

LONDON  
SCHOOL of  
HYGIENE  
& TROPICAL  
MEDICINE



LSHTM Research Online

Patouillard, E; Palafox, B; Tougher, S; Goodman, C; Hanson, K; Sochea, P; O'Connell, K; , TheAct-watchStudyGroup; (2012) A Qualitative Assessment of the Private Sector Antimalarial Distribution Chain in Cambodia, 2009. Technical Report. ACTwatch project, Population Services International, Nairobi. <https://researchonline.lshtm.ac.uk/id/eprint/2869487>

Downloaded from: <http://researchonline.lshtm.ac.uk/2869487/>

DOI:

**Usage Guidelines:**

Please refer to usage guidelines at <https://researchonline.lshtm.ac.uk/policies.html> or alternatively contact [researchonline@lshtm.ac.uk](mailto:researchonline@lshtm.ac.uk).

Available under license: Copyright the author(s)

<https://researchonline.lshtm.ac.uk>



## A Qualitative Assessment of the Private Sector Antimalarial Distribution Chain in Cambodia, 2009

September 2012



---

**Country Program Coordinator**

Phok Sochea

Population Services International-  
Cambodia

No 29 334 Street, Boeung Kreng  
Krang 1

Chamkar Morn

Phnom Penh, Cambodia

Phone: +855 23 210814

Email: [psoschea@psi.org.kh](mailto:psoschea@psi.org.kh)

**Co-Investigators**

Edith Patouillard

Benjamin Palafox

Sarah Tougher

Catherine Goodman

London School of Hygiene & Tropical Medicine

Department of Global Health & Development

Faculty of Public Health & Policy

15-17 Tavistock Place

London, UK WC1H 9SH

Phone: +44 20 7927 2389

Email: [benjamin.palafox@lshtm.ac.uk](mailto:benjamin.palafox@lshtm.ac.uk)

**Principal Investigator**

Kara Hanson

London School of Hygiene & Tropical Medicine

Department of Global Health & Development

Faculty of Public Health & Policy

15-17 Tavistock Place

London, UK WC1H 9SH

Phone: +44 20 7927 2267

Email: [kara.hanson@lshtm.ac.uk](mailto:kara.hanson@lshtm.ac.uk)



**Suggested citation:**

Patouillard E, Palafox B, Tougher S, Goodman C, Hanson K, Sochea P, O’Connell K and the ACTwatch Study group. 2012. A Qualitative Assessment of the Private Sector Antimalarial Distribution Chain in Cambodia, 2009. Nairobi: ACTwatch project, Population Services International.

ACTwatch is a project of Population Services International (PSI), in collaboration with the London School of Hygiene & Tropical Medicine. The ACTwatch Group comprises of a number of individuals:

*PSI ACTwatch Central:*

Tanya Shewchuk, Project Director  
 Dr Kathryn O’Connell, Principal Investigator  
 Hellen Gatakaa, Senior Research Associate  
 Stephen Poyer, Research Associate  
 Illah Evans, Research Associate  
 Julius Ngigi, Research Associate  
 Erik Munroe, Research Associate  
 Tsione Solomon, Research Associate

*PSI ACTwatch Country Program Coordinators:*

Cyprien Zinsou, PSI/Benin  
 Sochea Phok, PSI/Cambodia  
 Dr. Louis Akulayi, SFH/DRC  
 Jacky Raharinjatovo, PSI/Madagascar  
 Ekundayo Arogundade, SFH/Nigeria  
 Peter Buyungo, PACE/Uganda  
 Felton Mpasela, SFH/Zambia

*London School of Hygiene & Tropical Medicine:*

Dr. Kara Hanson, Principal Investigator  
 Dr. Edith Patouillard, Co-investigator  
 Dr. Catherine Goodman, Co-investigator  
 Benjamin Palafox, Co-investigator  
 Sarah Tougher, Co-investigator  
 Dr. Immo Kleinschmidt, Co-investigator

Other individuals who contributed to ACTwatch research studies in Cambodia include:

Phou Mean	Research Coordinator, PSI/Cambodia
Henrietta Allen	Malaria Technical Advisor, PSI/Cambodia
Dr. Ek Bopha	Malaria Services Coordinator, PSI/Cambodia
Dr. Duong Socheat	Director of the National Malaria Centre
Dr. Chea Nguon	Vice Director of National Malaria Centre
Dr. Kheng Sim	Vice Director of National Malaria Centre
Emily Harris	Malaria and Child Survival Associate, PSI
Dr. Megan Littrell	Malaria Research Technical Adviser, PSI

## Acknowledgements

The *ACTwatch* supply chain study was made possible through the financial support of the Bill & Melinda Gates Foundation. For this report, we also acknowledge the financial support of the UK Medical Research Council through a PhD studentship to Edith Patouillard. This study was implemented by the London School of Hygiene & Tropical Medicine (LSHTM) with the collaboration and support of Population Services International (PSI). We are grateful to Dr. Shunmay Yeung, Mr. Rik Bosman and Prof. Prashant Yadav for their guidance during the development of this study and comments on this report. We thank the National Centre for Parasitology, Entomology and Malaria Control and the Department of Drugs and Food of the Cambodian Ministry of Health for their contribution to the study. Many thanks also to the PSI Cambodia team for their continuous support during this study and to the LSHTM local counterparts, Ms Seng Sophea and Mr Chem Vuthy.

A technical review of the *ACTwatch* supply chain study protocol was provided by the following *ACTwatch* advisory committee members:

Mr. Suprotik Basu	Advisor to the United Nations Secretary General's Special Envoy for Malaria
Mr. Rik Bosman	Distributive Trade Expert, CEO Groupe Bernard
Ms. Renia Coghlan	Global Access Associate Director, Medicines for Malaria Venture
Dr. Thom Eisele	Assistant Professor, Tulane University
Mr. Louis Da Gama	Malaria Advocacy & Communications Director, Global Health Advocates
Dr. Paul Lalvani	Executive Director, RaPID Pharmacovigilance Program
Dr. Ramanan Laxminarayan	Senior Fellow, Resources for the Future
Dr. Matthew Lynch	Project Director, VOICES
Dr. Bernard Nahlen	Deputy Coordinator, President's Malaria Initiative (PMI)
Dr. Jayesh M. Pandit	Head, Pharmacovigilance Department, Pharmacy and Poisons Board–Kenya
Dr. Melanie Renshaw	Africa Advisor to the United Nations Secretary General's Special Envoy for Malaria
Mr. Oliver Sabot	Director, Malaria Control Team, Clinton Foundation
Ms. Rima Shretta	Senior Program Associate, Strengthening Pharmaceutical Systems Program, Management Sciences for Health
Dr. Rick Steketee	Science Director , Malaria Control and Evaluation Partnership in Africa (MACEPA)
Dr. Warren Stevens	Health Economist
Dr. Gladys Tetteh	CDC Resident Advisor, President's Malaria Initiative (PMI)-Kenya
Prof. Nick White, OBE	Professor of Tropical Medicine at Mahidol and Oxford Universities
Prof. Prashant Yadav	Professor of Supply Chain Management, MIT-Zaragoza International Logistics Program
Dr. Shunmay Yeung	Paediatrician & Senior Lecturer, LSHTM

