + Pv							
Other							
Fever	7.9 (130)	5.3,11.6	7.7 (65)	4.6,12.7	8.1 (65)	4.5,14.0	0.90

Malaria prevalence (as determined by blood slides) in non-targeted villages that are 2km or more from the forest was low. However, malaria prevalence in Domain 2 was higher than Domain 1 (p=0.04). It will be interesting to see the malaria prevalence using PCR particularly

[1] Comparison between Domain 1 and Domain 2
[2] PCR results pending due to lack of funding

in areas that are thought to have low malaria transmission. There was no significant difference of fever prevalence across Domain.

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

	Number of blood samples	Total positive % (N)	P-value	*P. falciparum* % (N)	*P. vivax* % (N)	Pf + Pv % (N)	Other % (N)
Slides	9090	0.9 (77)		0.4 (33)	0.5 (44)	0	0
< 5 years	1238	0.7 (9)		0.3 (4)	0.5 (5)	- (0)	- (0)
5 to 14 years	2022	0.8 (15)	<0.001	0.2 (3)	0.6 (12)	- (0)	- (0)
Male 15+ years	2701	1.5 (37)		0.8 (19)	0.7 (18)	- (0)	- (0)
Female 15+ years	3130	0.6 (16)		0.2 (7)	0.3 (9)	- (0)	- (0)
PCR[1]							
< 5 years							
5 to 14 years							
Male 15+ years							
Female 15+ years							
Slides	9090	0.9 (77)		0.4 (33)	0.5 (44)	0	0
Q1 (poorest)	1941	1.2 (22)		0.8 (14)	0.5 (8)	- (0)	- (0)
Q2	1842	1.4 (25)	0.01	0.4 (8)	1.0 (17)	- (0)	- (0)
Q3	1854	1.0 (16)		0.4 (6)	0.6 (10)	- (0)	- (0)
Q4	1757	0.6 (9)		0.3 (4)	0.3 (5)	- (0)	- (0)
Q5 (least poor)	1696	0.3 (5)		0.0 (1)	0.2 (4)	- (0)	- (0)
PCR							
Q1 (poorest)							
Q2							
Q3							
Q4							
Q5 (least poor)							
Slides		0.8 (82)		0.3 (34)	0.5 (48)	0	0
1 (< 500m)	4050	1.4 (44)		0.7 (21)	0.7 (23)	- (0)	- (0)
2 (500m to < 1km)	2785	0.7 (20)	0.03	0.2 (5)	0.6 (15)	- (0)	- (0)
3 (1km to < 2km)	2255	0.5 (13)		0.3 (7)	0.2 (6)	- (0)	- (0)
4 (≥ 2km)	1763	0.4 (5)		0.1 (1)	0.3 (4)	- (0)	- (0)
PCR							
1 (< 500m)							
2 (500m to < 1km)							
3 (1km to < 2km)							
4 (≥ 2km)							

A total of 9090 blood slides were collected and read during the CMS 2010. The distribution of malaria positivity for both species was significantly different among the age and sex groups and highest among adult males (>15 years) as observed in previous surveys. Not surprisingly, the association between malaria slide positivity and lower socio-economic status and living closer to the forest was also observed.

Interestingly, there no mixed (Pf + Pv) or other malaria species detected.

[1] PCR results pending due to lack of funding

Table 2.3 Distribution of malaria species by province

	Number of blood samples	Total positive % (N)	*P. falciparum* % (N)	*P. vivax* % (N)	Pf + Pv % (N)	Other % (N)
Slides						
Mondulkiri	213	**2.7** (5)	1.8 (3)	0.9 (2)	- (0)	- (0)
Rattanakiri	526	**2.6** (16)	1.7 (10)	0.9 (6)	- (0)	- (0)
Kratie	740	**2.3** (14)	1.3 (8)	1.1 (6)	- (0)	- (0)
Stung Treng	518	**1.7** (8)	0.6 (3)	1.1 (5)	- (0)	- (0)
Kampong Thom	563	**1.5** (7)	0.2 (1)	1.4 (6)	- (0)	- (0)
Pursat	360	1.5 (5)	- (0)	1.5 (5)	- (0)	- (0)
Pailin	359	1.0 (1)	- (0)	0.2 (1)	- (0)	- (0)
Oddar Meanchey	568	0.9 (5)	0.4 (2)	0.4 (3)	- (0)	- (0)
Kampong Speu	458	0.9 (4)	0.2 (1)	0.7 (3)	- (0)	- (0)
Kampot	450	0.9 (3)	0.7 (2)	0.2 (1)	- (0)	- (0)
Siem Reap	360	0.6 (2)	0.6 (2)	- (0)	- (0)	- (0)
Koh Kong	227	0.5 (1)	- (0)	0.5 (1)	- (0)	- (0)
Kampong Cham	1412	0.4 (4)	- (0)	0.4 (4)	- (0)	- (0)
Preah Vihear	563	0.2 (1)	0.2 (1)	- (0)	- (0)	- (0)
Battambang	797	0.1 (1)	- (0)	2.4 (1)	- (0)	- (0)
Banteay Meanchey	444	- (0)	- (0)	- (0)	- (0)	- (0)
Kampong Chhnang	111	- (0)	- (0)	- (0)	- (0)	- (0)
Kep	100	- (0)	- (0)	- (0)	- (0)	- (0)
Sihanoukville	214	- (0)	- (0)	- (0)	- (0)	- (0)
Takeo	108	- (0)	- (0)	- (0)	- (0)	- (0)
PCR[1]						
Banteay Meanchey						
Battambang						
Kampong Cham						
Kampong Chhnang						
Kampong Speu						
Kampong Thom						
Kampot						
Kep						
Koh Kong						
Kratie						
Mondulkiri						
Oddar Meanchey						
Pailin						
Preah Vihear						
Pursat						
Rattanakiri						
Siem Reap						
Sihanoukville						
Stung Treng						
Takeo						

Table 2.3 shows the distribution of malaria prevalence by province. Prevalence for both malaria species was higher in Domain 2 than in Domain 1. Disaggregated, the provinces with the highest malaria prevalence were Mondulkiri (2.7%), Rattanakiri (2.6%), Kratie (2.3%), Stung Treng (1.7%), and Kampong Thom (1.5%). These provinces are all in the **northeastern part of the country**, and are not easily accessible particularly during the rainy

[1] PCR results pending due to lack of funding

season. This part of Cambodia (bordering Lao PDR and Vietnam) is largely forested and has a large number of ethnic minority groups that may have limited access to malaria treatment and prevention services. These results highlight the importance of addressing and reducing malaria transmission in remote areas of the country, particularly along the borders.

Table 2.4 Malaria prevalence among mobile populations by Domain

	Blood samples	Total positive % (N)	Domain 1 % (N)	Domain 2 % (N)	P-value
Slides					
Residents	8901	0.9 (75)	0.5 (22)	1.3 (53)	0.004
Visitors	189	1.5 (2)	0.8 (1)	3.8 (1)	0.26
Travellers	995	1.5 (14)	0.8 (7)	0.8 (7)	0.9
Forest goers	743	2.5 (17)	2.3 (9)	2.8 (8)	0.71
PCR[1]					
Residents					
Visitors					
Travellers					

Tables 2.4 and 2.5 show the malaria prevalence and by species among mobile populations (which includes visitors, travellers, and forest-goers). Although the malaria prevalence among mobile populations was generally higher, resident populations living in Domain 2 had significantly more malaria than those living in Domain 1 (p=0.004). Forest-goers had the highest malaria risk in both Domains.

Table 2.5 Malaria prevalence in mobile populations by species

	N	*P. falciparum* % (n)	*P. vivax* % (n)	Pf + Pv % (n)	Other % (n)
Slides – Total					
Residents	8901	0.4 (32)	0.5 (43)	- (0)	- (0)
Visitors	189	0.6 (1)	0.9 (1)	- (0)	- (0)
Travellers	955	1.0 (8)	0.5 (6)	- (0)	- (0)
Forest goers	743	1.4 (8)	1.2 (9)	- (0)	- (0)
Slides – Domain 1					
Residents	4437	0.2 (7)	0.3 (15)	- (0)	- (0)
Visitors	148	0.8 (1)	- (0)	- (0)	- (0)
Travellers	464	0.8 (3)	0.7 (4)	- (0)	- (0)
Forest goers	403	1.0 (3)	1.3 (6)	- (0)	- (0)
Slides – Domain 2					
Residents	4464	0.6 (25)	0.7 (28)	- (0)	- (0)
Visitors	41	- (0)	3.8 (1)	- (0)	- (0)
Travellers	491	1.1 (5)	0.4 (2)	- (0)	- (0)
Forest goers	340	1.8 (5)	1.0 (3)	- (0)	- (0)

[1] PCR results pending due to lack of funding

Table 2.6 Determinants of a positive blood slide / PCR

	Slide positive			PCR positive		
	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value
Domain						
1	1					
2	2.54	1.3,4.8	**0.01**			
Age / Sex						
< 5 years	1					
5 to 14 years	1.00	0.38,2.61	0.90			
Male 15+ years	1.99	1.01,3.93	**0.04**			
Female 15+ years	0.76	0.36,1.62	0.40			
SES group						
Q1 (poorest)	1					
Q2	1.16	0.60,2.23	0.60			
Q3	0.79	0.35,1.78	0.50			
Q4	0.46	0.19,1.11	0.08			
Q5 (least poor)	0.21	0.69,0.63	**0.001**			
Forest goer						
Yes	3.3	1.85,6.11	**<0.001**			
No	1					
Traveller						
Yes	1.85	0.90,3.80	0.09			
No	1					
Residence						
Usual resident	1.58	0.12,2.70	0.4			
Temporary visitor	1					
Fever past 2 weeks						
Yes	1.48	0.67,3.31	0.3			
No	1					
Slept under net last night						
Any Net						
Yes	1					
No	1.00	0.26,3.73	0.9			
LLIN[1]						
Yes	1.48	0.81,2.69	0.1			
No	1					
Risk category						
1 (< 500m)	1					
2 (500m to < 1km)	0.53	0.25,1.10	0.08			
3 (1km to < 2km)	0.37	0.14,1.02	**0.05**			
LLIN distribution[2]						
2009 or 2010	0.82	0.39,1.72	0.6			
No	1					
VMW[3] present						
Yes	2.30	1.19,4.45	**0.01**			
No	1					
VHV[4] present						
Yes	1.20	0.58,2.51	0.6			
No	1					

[1] Long-lasting insecticide-treated net
[2] Distribution by CNM; includes both LLINs and long-lasting insecticide treated hammock nets (LLIHNs); cluster-level data
[3] Village Malaria Worker
[4] Village Health Volunteer

Table 2.6 illustrates the key determinants of having positive malaria blood slide: 1) living in Domain 2, 2) being an adult male, 3) being from low socio-economic status, 4) going to the forest, and 5) living closest to the forest. Those living in Domain 2 were 2.5 times more likely to have a positive malaria slide compared to those living in Domain 1. Likewise, being an adult male and going to the forest increased the odds of having malaria two- and three-fold, respectively. Higher socio-economic status and living farther away from the forest were protective. Having a Village Malaria Worker (VMW) in the village was associated with malaria because these malarious villages were purposefully selected to have VMWs.

There was no association with fever within the past two weeks and malaria, as would be expected in low malaria transmission settings.

Table 2.7 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						
< 5 years	20.8 (245)	17.5,24.6	26.0 (143)	20.9,31.8	16.1 (102)	12.0,21.1
5 to 14 years	11.1 (219)	9.3,13.1	12.4 (127)	9.9,15.6	9.6 (92)	7.4,12.4
Male, 15+ years	6.5 (175)	5.4,8.0	7.0 (102)	5.3,9.1	6.1 (73)	4.5,8.2
Female, 15+ yrs	5.3 (171)	4.3,6.6	5.8 (91)	4.3,7.9	4.8 (80)	3.5,6.5
SES group						
Q1 (poorest)	11.8 (232)	9.8,14.1	13.3 (134)	10.2,17.0	10.3 (126)	7.7,13.6
Q2	8.7 (163)	7.2,10.4	10.0 (93)	7.8,12.8	7.4 (70)	5.7,9.6
Q3	9.0 (166)	7.1,11.3	10.0 (90)	7.2,13.8	8.0 (76)	5.6,11.3
Q4	9.0 (145)	7.5,10.9	9.9 (77)	7.7,12.5	8.2 (68)	6.0,11.0
Q5 (least poor)	6.8 (104)	5.3,8.6	8.2 (69)	6.2,10.9	5.1 (35)	3.3,7.7
Risk category						
1 (< 500m)	8.9 (361)	6.9,11.5	10.8 (216)	7.8,14.7	7.1 (145)	4.6,10.8
2 (500m to < 1km)	9.1 (250)	7.5,11.1	9.8 (131)	7.4,13.0	8.5 (119)	6.5,11.2
3 (1km to < 2km)	9.1 (199)	7.4,11.3	10.2 (116)	8.4,12.3	7.6 (83)	4.5,12.6

Table 2.7 presents fever prevalence by background characteristic. It tells us that the proportions seemed to decrease by age and wealth quintile, and these patterns were observed across Domains. However, there were no differences in the prevalence of fever across risk categories.

Table 2.8 Determinants of fever in the past two weeks

	DOMAIN 1			DOMAIN 2		
	% (N)	95% CI	P-value	% (N)	95% CI	P-value
Total						
Age / Sex						
< 5 years	1			1		
5 to < 15 years	0.40	0.31,0.51	<0.001	0.55	0.39,0.78	<0.001
Male 15+ years	0.21	0.13,0.34		0.33	0.22,0.50	<0.001
Female 15+ years	0.17	0.11,0.26		0.26	0.19,0.36	<0.001
SES group						
Q1 (poorest)	1			1		
Q2	0.72	0.51,1.02	0.07	0.69	0.52,0.92	0.01
Q3	0.73	0.45,1.18	0.19	0.75	0.49,1.16	0.20
Q4	0.71	0.50,1.01	0.06	0.77	0.52,1.13	0.10
Q5 (least poor)	0.58	0.39,0.88	0.01	0.46	0.26,0.80	0.01
Forest goer						
Yes	1.29	0.92,1.82	0.10	1.24	0.82,1.89	0.20
No	1			1		
Traveller						
Yes	1.22	0.88,1.70	0.20	1.10	0.77,1.57	0.50
No	1			1		
Residence						
Usual resident	2.34	0.95,5.73	0.06	4.76	0.57,39.40	0.10
Temporary visitor	1			1		
Slept under net last night						
Any Net	1			1		
Yes	1.08	0.65,1.79	0.70	1.08	0.67,1.74	0.70
No						
LLIN				1		
Yes	1	0.67,1.02	0.40	1.10	0.82,1.47	0.40
No	0.90					
Risk category						
1 (< 500m)	1			1		
2 (500m to < 1km)	0.90	0.56,1.45	0.6	1.21	0.70,2.10	0.4
3 (1km to < 2km)	0.94	0.62,1.42	0.7	1.07	0.52,2.21	0.8
LLIN distribution[1]						
2009 or 2010	1.07	0.75,1.51	0.6	0.78	0.46,1.32	0.3
No	1			1		
VMW present						
Yes	1.38	0.99,1.92	0.05	1.18	0.68,2.05	0.5
No	1			1		
VHV present						
Yes	0.67	0.48,0.94	0.02	0.98	0.60,1.59	0.9
No	1			1		

Table 2.8 shows that the determinants for fever within the past 2 weeks are non-specific, and would not be useful for predicting associations with malaria positivity.

[1] Distribution by CNM; includes both LLINs and LLIHNs; cluster-level data

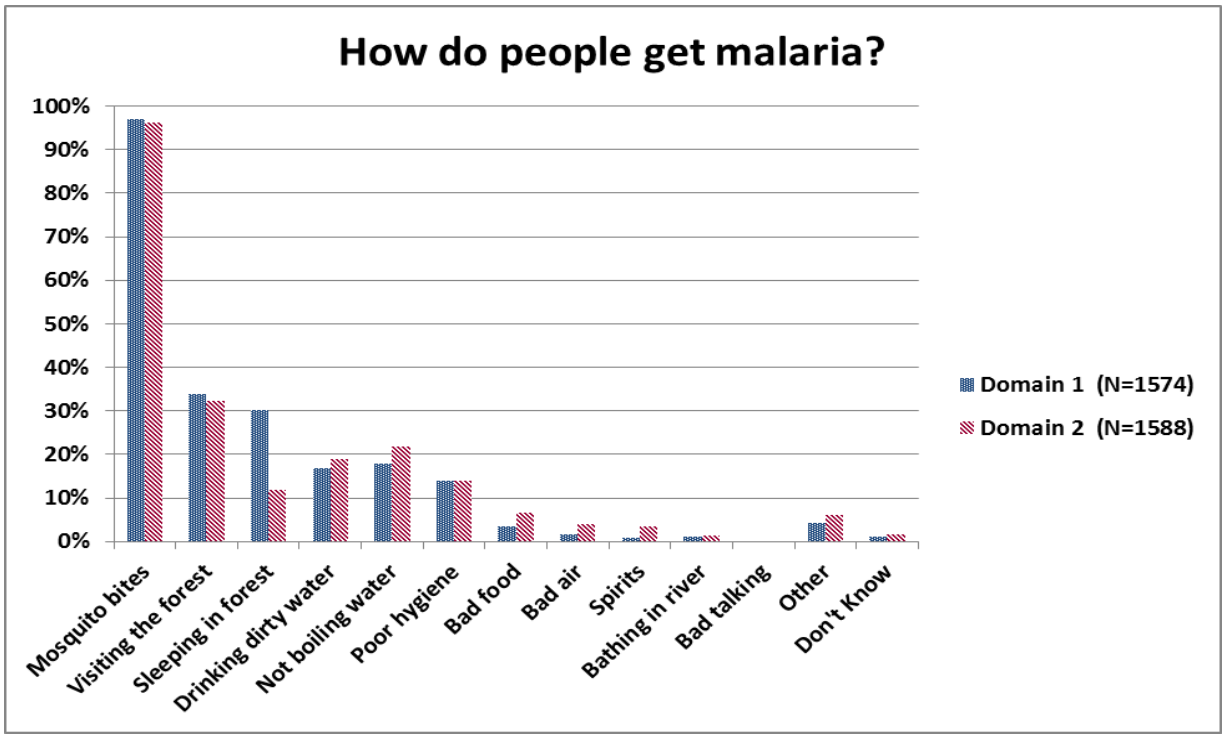
Part 3: Knowledge

Table 3.1 Knowledge of malaria transmission and prevention by Domain

	TOTAL		DOMAIN 1		DOMAIN 2		
Knowledge of:	**% (N)**	**95% CI**	**% (N)**	**95% CI**	**% (N)**	**95% CI**	**P-value**
Transmission[1]	97.5 (3085)	96.5,98.1	98.0 (1545)	96.7,98.8	96.9 (1540)	95.4,98.0	0.19
Prevention 1[2]	69.5 (2176)	66.0,72.7	70.4 (1101)	65.4,75.0	68.5 (1075)	63.6,73.0	0.56
Prevention 2[3]	49.8 (1524)	45.9,53.7	53.1 (805)	47.1,59.1	46.4 (719)	41.4,51.5	0.10
3 key messages[4]	4.7 (146)	3.7,6.1	3.5 (55)	2.5,5.0	6.0 (91)	4.2,8.4	0.04

As with the previous CMS 2004 and CMS 2007 surveys, respondent knowledge about the transmission of malaria (i.e., malaria is transmitted through mosquito bites) is generally very high. Knowledge about using mosquito nets to prevent malaria was also similar between the two Domains. More importantly, only about half of the respondents in both Domain 1 and Domain 2 knew that ITNs were used to prevent malaria. Only 3.5% of respondents in Domain 1 and 6% in Domain 2 were able to name 3 key messages about malaria prevention. Despite the few number of respondents, it was interesting to note that more respondents in non-Containment zones knew the key messages than those in the Containment zones.

Figure 3.1 Knowledge of malaria transmission by Domain



[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 HC; seek treatment within 24 hours; complete antimalarial treatment; get a blood test before taking medicine

Even though nearly all respondents knew that malaria was caused by mosquito bites, a significant proportion of these respondents also believed some incorrect modes of transmission. Perhaps more efforts should be made to address or correct these erroneous messages.

Interestingly, although the total numbers were few, more respondents in Domain 1 cited sleeping in the forest as a source of getting malaria than in Domain 2.

Figure 3.2 Knowledge of malaria prevention by Domain

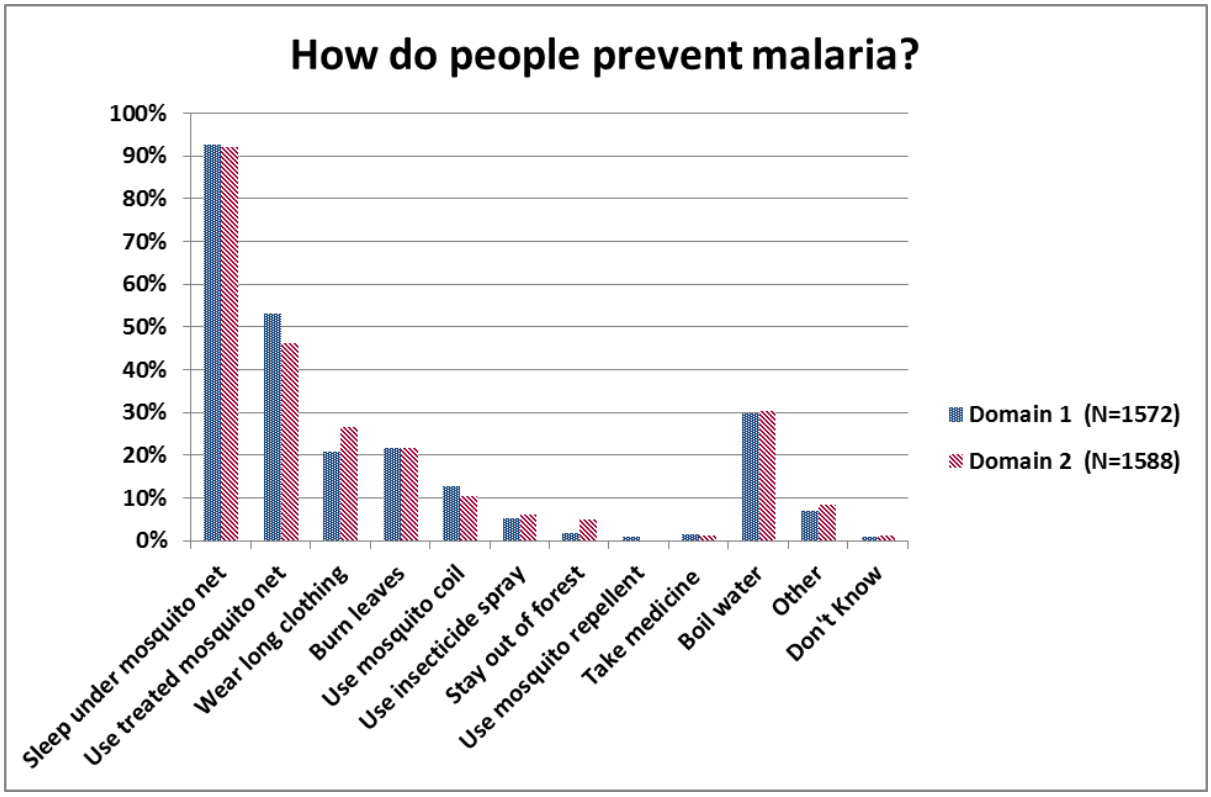


Figure 3.2 shows the distribution of responses about malaria prevention, which did not seem to be different between Domain 1 and Domain 2. More than 90% of respondents in both Domain understood that sleeping under a mosquito net would prevent malaria. However, nearly 30% of respondents in both Domains believed that boiling water was a method of malaria prevention. The BCC/IEC communications activities of the national programme have contributed to the increase in knowledge of how malaria is transmitted, but the national programme should also look at ways to address the other common responses such as boiling water. Despite not directly relevant for malaria prevention, boiling water is a good practice to reduce the transmission of other water-borne diseases.