# Contents

<b>DEFINITIONS .....</b>	<b>IV</b>
<b>ABBREVIATIONS.....</b>	<b>VI</b>
<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>1. INTRODUCTION &amp; OBJECTIVES .....</b>	<b>3</b>
<b>2. COUNTRY BACKGROUND.....</b>	<b>3</b>
<b>3. METHODS.....</b>	<b>5</b>
3.1. Scope of the supply chain survey .....	5
3.2. Sampling & data collection procedures.....	5
3.3. Data analysis.....	7
<b>4. RESULTS .....</b>	<b>7</b>
4.1. Market Structure .....	7
4.2. Provider Conduct.....	10
4.3. Sales Revenue and Expenses .....	17
4.4. Non-Regulatory Interventions.....	18
4.5. Regulation.....	19
4.6. Public-Private Links and Public Sector Issues .....	21
4.7. RDTs.....	21
<b>5. SUMMARY OF KEY FINDINGS.....</b>	<b>23</b>
<b>6. APPENDICES .....</b>	<b>25</b>
6.1. Characteristics of wholesalers and retailers interviewed .....	25
<b>7. REFERENCES .....</b>	<b>26</b>

## Definitions

**Antimalarial:** Any medicine recognized by the WHO for the treatment of malaria. Medicines used solely for the prevention of malaria were excluded from analysis in this report.

**Artemisinin and its derivatives:** Artemisinin is a plant extract used in the treatment of malaria. The most common derivatives of artemisinin used to treat malaria are artemether, artesunate, and dihydroartemisinin.

**Artemisinin monotherapy (AMT):** An antimalarial medicine that has a single active compound, where this active compound is artemisinin or one of its derivatives.

**Artemisinin-based Combination Therapy (ACT):** An antimalarial that combines artemisinin or one of its derivatives with an antimalarial or antimalarials of a different class. See combination therapy.

**Combination therapy:** The use of two or more classes of antimalarial drugs/molecules in the treatment of malaria that have independent modes of action.

**Distribution chain:** The chain of businesses operating from the factory gate/port of entry down to the retail level. Also sometimes referred to as downstream value chain. In this report, the terms distribution chain and supply chain are used interchangeably. More specifically, the 'private commercial sector distribution chain' refers to any type of supplier (e.g. public or private) who served private commercial outlets as well as private suppliers who served public and NGO outlets. In this way any transactions between public, NGO and private commercial sectors are noted.

**First-line treatment:** The government recommended treatment for uncomplicated malaria. Cambodia's first-line treatment for *Plasmodium falciparum* malaria or *P. falciparum/P. vivax* co-infection is artesunate-mefloquine, 50mg/250mg. For malaria infections of *P. vivax* or *P. malariae*, Cambodia's first-line treatment is chloroquine.

**Mark-up:** The difference between the price at which a product is purchased, and that at which it is sold. Sometimes also referred to as margin. In this report, the terms mark-up and margin are used interchangeably. May be expressed in absolute or percent terms. Because it is common for wholesalers to vary their prices with the volumes they sell, minimum, mid and maximum mark-ups were calculated in this report using price data collected from interviewees. Key findings on price mark-ups at the wholesale level are reported using mid mark-up data. As maximum and minimum selling prices were not collected at the retail level, only one set of absolute and percent retail mark-ups is calculated.

**Absolute mark-up:** The absolute mark-up is calculated as the difference between the selling price and the purchase price per full-course adult equivalent treatment dose. In this report, absolute mark-ups are reported in US dollars.

**Percent mark-up:** The percentage mark-up is calculated as the difference between the selling price and the purchase price, divided by the purchase price.

**Monotherapy:** An antimalarial medicine that has a single mode of action. This may be a medicine with a single active compound or a synergistic combination of two compounds with related mechanisms of action.

**Non-artemisinin therapy (nAT):** An antimalarial treatment that does not contain artemisinin or any of its derivatives.

**Non-WHO prequalified ACTs:** ACTs that do not meet acceptable standards of quality, safety and efficacy as assessed by the WHO Prequalification of Medicines Programme, or have yet to be assessed as such. (See WHO prequalified ACTs below)

**Oral artemisinin monotherapy:** Artemisinin or one of its derivatives in a dosage form with an oral route of administration. These include tablets, granules, suspensions, and syrups and exclude suppositories and injections.

**Outlet:** Any point of sale or provision of a commodity to an individual. Outlets are not restricted to stationary points of sale and may include mobile units or individuals.

**Purchase price:** The price paid by businesses (i.e. wholesalers or outlets) for their most recent purchase of an antimalarial product from their suppliers. This is different from selling price (see below). Prices are shown in US dollars.

**Rapid-Diagnostic Test (RDT) for malaria:** A test used to confirm the presence of malaria parasites in a patient's bloodstream.

**Selling price:** The price paid by customers to purchase antimalarials. For outlets, these customers are patients or caretakers; for wholesalers, these customers are other businesses or health facilities.

**Treatment/dosing regimen:** The posology or timing and number of doses of an antimalarial used to treat malaria. This schedule often varies by patient weight.

**WHO prequalified ACTs:** ACTs that meet acceptable standards of quality, safety and efficacy as assessed by the WHO Prequalification of Medicines Programme. This is a service provided by WHO to guide bulk medicine purchasing of international procurement agencies and countries for distribution in resource limited settings, often using funds for development aid (e.g. Global Fund grants). More details on the list of prequalified medicines and the prequalification process may be found on the WHO website at: <http://www.who.int/mediacentre/factsheets/fs278/en/index.html>.

**Wholesalers:** Businesses that supply other businesses, which may include retailers or other wholesalers. In this report, wholesalers are classified further into more specific categories defined by the type of businesses that they supply. As some wholesalers will supply different types of businesses (e.g. both retail outlets and other wholesalers), these categories are not mutually exclusive and such wholesalers may appear in multiple categories. These are defined below.

**Terminal wholesalers:** Wholesalers that supply retail outlets *directly*.

**Intermediate wholesalers:** Wholesalers that supply other wholesalers *directly*.

**Primary or top wholesalers:** Wholesalers that import and/or receive supplies *directly* from manufacturers.

## Abbreviations

<b>A+M</b>	Artesunate + Mefloquine (name of the co-blistered pre-packaged first line treatment dispensed in the public sector)
<b>ACT</b>	artemisinin-based combination therapy
<b>AETD</b>	adult equivalent treatment dose
<b>AL</b>	artemether lumefantrine
<b>AMFm</b>	Affordable Medicine Facility - malaria
<b>AMT</b>	artemisinin monotherapy
<b>ART+PP+PR</b>	Artemisinin and Piperaquine and Primaquine
<b>ASAQ</b>	artemisinin-amodiaquine
<b>ASMQ</b>	artemisinin and mefloquine
<b>CNM</b>	The National Centre for Parasitology, Entomology, and Malaria Control (formerly known as the National Centre for Malaria)
<b>CQ</b>	chloroquine
<b>DDF</b>	Department of Drugs and Food of the Ministry of Health
<b>DHA</b>	dihydroartemisinin
<b>DHA+PP</b>	dihydroartemisinin and piperaquine
<b>INT</b>	intermediate level (wholesaler of supply chain)
<b>IPT</b>	intermittent preventive treatment of malaria
<b>IQR</b>	inter-quartile range
<b>IRS</b>	indoor residual spraying
<b>ITN</b>	insecticide treated net
<b>LSHTM</b>	London School of Hygiene & Tropical Medicine
<b>MDR</b>	Multi Drug Resistance
<b>MEC</b>	mutually-exclusive category of wholesalers
<b>MOH</b>	Ministry of Health
<b>MQ</b>	mefloquine
<b>nAT</b>	non-artemisinin therapy
<b>NGO</b>	non-governmental organisation
<b>OS</b>	ACTwatch Outlet Survey
<b>OTC</b>	over the counter
<b><i>Pf</i></b>	<i>Plasmodium falciparum</i>
<b>POM</b>	prescription only medicine
<b>PPS</b>	probability proportional to size
<b>PSI</b>	Population Services International
<b><i>Pv</i></b>	<i>Plasmodium vivax</i>
<b>RDT</b>	rapid diagnostic test
<b>VMW</b>	Village Malaria Workers
<b>VAT</b>	value added tax
<b>WHO</b>	World Health Organization
<b>WS</b>	wholesaler



## Executive Summary

In Cambodia, as in many low-income countries, private commercial providers play an important role in the treatment of malaria. To design effective interventions for improved access to accurate diagnosis and effective malaria treatment, there is a need to understand retailers' behaviour and identify the factors that influence their stocking and pricing decisions. Private commercial retailers are the last link in a chain of manufacturers, importers and wholesalers, and their supply sources are likely to have an important influence on the price and quality of malaria treatment that consumers can access. However, there is limited rigorous evidence on the structure and operation of the distribution chain for antimalarial drugs that serves the retail sector.

The ACTwatch Supply Chain Study, one of the ACTwatch project components, aims to address this gap by conducting quantitative and qualitative studies on distribution chains for antimalarials in the ACTwatch countries (Cambodia, Benin, the Democratic Republic of Congo, Madagascar, Nigeria, Uganda and Zambia). This report presents the results from qualitative interviews with antimalarial drug wholesalers, retailers and other key stakeholders conducted in Cambodia between April and November 2009. A summary of the key findings is given below. To provide a complete description of the supply chain for antimalarial drugs, this report should be read in conjunction with the report on the results of the structured supply chain survey also conducted as part of this study [1], available at [www.actwatch.info](http://www.actwatch.info).

- As the bulk of antimalarial treatment is manufactured outside of the country, pharmaceutical importers, including PSI/Cambodia, constitute a critical component of Cambodia's private sector distribution chain for antimalarials by ensuring a regular national supply of antimalarials and also by facilitating their distribution throughout the country. Non-importing wholesalers also play a role in distributing antimalarials, particularly to more remote areas and to retail outlet types not targeted by importers, including more informal types such as drug shops, grocery stores, etc.
- The degree of competition varied by level in the distribution chain: at import level, competition was restrained by sole distributor and like agreements between foreign manufacturers and domestic importers, and also by a number of barriers to entry, including the costs of importing, the limited size of the overall market and lack of access to capital. Competition was less restrained at lower levels of the chain where the key barrier in theory to market entry was the difficulty of securing a license to operate, though many believed it was a barrier easily circumvented.
- Commodities for malaria treatment, including ACTs and RDTs, were perceived to be generally available in the private sector distribution chain; however, availability of ACTs and RDTs at lower levels of the chain was poorer. At both wholesale and retail levels, stocking decisions were driven by perceived drug quality, which was in turn affected by factors such as media promotion and social marketing targeting wholesalers, retailers and consumers, as in the case of Malarine (the ACT brand socially marketed by PSI/Cambodia). However, supplier stock outs of Malarine combined with its perceived side effects led some providers to continue stocking alternative treatments, including artemisinin monotherapies, even though they were aware that sales of such products were prohibited.
- Most wholesalers and retailers purchased new stock from either one or two suppliers. When choosing a supplier, factors considered were supplier selling prices, availability of delivery services, and perceived knowledge/expertise of the supplier in the treatment of malaria. Offering credit facilities was also cited as a strategy to attract custom, but access to supplier credit was perceived to be restricted to customers known to suppliers.

- Retailers and wholesalers had similar price setting behaviours. Providers reported setting their price on the basis of antimalarial purchase price and their price mark-ups on the basis of transport costs. At the top of the chain, importers considered a broader range of costs when setting prices, including overhead and promotion costs among others. In addition, most providers admitted seeking profits, although many argued that their pricing decision was constrained by the price set by other shops. Second and third-degree price discrimination strategies were commonly reported by both retailers and wholesalers who varied prices on the basis of volume purchased and customer characteristics.
- Retailers employed a wide range of tactics to gain competitive advantage over other businesses, attract consumers and generate demand. A retailer's reputation for delivering high quality treatment, reflected in their length of operation in a market, positive consumer experiences, and through the provision of 'cocktail' therapies, was viewed as crucial to achieving this; however, providing added value services, such as of blood diagnostic testing, was not. Nevertheless, RDTs were available from many outlets and were perceived to be easy to use, although less precise than microscopy for confirming malaria infection.

# 1. Introduction & Objectives

In Cambodia, as in many low-income countries, private commercial providers play an important role in the treatment of malaria. To design effective interventions for improved access to accurate diagnosis and effective malaria treatment, there is a need to understand retailers' behaviour and identify the factors that influence their stocking and pricing decisions. Private commercial retailers are the last link in a chain of manufacturers, importers and wholesalers, and their supply sources are likely to have an important influence on the price and quality of malaria treatment that consumers can access. However, there is limited rigorous evidence on the structure and operation of the distribution chain for antimalarial drugs that serves the retail sector.

This study aims to address this gap and constitutes an integral part of the ACTwatch project, a multi-country programme of research being conducted in Cambodia, Benin, the Democratic Republic of Congo, Madagascar, Nigeria, Uganda and Zambia. The overall goal of ACTwatch is to generate and disseminate evidence to policy makers on artemisinin-based combination therapy (ACT) availability and price in order to inform the development of policies designed to increase rates of access to effective malaria treatment. Along with the Supply Chain Study, the ACTwatch project also includes Outlet and Household Surveys led by Population Services International (PSI) in Cambodia.

The objective of the Supply Chain component of ACTwatch is to document and analyse the supply chain for antimalarials and rapid diagnostic tests (RDTs) for malaria using quantitative (structured surveys) and qualitative (in-depth interviews) methods for studying providers operating at each level of the chain. This report presents the results from qualitative interviews with antimalarial drug wholesalers and other related key stakeholders conducted in Cambodia between April and November 2009. In order to provide a complete description of the supply chain for antimalarial drugs, this report should be read in conjunction with the report on the results of the structured supply chain survey also conducted as part of this study [1], available at [www.actwatch.info](http://www.actwatch.info).