Table 3.2 Knowledge of signs and symptoms of malaria

	TOTAL		DOMAIN 1		DOMAIN 2		
	% (N)	95% CI	% (N)	95% CI	% (N)	95% CI	P-value
Know malaria symptoms	74.1 (2370)	70.7,77.2	73.1 (1175)	68.6,77.2	75.1 (1195)	70.0,79.6	0.50
Know symptoms of serious fever	49.7 (1600)	46.7,52.6	46.6 (763)	42.1,51.1	52.7 (837)	49.0,56.4	0.04
Know where to go for testing and treatment	97.4 (3078)	96.5,98.1	98.5 (1551)	97.6,99.1	96.3 (1527)	94.6,97.6	<0.001
Know appropriate diagnosis and treatment[1]	16.8 (527)	13.8,20.3	14.4 (233)	10.6,19.2	19.2 (294)	14.8,24.6	0.14
Know anti-malarials	47.6 (1519)	43.5,51.8	43.1 (710)	37.5,48.9	52.2 (809)	46.3,58.0	0.03
Know ACTs	37.6 (1202)	33.0,42.4	31.9 (538)	25.7,38.9	43.3 (664)	37.1,49.7	0.01
Know anti-malarials are effective if all treatment taken	85.1 (2691)	81.0,88.5	87.1 (1388)	82.3,90.7	83.1 (1303)	76.0,88.5	0.20

Respondent knowledge about the signs and symptoms of malaria was varied, but most respondents had a good understanding of where to go for testing and treatment. In both Domains, 17% of respondents knew that malaria should be confirmed with test, should be treated by a trained provider, can name antimalarials and know to take antimalarials for 3 days. More than one-third of respondents (32% in Domain 1 and 43% in Domain 2) knew about ACTs. Knowledge about the signs and symptoms of suspected malaria as well as signs of a serious fever were also good (Figure 3.3 and Figure 3.4)

[1] Confirm with test, go to trained provider, can name antimalarials and know to take antimalarials for 3 days

Figure 3.3 Knowledge of signs or symptoms of malaria by Domain

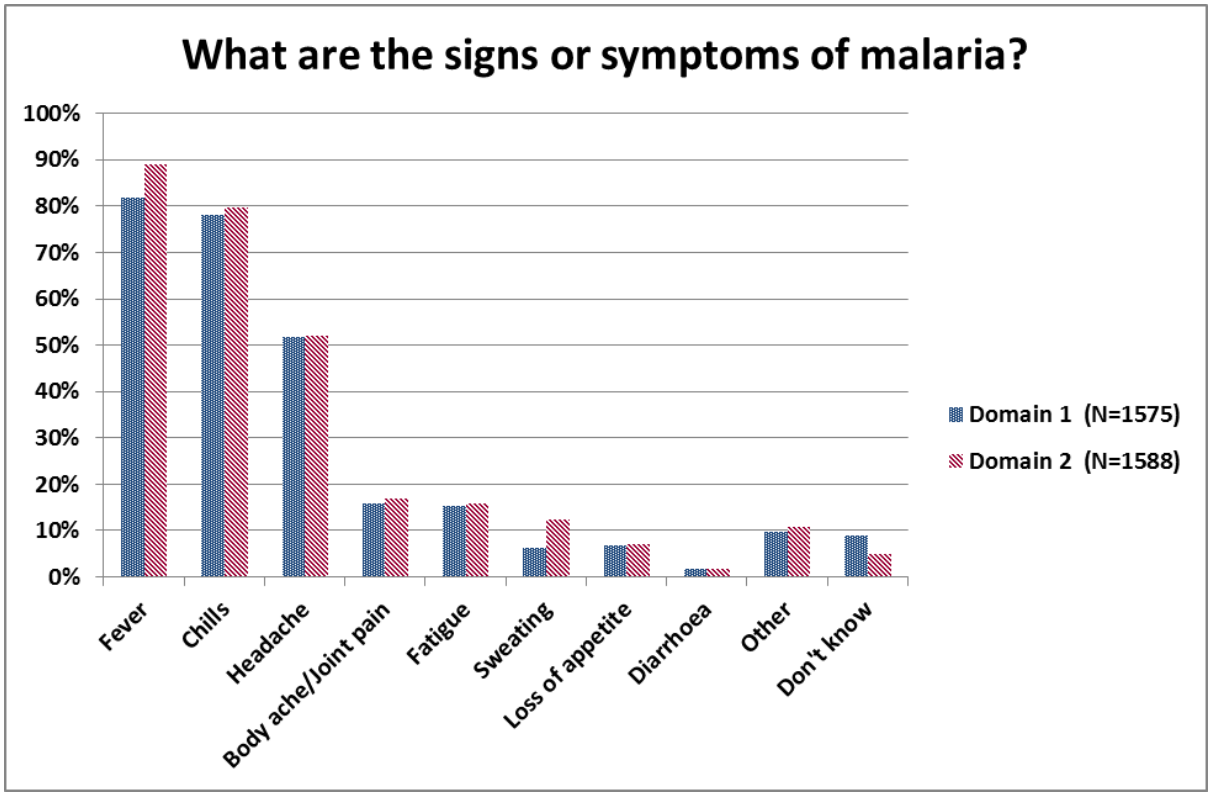


Figure 3.4 Knowledge of signs and symptoms for serious fever by Domain

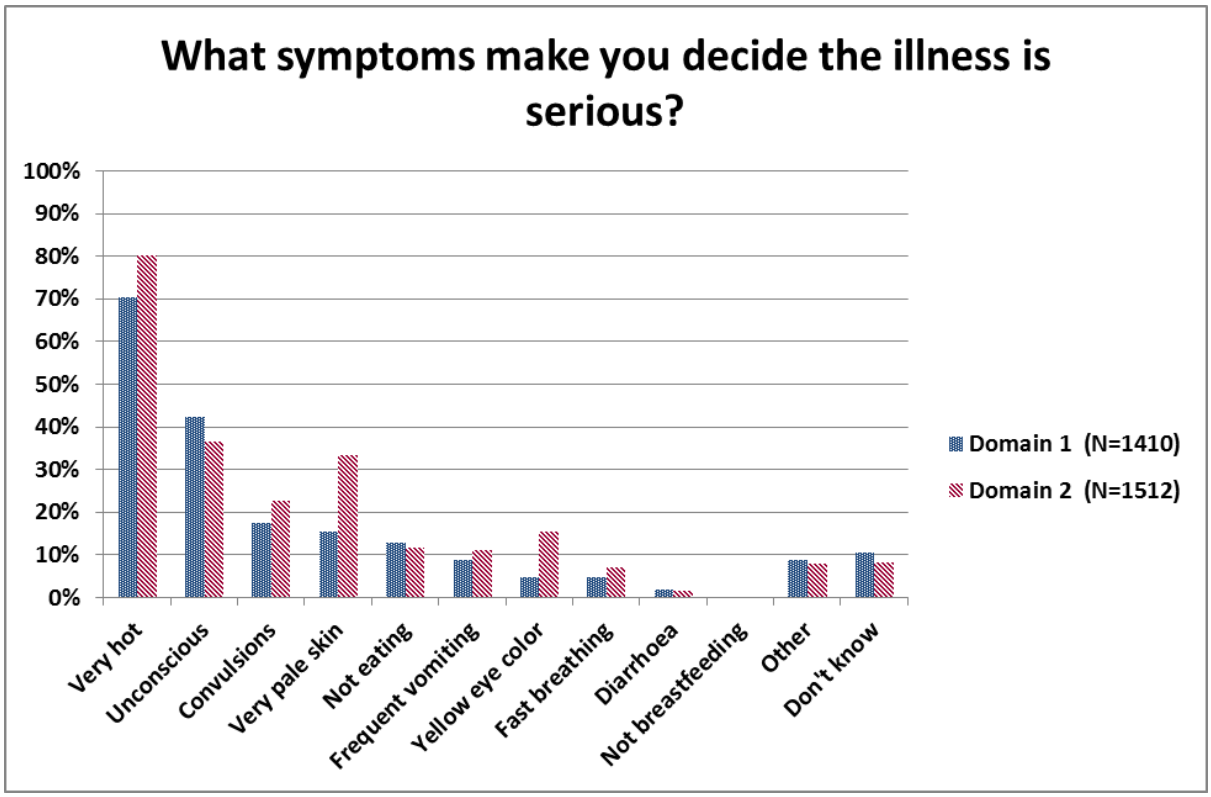


Table 3.3 Knowledge of providers for malaria diagnosis and treatment

	Place to go for a test		Place to go for advice or treatment	
	DOMAIN 1	**DOMAIN 2**	**DOMAIN 1**	**DOMAIN 2**
	% (N)	**% (N)**	**% (N)**	**% (N)**
VMW	4.2 (72)	9.7 (147)	3.4 (58)	9.8 (146)
Health centre/FDH	**77.4** (1174)	**70.7** (1082)	**80.0** (1220)	**72.7** (1121)
Referral hospital	7.0 (115)	5.6 (92)	6.6 (111)	5.1 (80)
Private health provider	9.1 (173)	10.3 (201)	8.7 (161)	9.5 (187)
Private laboratory	1.5 (25)	0.4 (9)	0.2 (4)	0.4 (8)
Pharmacy	0.4 (5)	1.4 (22)	0.6 (7)	1.1 (18)
Shop/market	-	-	0.2 (4)	0.2 (5)
Self-treat	-	-	0.1 (2)	0.1 (2)
Other source	0.1 (2)	0.8 (16)	0.1 (2)	0.7 (11)
Don't know	0.3 (6)	1.0 (16)	0.2 (3)	0.6 (10)

Table 3.3 shows the distribution of the respondents' knowledge about where to go for test or treatment. It is encouraging that most respondents (> 70%) in both Domain 1 and Domain 2 indicated that they would go to the health centre or former district hospital for a malaria test, advice, or treatment. About 10% of respondents in Domain 2 compared 3% in Domain 1 said that they would go to a VMW for advice or treatment. This could be a reflection of the greater presence of VMWs in Domain 2 compared to Domain 1.

Table 3.4 Knowledge of antimalarials

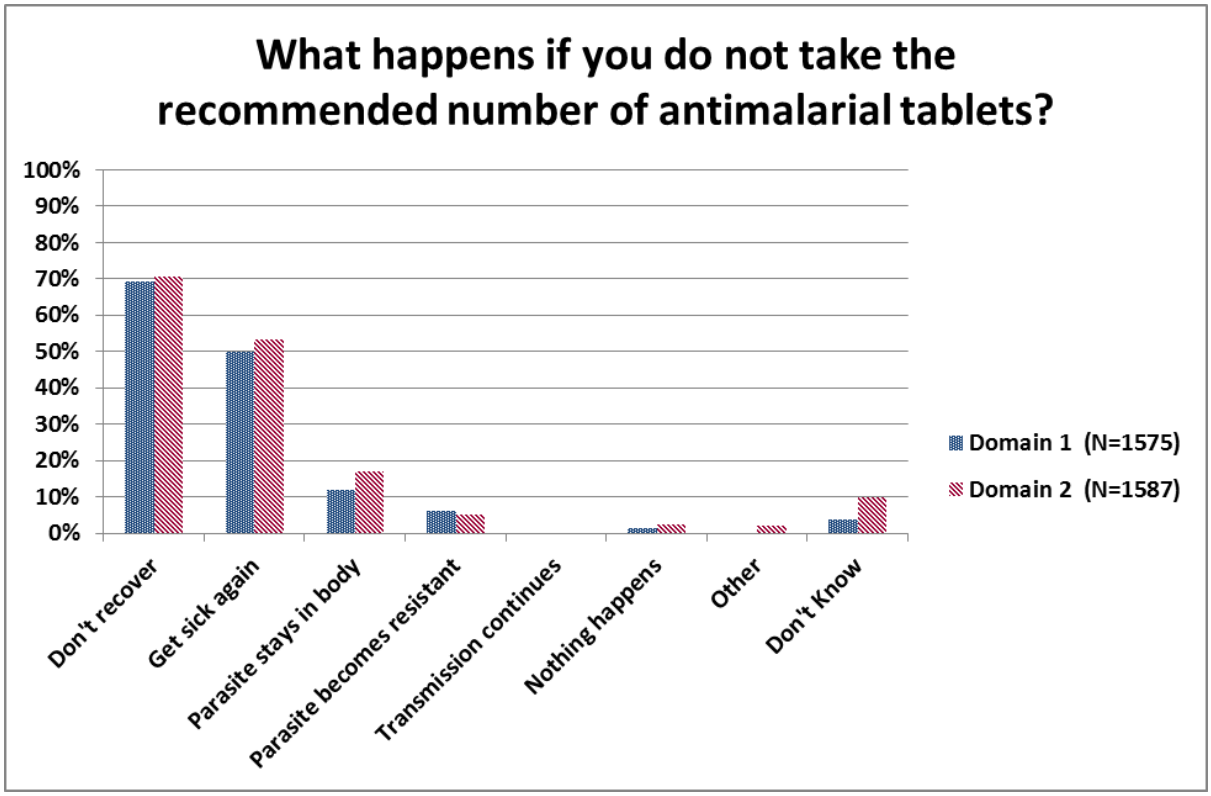
Antimalarial drug named	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
A+M *(AS-MQ)*	15.9 (233)	5.8 (42)	24.4 (191)
Malarine *(AS-MQ)*	64.0 (986)	**65.7** (480)	**62.6** (506)
Other Artesunate-Mefloquine	4.8 (82)	7.5 (57)	2.6 (25)
Duo-Cotecxin *(DHA-pip)*	0.6 (8)	**0.2** (1)	**0.9** (7)
Other DHA-piperaquine	0.4 (5)	0.2 (2)	0.5 (3)
Artemisinin-Piperaquine	0.0 (1)	- (0)	0.1 (1)
Dihydroartemisinin	0.1 (1)	- (0)	0.1 (1)
Plasmotrim *(Artesunate)*	0.7 (10)	0.6 (5)	0.7 (5)
Other Artesunate	1.8 (29)	2.2 (28)	1.4 (11)
Artemether	0.0 (1)	0.1 (1)	- (0)
Artemisinin	- (0)	- (0)	- (0)
Mefloquine	2.7 (38)	3.3 (22)	2.2 (16)
Quinine	28.5 (438)	32.3 (222)	25.2 (216)
Chloroquine	8.7 (129)	13.3 (86)	4.9 (43)
Primaquine	0.1 (2)	0.3 (2)	- (0)
Malarone *(Atovaquone-Proguanil)*	0.1 (4)	0.1 (2)	0.2 (2)
Coartem *(Artemether-Lumefantrine)*	- (0)	- (0)	- (0)
Drug cocktail for fever or malaria	0.1 (2)	- (0)	0.1 (2)
Other antimalarial drug	33.8 (514)	**39.2** (268)	**29.3** (246)

Respondent knowledge about artesunate + mefloquine (AS-MQ or Malarine) was equally high in Domain 1 and Domain 2. Malarine is the branded product of AS-MQ throughout Cambodia. It was interesting to note that only 24% of respondents recognized A+M (non-branded AS-MQ) in Domain 2 where this drug should have been available. Likewise, a few respondents in both Domains could name Malarone (an antimalarial drug used in Thailand in the Containment zone 1 and for the treatment of Pf malaria detected through the focal screening and treatment (FSAT)). It is worth noting that 39% and 29% of respondents mentioned other antimalarial drugs not on the list (Table 3.4).

Table 3.5 Knowledge of grouped antimalarials

	TOTAL		DOMAIN 1		DOMAIN 2	
Drug type named	**% (N)**	**95% CI**	**% (N)**	**95% CI**	**% (N)**	**95% CI**
ACTs	78.5 (1196)	73.3,82.9	**73.9** (537)	63.7,82.0	**82.3** (659)	78.1,85.9
Artemisinin monotherapy	2.4 (40)	1.6,3.6	2.8 (24)	1.7,4.7	2.1 (16)	1.1,3.9
Other anti-malarial drugs	33.8 (514)	28.6,39.5	39.2 (268)	30.2,49.1	29.3 (246)	23.7,35.5

Figure 3.5 Knowledge about recommended number of antimalarial tablets



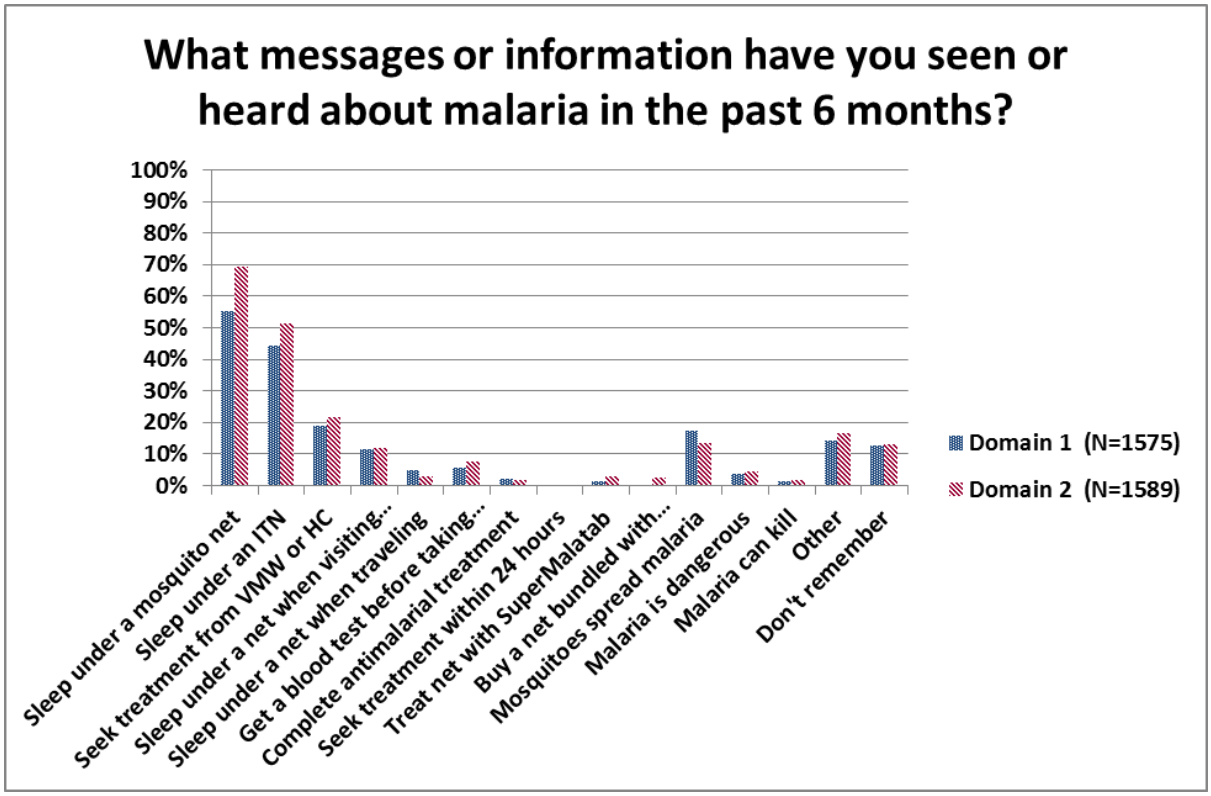
More than two-thirds of respondents in both Domain 1 and Domain 2 believed that an individual would not recover if one did not take the recommended number of antimalarials. This suggests that knowledge about drug compliance was quite high and did not different between the two Domains, despite the emphasis of BCC activities in the Containment zones on completing drug treatments.

Table 3.6 Knowledge of key messages

Knowledge of key messages	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Use ITN	47.5 (1476)	**44.0** (675)	**51.0** (801)
Use mosquito net in forest	11.7 (352)	11.5 (172)	11.8 (180)
Use mosquito net when travelling	3.8 (116)	4.7 (70)	2.9 (46)
Test before treatment	6.4 (210)	5.3 (91)	7.5 (119)
Get treated at HC or by VMW	19.9 (622)	18.6 (291)	21.3 (331)
Seek treatment within 24hrs	0.2 (10)	0.3 (7)	0.2 (3)
Take all anti-malarials	1.7 (54)	1.8 (27)	1.6 (27)
Knowledge of 1 message	43.9 (1391)	42.7 (673)	45.2 (718)
Knowledge of 2 messages	16.2 (495)	16.4 (246)	16.1 (249)
Knowledge of 3 messages	4.3 (129)	3.4 (54)	5.1 (75)

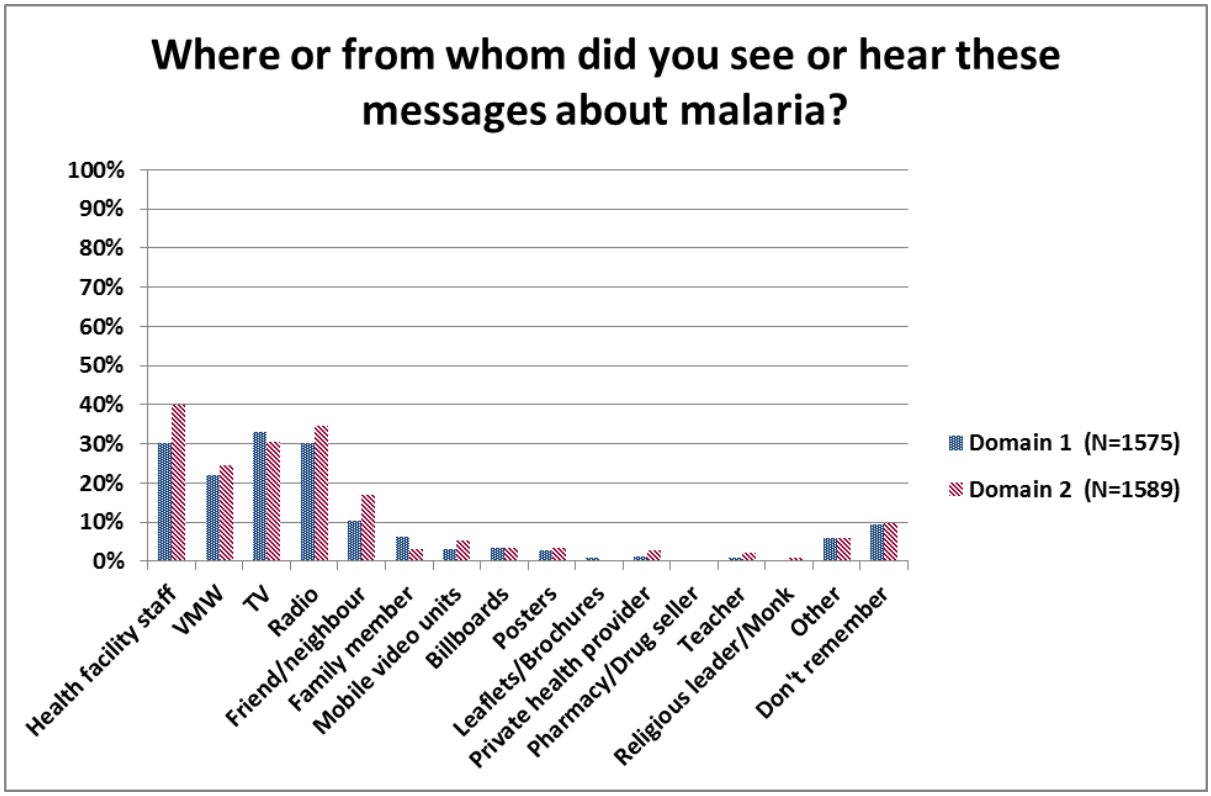
Levels of knowledge of key messages for malaria prevention and treatment did not differ significantly between the Domains. As expected, there were very few respondents who knew at least 3 key messages. Only 16% of respondents could name 2 key messages on malaria prevention and treatment.

Figure 3.6 Malaria messages seen or heard in past 6 months by Domain



Most respondents know that they should sleep under a mosquito net to prevent malaria and this seems to be supported by the most common messages heard within the past 6 months. There did not seem to be major differences in the messages heard when comparing Domain 1 and Domain 2.

Figure 3.7 Source of messages as reported by respondents by Domain



Among those respondents who heard a message within the past 6 months, most received these messages from health facility staff, VMW, TV, or radio. In fact, these channels of interpersonal communication appear to be cited as the most common sources of information received by respondents. It should be noted that print-based materials such as billboards, posters, and brochures were not cited as common sources of information.

Table 4.1 Summary of household ownership of at least one mosquito net

		Any Type		ITN		LLIN	
	HH	% (95% CI)	P-value	% (95% CI)	P-value	% (95% CI)	P-value
Total[1]	3164	99.4 (98.9,99.7)		74.7 (66.8,81.3)		51.7 (43.6,59.6)	
Domain							
1	1575	99.4 (98.5,99.8)	0.90	**77.6** (67.2,85.3)	0.40	**51.6** (40.4,62.7)	0.98
2	1589	99.4 (98.7,99.7)		**71.9** (59.4,81.7)		**51.8** (40.4,62.9)	
Risk category							
1 (< 500m)	1417	99.1 (99.2,99.6)	0.40	**82.5** (74.6,88.4)	0.17	**59.1** (48.3,69.1)	0.39
2 (500m-<1km)	955	99.7 (98.8,99.9)		68.0 (51.3,81.1)		48.6 (33.4,64.1)	
3 (1km-< 2km)	792	99.3 (97.3,99.8)		74.7 (61.3,84.7)		46.8 (33.7,60.4)	
SES group							
Q1 (poorest)	694	98.4 (96.6, 99.3)	0.03	79.0 (71.5,84.9)	0.26	51.8 (42.8,60.6)	0.90
Q2	643	99.7 (98.9, 99.9)		75.4 (67.4,81.9)		53.2 (43.7,62.5)	
Q3	632	99.3 (98.9, 99.7)		75.9 (67.0,82.9)		52.1 (42.1,62.0)	
Q4	602	100.0		71.5 (59.8,80.8)		50.4 (40.1,60.6)	
Q5 (least poor)	593	99.5 (97.9, 99.9)		71.8 (60.4,80.9)		50.9 (41.0,60.7)	

Household ownership of any type of mosquito net is extremely high, as noted in earlier surveys, showing a very strong mosquito net culture. However, there is still a need to focus more on shifting from ownership and use of any net to ownership and use of LLINs as indicated by the much lower ownership of ITNs and even lower of LLINs. 52% household ownership of at least one LLIN is still below target. There is a rather similar household ownership in Domains 1 and 2. While there were special efforts to increase coverage in the parts of Domain 1 covered by artemisinin resistance containment activities, especially in Containment Zone 1, there were ongoing efforts to distribute in Domain 2, which includes the regions of Cambodia with the highest malaria incidence.

Ownership of LLINs is slightly higher in areas closest to the forest as would be expected, and this is likely to offer best protection to those at highest risk. The very small differences in ownership by socioeconomic status indicate high equity in the combination of distribution systems in place.

Table 4.2 Summary of household ownership of sufficient[2] mosquito nets

		Any Type		ITN		LLIN	
	HH	% (95% CI)	P-value	% (95% CI)	P-value	% (95% CI)	P-value
Total[1]	3164	63.2 (59.3,66.9)		37.7 (32.3,43.4)		22.8 (18.3,28.1)	
Domain							
1	1575	64.8 (59.0,70.2)	0.40	**42.4** (34.7,50.5)	0.09	**24.3** (18.0,31.9)	0.50
2	1589	61.6 (56.3,66.6)		**32.9** (25.7,41.0)		**21.4** (15.3,29.0)	
Risk category							
1 (< 500m)	1417	60.0 (53.8,65.9)	0.50	**40.5** (34.0,47.3)	0.34	**25.1** (18.8,32.7)	0.68
2 (500m-< 1km)	955	64.1 (58.3,69.6)		32.6 (23.4,43.3)		20.3 (12.9,30.4)	
3 (1km-< 2km)	792	65.9 (56.9,74.0)		41.5 (30.5,53.4)		23.7 (15.5,34.5)	
SES group							
Q1 (poorest)	694	50.0 (44.0,56.0)	<0.001	32.7 (26.3,39.7)	0.16	20.6 (15.7,26.7)	0.60
Q2	643	58.2 (52.4,63.9)		35.9 (29.7,42.7)		22.8 (17.3,29.4)	
Q3	632	60.9 (56.1,65.5)		37.8 (32.0,43.8)		22.2 (16.8,28.7)	
Q4	602	68.2 (63.0,73.1)		38.4 (31.1,46.2)		23.0 (17.1,30.2)	
Q5 (least poor)	593	79.1 (73.9,83.4)		43.7 (33.2,54.9)		25.6 (18.3,34.7)	

[1] Note that "Total", "Domain" and "SES group" include only risk categories 1-3, which are villages eligible for mosquito net distribution by CNM.