## 2. Country Background

### *Economic Profile*

Cambodia is located in South-East Asia and borders Thailand, Vietnam and Laos. It has a population of 13.4 million, predominantly rural [2]. The gross domestic product (GDP) per capita is US\$ 739 [3] and a third of the population live under the poverty line [4]. Most of the labour force works in private local enterprises, are self-employed, or work as unpaid family workers, indicating the importance of 'the informal or unorganized sector' [2]. The agriculture, forestry and fishing sector includes 72% of the employed population but, still being narrowly focused on paddy production, accounts for only 32% of GDP. By contrast, the wholesale and retail trade sector which accounts for 8% of the employed population contributes nearly 39% of GDP [2].

The importance of the private commercial sector is relatively recent. From 1975 to 1979, the Khmer Rouge regime implemented a form of agrarian socialism, characterized by the abolition of money and private property, and after the fall of the regime, a socialist economic model was implemented. In 1993, the UN-supervised first election marked the start of progress towards recovery, and from 1998, after a second round of elections, economic and political stability returned. Several reforms were then implemented, including market liberalization, complete dollarization of the economy and administrative decentralisation [5].

### *Health System*

In the health sector, Cambodia has also engaged in significant reforms: a Health Coverage Plan designed to improve primary health care coverage, the allocation of financial resources to provincial health departments, the creation of operational districts and the establishment of community-based programmes, notably for immunisations and birth spacing.

In terms of health outcomes, however, Cambodia has a persistently high maternal mortality rate at 461 deaths per 100,000 pregnancies [2], and an under-five mortality rate of 66 deaths per 1,000 live births [6]. The public health system continues to face major challenges especially in terms of growing inequities, with relatively low access to public health services, especially amongst the poor [5, 7]. Around 80% of care seeking visits are to the private sector [6, 8], where a wide range of providers operate, including pharmacies, cabinets<sup>1</sup>, mobile providers, drug shops and grocery sellers, but also at times government doctors and nurses running their own private practices. Many providers however operate with limited or no health qualifications but are reportedly widely used, especially by poorer groups [9] and in remote forested areas where communities have no access to formal health services [10, 11].

### *Pharmaceutical Sector*

The pharmaceutical sector is regulated by the 2007 Pharmaceutical Law. Regulation is overseen and implemented by the Department of Drugs & Food (DDF) of the Ministry of Health, in collaboration with municipal (for Phnom Penh) and provincial health departments to which some tasks have been delegated. The importation of pharmaceutical products is regulated by the DDF, which requires importers to be staffed by a pharmacist and to obtain an import permit before each drug shipment. Sales of pharmaceutical products to end-users are regulated by provincial health departments (or the municipality in the case of Phnom Penh) and 3 categories of license are available: (i) pharmacy license for outlets managed by a pharmacist, (ii) depot A license for outlets managed by an assistant pharmacist, and (iii) depot B license for outlets managed by a nurse/midwife. Pharmacy license holders are authorised to wholesale pharmaceutical drugs and all license holders may open one outlet only, implying that integrated chains of drug outlets are not authorised. Registered drug outlets are authorised to sell registered pharmaceutical drugs, hygienic and cosmetic products with preventive and curative properties, and dental, laboratory and medical equipment. The sale of other consumer goods, such as household products or food is forbidden. Prices and mark-ups on pharmaceutical products are not regulated. Operating alongside these registered outlets are a number of unregistered outlets. A survey conducted by the Cambodian Ministry of Health (MOH) in 2001 estimated that such outlets far outnumber registered ones. [12]

### *Malaria Epidemiology and Control Strategies*

In Cambodia, malaria is transmitted by *Anopheles dirus*, *Anopheles minimus* and *sundaicus* mosquitoes [13] breeding in forests and jungles covering 60% of the landmass [14]. Malaria is, therefore, not endemic across the country, although parasite prevalence rates are reported to reach 15% to 40% in remote forested areas compared to 0% to 3% in the plains [15]. Malaria transmission risk is seasonal and associated with the rainy season, with peaks generally around August/September. The total population at risk is estimated at 2.65 million. Around 74% of confirmed cases are *Plasmodium falciparum* (Pf) and 26% *Plasmodium vivax* (Pv) [14].

---

<sup>1</sup> Cabinets are outlet staffed with a qualified or semi-qualified provider of diagnostic services and medicines, but not registered with the Ministry of Health; Semi-qualified health care providers may be those who received training in the camps after the Khmer Rouge regime. Qualified health care providers may include government health workers who have their own private practice or retired nurses or midwives.

The national malaria control programme is managed by the National Centre for Entomology, Parasitology and Malaria Control (CNM). Over the past 10 years, the CNM has initiated innovative approaches for controlling malaria. Since 2000, co-blistered artesunate and mefloquine (a WHO-recommended but not prequalified ACT) has been the first line treatment for *Pf* malaria and, at the time of the study, chloroquine the first line treatment for *Pv* malaria<sup>2</sup>. Cambodia's second-line treatment for *Pf* malaria is quinine combined with tetracycline. Before treatment, confirmation of malaria infection using microscopy or rapid diagnostic test (RDT) is recommended. To this effect, a pre-packaged ACT referred to as "A+M" and the RDT Paracheck (later replaced by Carestart) are supposed to be dispensed free of charge by public health facilities and village malaria workers (VMW). In the private commercial sector, through the social marketing programme implemented by PSI, RDTs were branded as Malacheck® and pre-packaged ACT as Malarine®. These products were sold by PSI at subsidized prices to wholesale and retail outlets (US\$ 0.42 for one pack/dose of Malarine® adult and US\$ 0.05 for 1 RDT unit); the recommended selling price for an adult dose of Malarine® adult was around US\$ 0.61 (2500 Riel) and for Malacheck® was around US\$ 0.24 (1000 Riel).

## 3. Methods

### 3.1. Scope of the supply chain survey

The Supply Chain Study was conducted amongst wholesalers who operated in the private commercial distribution chain that served the antimalarial drug retailers described in the ACTwatch Outlet Survey report. [16] The term 'private commercial sector distribution chain' refers to any type of supplier (e.g. public or private) who served private commercial outlets as well as private suppliers who served public and NGO outlets, and the focus of the study is on suppliers who operate from the point where commodities leave the factory gate or port-of-entry down to those directly supplying retailers. Overall, the study consisted of two components:

- (i) A cross-sectional structured survey that collected data on the structure of the private commercial sector supply chain for antimalarial drugs, wholesaler characteristics and business practices, wholesale outlet licensing and inspection, wholesaler knowledge, qualifications and training; and wholesale availability, purchase prices and mark-ups for antimalarials and rapid diagnostic tests;
- (ii) Qualitative interviews with a subset of wholesalers and retailers included in the structured survey, and other key stakeholders relevant to the operation of the private commercial sector distribution chain for antimalarials and RDTs. This report presents the results from the second component. The methods and results from (i) the structured survey of wholesalers are described in a separate report [1] that can be found on the ACTwatch website at [www.actwatch.info](http://www.actwatch.info).