[2] 2 persons or less per mosquito net

The proportion of household ownership of “sufficient” nets, ITNs and LLINs defined as 2 persons or less per mosquito net is well below target. There is little difference between Domains, among risk categories and by socioeconomic status.

Table 4.3 Inventory of household mosquito nets

	TOTAL		DOMAIN 1		DOMAIN 2	
	N	Mean ± SD (95% CI)	N	Mean ± SD (95% CI)	N	Mean ± SD (95% CI)
Total number of nets in household	7716	2.78 ± 0.06	3940	2.83 ± 0.09	3776	2.74 ± 0.08
Nets hanging up in house	5995	2.17 ± 0.04	3121	2.26 ± 0.05	2873	2.09 ± 0.53
Nets stored in house	1124	0.40 ± 0.03	465	0.34 ± 0.03	659	0.48 ± 0.04
Nets being used away from home	171	0.6 ± 0.008	104	0.07 ± 0.01	66	0.05 ± 0.01
Hammock nets in house	257	0.09 ± 0.02	163	0.12 ± 0.03	93	0.07 ± 0.01
Hammock nets used away from home	124	0.04 ± 0.007	64	0.05 ± 0.009	60	0.04 ± 0.01
Nets used for non-sleeping purposes	61	0.02 ± 0.004	26	0.02 ± 0.004	34	0.03 ± 0.008

Table 4.4a Characteristics of household nets in villages <2 km from the forest

	TOTAL		DOMAIN 1		DOMAIN 2	
	N	%	N	%	N	%
Age of net						
< 6 months	1369	15.7	672	15.7	697	15.6
6 mo to < 1 year	2468	27.7	1279	28.4	1189	27.0
1 year to < 2 years	2340	27.0	1161	25.7	1179	28.3
2 years to < 3 years	1358	15.3	692	15.1	666	15.6
3 years to < 5 years	708	8.1	388	9.0	320	7.1
≥ 5 years	419	5.0	211	4.9	208	5.0
Source of net						
Gift (family/friend)	673	7.4	151	3.5	522	11.6
Government	3627	39.9	1780	37.9	1847	42.0
NGO	820	9.5	747	17.2	73	1.4
Shop/Market	2430	29.3	1240	29.3	1190	29.3
Itinerant seller	1160	13.7	496	11.8	664	15.6
Other	22	0.3	16	0.4	6	0.2
Price of net (KHR)[1]						
No cost	3542	45.0	2063	49.6	1479	40.0
< 12,000	1217	16.2	515	13.6	702	19.1
12,000 to < 40,000	2722	37.4	1364	36.3	1358	38.7
≥ 40,000	109	1.4	25	0.5	84	2.2
Type of net						
LLIN :						
Olyset	2916	82.9	1466	81.4	1450	84.6
PermaNet	310	7.9	229	10.8	81	4.8
NetProtect	9	0.1	8	0.2	1	0.1
Malanet (bed)	197	5.4	41	2.2	156	9.0
Malanet (hammock)	113	3.0	96	5.0	17	0.9
GF/MoH logo	20	0.6	8	0.5	12	0.7
CONVENTIONAL :						
B52	2185	44.9	1047	42.8	1138	46.9
No logo	1856	37.5	972	39.7	884	35.3
Hammock	221	4.2	77	3.1	144	5.3
Other	767	13.4	412	14.5	355	12.4
BUNDLED[2] :						
B52	69	54.2	36	51.1	33	58.6
No logo	46	29.5	27	29.3	19	29.9
Hammock	8	5.2	7	7.4	1	2.1
Other	11	11.0	9	12.2	9	9.3
Net treated past 12 months						
LLINs	1061	19.9	720	26.7	341	13.0
Conventional nets	5	3.4	3	3.0	2	4.0
Bundled nets						
Holes in net						
Yes	3752	43.7	1931	43.7	1820	42.5
No	5008	56.3	2514	56.3	2494	57.5
Net repaired						
Yes	2078	25.3	1074	25.3	1004	23.5
No	6524	74.7	3287	74.7	3287	76.5

[1] KHR = Cambodia Riel; approximately $1USD = 4000 KHR
[2] a conventional mosquito net packaged and sold with a SuperMalatab insecticide kit, and age of net <1 year

Table 4.4a Characteristics of household mosquito nets *(continued)*

	TOTAL		DOMAIN 1		DOMAIN 2	
	N	**%**	**N**	**%**	**N**	**%**
Frequency washed						
Weekly	1088	13.1	555	**13.1**	533	**13.0**
Monthly	2467	29.3	1039	**24.8**	1428	**34.1**
Every 2-3 months	1893	22.4	1041	24.5	852	20.3
Twice a year	699	8.4	397	9.1	302	7.6
Once a year	228	2.7	118	2.6	110	2.8
< once a year	90	1.1	61	1.5	29	0.6
Never	2018	23.0	1073	24.3	945	21.7
Used last night						
Yes	6578	76.0	3305	75.8	3273	76.2
No	2118	24.0	1101	24.2	1017	23.8
Old nets not used to sleep						
Yes	631	16.7	314	16.2	317	17.2
No	3145	83.3	1563	83.8	1582	82.8
Unused new nets						
Yes	861	22.1	424	22.1	437	22.1
No	2931	77.9	1450	77.9	1463	77.9
Why aren't the new nets used?						
Saving for visitors	483	58.1	248	62.0	235	54.4
Saving for future	534	61.2	247	55.1	287	67.0
No place to hang	2	0.2	2	0.4	0	-
Have enough nets	33	3.8	16	3.1	17	4.4
Other	4	0.4	4	0.9	0	-

The information on age of nets provides useful insights into how long people continue to use their nets as well as their continuing access to nets. The results look good for both aspects, suggesting that the combination of distribution systems in place is maintaining access. Further analysis of these results by type of net will be worthwhile for ongoing development of distribution strategies, but is beyond the scope of the present report.

The source of nets indicates that both public and private sector play significant roles in maintaining high ownership. It would be interesting to explore further the role of itinerant sellers, which are the source of 14% of all nets. It is surprising to note that in Domain 2 there were more nets from government (1,847) than nets at no cost (1,479), whilst this is not the case in Domain 1. It is important to keep in mind that the questionnaire respondent will not always be the one who either bought or received nets, so that some anomalies may be expected. The number of Malanets which ties in with the fact that PSI has not marketed Malanet since mid 2008 and the last stock of Malanets were distributed from warehouse during 2009. The lack of any bundled nets treated in the past 12 months may be due to a stock out of kits from August 2010, in addition it may be because people do not understand the terminology 'bundled net'. A quarter of all nets had been repaired, while 48% had holes. This shows reasonable amount of care for nets with some room for improvement.

Washing habits are seen here as quite variable. As there is no ideal frequency recommended, this does not call for action other than to confirm the value of shifting to LLINs in all sectors. The percentage of all nets used the previous night (76%) is quite high, but could be improved. Very few people said they were not using the new nets because they had enough or had no place to hang them, and this suggests there is not an issue of saturation with nets which would have called into question further distribution.

Table 4.4b Characteristics of household mosquito nets in villages ≥2 km from the forest

	TOTAL		DOMAIN 1		DOMAIN 2	
	N	%	N	%	N	%
Price of net (KHR[1])						
No cost	103	9.0	44	6.6	59	10.7
< 12,000	331	24.0	156	22.7	175	24.9
12,000 to < 40,000	1011	66.8	492	70.5	519	64.1
≥ 40,000	6	0.3	1	0.2	5	0.4
Type of net						
LLIN :						
Olyset	1442	83.4	706	77.6	736	89.7
PermaNet	147	8.6	113	12.3	34	4.6
NetProtect	7	0.2	7	0.3	0	-
Malanet (bed)	81	3.7	22	2.3	59	5.2
Malanet (hammock)	67	4.1	62	7.4	5	0.6
GF/MoH logo	1	0.1	1	0.1	0	-
CONVENTIONAL :						
B52	720	39.3	399	39.9	321	38.5
No logo	730	37.0	434	40.8	296	32.6
Hammock	101	6.0	30	3.2	71	9.4
Other	359	17.7	174	16.1	185	19.6
BUNDLED :						
B52	32	53.9	18	60.8	14	15.0
No logo	22	27.6	12	19.5	10	36.8
Hammock	4	4.8	4	9.0	0	-
Other	11	13.7	3	10.7	8	17.2

Note: 638 households ≥2 km from the forest were sampled for the purpose of obtaining data on bundled nets.

The majority of nets in households ≥2 km from the forest are bought, as the national malaria programme does not target these villages, where risk of infection is low in the households, but nets for use by travellers are important. They seem to be slightly cheaper than in the other categories.

Table 4.5 Characteristics of bundled mosquito nets

	TOTAL (N=167)	Risk Category 1	Risk Category 2	Risk Category 3	Risk Category 4
	% (N)	% (N)	% (N)	% (N)	% (N)
When Purchased					
< 6 month	30.7 (41)	24.1 (14)	40.6 (11)	21.2 (9)	40.1 (7)
6 month - < 1 year	32.6 (54)	25.6 (18)	35.6 (10)	34.9 (16)	36.3 (10)
More than 1 year[2]	36.7 (72)	50.3 (37)	23.8 (10)	44.0 (18)	23.6 (7)
Used SuperMalatab kit					
Yes	54.2 (91)	53.7 (37)	68.5 (21)	50.9 (23)	42.2 (10)
No	45.8 (76)	46.3 (32)	31.5 (10)	49.1 (20)	57.8 (14)
When Treated 2010					
After June 2010	29.7 (49)	23.7 (19)	32.3 (9)	23.7 (11)	42.2 (10)
Before June 2010[1]	21.7 (38)	21.7 (15)	36.2 (12)	25.5 (11)	- (0)
Don't know	48.7 (80)	54.6 (35)	31.5 (10)	50.8 (21)	57.8 (14)
Who treated the net					

[1] KHR = Cambodia Riel; approximately $1USD = 4000 KHR
[2] PSI first began distributing bundled nets in Q4 2009

Net seller	1.4 (3)	1.1 (2)	- (0)	- (0)	5.3 (1)
Respondent	51.9 (84)	48.3 (29)	68.5 (21)	58.6 (26)	30.0 (8)
Family member	0.5 (2)	1.7 (2)	- (0)	- (0)	- (0)
Other	0.3 (3)	1.0 (3)	- (0)	- (0)	- (0)
Don't remember	45.8 (75)	47.9 (33)	31.5 (10)	41.4 (17)	64.7 (15)
Why SuperMalatab kit not used					
Don't know how	10.7 (13)	18.1 (8)	0 (0)	17.2 (4)	2.5 (1)
Fear side effects	22.9 (11)	4.9 (1)	42.2 (3)	20.3 (4)	34.1 (3)
Not yet used the net	22.5 (16)	26.7 (7)	19.4 (2)	- (0)	42.4 (7)
Other	4.1 (3)	2.2 (1)	10.3 (1)	- (0)	6.6 (1)
Don't know	39.7 (33)	48.0 (15)	28.2 (4)	62.5 (12)	14.5 (2)

The proportion of bundled nets purchased more than one year ago (37%) is surprising, as the bundled net project distribution began in the second quarter of 2010, suggesting there must be other sources or the question was misunderstood. Similarly, it would be interesting to know what was used by the 46% not using SuperMalatab kits. Most net treatments were done by the respondents. The reasons for not using the kits are interesting, and show variation by risk category. The fear of side effects is quite high, suggesting the need for further BCC/IEC.

Table 4.6 Household ownership of mosquito nets by province

			At least one mosquito net		Sufficient[1]
	No. of Clusters	**HH**	**Any type % (95% CI)**	**LLIN % (95% CI)**	**LLINs % (95% CI)**
DOMAIN 1					
Banteay Meanchey	5	157	99.6 (97.1,99.9)	31.3 (10.8,63.1)	**16.2** (4.8,42.4)
Battambang	8	271	100.0 (-)	74.0 (65.7,80.9)	40.4 (31.9,49.5)
Kampong Speu	5	158	99.4 (96.3,99.9)	74.1 (61.1,84.0)	27.5 (22.2,33.5)
Kampot	6	159	99.5 (96.5,99.9)	69.0 (47.7,84.5)	34.5 (18.1,55.7)
Koh Kong	2	80	100.0 (-)	98.5 (95.4,99.5)	53.5 (43.2,63.5)
Oddar Meanchey	5	197	99.7 (97.7,100.0)	29.1 (8.6,64.1)	**12.1** (3.4,35.1)
Pailin	3	118	100.0 (-)	67.8 (66.9,68.8)	40.9 (35.1,47.0)
Preah Vihear	5	197	96.8 (90.4,99.0)	27.3 (16.0,42.6)	**5.5** (2.7,11.0)
Pursat	4	120	99.4 (94.3,99.9)	34.3 (7.7,76.5)	16.9 (3.1,56.6)
Siem Reap	5	118	100.0 (-)	28.0 (8.2,62.7)	**6.6** (1.3,56.6)
DOMAIN 2					
Kampong Cham	15	479	99.4 (97.9,99.8)	29.3 (15.3,48.7)	**9.0** (3.0,23.5)
Kampong Chhnang	2	40	100.0 (-)	0 (-)	0 (-)
Kampong Thom	6	199	100.0 (-)	60.1 (32.9,82.2)	21.1 (9.7,40.0)
Kep	1	40	97.5 (97.5,97.5)	22.5 (22.5,22.5)	**7.5** (7.5,7.5)
Kratie	7	236	99.9 (99.0,100.0)	61.0 (34.6,82.2)	24.7 (12.9,42.0)
Mondulkiri	2	78	100.0 (-)	60.2 (27.7,85.6)	19.2 (10.5,32.5)
Rattanakiri	5	197	98.2 (94.1,99.4)	63.7 (37.3,83.8)	28.8 (15.8,46.5)
Sihanoukville	3	80	100.0 (-)	81.8 (48.5,95.6)	48.3 (20.5,77.2)
Stung Treng	5	200	98.9 (96.7,99.7)	66.5 (42.1,84.5)	38.8 (24.4,55.5)
Takeo	2	40	100.0 (-)	77.5 (77.5,77.5)	15.0 (15.0,15.0)

There seems to be quite high LLIN ownership in some provinces with low malaria risk, whilst it is relatively low in some provinces within the artemisinin resistance containment zones.

[1] Defined as ≤ 2 persons per mosquito net

Table 4.7a Summary of mosquito net usage (previous night) by target populations living in villages <2 km from the forest

	N	TOTAL % (95% CI)	DOMAIN 1 % (95% CI)	DOMAIN 2 % (95% CI)	P-value
Any Net					
All people	16459	85.4 (83.8,86.9)	83.5 (81.6,85.2)	87.3 (84.4, 89.8)	0.03
Under 5 years	1745	92.5 (90.5,94.1)	90.6 (87.3,93.2)	94.2 (91.5,96.1)	0.05
Pregnant women	161	90.5 (83.5,94.7)	87.7 (75.8,94.2)	93.5 (84.2,97.5)	0.27
Forest goers	1304	75.1 (70.3,79.3)	73.7 (67.8,78.9)	76.6 (68.7,83.0)	0.53
Travellers	2525	55.2 (49.1,61.1)	54.6 (48.7,60.3)	55.8 (45.1,66.0)	0.84
Visitors	265	68.8 (58.4,77.6)	67.3 (55.0,77.6)	75.9 (59.8,87.0)	0.35
ITN					
All people	16459	52.6 (46.3,58.8)	53.0 (45.1,60.7)	52.2 (42.5,61.8)	0.90
Under 5 years	1745	56.3 (49.3,63.2)	55.9 (45.7,65.5)	56.8 (46.9,66.1)	0.90
Pregnant women	161	59.1 (48.9,68.6)	56.7 (41.7, 70.6)	61.6 (47.9,73.8)	0.62
Forest goers	1304	50.4 (44.5,56.3)	**51.6** (43.1,59.9)	**49.1** (40.8,57.4)	0.68
Travellers	2525	33.8 (28.1,39.9)	35.3 (29.6,41.5)	32.2 (22.8,43.2)	0.60
Visitors	265	35.5 (26.0,46.4)	36.1 (25.1,48.7)	33.1 (17.9,52.9)	0.79
LLIN					
All people	16459	31.5 (26.1,37.4)	29.3 (22.6,37.1)	33.6 (25.5,42.9)	0.45
Under 5 years	1745	34.5 (28.3,41.3)	31.1 (22.9,40.6)	37.6 (28.7,47.4)	0.32
Pregnant women	161	35.7 (25.7,47.2)	32.7 (19.8,48.8)	39.0 (24.8,55.4)	0.56
Forest goers	1304	28.5 (23.0,34.8)	**25.6** (18.4,34.5)	**31.9** (24.0,41.0)	0.29
Travellers	2525	17.0 (13.1,21.8)	16.8 (12.6,22.1)	17.2 (11.1,25.8)	0.93
Visitors	265	19.1 (13.0,27.2)	19.8 (12.8,29.4)	16.0 (7.7,30.3)	0.60

The use of nets by children under five and pregnant women is slightly higher than by the rest of the population. The slightly lower use by forest goers needs addressing. Although the use by visitors is lower than by residents, it is still substantial, and shows that either many households provide nets for visitors or the visitors bring their nets with them, both of which are encouraging.

Table 4.7b Summary of mosquito net usage (previous night) by non-targeted populations living in villages ≥2 km from the forest

	N	TOTAL % (95% CI)	DOMAIN 1 % (95% CI)	DOMAIN 2 % (95% CI)	P-value
Any Net					
All people	3189	83.2 (78.8,86.8)	80.4 (74.5,85.1)	85.4 (78.4,90.4)	0.21
Under 5 years	281	92.3 (86.8,95.6)	88.1 (78.3,93.8)	95.1 (88.8,98.0)	0.08
Pregnant women	28	86.9 (63.8,96.2)	72.4 (36.2,92.4)	100 (-)	0.07
Forest goers	90	70.1 (47.6,85.8)	62.8 (31.4,86.2)	74.2 (41.6,92.1)	0.56
Travellers	530	43.3 (35.7,51.3)	42.8 (28.6,58.4)	43.7 (36.1,51.6)	0.92
Visitors	35	64.3 (26.9,89.8)	42.2 (11.3,80.7)	100 (-)	0.04
ITN					
All people	3189	10.6 (5.1,20.6)	6.6 (3.3,12.7)	13.8 (5.2,31.6)	0.18
Under 5 years	281	12.4 (5.0,27.6)	**5.3** (2.1,12.8)	**17.2** (5.9,40.9)	0.07
Pregnant women	28	0 (-)	0 (-)	0 (-)	-
Forest goers	90	13.6 (6.3,26.9)	5.8 (1.3,21.6)	18.1 (8.5,34.7)	0.12
Travellers	530	7.2 (3.9,12.9)	8.9 (3.9,18.8)	6.1 (2.5,13.9)	0.49
Visitors	35	5.5 (0.6,37.6)	0 (-)	14.4 (1.0,73.1)	0.31
LLIN					
All people	3189	7.4 (2.6,19.0)	3.7 (1.0,12.6)	10.4 (2.9,30.8)	0.21
Under 5 years	281	8.0 (2.7,21.8)	2.6 (0.5,13.2)	11.7 (3.4,33.2)	0.10
Pregnant women	28	0 (-)	0 (-)	0 (-)	-
Forest goers	90	5.1 (1.9,12.8)	3.0 (0.5,17.1)	6.3 (1.9,18.9)	0.47

Travellers	530	3.2 (1.1,9.0)	2.3 (0.9,5.8)	3.9 (0.9,16.0)	0.52
Visitors	35	5.5 (0.6,37.6)	0 (-)	14.4 (1.0,73.1)	0.31

The high use of any net in non-target populations is still good, as a national habit of using nets is important given the mobility of the population meaning that many people visit higher risk areas. The lower use of ITNs and LLINs is expected, as most people in this risk category have bought their nets, but it demonstrates the potential value of shifting the market to LLINs. The very low proportion of forest goers living in this category who used an LLIN when they stayed overnight in the forest requires addressing, as these are people at high risk of infection.

Figure 4.1 Attitudes about the benefits of insecticide-treated nets by Domain

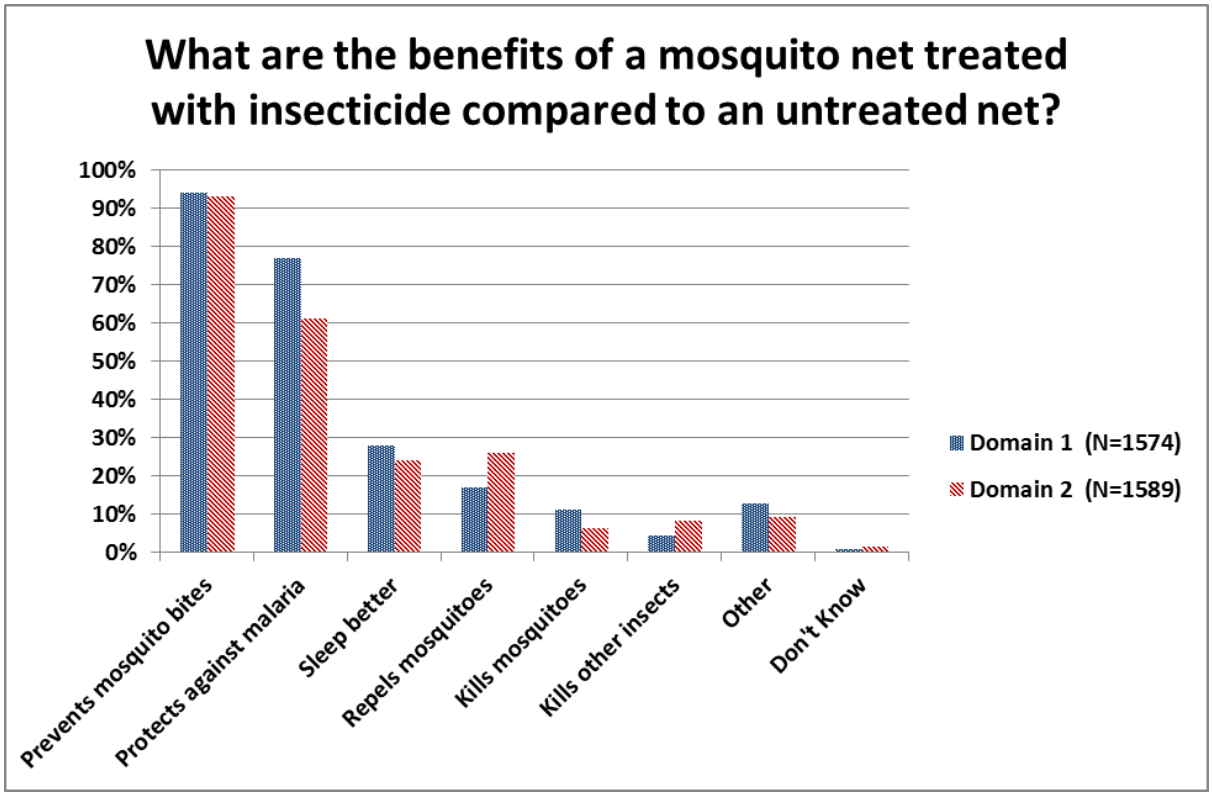


Table 4.8 Use of any mosquito nets and long lasting insecticide-treated nets the previous night

	Any Net			LLIN		
	N	% (95% CI)	P-value	N	% (95% CI)	P-value
Total	16641	84.8 (83.3,86.2)		5555	25.2 (21.0,30.0)	
Domain						
1	8132	82.7 (80.9,84.4)	0.01	2554	23.3 (18.0,29.6)	0.41
2	8509	86.8 (84.1,89.1)		3001	27.1 (20.7,34.6)	
Risk category						
1 (< 500m)	6276	86.0 (83.4,88.2)	0.14	2779	38.7 (30.8,47.2)	<0.001
2 (500m to < 1km)	4355	86.8 (83.9,89.2)		1462	27.7 (18.6,39.2)	
3 (1km to < 2km)	3421	82.6 (78.9,85.7)		1125	27.7 (19.1,38.4)	
4 (≥ 2km)	2589	83.2 (79.2,86.5)		189	7.4 (2.9,17.8)	
SES group						
Q1 (poorest)	3039	83.8 (80.0,86.5)	0.16	1239	30.5 (23.5,38.7)	0.18
Q2	3233	83.5 (80.7,86.0)		1165	26.2 (20.7,32.6)	
Q3	3442	83.9 (81.7,85.8)		1152	24.4 (19.1,30.6)	
Q4	3452	87.0 (85.0,88.8)		1057	24.0 (19.1,29.7)	
Q5 (least poor)	3475	85.6 (82.3,88.3)		942	22.1 (16.4, 29.2)	
Age / Sex						
< 5 years	1869	92.5 (90.6,94.0)	<0.001	636	28.3 (23.2,34.0)	<0.001
5 to < 15 years	4314	90.3 (88.8,91.7)		1473	27.5 (22.8,32.9)	
Male 15+ years	4815	76.9 (74.3,79.3)		1591	22.4 (18.5,26.9)	
Female 15+ years	5643	86.1 (84.6,87.6)		1855	25.3 (20.9,30.3)	
Forest goer						
Yes	1046	74.4 (69.4,78.8)	<0.001	387	25.4 (20.4,31.1)	0.93
No	15595	85.5 (84.0,87.0)		5168	25.2 (20.9,30.1)	
Traveller						
Yes	1650	51.9 (46.9,56.9)	<0.001	481	13.3 (10.2,17.1)	<0.001
No	14991	91.1 (89.7,92.3)		5074	27.5 (22.9,32.6)	
Residence						
Usual resident	1643	85.1 (83.5,86.5)	<0.001	5498	25.4 (21.1,30.2)	0.02
Temporary visitor	211	68.0 (57.3,77.1)		57	16.7 (11.3,24.1)	
Fever						
Yes	1218	91.3 (88.9,93.3)	<0.001	402	27.1 (21.7,33.2)	0.31
No	15423	84.3 (82.7,85.8)		5153	25.1 (20.8,29.9)	
Sufficient LLINs						
Yes	2857	91.4 (89.3,93.1)	<0.001	2417	77.3 (73.7,80.5)	<0.001
No	13784	83.7 (82.1,85.2)		3138	16.5 (13.4,20.0)	
Heard key message[1]						
Yes	7813	84.7 (82.5,86.6)	0.76	2620	25.2 (20.4,30.7)	0.97
No	8828	85.0 (83.4,86.4)		2935	25.3 (20.9,30.2)	

The high use of any nets shows that people will use nets if they have them. It would be interesting to find out if the presence of untreated nets in any way suppresses use of LLINs with the extra protection the latter afford, but this would be difficult to ascertain. The table shows that LLIN use is highest in villages closest to forest, which is appropriate. Their use is also slightly higher in the poorest, but uniform by age. There is no difference in use by forest goers and others, while use by travellers is lower; it would be useful to explore if this is due to availability. There is very little difference in use in those with and without fever. The use was the same by people who had or had not heard the key malaria message to sleep under an insecticide-treated net.

[1] Key message as "sleep under an insecticide-treated net"

Table 4.9 Details and characteristics of outlets selling nets

	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Total[1]	100.0 (183)	50.8 (93)	49.2 (90)
Respondent's position			
Owner	97.2 (176)	95.7 (89)	98.9 (87)
Employee	0.6 (1)	1.1 (1)	- (0)
Family member	2.2 (4)	3.2 (3)	1.1 (1)
Other	- (0)	- (0)	- (0)
Respondent's sex			
Male	10.4 (19)	6.5 (6)	14.4 (13)
Female	89.6 (164)	93.5 (87)	85.6 (77)
Outlet located in selected cluster			
Yes	31.7 (57)	36.7 (33)	26.7 (24)
No	68.3 (123)	63.3 (57)	73.3 (66)
Type of outlet			
General store / shop	48.1 (88)	51.6 (48)	44.4 (40)
Net seller in market	50.8 (93)	47.3 (44)	54.4 (49)
Other	1.1 (2)	1.1 (1)	1.1 (1)
Outlet age			
< 1 year	6.0 (11)	9.7 (9)	2.2 (2)
1-3 years	18.0 (33)	24.7 (23)	11.1 (10)
3-5 years	16.4 (30)	17.2 (16)	15.6 (14)
5+ years	59.6 (109)	48.4 (45)	71.1 (64)
Where do you buy your nets[2]			
Market in Phnom Penh	50.8 (93)	48.4 (45)	53.3 (48)
Local market	38.8 (71)	43.0 (40)	34.4 (31)
Traveling sales person (PSI)	15.9 (29)	3.2 (3)	28.9 (26)
Hawker/Itinerant seller	3.8 (7)	4.3 (4)	3.3 (3)
Distributor	1.6 (3)	- (0)	3.3 (3)
Government or NGO	- (0)	- (0)	- (0)
Other	6.0 (11)	11.8 (11)	- (0)
Sales of nets compared to last year			
Selling more	21.0 (38)	30.0 (27)	12.2 (11)
Selling same	22.1 (40)	13.2 (12)	31.1 (28)
Selling less	51.4 (93)	50.6 (46)	52.2 (47)
Don't Know	1.7 (3)	1.1 (1)	2.2 (2)
N/A (didn't sell last year)	3.9 (7)	5.5 (5)	2.2 (2)
Sell insecticide for treating nets			
Yes – SuperMalatab or Malatab	7.1 (13)	2.2 (2)	12.2 (11)
Yes – other brand	- (0)	- (0)	- (0)
No	92.9 (170)	97.8 (91)	87.8 (79)

This table confirms the dominance of Phnom Penh markets as the source of mosquito nets to retailers.

It is interesting to note that more mosquito net outlets reported a drop than a rise in sales over the last year. The reasons for this are unknown. The number selling SuperMalatab or Malatab is low, however it should be noted that Malatab alone has not been socially marketed since 2008, and Super Malatab is supposed to be part of the bundling programme and not sold separately, however if some already has a net and would like a kit it would make sense for Super Malatab to be available. Table 4.10 shows numbers of insecticide bundled with nets.

[1] Interviews were conducted at 183 outlets, which was 95.3% of the target number (192) for the net outlet survey
[2] Multiple responses possible

Table 4.10 Types of nets sold by mosquito net outlets

	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Total number of outlets	**100.0 (183)**	**100.0 (93)**	**100.0 (90)**
LLIN / LLIHN	**23.1 (42)**	**3.3 (3)**	**43.3 (39)**
Olyset	5.5 (10)	1.1 (1)	10.0 (9)
Permanet	6.0 (11)	- (0)	12.4 (11)
Malanet – bednet	14.0 (25)	- (0)	28.7 (25)
Malanet – hammock	14.3 (26)	2.2 (2)	27.0 (24)
NetProtect	- (0)	- (0)	- (0)
GF/MoH logo	0.6 (1)	- (0)	1.1 (1)
Conventional	**87.4 (160)**	**83.9 (78)**	**91.1 (82)**
B52	68.3 (125)	71.0 (66)	65.6 (59)
No logo	51.7 (93)	41.3 (38)	62.5 (55)
Hammock	44.2 (80)	54.8 (51)	33.0 (29)
Other	28.1 (50)	17.8 (16)	38.6 (34)
Bundled	**64.8 (118)**	**67.4 (62)**	**62.2 (56)**
B52	39.2 (71)	39.6 (36)	38.9 (35)
No logo	39.7 (71)	36.7 (33)	42.7 (38)
Hammock	18.3 (33)	15.4 (14)	21.4 (19)
Other	19.6 (35)	19.6 (18)	19.5 (17)

The much higher percentage of mosquito net outlets selling LLINs in Domain 2 than Domain 1 may be related to the social marketing of Malanet by PSI, however this was last done in 2008. Note there were also more outlets selling other brands of LLINs in Domain 2. This would be worth exploring.

Table 4.11 Cost to buy and sell nets for mosquito net providers

		Buying Price (KHR)[1]			Selling Price (KHR)		
Type of Net	**Outlets (N)**	**Mean**	**Median**	**Min, Max**	**Mean**	**Median**	**Min, Max**
LLIN							
Olyset	8	13437	13000	8000, 20000	15312	15000	8500, 25000
Permanet	11	14318	13500	8000, 20000	15864	15000	8500, 22000
Malanet – bednet	25	13580	1100	6500, 33000	15720	13000	9000, 35000
Malanet – hammock	27	9548	10000	4800, 24000	11370	12000	6500, 28000
NetProtect	0	-	-	-	-	-	-
GF/MoH logo	0	-	-	-	-	-	-
Conventional							
B52	125	18656	18500	8000, 48000	21528	21000	10000, 50000
No logo	93	11682	10000	4500, 44000	14204	12000	8000, 48000
Hammock	77	7799	7000	5000, 45000	9909	9000	6500, 50000
Other	49	25929	29000	6000, 55000	29663	32000	7000, 60000
Bundled							
B52	68	19568	18300	8500, 48000	22191	21000	10000, 50000
No logo	68	10507	9000	6500, 25000	12949	12000	7500, 27000
Hammock	30	7810	6900	5300, 20000	9743	8750	5800, 24000
Other	31	16774	9000	5500, 49000	19016	12000	7500, 52000

The markups between buying and selling prices are around 10 to 20% or 2,000 to 3,000 riels. These do not seem excessive.

[1] KHR = Cambodia Riel; approximately $1USD = 4000 KHR

Part 5: Treatment

In addition to malaria knowledge and prevention, treatment seeking behaviour is also an important component of the CMS 2010 survey which was assessed in the household component for fever cases occurring the 2 weeks prior to the interviews. Estimates of treatment knowledge and practice among health providers were measured in the drug outlet survey.

Table 5.1 Summary of treatment-seeking indicators

	TOTAL		DOMAIN 1		DOMAIN 2	
	% (N)	95% CI	% (N)	95% CI	% (N)	95% CI
Total fever cases	100 (1158)		100 (672)		100 (486)	
Seek treatment <48 hours	48.1 (556)	43.6,52.7	47.3 (316)	43.6,55.1	49.3 (240)	40.8,53.9
Have malaria test	21.6 (254)	17.0,27.0	21.0 (145)	16.2,26.7	22.5 (109)	14.3,33.5
Antimalarial <24 hours	3.7 (44)	2.2,6.3	2.4 (18)	1.4,4.0	5.6 (26)	2.6,11.9
ACT <24 hours	1.3 (17)	0.5,3.2	0.7 (7)	0.3,1.7	2.2 (10)	0.7,7.2

Due to the low prevalence and incidence of malaria, treatment seeking behavior indicators in this survey refer to treatment seeking for fevers and not necessarily for malaria. Table 5.1 provides a summary of these treatment seeking indicators.

Nearly half of all fever cases sought treatment within 48 hours in both Domain 1 and Domain 2. The proportion of fevers that had a malaria test (21% in Domain 1 and 23% in Domain 2) is interesting compared to HF/VMW reports that most cases are parasitologically diagnosed.

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 (187)		100 (94)		100 (93)	
Stocks ACTs	87.2 (163)	82.3, 92.0	80.9 (76)	72.7,88.9	93.6 (87)	88.5,98.6
Stocks RDT's	80.1 (150)	74.5, 86.0	86.2 (81)	79.1,93.3	74.2 (69)	65.1,83.3
Has not sold any artemisinin monotherapy in the past 6 months	84.5 (158)	79.3,89.7	91.5 (86)	85.7,97.2	77.4 (72)	68.8,86.1
Knows national policy for uncomplicated Pf	85.3 (87)	78.3, 92.3	88.6 (39)	78.9,98.4	82.8 (48)	72.7,92.8
Knows national policy for uncomplicated Pv	35.7 (34)	25.1, 44.3	14.3 (6)	3.2,25.3	50.0 (28)	36.5,63.5

Table 5.1b indicate that even in Domain 1 where efforts have been made to encourage the correct management of malaria, 20% of drug outlets did not have a stock of ACTs and 14 % did not have RDTs. Domain 2 did rather better with only 7% of outlets not carrying ACTs although the stocks of RDTs were lower. Knowledge of national treatment polices for Pf is quite high in both Domains with slightly better knowledge in Domain 1. Knowledge of the national polices in relation to management of Pv remain a cause for concern but appears to be considerably better in Domain 2

[1] Drug outlets include shops/markets, drug stores/pharmacies, grocery stores, and cabinets

Table 5.2: Details of fever cases and type of fever

	TOTAL	DOMAIN 1	DOMAIN 2
	% (N)	% (N)	% (N)
Total	100 (1167)	100 (679)	100 (488)
Age / Sex			
< 5 years	28.0 (315)	27.9 (176)	28.2 (139)
5 to 14 years	31.1 (363)	31.6 (217)	30.5 (146)
Male, 15+ years	21.0 (250)	20.2 (147)	22.1 (103)
Female, 15+ yrs	19.8 (239)	20.3 (139)	19.2 (100)
Type of fever*			
Malaria	7.2 (87)	4.8 (40)	10.6 (47)
Intermittent fever	3.4 (42)	1.7 (14)	5.8 (28)
Other fever	35.4 (410)	33.7 (226)	37.8 (184)
Cold/flu	50.7 (558)	56.9 (358)	42.1 (200)
Other	3.2 (35)	2.9 (19)	3.6 (16)
Socioeconomic group			
Q1 (poorest)	22.9 (299)	22.3 (172)	23.7 (127)
Q2	19.9 (239)	20.7 (148)	18.8 (91)
Q3	21.9 (251)	20.9 (142)	23.4 (109)
Q4	19.4 (215)	19.4 (1180	19.3 (97)
Q5 (least poor)	15.9 (163)	16.7 (99)	14.8 (64)
Risk category			
< 500m	35.0 (539)	36.2 (328)	33.4 (211)
500m to < 1km	40.5 (367)	38.3 (209)	43.6 (158)
1km to < 2km	24.4 (261)	25.5 (142)	22.9 (119)
≥ 2km[1] from forest	(180)	(95)	(85)

* self-reported by the fever case themselves or their carer if child < 14 years

Table 5.2 indicates that the age and sex profile of fever cases was the same in both Domains. A majority of cases were children with equal numbers under 5 and age 5 to 15 years. Socio-economic status was also similar across domains, with slightly fewer cases in the least poor group. Perceived fever type indicates slightly more malaria in Domain 2 which is to be expected. More fevers were reported in the risk categories 1 and 2 than in category 3 in both domains.

[1] Included here to show the number of fever cases found in risk category 4.

Table 5.3 Treatment-seeking for the fever

	TOTAL		DOMAIN 1		DOMAIN 2	
	% (N)	95% CI	% (N)	95% CI	% (N)	95% CI
Total	100 (1167)		100 (679)		100 (488)	
Seek treatment						
Seek any treatment	90.7	88.2,92.7	91.0 (621)	87.6,93.4	90.3 (442)	86.0,93.0
Seek first treatment within 24 hours	48.1 (556)	43.6,52.7	47.3 (316)	40.8,53.9	49.3 (240)	43.6,55.1
First place treatment sought						
Referral Hospital	1.5 (18)	0.8,2.6	1.4 (11)	0.6,3.2	1.6 (7)	0.8,3.2
HC/FDH/HP	29.9 (285)	23.8,36.7	33.8 (192)	25.2,43.5	24.5 (93)	17.1,33.8
VMW/VHV	1.4 (18)	0.6,3.4	2.1 (15)	0.7,5.6	0.4 (3)	0.1,1.4
Other public service	1.3 (17)	0.6,3.1	2.2 (16)	0.9,5.1	0.2 (1)	0.01,1.2
Private facility	20.1 (214)	15.4,26.0	24.6 (149)	17.7,33.1	13.9 (65)	8.9,21.1
Pharmacy/drug shop	18.7 (199)	14.8,23.3	14.5 (86)	10.5,19.7	24.5 (113)	17.4,33.2
Mobile provider	7.8 (86)	5.2,11.6	1.8 (18)	0.5,6.9	16.2 (68)	11.4,22.5
Shop/market	17.1 (188)	12.6,22.9	16.2 (102)	10.9,23.4	18.3 86)	11.2,28.7
Other	2.2(20)	1.1,4.1	3.4 (17)	1.7,6.6	0.5 (3)	0.1,2.8
Number of places treatment sought						
None	9.3 (104)	7.3,11.8	9.0 (58)	6.6,12.4	9.7 (46)	6.7,14.0
One	83.8 (980)	80.4,86.7	83.5 (567)	78.7,87.4	84.2 (84.2)	79.2,88.1
Two	6.7 (80)	4.7,9.4	7.0 (51)	4.2,11.6	6.1 (6.1)	4.0,9.2
Three	0.3 (3)	0.1,1.2	0.5 (3)	0.1,2.0	- (0)	-
Type of provider for all treatment sought						
Public only	27.1 (300)	22.2,32.7	31.1 (206)	24.0,39.2	21.7 (94)	16.0,28.7
Private trained only	52.0 (610)	46.0,58.0	52.9 (347)	44.5,61.1	50.8 (263)	42.4,59.2
Private non trained only	6.8 (81)	4.5,10.0	1.5 (35)	0.4,5.7	14.0 (65)	9.8,19.6
Public & private	4.2 (49)	2.8,6.4	5.1 (35)	3.1,8.4	3.0 (14)	1.5,5.9
Private trained & not trained	0.4 (5)	0.1,1.2	0.1 (2)	0.0,1.1	0.7 (3)	0.2,2.6
None	9.5 (104)	7.4,12.0	9.3 (58)	6.7,12.7	9.8 (46)	6.7,14.1
Drugs taken						
Any drugs	92.8 (1046)	90.3,94.7	93.2 (618)	89.8,95.6	92.2 (428)	87.9,95.1
Drugs within 24 hours	56.2 (571)	52.0,60.4	58.3 (345)	52.5,63.9	53.3 (226)	47.3,59.2

Table 5.3 shows the seeking treatment practices for the fever case and their carers. Over 90% sought some form of treatment but just under 50% of these were within 24 hours of the onset of fever. This was similar in both domains.

Perceived type of fever made no difference to whether treatment was sought, sought within 24 hours of onset of fever or take any drugs were taken. For all fevers the pattern was more or less similar to that shown in Table 5.3. However, taking a blood test for malaria differed by type of fever, as shown in Table 5.5 below.

Of those who sought any treatment, 65.8% first went to a private provider (i.e private facility, pharmacy/drug shop, mobile provider, shop/market or other facility), 24.5% first went to a public health facility or health post (HC/FDH/HP) and 4.4% sought treatment first at a referral hospital, with a VMW/VHV or another public service. Although a majority of fever cases first sought treatment in the private sector, it is important to note that most of them went to a trained provider.

Table 5.4. 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	100 (1164)		100(678)		100 (486)	
Had diagnostic test	21.6 (254)	17.0,27.0	21.0 (145)	16.2,26.7	22.5 (109)	14.3,33.5
Place of test[1]						
VMW	9.4 (26)	4.3,19.5	12.6 (19)	4.5,31.0	5.6 (7)	2.5,12.1
Health facility	48.4 (108)	36.8,60.1	50.3 (64)	33.1,67.4	46.1 (44)	32.2,60.5
Private clinic/lab	30.7 (80)	21.2,42.2	33.8 (45)	19.9,51.2	27.1 (35)	16.1,41.8
Pharmacy/shop	9.5 (20)	6.1,14.7	3.3 (4)	1.2,8.4	17 (16)	11.3,24.7
Mobile provider	1.9 (5)	0.6,6.1	- (0)	-	4.3 (5)	1.4,11.9
Who was tested						
< 5 years	27.9 (313)	25.2,30.8	27.8 (175)	24.1,31.7	28.1 (138)	23.9,32.7
5 to 14 years	31.2 (363)	28.2,34.5	31.7 (217)	28.0,35.6	30.6 (146)	25.3,36.5
Male, 15+ years	21.1 (250)	18.4,24.0	20.2 (147)	16.8,24.2	22.2 (103)	18.0,27.1
Female, 15+ yrs	19.8 (238)	17.5,22.4	20.3 (39)	17.2,23.9	19.1 (99)	15.7,23.0
Had test before any treatment*	79.1 (190)	71.9,84.9	72.4 (99)	62.1,80.8	87.4 (91)	74.9,94.2
Type of test*						
RDT	58.7 (138)	46.9,69.6	56.0 (73)	38.8,71.9	61.9 (65)	46.3,75.3
Slide	41.3 (93)	30.4,53.1	44.0 (52)	28.1,61.2	38.1 (41)	24.7,53.7
Test positive	36.9 (89)	26.4,48.9	28.0 (41)	18.9,39.3	47.3 (48)	30.6,64.6
Species for positive results						
Pf	4.9 (6)	1.9,12.3	10.1 (5)	3.6,25.3	1.4 (1)	0.2,10.3
Pv	12.1 (11)	6.3,21.9	22.3 (9)	10.0,42.3	5.2 (2)	1.8,13.8
Mixed	8.6 (7)	3.3,20.6	9.5 (3)	3.0,26.1	8.0 (4)	1.9,28.0
Not told	74.3 (63)	59.5,85.1	58.1 (23)	37.8,76.0	85.4 (40)	70.2,93.6

Table 5.4 indicates that the level of testing in both Domains was low at around 21% of fever cases. Of those tested, approximately 60% took place in the public sector at health facilities or with VMWs. In Domain 1 a higher proportion of testing (63%) occurred in the public sector. Interestingly, people in Domain 2 were more likely to be tested before treatment than those in Domain 1. RDTs were more commonly used than microscopy in both Domains. Tests were much more likely to be positive in Domain 2 as would be expected. The positivity rate as reported by household respondents is quite high in view of the low prevalence of malaria. However, a significant proportion of respondents (74%) were not informed about the test result.

Of the 1076 fever cases who did not have a malaria test, 73% said it was because they didn't think they had malaria. 3.3% said they were sure they had malaria,12.7% (137) said they could not afford the test, 1.4% (15) said they didn't know where to go for a test and 9.8% (105) gave other miscellaneous reasons.

Of those who were tested, more cases in Domain 2 were tested before any treatment (p=0.02). In both Domains male adults were more likely to be tested, Domain 1 (p=0.03), Domain 2 (p=0.005). The actual numbers appear lower because of the number of adult men in the population. Of those tested significantly more were positive in Domain 2 (p=0.04).

[1] Percent of those who had a test

Table 5.5 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 = 1130		**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**	**% (N)**
Type of fever							
Malaria	87	78.9 (66)	100 (66)	68.2 (27)	100 (27)	85.5 (39)	100 (39)
Intermittent fever	42	12.0 (6)	63.4 (4)	25.9 (4)	100 (4)	6.2 (2)	- (0)
Other fever	409	22.3 (95)	16.0 (12)	22.7 (54)	18.4 (7)	21.7 (41)	13.4 (5)
Cold/flu	558	13.1 (70)	5.4 (4)	15.9 (53)	5.8 (3)	8.0 (17)	4.4 (1)
Other	34	33.6 (10)	- (0)	37.9 (6)	- (0)	28.7 (4)	- (0)

Table 5.5 indicates that a high proportion of those who had malaria type of fever were tested and those tested had a positive result. It is important to note that these positive results were reported by the respondents.

Table 5.6 Antimalarials and other treatments taken for fever

	TOTAL	DOMAIN 1	DOMAIN 2
	% (N)	**% (N)**	**% (N)**
Total[1]	100 (1167)	100 (679)	100 (488)
ACT - Artesunate-Mefloquine	2.8 (35)	2.1 (18)	3.7 (17)
ACT - DHA-piperaquine	0.2 (2)	- (0)	0.5 (2)
Artesunate monotherapy	0.2 (2)	0.1 (1)	0.3 (1)
Other non artemisisin antimalarials	0.8 (9)	0.6 (4)	1.1 (5)
Cocktail	2.5 (29)	1.0 (7)	4.6 (22)
Antibiotics	10.6 (134)	10.7 (80)	10.6 (54)
Other non antimalarials	75.5 (870)	77.0 (511)	73.6 (870)

Two individuals (one in each Domain) reported taking artesunate monotherapy for the treatment of fever, but these drugs could have been leftover following the ban on oral artemisinin monotherapies in Cambodia.

It is important to note that cocktails of drugs are still prescribed although the proportion is much lower in the Containment zones than in the rest of the country. The low incidence of malaria would mean that it would be appropriate to prescribe non antimalarials for most cases of fever as is demonstrated here. For example, the proportion of antibiotics being used to treat fevers is approximately the same in both Domains, as would be expected.

[1] Note that treatments taken for malaria are shown in Table 5.8

Table 5.7 Specific drugs taken for fever

Drug	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
A+M[1]	0.9 (10)	1.0 (6)	0.9 (4)
Malarine[2]	1.9 (25)	1.2 (12)	2.8 (13)
DHA-piperaquine	0.2 (2)	- (0)	0.5 (2)
Plasmotrim[3]	0.1 (1)	0.1 (1)	- (0)
Other artesunate only[3]	0.1 (1)	- (0)	0.3 (1)
Mefloquine	0.1 (1)	- (0)	0.3 (1)
Quinine	0.4 (5)	0.4 (2)	0.5 (3)
Chloroquine	0.3 (3)	0.3 (2)	0.3 (1)
Malarone	1.2 (12)	2.0 (12)	- (0)
Cocktail	2.5 (29)	1.0 (7)	4.6 (22)
Other antimalarial drug	0.6 (9)	0.4 (5)	0.9 (4)
Tetracycline / doxycycline	0.1 (1)	0.2 (10	- (0)
Other antibiotics	10.5 (133)	10.5 (79)	10.6(54)
Paracetamol/aspirin	29.2 (324)	33.1 (205)	23.9 (119)
Vitamins/tonics	1.6 (18)	0.8 (5)	2.6 (13)
Infusion/IV fluids	1.9 (23)	1.5 (8)	2.6 (15)
Traditional herbal	0.4 (5)	0.6 (3)	0.1 (2)
Other non-antimalarials	50.9 (601)	47.0 (331)	56.3 (270)

It is not anticipated that fever cases would be treated with antimalarial drugs. A majority of these fever episodes were reported to have been treated with paracetamol or other non-antimalarials. None of the cases reported taking other artesunate-mefloquine, Duo-Cotecxin, artemisinin-piperaquine, DHA only or Coartem (AS-lumefantrine).

The majority of reported ACTs taken (66%) were obtained from the public sector with a further 18% from a trained private provider. Half (6/12) of cases who specified where they sourced Malarone all said 'other private sector provider. This is concerning as Malarone is only used in a limited geographical area of the Containment zone (specifically in Pailin). This suggests that some leakage of the drug may have taken place. The only individual who took Plasmotrim (an artemisinin-based monotherapy) received it from a health centre in Domain 1. The other artesunate monotherapy was obtained from a grocery store in Domain 2.