### 3.2. Sampling & data collection procedures

#### 3.2.1. Key Informant Interviews (KIIs)

These interviews were conducted between April and November 2009 with key public and private sector stakeholders at the top of the distribution chain, such as government officials involved in the delivery and funding of health care, and in the regulation of drugs and business; the most significant antimalarial importers and wholesalers; and representatives of organizations such as associations of wholesale pharmacists or pharmaceutical manufacturers. Key informants in the country were identified through a comprehensive review of relevant documents and through consultation with actors familiar with the country's distribution chain.

---

<sup>2</sup> The first line treatment for *Pv* malaria was changed to ACT in 2011

Using a semi-structured interview guide, the participant was asked questions about the overall antimalarial and RDT supply chains for the country, and their own role in these; broad estimates of the number of suppliers at each level; and their perceptions of key factors affecting supply and the effectiveness of regulation. Interviews were conducted by a member of the research team and notes were taken by a trained research assistant.

### **3.2.2. *In-Depth Interviews (IDIs)***

In-depth interviews (IDIs) were conducted between April and November 2009 within a sub-set of antimalarial providers sampled as part of the structured supply chain survey and the ACTwatch Outlet Survey. The IDI method was chosen to facilitate collection of data on complex issues, subjective perceptions and opinions, and the exploration of sensitive commercial and regulatory issues, which are not readily addressed using quantitative methods. To ensure inclusion of a diverse mix of businesses, respondents were purposively sampled from a range of commercial hubs across the country, from various trading environments (e.g. inside and outside of traditional markets), across various settings (e.g. urban, rural; accessible, remote; multi-drug resistance (MDR) free, suspected/confirmed and non-endemic areas) and across various levels of the supply chain, from retail level to the top of the supply chain. Wholesalers were then classified into three different categories for analysis: (i) primary wholesalers at the top of the supply chain (i.e. importers or those who are supplied directly by manufacturers); (ii) intermediate wholesalers (i.e. wholesalers that supply other wholesalers); and (iii) terminal wholesalers (i.e. wholesalers that supply retailers). For the retailers and terminal wholesalers, participants were further classified according to location: (i) remote, (ii) moderately accessible, and (iii) accessible. Retailers were also selected to ensure some variation in outlet type (e.g. registered pharmacy, drug store, mobile provider, grocery, village shop).

Interviews were conducted with the person in the business most informed about antimalarial trade by a member of the research team and notes were taken by a trained research assistant. Using a semi-structured interview guide, the participant was asked questions about key aspects of market structure (e.g. horizontal/vertical integration); key aspects of provider conduct (e.g. transport of drugs, credit, source and cost of capital, marketing techniques, vertical restraints, how prices are set, competition and collusion, how stocking and supplier choices are made, perceptions of the appropriateness of regulations and the enforcement capacity of authorities); cost structure; and the role of antimalarials in their portfolio (i.e. how do they compare to other product groups in terms of mark-up and share of sales values).

### **3.2.3. *Data collection procedures***

Both types of interviews used an information sheet and a consent form. Data collection tools were piloted by trained data collectors, revised to adapt the tools to the Cambodian context, and provided to interviewees in either English or Khmer. Before each interview, the researcher provided the information sheet, stated their name, the institutions involved, aims of the study, nature of questions to be asked and length of the interview. Each respondent was given the opportunity to ask questions at any time before, during and after the interview, and received the contact details of the local research coordinator. Interviewers then invited respondents to participate in the study and obtained written consent, or where this was not possible, oral consent was obtained and witnessed by a member of the research team. Interviewers emphasized that individual information was confidential and that no information would be passed on to regulatory authorities or competitors. Information from KIIs and IDIs was supplemented by review of relevant documents on antimalarial regulation and policy.

### 3.3. Data analysis

#### 3.3.1. Interview conducted

In total, 10 key informant and 33 in-depth interviews were conducted in Cambodia. Table 3.1 gives details of the number of in-depth interviews conducted and Tables A.1 and A.2 in the appendices provide further characteristics.

Table 3.1: Number of in-depth interviews across distribution chain levels

Business type/Distribution chain level	Number of in-depth interviews
Retailer	11
Terminal-level wholesaler	15
Intermediate-level wholesaler	4
Primary or top-level wholesaler	3
<b>Total</b>	<b>33</b>

#### 3.3.2. Analytical approach

One or two team members read all interview notes to identify the main themes or experiences identified by respondents. An initial coding structure was developed based on the research questions and existing literature, which was then applied to interview notes and revised as analysis proceeded. All interviews for a given country were coded by a single member of the research team, but to ensure consistency of codes applied by different team members across different countries, co-coding exercises were conducted at the beginning of the coding process where two researchers independently coded a minimum of 5 interview transcripts which were then compared. Any discrepancies were discussed and agreed between coders. Coding and analysis was conducted using NVIVO software.

## 4. Results

### 4.1. Market Structure

During the interviews, wholesaler and retailer respondents were asked a range of questions about the general structure of the distribution chain for antimalarials. Specific topics included the range of products, sellers and buyers at different levels of the chain; barriers to entering the pharmaceutical market; competition; and integration within the chain, such as vertical integration (i.e. where a single enterprise operates related businesses at different levels of the distribution chain, as in the case of a domestic manufacturer supplying wholesalers operated by the same owner) and horizontal integration (i.e. where a single enterprise operates more than one similar business at the same level of the distribution chain, as in the case of a retail chain).

#### 4.1.1. Antimalarial distribution chain structure and range of products sold

- *Dependence on importation:* As there was very limited domestic manufacturing of antimalarials at the time of the study, and none for ACTs, the private commercial sector distribution chain for antimalarials in Cambodia is composed of importers at the top of the chain, registered wholesalers in both the capital city and in provincial cities and towns at the intermediate level of the chain, and a wide range of outlet types at retail level, including registered health outlets (pharmacies, depot A and B pharmacies, and

clinical pharmacies), non-registered health outlets (cabinets, drug stores, mobile providers), and general/non-health outlets (grocery stores, village shops).

- *Delivery networks:* While provincial wholesale and retail pharmacies typically receive supplies directly from importers or wholesalers located in the capital city, some large importers leverage their sales teams and expansive delivery networks to bypass intermediate wholesalers entirely to supply some retail outlets in order to avoid intermediaries' mark-ups being added on top of their product prices (ID 12; ID 1). See section 4.2.6 for additional discussion on distribution practices. Antimalarial importers reported that they never traded products with other importers.
- *Horizontal trading:* Intermediate wholesalers (i.e. those supplied by other wholesalers) did sometimes trade with each other to satisfy immediate customer demand for a product that is out of stock. In these cases, other wholesalers situated close by and stocking the product typically served as supplier.
- *Integration:* Vertical or horizontal integration did not seem to exist as none of the retailers or wholesalers reported owning other retail or wholesale businesses.
- *Intersectoral transactions* were reported to sometimes occur with private sector retailers being supplied by public (military forces and public health facilities) or non-governmental (NGO and research institutes) sources. However, it was not common for public facilities to be supplied by private wholesalers.
- *ACTs and RDTs stocked:* Of the wholesalers and retailers interviewed, most had antimalarials in stock at the time of interview and nearly all of these businesses were also stocking an ACT product. RDTs were also commonly stocked by both wholesalers and retailers, but to a lesser extent compared to ACTs. However, fewer terminal wholesalers stocked ACTs and RDTs than wholesalers operating at higher levels of the distribution chain, and none of the general retail outlets interviewed (e.g. village shops, grocery stores) stocked either ACTs or RDTs.

#### **4.1.2. Competition**

- *Among wholesalers:* Most wholesaler respondents described their competitors as other wholesalers operating within the same district or province, while a few respondents also included wholesalers located further afield, particularly if these competitors delivered antimalarials to customers.
- *Among retailers:* For retailers, competitors were also defined as businesses operating within a prescribed geography, but on a smaller scale compared to wholesalers. For example, one retail pharmacy respondent described his competitors as drug shops located in the same or surrounding villages (ID 13), and an itinerant vendor described his competitors as being "approximately 10 minutes walk away, near the main road's roundabout and a bit farther away in the market" (ID 18).
- *Public vs. private:* Some wholesalers and retailers also perceived the public sector as competitors because government health centres and village malaria workers provide treatment free of charge (ID 13; ID 28). While traditional healers, known as *Kru Khmer*, also provided health services, they only played a very minor role. [6]
- *Among importers:* Competition among importers is limited as businesses were generally in some sort of sole distributorship agreement with overseas suppliers or in some kind of tacit 'gentlemen's agreement' with other drug importers such that individual products were imported by a single company. Sole distributorship agreement terms varied, sometimes including rules or vertical restraints (i.e. agreements between firms or individuals at different levels of the distribution chain) about selling prices and order volumes, embedded sales teams (i.e. sales staff paid for by suppliers), in-country product promotion and sales team training.



- *Restraints imposed by manufacturers:* Vertical restraints were also imposed by manufacturers when they make financial contributions to cover some of the costs associated with importation (see also section 4.1.3 on barriers to entry). For example, one importer explained that since his supplier had contributed to the costs of drug registration, the minimum order value he could now import from that supplier was US\$ 200,000 (ID 9).

#### **4.1.3. Barriers to entry**

- *Licenses:* For retailers, obtaining a drug outlet licence was the most commonly reported obstacle to market entry. A key aspect was the cap on the number of new drug outlet licenses that could be issued in each commune. At the time of data collection, the cap was 1 outlet per 2000 inhabitants and no new pharmacy licenses could be issued if the density was above this threshold. The process of applying for a drug outlet license was another barrier to market entry, with retailers perceiving it to be complicated and expensive. For example, there was no official fixed licence fee at the time of data collection; and although the DDF suggested provincial offices charge a small fee, the licence fees paid to the MOH Provincial Health Departments were reported to range from around US\$ 20 to as high as US\$ 180 in one case (ID 17). Other requirements for opening a drug outlet were also said to be hard to fulfil, particularly regarding the premises in which a drug business could be set up. Regulations stipulate that pharmacy outlets should be at least 20m<sup>2</sup> and depots 16m<sup>2</sup> with clear separation from the living space, but some respondents described that it was difficult to find a suitable premises in certain areas (ID 25). However, several respondents indicated that, in practice, many providers had overcome this barrier by operating without the required license. See section 4.5.2 for more information on licensing.
- *Start-up costs:* Other barriers to market entry mentioned by retailers included the significant financial resources required to set up a business (ID 13), and also the lack of experience in selling drugs or treating patients beyond that achieved by obtaining a relevant health qualification. Several respondents perceived such experience as necessary to confidently operate this type of business (ID 18).
- *Regulatory requirements:* Like retailers, wholesalers also reported regulatory requirements as the major obstacle to opening a drug business, particularly for would be importers. The costs of product registration, import licences and customs clearance were perceived as prohibitive, at around US\$ 1720 for product registration (composed of US\$ 1200 for manufacturer's registration, US\$ 50 for trademark registration, US\$ 250 for the drug quality control fee, and the US\$ 220 fee for the registration committee), US\$ 50 to obtain the import permit from the DDF for each shipment, the payment of 10% value-added tax (VAT) in order to clear customs, and storage costs at sea/airport that sometimes apply. Informal payments made to the authorities were also reported to be important cost components (ID 12). See section 4.5.1 for more information on importing and product registration.
- *Access to capital:* The second obstacle to entering the import market was the lack of capital and access to capital. One respondent estimated that around US\$ 250,000 was required to set up an import business, while another importer argued that better access to capital was needed as suppliers did not readily provide credit to importers (ID 11). See section 4.2.8 for more information on sources of capital.
- *Small domestic market:* Respondents also believed that that the antimalarial market share at import level was too small to be lucrative because the segment is perceived to be dominated by government providers that dispense antimalarials free of charge to patients, and by the social marketing programme of subsidised ACT in the private sector implemented by PSI Cambodia (ID 12).
- *Market exit:* No barriers to exiting the market for antimalarial drugs were reported by respondents.

## 4.2. Provider Conduct

Respondents both at wholesale and retail levels were asked questions related to a diverse range of business practices. Topics included choice of supplier, product selection, price setting, restocking practices, cooperation among businesses, sources of capital. Under price setting, respondents were specifically asked to discuss mark-ups and factors that may cause price variation, such as second degree price discrimination (i.e. discounts based on volume) and third degree price discrimination (i.e. price varies by attributes such as location or by customer segment).

### 4.2.1. Factors influencing choice of supplier

- *Use of few suppliers:* Both retailers and wholesalers reported using only one or two suppliers for antimalarial drugs. In cases where respondents reported using 2 suppliers, they commonly mentioned PSI Cambodia, the NGO distributing socially marketed subsidised ACTs, and a local supplier operating within their district or province.
- *Product variety and supplier stock-outs:* When asked about the reasons for having more than one supplier, many respondents reported that because one supplier was typically an importer selling only one antimalarial type, other products had to be purchased from a different supplier. In addition, importers were said to deliver on a monthly basis, and wholesalers and retailers sometimes reported the need to buy supplies between importer sales team visits. Importers were also reported to sometimes experience stock outs or have limited stock, forcing businesses to rely on other supply sources. In particular, stock outs of Malarine, the subsidised ACT, at PSI Cambodia were frequently mentioned as a reason for having a second supplier.
- *Best selling prices:* When faced with choosing a supplier, profit maximisation was a key consideration leading both wholesalers and retailers to seek suppliers with the best selling prices.
- *Delivery:* Most retailers and wholesalers also reported basing this choice on whether the supplier delivered orders directly to them. A few retailers elaborated that wholesalers using air-conditioned vans for taking and delivering orders were particularly attractive. As mentioned above (section 4.1.1), some importers have established sales teams and extensive delivery networks to increase their coverage and market share by delivering directly to retailers; however, not all areas or retailer types are served by these networks. One retail respondent described filling this gap by choosing to supply other retailers located outside of these importers' coverage areas, typically in difficult to reach areas (ID 23).
- *Knowledgeable suppliers:* Several retailers and wholesalers also indicated that they bought antimalarials from suppliers who they perceived to have knowledge about malaria and who provide information on new drugs and treatment regimens. For example, one retailer purchased from a supplier operated by a knowledgeable medical doctor also working at a government hospital who informed them on how to use new drugs and dispense according to patient weight (ID 13).
- *Reputation:* Another mobile retailer explained that he bought antimalarials from a supplier because other retailers did so (ID 15), and a few other retailers reported that they sometimes purchased antimalarials from government providers who were the only suppliers of those particular drugs.
- *Credit offered:* Credit was another strategy employed by suppliers to attract customers. For example, one wholesaler reported providing credit for at least 2 months as one month was thought to be too short to be attractive (ID 6).