[1] ACT: brand name for AS-MQ distributed by CNM to public health facilities and VMWs in Zone 2 and the rest of the country for treatment of Pf malaria

[2] ACT: brand name for AS-MQ marketed and distributed by PSI to private outlets throughout the country for treatment of Pf malaria

[3] Artemisinin-based monotherapy

Table 5.8 Proportion of fever type by drugs taken

		Type of Fever				
	Total	Malaria	Intermittent fever	Other fever	Cold/flu	Other
	N	% (N)	% (N)	% (N)	% (N)	
ACT: Artesunate-Mefloquine	35	88.3 (30)	0.8 (1)	7.0 (3)	3.9 (1)	- (0)
ACT: DHA-piperaquine	2	50.0 (1)	- (0)	50.0 (1)	- (0)	- (0)
Artesunate monotherapy	2	50.0 (1)	- (0)	50.0 (1)	- (0)	- (0)
Other non artemisisin antimalarials	9	24.6 (3)	12.5 (1)	51.8 (4)	11.2(1)	- (0)
Cocktail/other antimalarials	847	7.2 (87)	3.4 (42)	35.4 (410)	50.7 (558)	3.2 (35)
Antibiotics	129	0.8 (10	6.5 (8)	33.8 (42)	57.0 (76)	1.8 (2)
Infusion	23	- (0)	- (0)	66.5 (15)	29.1 (7)	4.4 (1)

On examination of treatment taken for fever by type of fever it is reassuring that almost all the ACTs were taken by cases who reported their fever type as malaria or intermittent fever (though these are self-reported). At the same time, however, it is alarming that 57% of people who took antibiotics were those who were perceived to have a cold/flu type fever.

Although cocktails remain popular they are not perceived as the treatment of choice for a fever thought to be malaria. It seems that drug cocktails are more often used when malaria is not suspected.

Table 5.9 Details of private drug outlets selling antimalarials and outlet respondents

	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Total outlets	187	94	93
Respondent's position			
Owner	96.8 (181)	94.7 (89)	98.9 (92)
Family Member	3.2 (6)	5.3 (5)	1.1 (1)
Respondent's sex			
Male	59.9 (112)	59.6 (56)	60.2 (56)
Female	40.1 (75)	40.4 (38)	39.8 (37)
Respondent's training			
Doctor	5.9 (11)	6.4 (6)	5.4 (5)
Pharmacist	9.6 (18)	7.5 (7)	11.8 (11)
Medical assistant	23.5 (44)	24.5 (23)	22.6 (21)
Nurse	14.4 (27)	18.1 (17)	10.8 (10)
Midwife	4.8 (9)	5.3 (5)	4.3 (4)
Other health training	16.0 (30)	6.4 (6)	25.8 (24)
No health training	25.7 (48)	31.9 (30)	19.3 (18)
Location of outlet			
Village	33.7 (63)	35.1 (33)	32.3 (30)
Town	66.3 (124)	64.9 (61)	67.7 (63)
Type of outlet			
Shop/ market	32.6 (61)	35.1 (33)	30.1 (28)
Drug store / pharmacy	43.8 (82)	36.2 (34)	51.6 (48)
Grocery store	7.0 (13)	9.6 (9)	4.3 (4)
Cabinet	14.4 (27)	18.1 (17)	10.8 (10)
Other	2.1 (4)	1.1 (1)	3.2 (3)
Offer consultations			
General consultations	57.2 (107)	54.3 (51)	60.2 (56)
Consultations for malaria	55.1 (102)	50.5 (47)	59.8 (55)
License to sell drugs	85.7 (126)	79.5 (62)	92.7 (64)
Keep records of malaria cases	4.9 (9)	6.5 (6)	3.2 (3)
Refer cases of malaria	70.6 (132)	63.8 (60)	77.4 (72)
Attended training past 6 months	40.6 (76)	50.0 (47)	31.2 (29)
Inspection past 6 months	53.6 (98)	57.6 (53)	49.4 (45)

Table 5.9 shows that most drug outlets were family-owned businesses. Although many shops are owned by fully trained professions, the educational background and training of drug sellers (respondents at the time of the interview) were varied. While it was encouraging that one-third of the respondents were medical assistants and nurses, it was concerning that 25% of those interviewed had no medical training.

It was interesting to observe that nearly all the drug outlets in Domain 2 were licensed to sell drugs compared to 80% in Domain 1. More private providers had been trained in Domain 1 than Domain 2 and more facilities had been inspected – perhaps due to the intense monitoring for counterfeit drugs in the Containment zones. Record-keeping of malaria cases was low across the board, and much more effort will be needed to include these private providers in the malaria surveillance system. A majority of the private providers do report that they refer cases of malaria to public health facilities.

Further analysis indicated that significantly more facilities offer consultations ($p=<0.001$) and malaria consultations ($p=0.01$) in Domain 2 compared with Domain 1.

Table 5.10 Details of stock management of ACTs in drug outlets

	Malarine	A+M	Duo-Cotecxin	Artekin	Artequick
	% (N)	**% (N)**	**% (N)**	**% (N)**	**% (N)**
Heard of drug	100 (187)	82.4 (154)	40.1 (75)	46.5 (87)	28.3 (53)
Sells drug	85.6 (160)	14.4 (27)	0.5 (1)	1.1 (2)	2.7 (5)
Price for a box (Riel)					
Median	3000	3000	3000	6400	1400
Minimum	1200	0	3000	800	100
Maximum	8000	8000	3000	12000	8000
Number of boxes sold previous week					
Median	2	0	5	0	0
Minimum	0	0	4	0	0
Maximum	36	10	7	0	0
When last stock bought					
Within week	15.6 (25)	8.0 (2)	- (0)	- (0)	25 (1)
Within month	19.4 (31)	16.0 (4)	100 (1)	- (0)	25 (1)
> 1 month	41.9 (67)	32.0 (8	- (0)	- (0)	25 (0)
Not sure	23.1 (37)	44 (11)	- (0)	100 (1)	25 (1)

The amount of A+M sold in the private sector is quite high, which suggests some leakage from the public sector, although it seems that some providers are giving it to people as they would in the public sector. There is a wide range of prices for subsidized Malarine whose recommended price is 2500 Riels.

Interestingly the private sector availability of DHA-Piperaquine which is the drug recommended by the national programme in Zone 1 of the containment area (within Domain 1) seems to be limited as only a few drug outlets reported selling these antimalarials. Artekin seem very expensive (median price was 6400 Riel).

Table 5.11 Details of antimalarials sold in private drug outlets in the past 6 months

	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Antimalarials			
A+M1 (child)	3.8 (7)	5.4 (5)	2.2 (2)
A+M2 (infant)	2.7 (5)	4.3 (4)	1.1 (1)
A+M3 (adolescent)	4.9 (9)	7.5 (7)	2.2 (2)
A+M4 (adult) *[old formulation]*	5.4 (10)	5.4 (5)	5.4 (5)
A+M5 (adult)	6.5 (12)	9.7 (9)	3.2 (3)
Malarine (adult)	85.6 (160)	78.7 (74)	92.5 (86)
Malarine (child)	44.9 (84)	39.4 (37)	50.5 (47)
Malarine (adolescent)	49.7 (93)	47.9 (45)	51.6 (48)
Artequin *(artesunate-mefloquine)*	0.5 (1)	1.1(1)	0 (0)
Duo-Cotecxin *(DHA-Piperaquine)*	1.1 (2)	1.1 (1)	1.1 (1)
Artekin *(DHA-Piperaquine)*	2.7 (5)	4.3 (4)	1.1 (1)
Artequick *(Artemisinin-Piperaquine)*	2.1 (4)	3.2 (3)	1.1 (1)
Coteсxin[1] *(Dihydroartemisinin only)*	0.5 (1)	0 (0)	1.1 (1)
Artesunate tablet[1]	12.4 (23)	7.5 (7)	17.4 (16)
Artesunate injection	3.7 (7)	0 (0)	7.5 (7)
Artesunate suppository	1.1 (2)	0 (0)	2.2 (2)
Artemether tablet[1]	2.1 (4)	0 (0)	4.3 (4)
Artemether injection	17.1 (32)	16.0 (15)	18.3 (17)
Artemisinin tablet[1]	0.5 (1)	1.1 (1)	0 (0)
Artemisinin suppository	0.5 (1)	1.1 (1)	0 (0)
Mefloquine	12.8 (24)	12.8 (12)	12.9 (12)
Quinine tablet	7.0 (13)	1.1 (1)	13.0 (12)
Quinine injection	10.2 (19)	3.2 (3)	17.4 (16)
Chloroquine	62.0 (116)	60.6 (57)	63.4 (59)
Primaquine	0.5 (1)	1.1 (1)	0 (0)
Malarone *(Atovaquone-Proguanil)*	1.1 (2)	2.1 (2)	0 (0)
Coartem	1.1 (2)	2.1 (2)	0 (0)
Other malaria drug	1.6 (3)	2.1 (2)	1.1 (1)
Drug cocktail	27.4 (51)	20.2 (19)	34.8 (32)
Tetracycline/doxycycline	86.1 (161)	84.0 (79)	88.2 (82)
Other antibiotics	98.9 (185)	98.9 (93)	98.9 (92)
Paracetamol	91.4 (171)	95.7 (90)	87.1 (81)
Rapid Diagnostic Test kits			
Carestart	7.5 (14)	4.3 (4)	10.8 (10)
Paracheck	11.2 (21)	5.3 (5)	17.2 (16)
Malacheck	73.8 (138)	79.8 (75)	67.7 (63)

Table 5.11 shows that the major drug for uncomplicated malaria in the private sector remains the socially marketed drug Malarine especially for adult patients. Domain 1 patients rely less on this drug than in Domain 2. Slightly more patients in Domain 1 use A+M. The combinations containing artemisinin derivatives and piperaquine are not prescribed very commonly in either domain but more in Domain 1 than Domain 2 which may reflect the use of these drugs in the containment zone.

The availability of oral artemisinin monotherapies in Domain 1 is considerably less than in Domain 2 although artesunate tablets are still being sold and drug cocktails may also contain artemisinin-based tablets. It is concerning that mefloquine and quinine tablets are still being sold. In Domain 2 quinine tablets seem to be commonly sold. Quinine tablets may still be being used to

[1] Oral artemisinin-based monotherapy

treat malaria in the first trimester of pregnancy but as there is such a difference between Domain 1 and Domain 2, it is unlikely that this is the only reason for the sale of quinine tablets. Quinine injections remain quite common in Domain 2 and may reflect the lack of artemisinin derivatives to treat severe malaria. Drug cocktails are still popular especially in Domain 2 and antibiotics seems to be liberally prescribed which may lead to irrational drug use and antibiotic resistance.

Malacheck remains the predominant RDT sold in private drug outlets in the past 6 months. It should be noted that Paracheck only detect single species malaria (i.e., *P. falciparum*).

Table 5.12 Details of diagnostics sold and tests performed in drug outlets

	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Total	100 (187)	100 (64)	100 (123)
Sell RDTs	80.2 (150)	86.2 (81)	74.2 (69)
RDT usually sold			
Malacheck[1]	73.8 (138)	79.8 (75)	67.7 (63)
CareStart[2]	7.5 (14)	4.3 (4)	**10.8** (10)
Paracheck[3]	11.2 (21)	5.3 (5)	17.2 (16)
Other	7.5 (14)	9.7 (9)	5.4 (5)
Clients ask for malaria test	47.1 (88)	35.1 (33)	**59.1** (55)
Percentage of clients per outlet who have a test before receiving antimalarials			
0%	20.5 (23)	25.0 (16)	12.7 (7)
< 10%	17.0 (19)	18.7 (12)	21.8 (12)
10% to <50%	6.3 (7)	1.6 (1)	12.7 (7)
50% to <100%	8.0 (9)	9.4 (6)	7.3 (4)
100%	48.2 (54)	45.3 (29)	45.5 (25)

Table 5.12 shows that Malacheck is the most commonly available type of RDT in Cambodia, particularly in Domain 1. More clients ask for a malaria test in Domain 2 compared to Domain1 which may relate to the fact that more fevers could be perceived as malaria in Domain 2. One-fifth of respondents interviewed in the drug outlets do not test patients before prescribing an antimalarial although this is less in Domain 2 than in Domain 1. Conversely, nearly half of the drug outlets in both Domains reported that patients are always tested for malaria before receiving antimalarials. It is important to note that the percentage of customers that have a test before being sold treatment does not identify where the test was performed. The malaria tests could have been performed in the drug outlet or elsewhere. Regardless, it would be important to find out what treatments are provided for those who test negative on the malaria tests.

The reasonably high percentage of clients asking for a malaria test is encouraging, this may be due to the ongoing communication campaigns (CNM/PSI) stressing the need to 'Get Tested First', however , it is disappointing this estimate is lower in Domain 1.

[1] Distributed by PSI to private outlets throughout the country
[2] Distributed by CNM to public health facilities throughout the country (2009-present)
[3] Distributed by CNM to public health facilities throughout the country (before 2009)

Table 5.13 Antimalarials: outlet respondents' knowledge and practice

	TOTAL % (N)	DOMAIN 1 % (N)	DOMAIN 2 % (N)
Knows recommended drug for uncomplicated *P.falciparum* (AS-MQ)	85.3 (87)	88.6 (39)	82.8 (48)
Knows recommended drug for uncomplicated *P.vivax* (CQ)	34.7 (34)	14.3 (6)	50.0 (28)
Recommends correct drug for uncomplicated *P.falciparum* (AS-MQ)	84.9 (135)	**90.9** (70)	79.3 (65)
Recommends correct drug for uncomplicated *P.vivax* (CQ)	35.2 (57)	22.4 (17)	**46.5** (40)
Heard about activities to stop resistance	63.6 (117)	58.7 (54)	68.5 (63)
Aware that some antimalarials are banned	64.7 (119)	59.8 (55)	69.6 (64)
Knows which drugs are banned (any oral artemisinin based monotherapy)	24.6 (46)	16.0 (15)	**33.3** (31)
Heard about fake drugs	83.6 (153)	81.5 (75)	85.7 (78)
Seen fake drugs	35.7 (66)	36.2 (34)	35.2 (32)

Although knowledge about recommended drug treatment for *P. falciparum* in Domain 1 and Domain 2 was good, it was disappointing that almost half drug outlet respondents did not respond to the questions on current nationally recommended drugs. However, knowledge about the recommended treatment for *P. vivax* was quite low particularly in Domain 1. Similarly about 15% did not specify what they actually recommended for uncomplicated *P. falciparum* and uncomplicated *P. vivax*. Of those who did respond it seems the knowledge of national drug policy for *P. vivax* was lower in Domain1 compared to Domain 2, $p<0.001$). The same pattern was observed for respondents recommending the correct drugs for *P. vivax* ($p<0.001$).

The percentage of outlet respondents who have heard about activities to stop resistance, and are aware that some drugs are banned is quite high, but it is disappointing that the knowledge of which drugs are banned in lower in Domain 1, in which containment activities take place. Awareness of activities around resistance containment is not universal and seems especially low in Domain 1 (which includes the containment zones). The knowledge of the specific drugs that are banned is disappointingly low at 16% in Domain 1 where this knowledge is especially important. Awareness of fake drugs is high at 84% in both Domains and at least one-third of drug sellers reported to have seen them.

Table 5.14 Most common drugs sold, most requested and drugs reported as possible counterfeit

	Most common drugs sold % (N)	Drugs most requested % (N)	Drugs suspected as fake % (N)
Total[1]	**100 (312)**	**100 (285)**	**100 (114)**
A+M ***(AS-MQ)***	29.2 (91)	29.8 (29)	14.9 (17)
Malarine ***(AS-MQ)***	34.6 (108)	32.6 (93)	8.8 (10)
Artequin	- (0)	- (0)	2.6 (3)
Duo-Cotecxin ***(DHA-Pip)***	0.3 (1)	1.1 (3)	2.6 (3)
Artekin ***(DHA-Pip)***	2.6 (8)	4.2 (12)	10.5 (12)
Artequick ***(Artemisinin-Pip)***	12.2 (38)	7.4 (21)	8.8 (10)
Cotecxin ***(DHA only)***[2]	-(0)	0.7 (2)	- (0)
Artesunate tablet[2]	1.0 (3)	4.2 (12)	20.2 (23)
Artesunate injection	- (0)	0.4 (1)	1.8 (2)
Artesunate suppository	- (0)	- (0)	- (0)
Artemether tablet[2]	- (0)	0.7 (2)	3.5 (4)
Artemether injection	1.0 (3)	0.4 (1)	4.4 (5)
Artemisinin tablet[2]	- (0)	- (0)	1.8 (2)
Artemisinin suppository	- (0)	0.4 (1)	1.8 (2)
Mefloquine	0.3 (1)	1.8 (5)	5.3 (6)
Quinine tablet	3.5 (11)	4.9 (14)	7.0 (8)
Quinine injection	2.9 (9)	3.2 (9)	0.9 (1)
Chloroquine	12.5 (39)	7.7 (22)	2.6 (3)
Primaquine	- (0)	0.4 (1)	0.9 (1)
Malarone	- (0)	- (0)	- (0)
Coartem	- (0)	- (0)	- (0)

Table 5.14 indicates that A+M and Malarine remains the most requested and most prescribed antimalarial drugs in Cambodia. Artequick (artemisinin-piperaquine) has been marketed by the Chinese manufacturers and seems to be the most popular artemisinin derivative piperaquine combination prescribed and requested. Chloroquine for the treatment of *P. vivax* malaria is the correct treatment but the low sales of primaquine reveal that radical treatment is not often undertaken.

[1] Total reflects multiple drug outlets who gave up to 3 responses to questions on common, popular and fake drugs
[2] Oral artemisinin-based monotherapy

Table 5.15 Respondent's knowledge of antimalarial drugs reported as banned

	Total[1] % (N)	Domain 1 % (N)	Domain 2 % (N)
Oral Monotherapy			
Artesunate tablet	14.5 (36)	9.5 (11)	18.9 (25)
Artemether tablet	6.9 (17)	1.7 (2)	11.4 (15)
Artemisinin tablet	0.4 (1)	0.9 (1)	0 (0)
Cotecxin ***(DHA only)***	2.8 (7)	4.3 (5)	1.5 (2)
Other Monotherapy			
Artesunate injection	2.8 (7)	2.6 (3)	3.0 (4)
Artesunate suppository	0.4 (1)	- (0)	0.8 (1)
Artemether injection	1.6 (4)	1.7 (2)	1.5 (2)
Artemether suppository	- (0)	- (0)	- (0)
ACT			
A+M ***(AS-MQ)***	18.6 (46)	23.3 (27)	14.4 (19)
Malarine ***(AS-MQ)***	15.7 (39)	29.3 (34)	3.8 (5)
Artequin ***(AS-MQ)***	3.6 (9)	1.7 (2)	5.3 (7)
Duo-Cotecxin ***(DHA-Pip)***	2.4 (6)	4.3 (5)	0.8 (1)
Artekin ***(DHA-Pip)***	14.1 (35)	13.8 (16)	14.4 (19)
Artequick ***(Artemisinin-Pip)***	1.6 (4)	0.9 (1)	2.3 (3)
Coartem ***(AS-Lumofantrine)***	- (0)	- (0)	- (0)
Other Antimalarials			
Quinine tablet	7.7 (19)	2.6 (3)	12.1 (16)
Quinine injection	0.4 (1)	0.9 (1)	0 (0)
Chloroquine	2.0 (5)	0.9 (1)	3.0 (4)
Mefloquine	3.2 (8)	1.7 (2)	4.6 (6)
Primaquine	0.4 (1)	0 (0)	0.8 (1)

[1] Percentage of all drug outlets responses

HEALTH FACILITY SURVEY

There were **37** public facilities and **36** private facilities included in the health facility survey. To ascertain the quality of malaria services received, a total of 427 malaria cases were followed up from case records at the public health facilities within the last 3 months and administered a questionnaire on their experience. To assess quality of services received, exit interviews were carried out among fever patients (or their caregivers) at both public and private facilities.

Part 6: Inventory of health facilities

Table 6.1 Details of the health facilities sampled

	Public facilities	Private facilities	Total
	N (%)	**N (%)**	**N (%)**
Total	37 (100)	36 (100)	73 (100)
Type of facility			
Reference hospital	8.1 (3)		3
Former district hospital	24.3 (9)		9
Health centre	67.6 (25)		25
Polyclinic		11.1 (4)	4
Cabinet		88.9 (32)	32
Services provided			
Malaria case management	93.3 (36)	86.1 (31)	91.8 (67)
Inpatient Department (IPD)	27.0 (10)	33.3 (12)	30.1 (22)
Outpatient Department (OPD)	97.3 (36)	77.8 (28)	87.7 (64)
Malaria diagnosis	81.1 (30)	63.9 (23)	72.6 (53)
ITN distribution	29.7 (11)	- (0)	15.1 (11)
Malaria health education	40.5 (15)	22.2 (8)	31.5 (23)
Antenatal screening for malaria	10.8 (4)	2.8(1)	6.9 (5)
IMCI	29.7 (11)	(2)	17.8 (13)
Blood bank	13.5 (5)	- (0)	6.9 (5)
Days per week (median (min,max))	5 (5,7)	7 (5,7)	7 (5,7)
Hours per day (median (min,max))	8 (4,25)	8 (3,24)	8 (3,24)
Facility had a supervisory visit in last 6 months	94.6 (35)		
Visit by Province Health Department	64.9 (24)	-	
Visit by Operational District	73.0 (27)	-	
National	40.5 (915)	-	
Has copy of the National Treatment Guidelines for Malaria	100 (37)	61.1 (22)	80.8 (59)
Treat severe cases of malaria	35.1 (13)	41.7 (15)	38.4 (28)
Refer severe cases of malaria	86.5 (32)	86.1 (31)	86.3 (63)
Has outpatient register	100 (37)	22.2 (8)	61.6 (45)
Outpatient register up to date	94.6 (35)	8.3 (3)	52.1 (38)

All private facilities sampled were for profit facilities and a majority of them were cabinets. It is encouraging to note that nearly all the public health facilities had supervisory visits within the past 6 months by both the Provincial Health Department and Operational District staff. In fact, over 80% of the supervisory visits took place in the 2 months prior to the survey. The main activities during these supervisory visits were observing work (80%), checking records /reports (66%), checking health facility supplies (29%), and updates provided (14%). Only in 5.7% (n=2) praise was given and in 2.9% (n=1) problems were discussed. In 88.6% (n=31) of the health facilities visited feedback about the visit was given. Whilst the last point is encouraging the low levels of

encouragement and problems discussed indicate the importance of further developing supportive supervision skills. In public health facilities, 76% (n=28) reported that they send a monthly list of cases by village to CNM.

Table 6.2 Health facility staff characteristics (respondents)

	Public facilities	Private facilities	Total
	% (N)	% (N)	% (N)
Total	100 (37)	100 (36)	100 (73)
Respondent's position			
Health Facility Chief	73.0 (27)	91.7 (33)	82.2 (60)
Deputy chief	21.8 (8)	8.3 (3)	15.1 (11)
Acting officer	2.7 (1)	- (0)	1.4 (1)
Respondent's sex			
Male	86.5 (32)	88.9 (32)	87.7 (64)
Female	13.5 (5)	11.1 (4)	12.3 (9)
Respondent's age			
20 to <40 years	18.9 (7)	22.2 (8)	20.6 (15)
40 to 49 years	43.2 (16)	55.6 (20)	49.3 (36)
>=50 years	37.8 (14)	22.2 (8)	30.1 (22)
Formal training			
Doctor	8.1 (3)	30.6 (11)	19.2 (14)
Pharmacist	- (0)	2.8 (1)	1.4 (1)
Nurse	83.8 (31)	30.6 (11)	57.5 (42)
Midwife	5.4 (2)	- (0)	2.7 (2)
Other	2.7 (1)	33.3 (12)	17.8 (13)
Knowledge of antimalarials			
Knows recommended drug for uncomplicated *P.falciparum*	81.1 (30)	58.3 (21)	69.9 (51)
Knows recommended drug for uncomplicated *P.vivax*	83.8 (31)	77.8 (28)	80.8 (59)
Heard about activities to stop resistance	75.7 (28)	80.6 (29)	78.1 (57)
Aware that some antimalarials are banned	73.0 (27)	80.6 (29)	76.7 (56)
Knows which drugs are banned (any oral artemisinin based monotherapy)	27.0 (10)	44.4 (16)	35.6 (26)
Heard about fake drugs	97.3 (36)	100 (36)	98.6 (72)
Seen fake drugs	38.2 (13)	52.8 (19)	45.7 (32)
Had malaria related training in 2010	32.4 (12)	47.2 (17)	39.7 (29)

Respondents were mostly nurses in public health facilities while the there were more doctors and other qualifications found in the private health facilities. The average amount of training for respondents from public facilities (median 3 years) was less than that for private facilities (median 6yrs). Approximately 40% of respondents had some malaria training in 2010, and this was slightly higher in private facilities compared to public facilities. Training was mostly case management and rational antimalarial drug use.

Knowledge about recommended treatments for *P. falciparum* and *P. vivax*, and antimalarial drug resistance was generally good. The low percentage of respondents in the private sector knowing the recommended drug for *P. falciparum* is of concern, given that 47% of respondents had received training in 2010, this requires further communication or more effective training. The percentage who had heard about resistance was encouragingly high in both sectors nationwide, but interestingly higher among private providers than public health providers. Nonetheless, there is a need to improve awareness in both sectors about banned and fake drugs, perhaps including more demonstration of how to recognise fake drugs.