#### **4.2.2. Factors affecting availability and choice of product**

- *Consumer perceptions of quality:* At retail level, consumer perceptions of drug quality were reported to influence stocking decisions, where the quality of a drug appeared to be signalled by its popularity. Respondents described their customers expressing preference for familiar products, for products they had heard of on television and for products they knew were popular with other customers. Malarine was the most commonly mentioned 'high quality' antimalarial drug, a situation that may reflect the social marketing programme promoting the Malarine brand. For example, one retailer explained that attending PSI Cambodia's training session influenced his stocking decisions, leading him to stock Malarine and stop selling other antimalarial drug types (ID 23). By contrast, A+M, the public sector version of ASMQ which was not the object of any promotion campaign, was reported to be less popular among consumers (ID 29). Customers were also said to prefer antimalarial drugs for which there were no known counterfeited versions available on the market, such as Malarine. This may reflect the effect of a government-led campaign on counterfeit medicines launched on Cambodian television at the start of 2009. Another signal of product quality mentioned by retailers was the presence of a DDF registration sticker on the packaging.
- *Country of manufacture and perceived quality:* Perceived drug quality was also a key factor considered by wholesalers. A few wholesalers said that the country of manufacture influenced their antimalarial stocking decisions, with drugs manufactured in European countries, China and Vietnam believed to be of higher quality than products produced in Cambodia (ID 27); and several respondents reported buying from PSI Cambodia because it was an NGO supported by the MOH to sell quality malaria treatment (ID 28; ID 29). However, as noted above, a number of respondents cited frequent stock outs at PSI Cambodia and infrequent visits from their sales teams (ID 5). Ironically, some wholesalers operating at lower levels of the distribution chain had stopped stocking antimalarial drugs all together in recent years because of increased competition due to the introduction of highly subsidised Malarine. One importer hypothesised that this competition may have led some businesses to choose to sell low-priced counterfeit and substandard drugs in order to remain competitive (ID 12).
- *Product range and side effects:* In addition to Malarine, both wholesalers and retailers also aimed to stock a wide range of products. This may reflect the need to treat for *Pv* infections with chloroquine, but may also be due to the undesirable side effects associated with the mefloquine component of Malarine, which led one respondent to stock an AMT tablet as an alternative (ID 26). Despite the ban on the sale of oral AMTs, demand among wholesalers and retailers persisted and it was therefore sometimes stocked.
- *Promotions:* Other factors influencing stocking decisions mentioned by wholesalers included supplier promotions that impact customer demand through promotion activities conducted by sales teams and television advertisements. Importers also considered the high costs of importing. See section 4.1.3 for more information on the costs of importing.

#### **4.2.3. Factors influencing consumer choice of provider**

- Respondents described a wide range of strategies employed to attract consumers.
- *Convenient outlet locations:* Retailers indicated that choice of outlet location was important and attempted to be situated where consumers were perceived to seek medication. Retailers reported that consumers preferred the convenience of outlets located in or around *phsars* or markets because if they did not find the products or services of their choice in a given shop they could easily visit another shop nearby (ID 22). Being located in or around a *phsar* was also reported to create positive externalities between providers because it increased the overall demand for these providers. One retailer on the outskirts of a *phsar* indicated that she would close her shop shortly after midday because the *phsar* was

only open in the morning and therefore she was not expecting customers to visit her shop in the afternoon (ID 34).

- *Long opening hours:* As such, opening hours were also a factor considered to affect consumer choice, with longer opening hours believed to be an attribute highly valued by customers. Some retailers even chose to remain open at all times (ID 30), which may reflect situations where the drug outlet was located at the provider's home or where providers travelled to patients' homes (e.g. mobile providers). Opening hours were also mentioned as one reason why people preferred seeking care in the private rather than the public sector. One mobile provider explained that for people sick at night there was no alternative source of care available locally other than him because the nearby health post did not provide care at night (ID 21).
- *Transport costs:* Transport costs were reported to be a key factor influencing consumers' choice of outlet, and outlets located along main roads and roundabouts were reported to attract custom because of their accessibility. One retailer said that customers considered transport costs alongside treatment prices when deciding on a provider (ID 19). Furthermore, seeking care from government facilities implied other indirect costs including the opportunity cost of being away from work or that of providing food to family members or friends who would have accompanied patients for the duration of their stay. Only when free treatment was available locally, such as through VMWs, was it reported to attract custom.
- *Personal relationships:* Customers were said to prefer providers they had known and who had been in operation for a long time as they were perceived to have more expertise in administering treatment (ID 16; ID 1). One clinical pharmacy owner said that when he moved from one village to another, his previous customers still sought care at his new outlet, although he had yet to acquire new customers (ID 18). Customers were also reported to choose a private retailer instead of a government facility due to personal relationships. Private retailers argued that they were more pleasant, polite and receptive to customer needs than government health workers (ID 28).
- *Reputation and health qualifications:* Furthermore, customers were not only reported to choose a particular provider based on their own experience but also on that of other customers, and reputation within a community was reported to be key for increasing demand (ID 19). Reputation was said to be built on providers' expertise in supplying complementary services to drug sales, including medical consultation and clinical care services, and *Kru Pets*<sup>3</sup> working at clinical pharmacies or as mobile providers were perceived to have more expertise than other provider types, such as grocery and village shopkeepers, who voluntarily admitted their lack of expertise (ID 23). As such, health qualifications were also reported to signal expertise. Even in very small outlets, it was common for at least one person to be qualified (e.g. working at the local health facility) or semi-qualified, having received some training after the fall of the Khmer Rouge regime (e.g. *Kru Pets*).
- *Drug cocktails:* The provision of 'cocktail therapy', mixtures of typically 3 and up to 7 different types of drugs, was also said to affect customers' choice of provider. The most common antimalarial included in such cocktails was quinine, followed by chloroquine or artesunate, and supplemented most frequently with paracetamol and vitamin C, and sometimes with tetracycline (although never in combination with quinine). Interestingly, nearly all private providers reported that providing cocktails was more profitable than selling only other drugs.

---

<sup>3</sup> *Kru Pets* are semi-qualified or qualified health care providers. Semi-qualified health care providers may be those who received training in the camps after the Khmer Rouge regime. Qualified health care providers may include government health workers who have their own private practice or retired nurses or midwives.