Table 6.3 Health facility staff characteristics

	Public facility staff (N=311)	Private facility staff (N=64)
Number of staff per facility		
Mean	8.4	1.8
Median	8	1[1]
Minimum	5	1
Maximum	11	5
Highest qualification		
Medical doctor	2.6 (8)	**23.4** (15)
Medical assistant	9.1 (28)	18.8 (12)
Pharmacist	0.7 (2)	- (0)
Laboratory technician	0.3 (1)	3.1 (2)
Nurse	**55.0** (170)	**32.8** (21)
Midwife	28.8 (89)	- (0)
Other	3.6 (11)	21.9 (14)
Present on day of survey		
In facility	84.0 (258)	90.3 (56)
In field	16.0 (49)	9.7 (6)
Years in service		
<5 years	35.2 (108)	42.9 (27)
5 to <15 years	28.0 (86)	38.1 (24)
15+years	36.8 (113)	19.0 (12)
Reported in service malaria related training	**79.7** (248)	**96.9** (62)
Type of last malaria related training		
Case management	40.8 (82)	38.9 (21)
Malaria laboratory	7.0 (14)	11.1 (6)
Health education	8.5 (17)	5.6 (3)
Insecticide-treated net distribution	2.0 (4)	1.9 (1)
Epidemiology	1.5 (3)	- (0)
Other (not specified)	**40.3** (81)	**42.6** (23)

Staff review was completed for all public health facilities, and all but 2 private facilities. Public facilities had significantly more staff compared to private facilities ($p<0.001$) probably because most private facilities were cabinets. Most of the private health facilities only had one staff with relatively fewer years of being in practice.

Nearly all private health facility staff reported to have undergone malaria related training compared to only 80% of public health facility staff. Of those who said they had any malaria training, year and length of last training was specified for approximately two thirds of the staff in public facilities (n=134) and just over half of the staff in private facilitates (n=29). Over 60% who specified year of training, reported training in 2009 or 2010, most reported training to be 3 or 5 days with almost 60% of these 3 days or less. Furthermore, a significant proportion of the respondents reported training in “other” aspects of malaria. PSI has provided training on correct management of malaria in private outlets for the past 8 years.

[1] 35 private health facilities had only 1 staff

Table 6.4 Summary of artemisinin-based combination therapy (ACTs), antimalarials and rapid diagnostic tests (RDTs) in stock at health facilities

Item	Public facilities N (%)	Private facilities N (%)
	(N=37)	(N=36)
Any antimalarial	100 (37)	91.7 (33)
ACTs	86.5 (32)	72.2 (26)
AMT (artemisinin based monotherapy) tablets	2.7 (1)	11.1 (4)
AMT (artemisinin based monotherapy) injections/suppositories	32.4 (12)	33.3 (12)
Non artemisinin antimalarials	73.0 (27)	69.4 (25)
Unspecified antimalarials or drug cocktail	2.7 (1)	5.6 (2)
Any RDTs	91.9 (34)	88.9 (32)

Days stockout was not completed correctly in the stock review. In previous surveys this has been problematic it has been suggested this may be because of the confused definition of stockout. However, there was a direct question on stockout, from this 37.8% (n=14) public facilities and 17.1% (n=6) private facilities reported a stock out of any drugs (it was not specific to particular drugs). This is obviously high but as it is non specific to ACT's or even antimalarials it is difficult to interpret. The main reason public facilities gave for stockout of any drugs was the lack of supplies from the OD.

Nearly all public facilities had up to date stock records 97.3% (n=36) compared to only 11.1% (n=4) of privates facilities, $p<0.001$. It was interesting to note that the tally of stock agreed with the stock records in public facilities, 97.3% (n=36) but not in private facilities, 8.6% (n=3), $p<0.001$ – indicating that the private providers do not closely monitor their stock supplies of drugs. All public facilities and 77.1% (n=27) of private facilities reported that they manage their drug stocks using the first in first out principle to minimize the risk of having expired drugs.

Table 6.5 Health facilities with stock of specific antimalarials, other drugs and RDTs

	Public facilities (N=37)		Private facilities (N=36)	
	Usually stocked[1]	Any with expired drugs	Usually stocked	Any with expired drugs
Antimalarials	% (N)	N	% (N)	N
A+M1[2]	73.0 (27)	0	5.6 (2)	1
A+M2	73.0 (27)	2	8.3 (3)	1
A+M3	64.9 (24)	0	2.8 (1)	1
A+M4	8.1 (3)	0	5.6 (2)	1
A+M5	83.8 (31)	1	8.3 (3)	1
Malarine[3] **(adult)**	- (0)	-	**52.8** (19)	3
Malarine (child)	- (0)	-	**33.3** (12)	2
Malarine (adolescent)	- (0)	-	**44.4** (16)	2
Artequin	2.7 (1)	0	22.2 (8)	0
Duo-cotecxin	8.1 (3)	1	2.8 (1)	0
Artekin	- (0)	-	8.3 (3)	1
Artequick	- (0)	-	2.8 (1)	0
Cotecxin	- (0)	-	8.3 (3)	0
Artesunate tablet	- (0)	-	- (0)	-
Artesunate injection	2.7 (1)	1	2.8 (1)	0
Artesunate suppository	- (0)	-	- (0)	-
Artemether tablet	- (0)	-	- (0)	-
Artemether injection	66.7 (22)	0	61.3 (19)	0
Artemisinin tablet	2.7 (1)	0	2.8 (1)	0
Artemisinin suppository	- (0)	-	-(0)	-
Mefloquine	10.8 (4)	0	**22.2** (8)	0
Quinine tablet	42.3 (16)	1	11.1 (4)	0
Quinine injection	8.1 (3)	0	2.8 (1)	0
Chloroquine	67.6 (25)	0	58.3 (21)	0
Primaquine	- (0)	-	**2.8** (1)	0
Malarone	- (0)	-	- (0)	-
Coartem	- (0)	-	- (0)	-
Other malaria drug	- (0)	0	- (0)	-
Drug cocktail	2.7 (1)	0	5.6 (2)	0
Other drugs				
Tetracycline/doxycycline	56.8 (21)	0	38.9 (14)	0
Other antibiotics	83.8 (31)	0	88.9 (32)	0
Paracetamol	97.3 (36)	0	97.2 (36)	0
RDTs				
Carestart	83.8 (31)	0	13.6 (5)	0
Paracheck	2.7 (1)	0	11.1 (4)	0
Malacheck	5.4 (2)	0	72.2 (26)	0

The inventory of antimalarial drugs, RDTs, and other drugs available in public and private health facilities indicate that not all the recommended antimalarial drugs were usually available. For example, only half of the private providers usually stocked Malarine and even fewer still for child doses. It was interesting to note that mefloquine was still usually stocked in 22% of private health facilities. Primaquine also appeared to be available in the private health facilities – though it is uncertain if testing for glucose-6-phosphate dehydrogenase (G6PD) deficiency was also available.

[1] This question asked about whether there were stocks usually available rather than whether the drug or supply was available at the time of the visit.

[2] A+M is the brand of artesunate plus mefloquine for public sector only

[3] Malarine is a brand name for AS/MQ equivalent to A+M promoted for the private sector (PSI)

The availability of other items such as mosquito nets was also very limited. Only 2.7% (n=1) public facility and 5.6% (n=2) private facilities had a stock of mosquito nets and the brand of mosquito net was not given. Only 70.3% (n=26) public facilities and 80.3 (n=29) private facilities had thermometers in stock. The lack of thermometers in 30% of public sector facilities suggests significant system weaknesses.

Table 6.6 Laboratory services and equipment available at health facilities

	Public facilities (N=37)	Private facilities (N=36)
	% (N)	**% (N)**
Malaria service		
Microscopy & RDT	35.1 (13)	25.0 (9)
Microscopy only	8.1 (3)	8.3 (3)
RDT only	56.8 (21)	66.7 (24)
Has laboratory technician (for facilities which use microscopy)		
Full time technician	100 (16)	58.3 (7)
Part time technician	-	33.3 (4)
None		8.3 (1)
Has working microscope (for facilities which use microscopy)	87.5 (14)	83.3 (10)
>1 week with no microscope in the last 3 months	18.8 (3)	- (0)
>1 week with no slides in the last 3 months	43.8 (7)	8.3 (1)
>1 week with no giemsa stain in the last 3 months	25.0 (4)	8.3 (1)
Availability of RDTs[1]		
Carestart	91.7 (33)	25.7 (9)
Paracheck	- (0)	5.7 (2)
Malacheck [2]	5.6 (2)	77.2 (27)
Optimal	- (0)	2.9 (1)
Other		
>1 week with no stock of RDTs	16.7 (6)	14.7 (5)
Has laboratory register/book	78.4 (29)	11.4 (4)
Laboratory register/book up to date (for those who had a register)	100 (29)	100 (4)
Has laboratory manual for malaria	83.3 (30)	31.4 (11)

Both public and private health facilities offer microscopy and RDT services. Among the health facilities with a working microscope, it is concerning that microscopy supplies including slides and stain were not available in the last 3 months, particularly in the public health facilities. Most of the RDTs used in the public health facility were the Carestart, while in the private health facilities Malacheck was more prevalent.

Among the public health facilities that have microscopy, there is a quality assurance system in place (4 send to CNM, 10 send to the Province, and 3 to both). Only 3 private health facilities perform QA and they all send the slides elsewhere other then the provincial or national reference laboratories for cross-checking.

[1] 1 missing public and 1 missing private for RDT brand
[2] Malacheck is a brand name for the RDT socially marketed by PSI and is equivalent to Carestart

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 health facility system, exit interviews with all fever cases were used to obtain a proxy measure of service delivery. In addition, in public health facilities only where malaria cases are recorded and kept to date from the health facility review, an attempt was made to follow up and interview the most recent 20 malaria cases in their villages. In the tables below, these malaria cases are referred to as case follow up.

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

	Case follow up Public facilities (N=427)	Exit interviews Public facilities (N=520)	Exit interviews Private facilities (N=469)
	Malaria cases	Fever patients	
	% (N)	% (N)	% (N)
Age / sex			
Under 5 years	4.7 (20)	33.8 (176)	40.9 (192)
5 to 14 years	16.4 (70)	20.8 (108)	16.4 (77)
15+years male	59.7 (255)	24.6 (128)	26.4 (124)
15+ years female	19.2 (82)	20.8 (108)	16.2 (76)
Education			
Child <5years	5.4 (23)	36.0 (187)	41.6 (195)
No school	15.0 (64)	14.2 (74)	10.9 (51)
Primary	62.1 (265)	42.3 (220)	35.2 (165)
Secondary	15.9 (68)	7.5 (39)	11.5 (54)
Above secondary	1.6 (7)	- (0)	0.9 (4)
Occupation			
Child	5.2 (22)	37.1 (193)	44.1 (207)
Student	18.3 (78)	19.4 (101)	16.4 (77)
Farmer	**51.8** (221)	29.4 (153)	23.5 (110)
Labourer	7.0 (30)	5.0 (26)	5.8 (27)
Fisherman	- (0)	0.2 (1)	0.2 (1)
Merchant	4.0 (17)	0.8 (4)	3.4 (16)
Housewife	2.6 (11)	1.5 (8)	2.3 (11)
Soldier	1.4 (6)	- (0)	1.3 (6)
Other	9.8 (42)	6.5 (34)	3.0 (14)
Time at current address			
<6 months	1.9 (8)	6.1 (32)	7.2 (34)
6 months to <1 year	2.1 (9)	6.5 (34)	8.1 (380
More than 1 year	96.0 (410)	87.3 (454)	84.6 (397)
Slept in forest in the last 6 months	**75.4** (322)	37.1 (192)	26.7 (125)
Travelled in the 2 weeks prior to illness	60.3 (126)	-	-
Sleep under net previous night	90.0 (379)	92.1 (479)	93.6 (438)

A total of 989 patients presenting with fever (520 in public health facilities and 469 in private health facilities) were administered an exit interview, and a further 427 patients with a malaria diagnosis within the past 3 months according to public health registers were followed up and administered an exit interview retrospectively.

The characteristics between recent malaria patients and those interviewed following consultation at the health facility (public and private) were slightly different. A majority of the malaria cases not surprisingly were adult males, while most seeking treatment for fever at public and private health facilities were children under 5 years. It was interesting to note that half of the

malaria cases were farmers and reported to have slept in the forest in the 6 months. Nearly all respondents had been residents at their current address for more than 1 year.

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

	Case follow up Public facilities (N=427)	Exit interviews Public facilities (N=520)	Exit interviews Private facilities (N=469)
	Malaria cases	**Fever patients**	
	% (N)	**% (N)**	**% (N)**
Saw health worker and had blood test	97.4 (416)	44.8 (233)	59.1 (277)
Saw health worker and received ACTs	47.3 (202)	15.4 (80)	11.9 (56)
Saw health worker and received antimalarials	65.8 (281)	22.1 (115)	24.7 (116)
Reported all 3 key assessments performed by health worker[1]	35.8 (153)	10.8 (56)	23.7 (111)
Reported all 3 key assessments performed by health worker (excluding travel)[2]	64.4 (275)	27.5 (143)	47.5 (223)
If given antimalarials health worker advised how to take them	99.3 (277)	96.5 (110)	98.2 (107)

Malaria cases who were followed up were asked what drugs they took before going to the health facility in which 0.5% (2) said they took an ACT before going to the health facility and 2% (8) reported taking an antimalarial beforehand.

The low percentage of fever cases seeing a health worker and receiving antimalarials in the exit interviews reflects that the interviews were of fever cases, many of whom were not found to be malaria positive. It is encouraging to see that nearly all the malaria cases (97%) who visited the health facility for treatment saw a health worker and had been administered a blood test, and half of these received an ACT and another two-thirds received an antimalarial (presumably chloroquine for the treatment of Pv). It is interesting that the percentage of fever patients reporting all three key assessments is low among the private sector but even lower in the public sector, suggesting further needs to improve quality of care through supervision. At least the proportion given advice on taking antimalarials was high in both sectors.

[1] Health care provider asked about travel & fever, auxiliary temperature taken, and tested
[2] Health care provider asked about fever, auxiliary temperature taken, and tested

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

	Case follow up Public facilities (N=427)	Exit interviews Public facilities (N=520)	Exit interviews Private facilities (N=469)
	Malaria cases	Fever patients	
	% (N)	% (N)	% (N)
A+M	**36.8** (157)	11.9 (62)	2.3 (11)
Malarine	6.3 (27)	1.0 (5)	7.2 (34)
Other artesunate + mefloquine	2.1 (9)	- (0)	0.6 (3)
Duo-Cotecxin	2.1 (9)	2.7 (14)	0.4 (2)
Other DHA-piperaquine	0.2 (1)	- (0)	- (0)
Artemisinin-piperaquine	0.2 (1)	- (0)	0.7 (7)
DHA only	-(0)	- (0)	- (0)
Plasmotrim	**0.5** (2)	- (0)	- (0)
Other artesunate only	2.1 (9)	- (0)	1.1 (5)
Artemether only	0.2 (1)	0.8 (4)	0.4 (2)
Artemisinin only	-(0)	- (0)	- (0)
Mefloquine only	-(0)	0.2 (1)	0.2 (1)
Quinine	1.9 (8)	0.2 (1)	0.2 (1)
Chloroquine	**14.3** (61)	4.6 (24)	7.0 (33)
Primaquine	- (0)	- (0)	- (0)
Malarone	- (0)	- (0)	- (0)
Coartem	- (0)	- (0)	- (0)
Drug cocktail	0.9 (4)	0.4 (2)	4.1 (19)
Other antimalarials	- (0)	0.8 (4)	0.6 (3)
Tetracycline/Doxycycline	0.5 (2)	0.4 (2)	0.4 (2)
Other antibiotics	1.4 (6)	**37.1** (193)	**40.7** (191)
Paracetamol	58.1 (248)	87.3(454)	57.1 (268)
Vitamins	4.2 (18)	21 (109)	20.9 (98)
Infusion/IV fluids	6.3 (27)	9.0 (47)	**31.8** (149)
Traditional herbs	- (0)	- (0)	- (0)
Other unspecified antimalarials	2.8 (12)	**42.7 (222)**	**48.8 (229)**

Among the malaria case follow up patients, these individuals received A+M (37%), chloroquine (14%), Plasmotrim (an oral artemisinin monotherapy) (0.5%), and paracetamol (58%). Among the fever cases, it is not expected that they would be treated with an antimalarial, but rather 37% and 41% of patients received antibiotics for the episode of fever. The over-prescribing of antibiotics should be reviewed more carefully, in addition to the prescription of "other unspecified antimalarials". The high frequency of these warrants further investigation.

On more detailed analysis of the malaria case follow up survey, 21.8% (n=93) cases said they paid nothing for their treatment. The median cost for those who paid was 2500 Riel (minimum 500 Riel, maximum 200,000).

The diagnoses for the 384 exit interview patients who received antibiotics for the fever was determined as follows: malaria (23), ARI (29), URI (66), cold/flu (158), dengue (9), diarrhoea (11), anaemia (2), dehydration (3), malnutrition (3) and other (104). The over prescription of antibiotics is particularly alarming, though not uncommon in these settings as well as the frequent use of infusions and IV fluids.

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 (427)	100 (427)
Mean age (years)	25.6	25.4
Diagnosed with malaria	100 (427)	85.9 (364)
Had blood test	97.4 (416)	99.5 (424)
Type of test		
RDT	73.3 (313)	72.3 (309)
Slide	20.4 (87)	27.2 (116)
Not sure	6.3 (27)	0.5 (2)
Malaria species		
P. falciparum	9.3 (37)	44.5 (189)
P. vivax	28.5 (113)	32.9 (140)
Mixed	6.1 (24)	19.5 (83)
Not told/don't know	56.1 (253)	3.1 (15)

Table 7.4 compares some information reported by the malaria case during the follow up interviews and the actual details recorded in the register at the health facility for that case. Prior to interviews these details were copied from the register to the relevant section in the case follow up questionnaire. Where differences occur a possible reason is recall bias depending on how long the case was seen at the facility prior to the interview.

It was interesting that not all the malaria cases in the follow-up were recorded as malaria in the case registers. It also suggests that patients themselves may tend to assume malaria when it is not. More than half of the patients did not know or were not told their malaria result (more specifically the parasite species). The results show high discordance between what patients perceive or know and what was recorded in the case registers. More research in this area is needed to improve communication of results to patients.

Table 7.5 Reported diagnosis and treatment among exit interview fever patients

Diagnosis[1]		Treatment received			
		ACT	Any antimalarial	Any antibiotic	Infusion
	N	% of patients receiving treatment (N)	% of patients receiving treatment (N)	% of patients receiving treatment (N)	% of patients receiving treatment (N)
Public health facility	422	(79)	(112)	(157)	(45)
Malaria	118	100 (79)	99.1(111)	1.9 (3)	73.3 (33)
Acute/upper respiratory infection	66	- (0)	- (0)	27.4 (43)	6.7 (3)
Cold / flu	157	- (0)	- (0)	46.5 (73)	2.2 (1)
GI infection	15	- (0)	- (0)	2.5 (4)	4.4 (2)
Other	66	- (0)	0.9 (1)	21.7 (34)	13.3 (6)
Private health facility	433	(56)	(116)	(172)	(166)
Malaria	130	94.6 (53)	94.0 (109)	11.6 (20)	49.4 (82)
Acute/upper respiratory infection	79	- (0)	1.7 (2)	31.4 (54)	13.3 (22)
Cold / flu	120	3.6 (2)	1.7 (2)	37.2 (64)	7.8 (13)
GI infection	36	1.8 (1)	0.9 (1)	8.1 (14)	12.7 (21)
Other	69	- (0)	1.7 (2)	11.6 (20)	16.9 (28)

[1] Note patients can have multiple diagnosis and multiple treatments. For diagnosis group malaria takes priority then respiratory infection, GI and other.

The proportion of patients reporting who received an infusion and diagnosed with malaria was higher in the private sector and much higher in the public sector (73%). Unless these were all inpatients with severe disease, it demonstrates huge over-reliance on infusions. This has been known as a problem, but the scale here is alarming. The use of antibiotics for colds and flu is also unacceptably high in both public and private sectors.

Discussion

This Cambodia Malaria Survey (CMS 2010) provides useful information for the tracking of progress and impact made by the national malaria programme over the years. This main scope of this report is to compare results between Domain 1 and Domain 2, and not meant to compare directly the results from 2004, 2007, and 2010. It is envisioned that a separate comparative report will follow this one looking at the malaria trends, specific indicators, and impact over the longitudinal series of malaria surveys.

However, it is important to acknowledge the top-line observations about the overall malaria trends over time since 2004. Overall, malaria prevalence for both species in Cambodia has decreased from a baseline of 4.4% (CMBS 2004) to 2.6% (CMS 2007) and now 0.9% (CMS 2010). This is indeed a very encouraging trend, particularly in light on Cambodia's new national strategy for malaria elimination by 2030. This reduction is most notable in Domain 1 (geographic areas covered for containment of artemisinin resistant malaria parasites) where the prevalence has dropped to 0.5% (CMS 2010). This reduction is also supported by the observed decline in overall malaria incidence as reported through public health facilities. The trend as reported through the health information system shows a 32% reduction in the incidence of confirmed malaria from 4.4 per 1000 in 2004 to 3.0 per 1000 in 2007. However, figures for 2010 suggest that the malaria incidence has increased slightly to 3.4 per 1000 – perhaps due to increased efforts for improved surveillance and emphasis on parasitological confirmation particularly in Domain 1.

It should be noted that the design of the CMS 2010 aims to serve two key objectives: 1) to serve as much as possible a comparison for the CMBS 2004 and CMS 2007 surveys, and 2) to provide data for direct comparison and impact evaluation of the Containment Project. The survey was designed to focus on two Domains - **Domain 1** covers the areas of the Containment Project Zones 1 and 2 in western Cambodia (areas with evidence of confirmed artemisinin resistance and the provinces buffering these priority areas, respectively) and **Domain 2** covers the rest of the eastern and southern parts of the country with strengthened malaria control activities. A separate report comparing the results for the Containment Surveys in 2009 and 2010 is currently being drafted.

Household Survey

The household survey with a malariometric component aimed to collect information on malaria prevalence, key household characteristics, mosquito net coverage and use, treatment-seeking behaviors for fevers, and knowledge about malaria prevention and treatment. As with previous surveys, malaria prevalence is strongly correlated with being an adult male, being from low socio-economic status, going to the forest, and living closest to the forest. These determinants are common for the epidemiology of malaria transmission in this region. It will be important for national programmes to continue to target their strategies and activities on these vulnerable populations, particularly for mobile and migrant workers who are considered most at risk.

With regards to mosquito net coverage, the proportion of households living in targeted at-risk villages with at least one ITN has improved from 36% (2004) to 43% (2007) and now at 75% (2010). It is also encouraging that the coverage of at least one ITN per household was similar between Domain 1 (78%) and Domain 2 (72%). The proportion of household with *sufficient* mosquito nets (i.e., at least one ITN for every two persons) has markedly improved since 2004 and 2007 but certainly should be improved from 42% in Domain 1 and 33% in Domain 2. With the increased efforts and resources to ensure that sufficient mosquito net coverage is achieved, particularly in the Containment zones (Domain 1), it is expected that coverage should be much higher.

It is encouraging that the proportion of individuals sleeping under an ITN the previous night has improved to 53% (all risk groups) in 2010 compared to 29% in 2004 and 25% in 2007. The proportions were found to be similar between the two Domains, which reinforces the increased

utilization of ITNs overall. Temporary forest goers sleeping under ITN also increased slightly from 35% in 2007 to 37% in 2010. No data from 2004 was available because this was not a target group in the survey. It will be especially important to target communications strategies among temporary forest goers since their risk for malaria is three-fold ($p<0.001$) compared to those who do not go to the forest.

General knowledge of malaria prevention and treatment is high among target groups, particularly with respect to the causes, signs, and symptoms of malaria. However, there is a great need for improvement of treatment-seeking knowledge and behavior. Only 20% of respondents knew that they should seek treatment at health centers or from VMWs, and even knew that they should get a malaria test before treatment or seek treatment within 24 hours. Approximately half of respondents could recite at least one key malaria message (primarily about the use of ITNs), but only 4% knew 3 messages. This suggests that more BCC/IEC focus should be placed on treatment-seeking behavior.

Net and drug outlet surveys

An added value of the CMS survey is the sampling of mosquito net and drug outlets from the private sector within the household surveys. The mosquito net and drug outlet surveys sought to assess the knowledge and behaviors of the providers of antimalarial drugs, RDTs, and LLINs in Cambodia. Most drug sellers surveyed knew the recommended drug treatment for *P. falciparum*, particularly in Domain 1 (91%) compared to Domain 2 (79%). Knowledge about the treatment for *P. vivax* was more concerning as only 22% and 47% knew the recommended appropriate treatment in Domain 1 and Domain 2, respectively. Considering the increasing proportion of *P. vivax* cases and the phased malaria elimination strategy in the country, it will be equally important to place emphasis on increasing provider knowledge about the diagnosis and treatment of vivax malaria.

The bundling strategy of commercially available nets is a national PSI programme. From our net outlet survey, it appears that 65% of mosquito net outlets sold bundled nets and approximately half of the respondents who purchased a bundled net re-treated their conventional nets themselves (Table 4.5). The lack of any bundled nets treated in the past 12 months is not consistent with the responses in Table 4.5, and this may suggest that the terminology of bundled nets is not used by the public. Further analysis into the effectiveness, sustainability, and methods of individual retreatment may be warranted.

The availability of artemisinin containing monotherapies, especially in the private sector, is still unacceptably high. It is concerning that 13% of public sector and 28% of private sector facilities do not usually stock any ACT. While some of these facilities will be in areas of low malaria transmission, so that lack of stock in the private sector is not surprising, the mobility of the populations at greatest risk means that appropriate antimalarials should be available throughout the country. Altogether, however, great achievements have been made since the ban on oral artemisinin monotherapies in March 2009 – as 92% of drug outlets in Domain 1 and 77% in Domain 2 did not sell these drugs during the time of the visit.

Health facility survey

The aim of the health facility survey is to assess the delivery of services for fever and malaria cases within the public and private sectors. Due to the relatively low incidence of malaria throughout the country, it is increasingly more difficult to conduct research dependent on prospective malaria cases. This is a challenge for ongoing therapeutic drug efficacy monitoring sites conducted every year. As a result, the CMS 2010 piloted a combination approach of retrospective and prospective interviews to obtain better estimates for the availability and quality of delivery of malaria-related services. Prospectively, exit interviews for fever cases were conducted at public and private health facilities. At the same time, retrospectively, up to 20 malaria cases within the last 3 months presented and recorded in public health facility registers were followed up in their villages.

One of the key findings from the malaria case follow up survey was that only one-third of patients received artesunate + mefloquine while another 14% received chloroquine presumably for the treatment of *P. vivax*. It is worth noting that 2 cases received oral artemisinin monotherapy (Plasmotrim) within the past 3 months from public health facilities. From the exit interviews in both public and private health facilities, the over prescription of antibiotics and frequent use of IV infusions for fever is concerning particularly among the private sector – though it is known that this practice is fairly commonplace in this part of the world. Among the patients receiving IV infusion, 33 (73%) and 82 (49%) were diagnosed as malaria in the public and private health facility, respectively. The over-reliance on IV infusion for the treatment of malaria in public health facility should be addressed.

Furthermore, out of the 384 fever patients interviewed who received antibiotics, only 95 (25%) were determined to have acute or upper respiratory infection which may warrant the use of such drugs. Health facility surveys in both public and private sectors, confirmed through exit interviews and malaria case follow up, provide a good way to correlate patient's perceived malaria services with those of providers. More research in this area is needed to improve the quality of care provided at public and private facilities coupled with emphasis on appropriate and accurate communication strategies to patients.

Conclusions and Recommendations

The Cambodia Malaria Survey (CMS) 2010 is useful to monitor and evaluate the impact of CNM and partner activities on malaria prevalence and its reduction over time. Conducted since 2004 and again in 2007, the CMS 2010 allows for a longitudinal comparison and tracking of malaria indicators by the national programme. Additionally, in 2009, the strategy to contain artemisinin resistance was implemented in ten provinces in Western Cambodia and a survey was conducted to serve as baseline to evaluate the intensive activities to contain artemisinin resistance. Domain 1 of the CMS 2010 survey also serves as a comparison for key monitoring and evaluation (M&E) framework and indicators for the Containment Project.

The malariometric results from the CMS 2010 reinforce that malaria prevalence has indeed declined since the CMBS 2004 and CMS 2007 surveys. There is a dramatic reduction of 80% in malaria prevalence since 2004. The marked reduction is also confirmed by available malaria incidence data from the routine health information system however no routine data is currently reported by the private sector where a large proportion of the population seek treatment for fever. CNM and partners are currently working together to establish systems to address this issue.

The CMS 2010 allows for comparison between Domain 1 (which includes Containment Project Zones 1 and 2 in Western Cambodia) and Domain 2 (the rest of Eastern and Southern Cambodia). This comparison is useful in assessing the impact of artemisinin resistance containment activities in Domain 1 compared to the rest of the country. As a result, the CMS 2010 survey has highlighted the following key findings and recommendations.

Household Survey

- ***Improve targeted BCC/IEC strategies and messages***. Since CMBS 2004 and CMS 2007 surveys, knowledge about malaria transmission and prevention has remained generally high among respondents. However, there is still a great need for improvement of treatment-seeking knowledge and behaviour. Knowledge of Malarine for the treatment of malaria is still robust, but more effective strategies for BCC/IEC regarding compliance and full treatment courses may still needed. Regarding the use of ITNs and LLINs, improved BCC/IEC strategies and messages targeted for people going to the forest is critical – as these still remain the most at-risk population. Going forward, as malaria infection and transmission decreases in Cambodia, it will be important to ensure that BCC strategies and messages are appropriate in a malaria elimination context.

- ***Further increase ITN/LLIN coverage of sufficient nets.*** Efforts by the national malaria programme to increase coverage of ITN and LLIN have largely been successful due to the intensive distribution programmes supported by the Global Fund, Bill & Melinda Gates Foundation, and other key stakeholders. Despite these efforts, the programme should aim to ensure that sufficient ITN/LLIN coverage (at least one ITN/LLIN for every two persons and at least one ITN/LLIN per person in priority artemisinin resistance containment zones) is met, particularly among larger households in targeted at-risk villages.

- ***Increase and maintain the use of ITNs and LLINs.*** The CMS 2010 has shown that the overall proportion of those who slept under an ITN/LLIN the previous night has increased to more than 50% from a baseline of 29% in 2004 and 25% in 2007. Efforts must be strengthened to maintain these substantial gains in ITN/LLIN use among all target groups. Furthermore, as malaria prevalence and incidence continues to decline, more effective strategies will be needed to promote the continued use of ITNs and LLINs.

- ***Promote strategies targeting vulnerable groups including forest goers.*** Forest goers have a three-fold increased risk of malaria compared to those who do not go to the forest. *The national programme should address this vulnerable risk group as a matter of priority throughout the country*. Although this survey did not purposefully sample military

personnel, it is not unrealistic to assume that this population (primarily based in the forested areas along the borders) would also be at risk for malaria.

Net and Drug Outlet Survey

- ***Consider more emphasis on mosquito net retreatment.*** According to the CMS 2010 survey, the availability of insecticides for the retreatment of mosquito nets was found to be low. Nearly 20% of LLINs had been reported to have been retreated within the past 12 months. Coupled with the frequent washing of mosquito nets (i.e., more than 40% of nets were washed at least once a month), a more robust strategy to ensure that mosquito nets (particularly conventional nets) are impregnated with insecticides should be emphasized. In an attempt to address this issue, PSI has piloted a national programme for bundling mosquito nets with treatment kits, in 2010 and 2011 678,000 and 700,000 kits respectively were distributed; this programme will continue through to 2013.

- ***Further reinforce and promote the ban on oral artemisinin monotherapies.*** Drug outlet sellers had limited knowledge about the ban on oral artemisinin monotherapies. Despite the intensive efforts to enforce the ban on the importation of oral artemisinin monotherapies in the country, the availability of some such monotherapies in 9% and 23% of private sector outlets in Domain 1 and Domain 2, respectively, highlights the need to maintain drug regulatory efforts and enforcement.

- ***Promote training and refresher trainings for health facility providers and private drug outlet prescribers, particularly on the diagnosis and treatment for P. vivax***. Prescriber knowledge about treatment for *P. vivax* continues to be low, and more information for the treatment of *P. vivax* should be included in the training modules for case management of malaria. As the case load for *P. falciparum* is decreasing relative to *P. vivax*, it will be important to ensure that health staff in public, private, and communities, are better equipped to diagnosis and treat non-Pf malaria, including increasingly non-malaria fevers.

Health facility Survey

- ***Ensure availability of antimalarials and RDTs.*** The issue of stock-outs of antimalarial drugs and RDTs in public health facilities of more than 1 week within the past 3 months should be addressed. Public health facilities reported stockouts of drugs (28%) and RDTs (16%) for more than one week during the past 3 months. It is especially important to ensure that effective antimalarials, supplies and regents are available and adequately stocked at point of care, particularly for health facilities offering in-patient care where more severe cases would likely be seen.

- ***Manage the over-use of antibiotics and intravenous infusions for the treatment fever and malaria.*** The over-reliance on the use of antibiotics and intravenous infusions for the treatment of fevers and malaria should be assessed. Particularly as malaria declines in the country, more fevers presented at public and private health facilities will be non-malaria related. Improved and more sensitive algorithms and training for the treatment of these non-malaria fevers should be developed and implemented.

Operational Research

- ***Promote further operational research addressing the changing epidemiology of malaria.*** The epidemiology of malaria will likely change as the incidence of malaria continues to decline in the region. More research may be needed to evaluate the impact of changing species distributions (i.e., increasing *P. vivax* burden) on disease transmission dynamics. There is also a need for more information on the effect of the rapidly changing environment on malaria vector behaviour and possible secondary malaria species.

Annexes

Annex 1. Details of indicators CMS 2010
Annex 2. Informed consent form
Annex 3. Household questionnaire
Annex 4. Drug outlet questionnaire
Annex 5. Net outlet questionnaire
Annex 6. Health facility questionnaire
Annex 7. Case follow-up questionnaire
Annex 8. Exit interview questionnaire

Annex 1. Details of indicators CMS 2010 will address

Indicators	Funding/ Programme	Target	Geographic or other specifications
Household Survey:			
Malaria prevalence among residents and visitors (percentage) -disaggregated by: * containment zone * Age/sex groups including children aged 6–59 months (detection of parasitemia by microscopy & PCR)	Containment Project NMCP		Containment zones 1 and 2 (Domain 1)
% of families living in high malaria endemic areas (<2km from the forest) of 20 provinces that have sufficient treated mosquito nets (1 ITN/LLIN for 2 persons) OR 100% coverage of resident population (2 persons per net) with long-lasting insecticide-treated mosquito nets (LLINs) in Zone 1.	GFATM Round 6 Containment Project for zone 1	60% 100% coverage	Domains 1 and 2, <2km from forest
% of households at risk of malaria living in the targeted villages with at least one insecticide-treated net (LLIN/ conventional treated net) and/or sprayed by IRS in the last 12 months. OR % of households living in endemic areas with at least one ITN/LLIN and/or sprayed by IRS in the last 12 months >90% coverage of population <2km of a forest in Zone 2 with ITNs.	SSF Regional Framework Containment Project for zone 2	60% >90% coverage	Domains 1 and 2
% of general population living in high malaria endemic areas (<2km from the forest) of 20 provinces sleeping under a treated mosquito net the previous night OR % of population at risk of malaria living in target villages who slept under an ITN (LLIN/LLIHN/ conventional treated net) during the previous night OR % of individuals in areas at high risk of malaria who slept under an ITN/LLIN the previous night OR Population sleeping under LLINs/LLIHN/ITNs the previous night increased to >90% in Zone 1 and areas <2km from forest. Disaggregated by: % of children <5 years living in high malaria endemic areas (<2km from the forest) of 20 provinces sleeping under a treated mosquito net the previous night. % of pregnant women living in high malaria endemic areas (<2km from the forest) of 20 provinces sleeping under a treated mosquito net the previous night.	GFATM Round 6 SSF Regional Framework Containment Project GFATM Round 6 GFATM Round 6	70% 45% >90% 70% 70%	Domains 1 and 2, <2km from forest Domains 1 and 2, <2km from forest Zone 1 (Domain 2) and <2km from forest Domains 1 and 2, <2km from forest

Indicators	Funding/ Programme	Target	Geographic or other specifications
% of population living in villages located between 2-5km from the forest who slept under an ITN (LLIN/LLIHN/conventional treated net) during the previous night	SSF	25%	Domains 1 and 2, 2-5km from the forest
% of forest visitors in the targeted villages who reported sleeping under an ITN (LLIHN/LLIN/conventional treated net) the last time they slept in the forest. OR At least 80% of temporary forest workers/mobile populations sleeping under an ITN the last time the person spent the night in the forest.	SSF Containment Project	40% 80%	Domains 1 and 2, forest visitors Zone 1 (Domain 1)
% of population who treated their net with Super Malatab kit among those who purchased a bundled net within the past 6 months, in villages located within 5km from the forest.	SSF	Baseline to be established	Domains 1 and 2, <5km from forest
% of people in the target areas with fever in the last two weeks who received antimalaria treatment according to national policy within 24 hours of the onset of fever.	GFATM Round 6	60%	Domains 1 and 2
% of individuals residing in areas at risk of malaria with fever in the last two weeks who sought health care within 48 hours of onset of fever	Regional Framework		Domains 1 and 2
% of respondents in Zone 1 and Zone 2 who are aware of: - new treatment policy and - appropriate malaria diagnosis and treatment.	Containment Project		
% of target population who can explain how malaria is prevented through the use of ITN. OR % of population at risk who know the cause of, symptoms of, treatment for or preventive measures for malaria OR Proportion of household respondents in Zone 1 aware of key messages increased to 50% by end 2009 and >90% by end 2010.	SSF Regional Framework Containment Project	80% >90%	Domains 1 and 2 Zones 1 and 2 (Domain 1)

Indicators	Funding/ Programme	Target	Geographic or other specifications
Drug Outlet Survey:			
% of private sector outlets in endemic provinces not selling artemisinin monotherapy. OR % of private sector outlets not selling artemisinin monotherapy in Zone 1.	SSF Containment Project	75% 100%	Domains 1 and 2 Zone 1 (Domain 1)
% of private drug sellers who are aware of: - new treatment policy in Zone 1 - appropriate malaria diagnosis and treatment in Zones 1 and 2	Containment Project	>80%	Zone 1 (Domain 1) Zones 1 and 2 (Domain 1)
Health Facility Survey:			
People presenting to a health worker with fever who had a finger prick for malaria testing (percentage) disaggregated by: - Under 5 children - Other age/sex groups - Public and private sector	NMCP		
People presenting to a health worker with fever receiving antimalarial treatment according to national policy (percentage) disaggregated by: - Probable/confirmed - Species - Under 5 children - Other age/sex groups - Public and private sector - Within 24 hours/48 hours of onset of fever - Simple and severe malaria	NMCP		
% HFs: - that offer basic malaria care services (malaria diagnosis, treatment, referral, health education and ITNs) - with all malaria-responsible staff present in surveyed HF /engaged in field work on the day of the survey - with all 5 essential supplies to diagnose/prevent malaria in HF on day of the survey (thermometer, RDTs, microscope, slides and reagents, ITNs) - with first line medications for malaria on day of the survey - with up-to-date clinical/laboratory records of malaria cases - with up-to-date stock records	NMCP		

% HF in which interviewed HW reported receiving in-service or pre-service training in malaria in last 12 months	NMCP		
% HF that received malaria programme related **external** supervision at least once **in the last 3 months** (supervision included one or more of the following: checked records or reports, checked supplies, observed work, provided feedback, gave praise, provided updates, discussed problems)	NMCP		
% HF in which all 4 key assessment tasks are made by HW (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)	NMCP		
% HF in which the patient or caretaker of a child was prescribed an antimalarial can correctly describe how to administer the drug	NMCP		
Number and % of health facilities with no reported stock-outs lasting more than 1 week at any time during the past 3 months of : - nationally recommended antimalarial drugs (ACTs) - RDTs	SSF SSF	65% 65%	Domains 1 and 2
Health facilities with microscopy and/or rapid diagnostic testing capability (number or percentage) OR Diagnosis and new treatment available at 100% of health facilities (all levels).	NMCP Containment Project	 100%	 Zone 1 (Domain 1)
90% symptomatic Pf cases effectively treated according to Zone protocol in public (and private sector).	Containment Project	90%	Zones 1 and 2 (Domain 1)
100% of health centres and hospitals are fully functioning in Zone 1.	Containment Project	100%	Zone 1 (Domain 1)

Annex 2. Informed Consent Form

The Ministry of Health of the Royal Government of Cambodia recognized that Malaria is a major public health problem in the county and hence set up a specialized center called the National Centre for Parasitology, Entomology and Malaria Control (CNM) to plan, implement, monitor and evaluate an effective health programme to control and prevent the spread of the disease in the country. CNM carries out periodic assessment of the malaria situation in the country through health information collected routinely from the public health facilities in the country and also through special surveys and studies. By assessing the magnitude of the problem, CNM attempts to make realistic plans to control the disease in the country and in order to implement the programme effectively, seeks to mobilize the required funds from the Royal Government as well as through a wide range of donors. Currently the Global Fund for HIV/AIDS, TB and Malaria (GFATM), the World Health Organization (WHO), US Agency for International Development (USAID), U.K.'s Department for International Development (DFID), the World Bank (WB), and the Bill and Melinda Gates Foundation (BMGF) are among the major agencies supporting the National Malaria Control Programme. International NGOs (notably Partners for Development, Health Unlimited, and Population Services International) as well as local NGOs are currently collaborating with CNM as well as the Provincial Health Departments to ensure effective delivery of malaria services to the community. The Ministry of Health, CNM, all the partners and donor agencies are also interested in extending the usefulness of the most effective antimalarial drugs available by eliminating artemisinin-resistant parasites in Cambodia. For this purpose, with financial support from GFATM Round 6 and technical support from Malaria Consortium, CNM is undertaking malaria surveys in a sample of high risk villages in Cambodia from October to November 2010 to establish baseline information for the national malaria programme.

The study protocol had been submitted to and approved by the Ethics Committee of Ministry of Health, Cambodia.

Teams of research staff from CNM and (other partners) will visit selected households in the selected villages during the study period and undertake the following tasks:

1. *Administration of a questionnaire*: Questions relating to the causation, transmission, knowledge and actual use of preventive and treatment measures will be directed at the heads of households and their verbatim responses will be recorded.
2. *Drawing of blood* by finger prick and preparation of blood slides and filter paper samples on four members from each household for malaria in all the selected villages. We shall test one woman, one man, one child under five years old and one child between five and fourteen years (if present). If there are visitors to the household, up to four of these persons will be tested. Any pregnant women in the household will also be tested.

Your participation is completely at your own free-will and you may refuse to participate, without penalty, and you can choose not to answer any individual question or all of the questions or choose not to be finger-pricked for blood slide preparation. However, we hope that you will participate in this study since your views and participation is important.

If you do not want your child to participate in this study, he/she will still be able to receive treatment as usual at the nearest public health facility. Participation in this study will not cost you or your family anything. You may also withdraw your child from the study at any time and for any reason. You will not directly benefit from the study because you may not be currently suffering from malaria. However, results obtained from the study will greatly benefit the country and the populations exposed to the risk of contacting malaria, in improving the effectiveness of the current programme and planning more effective interventions against the disease in the future. Please let us know any time if there is anything you would like to know or are worried about regarding the study. There will be no cost to be incurred by you throughout the study period. In case of any illness due to the blood spot collection procedures related to the study, you will receive medical treatment for that illness free of charge and follow up for 1 year. The closest health facility will be open every day and someone will be available to attend to you. The containment project malaria survey will follow the policy of the "Helsinki Declaration and Good Clinical Practice (GCP)'.

Whatever information you provide will be kept strictly confidential and will not be shown to other persons.

Do you have any questions about the study?

In case of emergency, please contact:

Dr. Duong Socheat Phone: 012-815 950

I have been explained and have understood the above given information regarding the study and my participation in the study. I hereby, exercising my free power of choice give my consent to be included in the study and I am also aware of my right to withdraw my consent at any time during the study without giving any reason.

Subject's signature (or thumb impression):

_____

_____/_____/_____ (dd/mm/yyyy)

Witness's signature (or thumb impression):

_____

_____/_____/_____ (dd/mm/yyyy)

Investigator's signature (or thumb impression):

_____

_____/_____/_____ (dd/mm/yyyy)

Annex 3. Household Questionnaire

IDENTIFICATION

Cluster code (1-48): ..... ☐☐	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?	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/programme ..... 1 NGO worker/programme ..... 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

NO.	QUESTIONS	Net 1	Net 2	Net 3
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 Conventional 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 Conventional 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 Conventional 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
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

NO.	QUESTIONS	Net 1	Net 2	Net 3
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	Where did you get your net treated the last time?	At home .....1 In village.....2 In another village ....3 Other.....4 Spec_____	At home .....1 In village .....2 In another village ....3 Other.....4 Spec_____	At home .....1 In village .....2 In another village ....3 Other .....4 Spec_____
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**
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**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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 Other ..... 5 Specify:_____	
Q50	Do you have any new nets that you are not using to sleep under?	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	
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
Q60	Did (NAME) take a hammock net or 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 want to use ...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 want to use ...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 want to use...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 hammock net or 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 Mosquito net .....2 Not sure 8	Hammock net .....1 Mosquito net.....2 Not sure 8	Hammock net .....1 Mosquito 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**

NO.	QUESTIONS	Person 1	Person 2	Person 3
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**
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

NO.	QUESTIONS	Person 1	Person 2	Person 3
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
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

NO.	QUESTIONS	Person 1	Person 2	Person 3
Q78	Has (NAME) traveled to Thailand 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

NO.	QUESTIONS	Person 1	Person 2	Person 3
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
Q87	Has (NAME) traveled to Thailand 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
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**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q90	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	➔ **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 or dipstick) ..... 4 Other ..... 5 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	
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 type 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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q95	If you suspect someone in your household has malaria, where would you go for advice or treatment?	VMW/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?	VMW/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	
Q99	What messages or information related to malaria did you see or hear? 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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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**
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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q106	What happens if you don't take all the tablets (i.e., total number of tablets prescribed)?	Nothing ..... 1 Patient gets sick again ..... 2 Patient does not recover ..... 3 Other ..... 4 Specify:_____ Don't know..... 8	
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: ..... ☐☐
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**

NO.	QUESTIONS	Person 1	Person 2
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
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

NO.	QUESTIONS	Person 1	Person 2
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
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

NO.	QUESTIONS	Person 1	Person 2
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**
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**

NO.	QUESTIONS	Person 1	Person 2
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
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

NO.	QUESTIONS	Person 1	Person 2
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**
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 ..... 1 Health facility (public) ..... 2 Pharmacy/Shop ..... 3 Private health facility/lab ..... 4 Private doctor/nurse ..... 5 Other ..... 6 Specify: _____ Don't know 8	VMW ..... 1 Health facility (public) ..... 2 Pharmacy/Shop ..... 3 Private health facility/lab ..... 4 Private doctor/nurse ..... 5 Other ..... 6 Specify: _____ Don't know 8
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

END INTERVIEW

Thank respondent for taking the time to be interviewed.

Annex 4. 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: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ Date: _ _ / _ _ / _ _	Name: _____ Code: ☐☐☐☐ 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 and Duo-Cotecxin

"I would first like to ask you about three 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?	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	

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?"

Q32		**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?**		
Code	**Drug / Test Name**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**	**Not Known**

Q32 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 (ADULT)	1	2	1	2	1	2	1	2	8
9	MALARINE (CHILD)	1	2	1	2	1	2	1	2	8
10	MALARINE (ADOLESCENT)	1	2	1	2	1	2	1	2	8
11	ARTEQUIN *(Artesunate-Mefloquine)*	1	2	1	2	1	2	1	2	8
12	DUO-COTECXIN *(Dihydroartemisinin-Piperaquine)*	1	2	1	2	1	2	1	2	8
13	ARTEKIN *(DHA-piperaquine)*	1	2	1	2	1	2	1	2	8
14	ARTEQUICK *(Artemisinin-Piperaquine)*	1	2	1	2	1	2	1	2	8
15	COTECXIN *(Dihydroartemisinin only)*	1	2	1	2	1	2	1	2	8
16	ARTESUNATE TABLET	1	2	1	2	1	2	1	2	8
17	ARTESUNATE INJECTION	1	2	1	2	1	2	1	2	8
18	ARTESUNATE SUPPOSITORY	1	2	1	2	1	2	1	2	8
19	ARTEMETHER TABLET	1	2	1	2	1	2	1	2	8
20	ARTEMETHER INJECTION	1	2	1	2	1	2	1	2	8
21	ARTEMISININ TABLET	1	2	1	2	1	2	1	2	8
22	ARTEMISININ SUPPOSITORY	1	2	1	2	1	2	1	2	8
23	MEFLOQUINE	1	2	1	2	1	2	1	2	8
24	QUININE TABLET	1	2	1	2	1	2	1	2	8
25	QUININE INJECTION	1	2	1	2	1	2	1	2	8
26	CHLOROQUINE	1	2	1	2	1	2	1	2	8
27	PRIMAQUINE	1	2	1	2	1	2	1	2	8
28	MALARONE *(Atovaquone-Proguanil)*	1	2	1	2	1	2	1	2	8
29	OTHER DRUG FOR MALARIA *Specify: _____*	1	2	1	2	1	2	1	2	8
30	DRUG COCKTAIL FOR MALARIA	1	2	1	2	1	2	1	2	8
31	ANTIBIOTICS	1	2	1	2	1	2	1	2	8
32	PARACETAMOL / ASPIRIN	1	2	1	2	1	2	1	2	8
33	CARESTART (COMBO TEST)	1	2	1	2	1	2	1	2	8
34	PARACHECK	1	2	1	2	1	2	1	2	8
35	MALACHECK	1	2	1	2	1	2	1	2	8

Q32 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
36	OPTIMAL	1	2	1	2	1	2	1	2	8
37	OTHER TEST FOR MALARIA	1	2	1	2	1	2	1	2	8
38	MALATAB	1	2	1	2	1	2	1	2	8

Section 4: Knowledge, practice, inspections and training

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q33	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	➔ **Q35**
Q34	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	
Q35	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) : _____	
Q36	In your opinion, what is the most effective antimalarial medicine?	Drug Name: _____ Drug Code:..... ☐☐ Other ..... 97 Specify:_____ Don't know..... 98	
Q37	Which drug do you most recommend for *P. falciparum*?	Drug Code:..... ☐☐ Other ..... 97 Specify:_____ Don't know..... 98	
Q38	Which drug do you most recommend for *P. vivax*?	Drug Code:..... ☐☐ Other ..... 97 Specify:_____ Don't know..... 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q39	What is the nationally recommended drug for *P.falciparum*?	Drug Code: ..... ☐☐ Other ..... 97 Specify:_____ Don't know..... 98	
Q40	What is the nationally recommended drug for *P. vivax*?	Drug Code: ..... ☐☐ Other ..... 97 Specify:_____ Don't know..... 98	
Q41	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	
Q42	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	
Q43	Do your customers usually ask for a specific antimalarial drug by name?	Yes ..... 1 No..... 2	➔ **Q45**
Q44	What are the three most common antimalarial drugs that people ask for by name?	NAME CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐	
Q45	In the past <u>week</u>, approximately how many people bought or were dispensed an antimalarial drug from your outlet?	Number of people:..... ☐☐☐ Don't know..... 888	
Q46	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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q47	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	
Q48	Do you sell drug cocktails for malaria?	Yes ..... 1 No ..... 2 Don't know 8	 ➔ **Q50** ➔ **Q50**
Q49	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	
Q50	Does your drug outlet provide diagnostic testing for malaria?	Yes ..... 1 No 2	 ➔ **Q55**
Q51	Which type of diagnostic testing for malaria does your outlet provide?	RDT/dipstick ..... 1 Blood slide/microscopy ..... 2 Both RDT and microscopy 3	
Q52	In the past week, approximately how many people bought or were dispensed a RDT from your outlet?	Number of people: ..... ☐☐☐ Don't know 888	
Q53	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	
Q54	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	
Q55	Do your customers ever ask for a malaria test?	Yes ..... 1 No 2	 ➔ **Q57**
Q56	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	
Q57	Have you ever referred suspected cases of malaria for treatment?	Yes ..... 1 No 2	 ➔ **Q60**
Q58	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:_____	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q59	Where do you refer suspected cases of malaria?	Referral/Provincial hospital ..... 1 Health Center/FDH ..... 2 VMW ..... 3 Private laboratory ..... 4 Other ..... 5 Specify: _____	
Q60	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 ☐	➔ **Q62**
Q61	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	
Q62	During 2009, have you attended any trainings or workshops about malaria?	Yes ..... 1 No 2	➔ **Q65**
Q63	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	
Q64	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	
Q65	Have you heard about the activities to stop the spread of drug resistance in this area of Cambodia?	Yes ..... 1 No 2	
Q66	Are you aware that some antimalarial drugs are banned in Cambodia?	Yes ..... 1 No 2	➔ **Q69**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q67	Which antimalarial drugs are banned in Cambodia?	NAME CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐ Other ..... 97 Specify: _____ Don't know..... 98	
Q68	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	
Q69	Have you heard about fake/counterfeit drugs?	Yes ..... 1 No..... 2	➔ **Q71**
Q70	Have you seen any fake/counterfeit drugs?	Yes ..... 1 No..... 2 Don't know..... 8	
Q71	In the past 6 months, has anyone come to inspect your outlet?	Yes ..... 1 No..... 2	➔ **Q74**
Q72	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	
Q73	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	
Q74	Do you have a license to sell drugs? *Check this box if their license is displayed on the wall:* →	Yes ..... 1 No..... 2 ☐	

Annex 5. Drug Outlet Questionnaire

IDENTIFICATION

	Outlet ID: ..... ☐☐☐
Cluster code (1-96): ..... ☐☐	Outlet Number (1-2): ..... ☐
Province: _____	Province code: ..... ☐☐
District: _____	District code: ..... ☐☐☐
Commune: _____	Commune code: ..... ☐☐☐☐☐
Village: _____	Domain: ..... ☐

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	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 is this market or town?	Distance (Km): ..... ☐☐	
Q4	Type of outlet	Shop/market.....1 Drug store/pharmacy .....2 Grocery store .....3 Cabinet.....4 Other .....5 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:_____ ___	
Q8	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	➔ **Q10**
Q9	How many years of formal training did you receive? *If the formal training was less than one year, fill in the month box.*	Years of training:..... ☐☐ Months of training: ..... ☐☐	
Q10	Do you offer consultations?	Yes.....1 No 2	➔ **Q14**
Q11	Approximately how many consultations do you provide each <u>day</u>?	< 1 per week .....1 1 to 5 per day.....2 6 to 10 per day.....3 > 10 per day.....4 Don't know 8	
Q12	Do you offer consultations for malaria?	Yes.....1 No 2	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q13	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	
Q14	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:..... __ __:__ __	
Q15	Do you distribute or display any information for your clients about malaria?	Yes.....1 No 2	➔ **Q17**
Q16	What type of information about malaria does this outlet display or distribute? MULTIPLE RESPONSES POSSIBLE	Poster.....1 Leaflets/Brochures.....2 Billboards .....3 Banner .....4 Other .....5 Specify: _____	

Section 2: Malarine, A+M, Duo-Cotecxin, Artekin and Artequick
"I would first like to ask you about five specific drugs."

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q17	Have you heard of a drug called Malarine or A+M?	Yes / No Malarine ..... 1 2 A+M 1 2	**If No ➔ Q25**
Q18	Do you sell Malarine or A+M?	Yes / No Malarine ..... 1 2 A+M 1 2	**If No ➔ Q24**
Q19	How much do you sell one box (small) of Malarine or A+M for?	Malarine: ..... ☐☐☐☐☐ A+M: ..... ☐☐☐☐☐	
Q20	How many boxes (small) of Malarine or A+M did you sell last week?	Malarine: ..... ☐☐☐ A+M: ..... ☐☐☐	
Q21	When did you last buy Malarine or A+M?	Malarine / A+M Within last week..... 1 1 Within last month ..... 2 2 More than a month ago.... 3 3 Not sure 8 8	
Q22	How many boxes of Malarine or A+M did you buy the last time you bought stock?	Number of boxes bought: Malarine: ..... ☐☐☐ A+M: ..... ☐☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q23	When will you buy your next stock of Malarine or A+M?	Malarine / A+M Within next week..... 1 1 Within next month..... 2 2 In more than a month..... 3 3 No plans to buy..... 4 4 Not sure 8 8	**Skip to Q25**
Q24	Why don't you sell Malarine or A+M? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Malarine / A+M Not available ..... 1 1 Too expensive to buy stock 2 2 No demand ..... 3 3 People don't know it..... 4 4 Don't know where to buy . 5 5 Other 6 6	
Q25	Have you heard of a drug called Duo-Cotecxin or Artekin or Artequick?	Yes / No Duo-Cotecxin ..... 1 2 Artekin..... 1 2 Artequick..... 1 2	**If No for all ➔ Q32**
Q26	Do you sell Duo-Cotecxin or Artekin or Artequick?	Yes / No Duo-Cotecxin ..... 1 2 Artekin..... 1 2 Artequick..... 1 2	**If No for all ➔ Q32**
Q27	How much do you sell one box (small) of Duo-Cotecxin or Artekin or Artequick for?	Duo-Cotecxin: ..... ☐☐☐☐☐. Artekin:..... ☐☐☐☐☐. Artequick:..... ☐☐☐☐☐	
Q28	How many boxes (small) of Duo-Cotecxin or Artekin or Artequick did you sell last week?	Number of boxes sold: Duo-Cotecxin: ..... ☐☐☐ Artekin:..... ☐☐☐ Artequick:..... ☐☐☐	
Q29	When did you last buy Duo-Cotecxin or Artekin or Artequick?	Duo-Cotecxin / Artekin / Artequick Within last week.....1 1 1 Within last month .....2 2 2 >1 month ago.....3 3 3 Not sure 8 8 8	
Q30	How many boxes (small) of Duo-Cotecxin or Artekin or Artequick did you buy the last time you bought stock?	Number of boxes bought: Duo-Cotecxin: ..... ☐☐☐ Artekin:..... ☐☐☐ Artequick:..... ☐☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q31	When will you buy your next stock of Duo-Cotecxin or Artekin or Artequick?	Duo-Cotecxin / Artekin / Artequick Within next week.....1 — 1 — 1 Within next month....2 — 2 — 2 >1 month.....3 — 3 — 3 No plans to buy.....4 — 4 — 4 Not sure .....8 — 8 — 8	**Skip to Q33**
Q32	Why don't you sell Duo-Cotecxin or Artekin or Artequick? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Duo-Cotecxin / Artekin / Artequick Not available .....1 — 1 — 1 Too expensive .....2 — 2 — 2 No demand .....3 — 3 — 3 People don't know ...4 — 4 — 4 Don't know where ....5 — 5 — 5 Other .....6 — 6 — 6	

Section 3: Antimalarials and diagnostics sold

"I would now like to ask you about all the antimalarial drugs and diagnostics you sell. 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?"

Q33 Code	Drug / Test Name	Sold in past 6 months?		In stock today?		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 (ADULT)	1	2	1	2	1	2	1	2	8
9	MALARINE (CHILD)	1	2	1	2	1	2	1	2	8
10	MALARINE (ADOLESCENT)	1	2	1	2	1	2	1	2	8
11	ARTEQUIN *(Artesunate-Mefloquine)*	1	2	1	2	1	2	1	2	8
12	DUO-COTECXIN *(Dihydroartemisinin-Piperaquine)*	1	2	1	2	1	2	1	2	8
13	ARTEKIN *(DHA-piperaquine)*	1	2	1	2	1	2	1	2	8
14	ARTEQUICK *(Artemisinin-Piperaquine)*	1	2	1	2	1	2	1	2	8
15	COTECXIN *(Dihydroartemisinin only)*	1	2	1	2	1	2	1	2	8
16	ARTESUNATE TABLET	1	2	1	2	1	2	1	2	8
17	ARTESUNATE INJECTION	1	2	1	2	1	2	1	2	8

Q33 Code	Drug / Test Name	Sold in past 6 months?		In stock today?		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
18	ARTESUNATE SUPPOSITORY	1	2	1	2	1	2	1	2	8
19	ARTEMETHER TABLET	1	2	1	2	1	2	1	2	8
20	ARTEMETHER INJECTION	1	2	1	2	1	2	1	2	8
21	ARTEMISININ TABLET	1	2	1	2	1	2	1	2	8
22	ARTEMISININ SUPPOSITORY	1	2	1	2	1	2	1	2	8
23	MEFLOQUINE	1	2	1	2	1	2	1	2	8
24	QUININE TABLET	1	2	1	2	1	2	1	2	8
25	QUININE INJECTION	1	2	1	2	1	2	1	2	8
26	CHLOROQUINE	1	2	1	2	1	2	1	2	8
27	PRIMAQUINE	1	2	1	2	1	2	1	2	8
28	MALARONE *(Atovaquone-Proguanil)*	1	2	1	2	1	2	1	2	8
29	COARTEM *(Artemether-Lumefantrine)*	1	2	1	2	1	2	1	2	8
30	OTHER DRUG FOR MALARIA *Specify:* _____	1	2	1	2	1	2	1	2	8
31	DRUG COCKTAIL FOR FEVER OR MALARIA	1	2	1	2	1	2	1	2	8
32	TETRACYCLINE/DOXYCYCLINE	1	2	1	2	1	2	1	2	8
33	OTHER ANTIBIOTICS	1	2	1	2	1	2	1	2	8
34	PARACETAMOL / ASPIRIN	1	2	1	2	1	2	1	2	8
35	CARESTART (COMBO TEST)	1	2	1	2	1	2	1	2	8
36	PARACHECK	1	2	1	2	1	2	1	2	8
37	MALACHECK	1	2	1	2	1	2	1	2	8
38	OTHER TEST FOR MALARIA	1	2	1	2	1	2	1	2	8
39	SUPER MALATAB	1	2	1	2	1	2	1	2	8

Section 4: Knowledge, practice, inspections and training

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q34	What are the signs or symptoms of malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Fever ..... 1 Chills ..... 2 Sweating ..... 3 Headache ..... 4 Body ache/Joint pain ..... 5 Anemia ..... 6 Jaundice ..... 7 Enlarged spleen ..... 8 Other ..... 9 Specify:_____ __ Don't know 98	
Q35	What do you do if you suspect the patient has malaria? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Examine patient ..... 1 Perform blood test (slide) ..... 2 Perform blood test (dipstick) ..... 3 Refer for blood test ..... 4 Refer for treatment ..... 5 Sell antimalarial drugs ..... 6 Other ..... 7 Specify:_____ __ Don't know 98	
Q36	What are the three most common drugs you sell for malaria? How much do you sell a single complete treatment course for? (USE THOSE DRUG CODES IN GHD LIST BELOW)	Code / Price Drug 1st : ☐☐ Riel: _____ Drug 2nd : ☐☐ Riel: _____ Drug 3rd : ☐☐ Riel: _____	
Q37	Which drug do you most recommend for *P. falciparum*?	DRUG NAME / CODE P.falciparum: _____ ☐☐ Don't know 98	
Q38	Which drug do you most recommend for *P. vivax*?	DRUG NAME / CODE P.vivax: _____ ☐☐ Don't know 98	
Q39	Have you heard about the national treatment guidelines?	Yes ..... 1 No 2	➔ **Q42**
Q40	Which is the currently recommended drug for treatment of uncomplicated *P. falciparum*?	DRUG NAME / CODE P. falciparum: _____ ☐☐ Don't know 98	
Q41	Which is the currently recommended drug for treatment of uncomplicated *P. vivax*?	DRUG NAME / CODE P. vivax: _____ ☐☐ Don't know 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q42	How do you decide which antimalarial drugs to stock? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYTHING ELSE?	Most profitable ..... 1 Recommended by government ..... 2 Lowest price ..... 3 Drug company/ drug seller ..... 4 Consumer demand ..... 5 Brand reputation ..... 6 Clear dosage form ..... 7 Easily available ..... 8 Prescribed most often by doctors ..... 9 Other ..... 10 Specify:_____ __ Not sure 98	
Q43	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	
Q44	Do your customers usually ask for a specific antimalarial drug by name?	Yes ..... 1 No 2	➔ **Q46**
Q45	What are the three most common antimalarial drugs that people ask for by name?	NAME CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐	
Q46	In the past <u>week</u>, approximately how many people bought antimalarial drugs from your outlet?	Number of people: ..... ☐☐☐ Don't know 888	
Q47	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	
Q48	In the past <u>month</u>, did you ever cut blisters of antimalarials for customers who cannot afford to buy the entire pack?	Yes ..... 1 No ..... 2 Don't know 8	
Q49	Do you sell drug cocktail for malaria?	Yes ..... 1 No ..... 2 Don't know 8	➔ **Q51** ➔ **Q51**
Q50	In the past <u>week</u>, approximately how many people bought a drug cocktail from your outlet for malaria?	Number of people: ..... ☐☐☐ Don't know 888	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q51	Does your drug outlet offer diagnostic testing for malaria?	Yes..... 1 No 2	➔ **Q56**
Q52	Which type of diagnostic testing for malaria does your outlet offer?	RDT/dipstick ..... 1 Blood slide/microscopy..... 2 Both RDT and microscopy 3	
Q53	In the past <u>week</u>, approximately how many people did you perform a test for malaria?	Number of people: ..... ☐☐☐ Don't know..... 888	
Q54	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	
Q55	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	
Q56	Do your customers ever ask for a malaria test?	Yes..... 1 No 2	➔ **Q58**
Q57	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 clinic or private lab..... 5 Sell them drugs for malaria ..... 6 Other..... 7 Specify:_____ __ Not sure 8	
Q58	Have you ever referred suspected cases of malaria for treatment?	Yes..... 1 No 2	➔ **Q61**
Q59	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:_____ __	
Q60	Where do you refer suspected cases of malaria?	Referral/Provincial hospital..... 1 Health Center/FDH..... 2 VMW ..... 3 Private laboratory ..... 4 Other..... 5 Specify: _____	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q61	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 ☐	➔ **Q63**
Q62	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	
Q63	During 2010, have you attended any trainings or workshops about malaria?	Yes ..... 1 No 2	➔ **Q66**
Q64	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	
Q65	Who conducted these trainings? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANYONE ELSE?	Health Center/Hospital ..... 1 Province (PHD) ..... 2 Operational District ..... 3 MoH/CNM ..... 4 DDF ..... 5 NGO ..... 6 Other ..... 7 Specify:_____ __ Not sure 8	
Q66	Have you heard about the activities to stop the spread of drug resistance in this area of Cambodia?	Yes ..... 1 No 2	
Q67	Are you aware that some antimalarial drugs are banned in Cambodia?	Yes ..... 1 No 2	➔ **Q70**
Q68	Which antimalarial drugs are banned in Cambodia?	NAME / CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐ Don't know 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q69	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	
Q70	Have you heard about fake drugs?	Yes ..... 1 No 2	
Q71	Have you seen any fake drugs?	Yes ..... 1 No ..... 2 Don't know 8	➔ **Q73** ➔ **Q73**
Q72	Which antimalarial drugs have you seen that you suspect may have been fake?	NAME / CODE Drug 1: _____ ☐☐ Drug 2: _____ ☐☐ Drug 3: _____ ☐☐	
Q73	In the past 6 months, has anyone come to inspect your outlet?	Yes ..... 1 No 2	➔ **Q76**
Q74	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 Justice Police ..... 4 Other government official ..... 5 NGO ..... 6 Other ..... 7 Specify:_____ __ Not sure 8	
Q75	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	
Q76	Do you have a license to sell drugs? *Check this box if their license is displayed on the wall:* →	Yes ..... 1 No ..... 2 ☐	

END INTERVIEW

Thank respondent for taking the time to be interviewed.

Annex 6. Net Outlet Questionnaire

IDENTIFICATION

	Outlet ID: ..... ☐☐☐
Cluster code (1-96): ..... ☐☐	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: ..... ☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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:_____ ___	
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			
Conventional 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 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	1 2	1 2			

Specify: _____					

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 <u>last week</u>?	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" 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:_____ ___	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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	
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 *Conventional 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.

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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	
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" 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 with Super Malatab? WRITE DATE AS MONTH AND YEAR	Date started selling bundled hammock nets: __ __ / __ __ __ __ Month Year	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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 <u>last week</u>?	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	
Q40	How many insecticide treatments did you buy the last time?	Number of insecticide bougl ☐☐☐ 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 7. Health Facility Part 1 Questionnaire

Facility Identification Details

Health Facility Cluster: [____|____] (01-38)

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	Does the facility provide on call services?	Yes ..... 1 No 2	
Q7	Has this health facility received a supervisory visit in the last <u>6 months</u>? **IF PRIVATE FACILITY, SKIP TO Q14**	Yes ..... 1 No ..... 2 Not sure 8	**➔ Q12** **➔ Q12**
Q8	Who came to supervise in the last <u>6 months</u>? 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 supervisor's 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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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:*_____ ___	
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 2010, 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 IBN..... 6 Health education..... 7 Microplanning ..... 8 VMW/MMW training..... 9 VHV training ..... 10 Other..... 11 *Specify:*_____ ___ Don't know..... 98	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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**
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: 1 = Malaria laboratory 2 = Case management 3 = IBN 4 = Health education 5 = Epidemiology 6 = Other (specify)		
						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. days stockout* 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	ARTEQUIN *(Artesunate-Mefloquine)*	1	2				1	2
12	DUO-COTECXIN *(DHA-piperaquine)*	1	2				1	2
13	ARTEKIN *(DHA-piperaquine)*	1	2				1	2
14	ARTEQUICK *(Artemisinin-Piperaquine)*	1	2				1	2
15	COTECXIN *(Dihydroartemisinin only)*	1	2				1	2
16	ARTESUNATE TABLET	1	2				1	2
17	ARTESUNATE INJECTION	1	2				1	2
18	ARTESUNATE SUPPOSITORY	1	2				1	2
19	ARTEMETHER TABLET	1	2				1	2
20	ARTEMETHER INJECTION	1	2				1	2
21	ARTEMISININ TABLET	1	2				1	2
22	ARTEMISININ SUPPOSITORY	1	2				1	2
23	MEFLOQUINE	1	2				1	2
24	QUININE TABLET	1	2				1	2
25	QUININE INJECTION	1	2				1	2
26	CHLOROQUINE	1	2				1	2

		Q43		Q44	Q45	Q46	Q47	
Code	**Stock item**	**Usually in stock**		**Quantity currently in stock**		**No. days stockout* in last 3 months**	**Any items past expiry?**	
		Yes	No	Units	Number		Yes	No
27	PRIMAQUINE	1	2				1	2
28	MALARONE *(Atovaquone-Proguanil)*	1	2				1	2
29	COARTEM *(Artemether-Lumefantrine)*	1	2				1	2

30	OTHER DRUG FOR MALARIA *Specify:* _____	1	2				1	2
31	DRUG COCKTAIL FOR FEVER OR MALARIA	1	2				1	2
32	TETRACYCLINE/DOXYCYCLINE	1	2				1	2
33	OTHER ANTIBIOTICS	1	2				1	2
34	PARACETAMOL / ASPIRIN	1	2				1	2
35	CARESTART (COMBO TEST)	1	2				1	2
36	PARACHECK	1	2				1	2
37	MALACHECK	1	2				1	2
38	OTHER TEST FOR MALARIA	1	2				1	2
39	THERMOMETER	1	2					
40	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	
Q51	Do they tally with the stocks on hand? DO NOT ASK, OBSERVE ONLY	Yes .....1 No 2	
Q52	Does the facility use the principle of "First in, first out" (FIFO) 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**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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 2010 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 01/08/2010, 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	
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:_____ ___	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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 2010 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)

Annex 8. Health Facility Part 2 (Follow-up interview) Questionnaire

Patient Follow-up Interview Form

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

Health Facility Cluster: [____|____] (01-38)

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.: ..... 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: Interviewer's Name: Result code:	_ _ / _ _ / _ _ _____ ___ _____	_ _ / _ _ / _ _ _____ ___ _____	_ _ / _ _ / _ _ _____ ___ _____	Date: __ __ / __ __ / __ __ Interviewer Result code
Next planned visit: Date: Time:		_ _ / _ _ / _ _ _____ __	_ _ / _ _ / _ _ _____ __	Total number of visi

* 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: Code: Date: _ _ / _ _ / _ _	Name: Code: Date: _ _ / _ _ / _ _	Name: Code: Date: _ _ / _ _ / _ _	Name: Code: 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 travelled 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 mosquito net last night?	Yes ..... 1 No ..... 2 Not sure 8	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q24	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
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 <u>before</u> 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): ..... ☐☐☐☐☐	
Q39	When you/your child arrived at the health facility, how long did you wait to see the nurse/doctor?	Time (minutes): ..... ☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q67	Has anyone else in your household been sick with fever in the past two weeks?	Yes ..... 1 No 2	
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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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	Other Artesunate-Mefloquine (e.g., Artequin)
4	Duo-Cotecxin (Dihydroartemisinin-Piperaquine)
5	Other Dihydroartemisinin-Piperaquine (e.g., Artekin, Artecan, Arterakine or p-Alaxin)
6	Artemisinin-Piperaquine (e.g., Artequick)
7	Dihydroartemisinin only (e.g., Cotecxin or Alaxin)
8	Plasmotrim (Artesunate)
9	Other Artesunate only (e.g., Arinate, Arquine or Artesunat)
10	Artemether only (e.g., Artemedine)
11	Artemisinin only
12	Mefloquine only (e.g., Lariam or Mephaquin)
13	Quinine
14	Chloroquine
15	Primaquine
16	Malarone (Atovaquone-Proguanil)
17	Coartem (Artemether-Lumefantrine)
18	Drug cocktail for fever or malaria
19	Other antimalarial drug
Non-malaria drugs:	
20	Tetracycline/Doxycycline
21	Other Antibiotics
22	Paracetamol / Aspirin
23	Vitamins / Tonics
24	Infusion / IV fluids
25	Traditional herbs
26	Other non-malaria drugs

Annex 8. 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 HEALTH FACILITY

Health Facility Cluster: [____|____] (01-38)

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	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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	
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): ..... ☐☐☐☐☐	

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
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 give you/you child a diagnosis for your/your child's fever?	Yes ..... 1 No..... 2 Not sure..... 8	 ➔ **Q36** ➔ **Q36**
Q35	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:_____ ___	
Q36	Did you/your child have a blood test for malaria?	Yes ..... 1 No..... 2	 ➔ **Q40**
Q37	What type of test?	RDT/dipstick..... 1 Blood slide/microscopy ..... 2 Not sure..... 8	
Q38	Do you know the result of the test?	Positive..... 1 Negative ..... 2 Not told result ..... 3 Not sure..... 8	 ➔ **Q40** ➔ **Q40** ➔ **Q40**
Q39	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
Q40	Did the nurse/doctor give you/your child an infusion today?	Yes ..... 1 No..... 2	
Q41	Did the nurse/doctor prescribe any drugs for you/your child today?	Yes ..... 1 No..... 2	 ➔ **Q51**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q42	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: ☐☐ _____ ❑	
Q43	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	
Q44	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	
Q45	Can you show me the drugs you/your child were prescribed?	Yes ..... 1 No 2	
Q46	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	
Q47	How many tablets per dose? FOR ANTIMALARIALS ONLY	No. tablets: ..... ☐☐	
Q48	How many times per day? FOR ANTIMALARIALS ONLY	No. times/day: ..... ☐☐	
Q49	How many days? FOR ANTIMALARIALS ONLY	No. days: ..... ☐☐	
Q50	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	
Q51	Do you know of any antimalarial drugs that should no longer be used to treat malaria?	Yes ..... 1 No 2	➔ **Q53**

NO.	QUESTIONS AND FILTERS	CODING CATEGORIES	SKIP
Q52	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: _____ ☐☐	
Q53	Why do you think you/your child became sick with fever? MULTIPLE RESPONSES POSSIBLE CIRCLE ALL MENTIONED PROBE ONCE: ANY OTHER REASONS?	Got malaria ..... 1 Slept in forest ..... 2 Slept in chamkar ..... 3 Family member had fever ..... 4 Family member had cold ..... 5 Slept in forest without net ..... 6 Spirit ..... 7 Got wound ..... 8 Other ..... 9 Specify: _____ Don't know 98	
Q54	Has anyone else in your household been sick with fever in the past two weeks?	Yes ..... 1 No 2	
Q55	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	
Q56	How much did you pay for your/your child's treatment today?	Cost of treatment (Riel): ... ☐☐☐☐☐ Not Sure 98	
Q57	Were you satisfied with the treatment you received at the health facility today?	Yes ..... 1 No 2	
Q58	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	Other Artesunate-Mefloquine (e.g., Artequin)
4	Duo-Cotecxin (Dihydroartemisinin-Piperaquine)
5	Other Dihydroartemisinin-Piperaquine (e.g., Artekin, Artecan, Arterakine or p-Alaxin)
6	Artemisinin-Piperaquine (e.g., Artequick)
7	Dihydroartemisinin only (e.g., Cotecxin or Alaxin)
8	Plasmotrim (Artesunate)
9	Other Artesunate only (e.g., Arinate, Arquine or Artesunat)
10	Artemether only (e.g., Artemedine)
11	Artemisinin only
12	Mefloquine only (e.g., Lariam or Mephaquin)
13	Quinine
14	Chloroquine
15	Primaquine
16	Malarone (Atovaquone-Proguanil)
17	Coartem (Artemether-Lumefantrine)
18	Drug cocktail for fever or malaria
19	Other antimalarial drug
Non-malaria drugs:	
20	Tetracycline/Doxycycline
21	Other Antibiotics
22	Paracetamol / Aspirin
23	Vitamins / Tonics
24	Infusion / IV fluids
25	Traditional herbs
26	Other non-malaria drugs