- *Public sector stock-outs:* Frequent stock outs of antimalarials in public health facilities, especially at lower levels (e.g. health posts), were another factor respondents believed led consumers to seek care in the private sector (see section 4.6 for more information on public sector issues). Related to this, some respondents aimed to stock a wide range of products, particularly among outlets providing treatment services such as clinical pharmacies and mobile providers (ID 20).
- *Testing services:* However, it is interesting to note that the provision of blood testing services was rarely reported as a strategy for attracting custom. See section 4.7 on RDTs for more information.
- *Credit for consumers:* Finally, although the availability of credit facilities was generally viewed as attractive, most were reluctant to provide credit to consumers or limited access only to customers that they had known for a long time. Some respondents indicated that they did not offer credit to customers because of the high risk of default, and several providers who offered credit indicated that customers sometimes paid them back after many months or even years and sometimes not at all (ID 21).

#### **4.2.4. Price setting**

##### *Determinants of price*

- *Retailer costs:* When asked about setting mark-ups, nearly all retailers said they sought to make a profit, taking into account drug purchase prices and the cost of restocking (i.e. either travelling to their supplier's outlet or paying private taxis for delivering their orders). Very few shopkeepers reported considering other costs; but when shopkeepers did consider other costs, they mentioned drug license fees and in a few instances other local taxes.
- *Retail competition:* However, many retailers argued that their price setting decision was constrained by the price set by other providers. Customers were said to shop around in search of the cheapest price, such that charging higher prices was almost impossible without losing some or all customers (ID 16). This led some shopkeepers to consider other costs incurred by consumers when seeking care by setting their price as a function of the price charged at outlets located further away plus the cost of transport that customers would incur if they chose to seek care at those outlets. One respondent explained that patients prefer to seek treatment from his drug shop because they would otherwise have to pay 10,000 riel (US\$ 2.50) for transport alone to go to receive treatment at the public health centre (ID 19).
- There were, however, a few exceptions. For example, one mobile provider argued that he was the price leader in his market as he would set his price first and competitors would adjust their prices to charge the same (ID 17). A few retailers also reported that they competed intensely on price as they charged lower prices than other providers.
- *Recommended retail prices:* Recommended retail prices (RRPs) on antimalarials apart from Malarine were not observed. However, very few retailers reported setting their price for Malarine at the recommended level and those who did reported being constrained by customers' knowledge of the RRP, particularly because the RRP was printed on the packaging (ID 14). Most retailers reported that they did not follow the RRP because it was too low and did not provide a sufficient margin on top of the purchase price (ID 16). A few respondents also perceived the RRP as a recommendation for setting prices rather than as an obligation.
- *Wholesalers:* Wholesalers reported very similar price setting behaviours to retailers, considering purchase prices, transport costs and profit opportunities, with many also arguing that their price setting behaviour was constrained by the price charged by competitors (ID 34). A few wholesalers also said that they would decrease the price of 'slow moving' antimalarials or of those getting close to their expiry dates.

- Some differences between wholesaler price setting behaviours were identified across distribution chain levels, notably between importing and non-importing wholesalers. First, importers reported considering a broader range of costs than those reported by other wholesalers when setting prices, including freight and insurance costs, staff salaries, promotion costs, in-country transport costs and, at times, interest on trade credit (ID 12). Second, importers reported giving discounts and bonuses depending on volumes of purchase or whether customers paid cash or credit (see sub-section on price variation below). Finally, one importer reported that his price mark-up was constrained by the intense competition his products faced from the socially marketed subsidised ACT, Malarine, and the provision of free malaria treatment at government outlets (ID 12).
- *No price fixing*: All wholesalers and retailers denied collaborating on price with other businesses.

#### *Mark-ups*

- *Importers*: Importers applied mark-ups on antimalarials ranging from 15% to 55%, with ACTs attracting the lowest mark-ups of 15%, followed by nAT tablets such as chloroquine at 30%, and AMT non-tablets at around 45% to 55%.
- *Wholesalers*: Intermediate wholesaler mark-ups differed somewhat depending on their location, with those based in the capital city applying mark-ups of around 3% to 25%, and those based in the provinces between 15% and 35%.
- *Retailers*: Retailers reported applying the highest mark-ups, ranging between 26% and 88%.

#### *Price discrimination and variation*

- *Importers*: As mentioned above, importers reported giving discounts and bonuses, with discounts ranging from 2% to 10% depending on whether customers paid with cash or credit, and bonus schemes such as 'buy 10, get one free', or sometimes combined with gifts, such as 'buy 30, get a fan'.
- *Wholesalers*: When buying from other wholesalers operating at the same level of the chain (i.e. horizontal trading), the small volumes typical of these types of transactions meant that discounts or bonuses were not given.
- *Retailers*: When supplying retailers, several wholesalers reported varying prices as a function of volume sold. However, because it was common for wholesalers to also retail, some respondents varied prices regardless of the volume sold, by charging a lower price for one antimalarial pack when selling to retailers than to patients (ID 34).
- *Consumer discounts*: Several retailers mentioned varying their price as a function of the total amount spent by a customer. Retailers described giving discounts to customers who bought antimalarial drugs alongside other drugs or consumer goods, and/or to customers perceived as poor. A few retailers reported giving discounts to customers who bargained for lower prices, particularly to those citing lower prices at competing businesses. However, some retailers did not vary price based on purchase volume or value, or on customer characteristics. For example, one mobile provider described considering the purchase price only, on to which he added a fixed percent mark-up of 30%, and did not consider if the consumer could afford the resulting price (ID 21).

#### **4.2.5. Vertical restraints**

- *Importers*: As mentioned in section 4.1, vertical restraints were often included in sole distributorship agreements between foreign manufacturers and Cambodian importers. The terms, however, varied and sometimes included rules about selling prices and order volumes, embedded sales teams, in-country

product promotion and sales team training. In addition, vertical restraints were sometimes imposed by manufacturers when they made financial contributions to cover some of the costs associated with importation. See section 4.1.2 for additional discussion and examples of vertical restraints.

- *Wholesalers:* A few intermediate wholesalers explained that PSI Cambodia sales teams also applied vertical restraints, requiring customers wishing to purchase Malarine to purchase PSI-subsidised condoms as well (ID 3 & 4).
- *Retailers:* At retail level, vertical restraints were not reported. For example, almost all private retailers described exercising control over price setting.

#### **4.2.6. Restocking and distribution practices**

- *Importers:* Importers reported ordering supplies 2 to 3 times per year with a lead time of 1 to 3 months. Respondents said that the quantities procured could be influenced by different factors, including remaining stock from previous orders, transmission seasons, market research at provincial and district levels conducted by their own sales teams as part of their day-to-day activities, market research conducted by overseas manufacturers, and malaria surveillance data available from the MOH.
- Importers maintained warehouses in the capital city or close by and distributed through their own wide-reaching and well-organised distribution networks covering most of the country. Rather than establishing distribution hubs at provincial level, this network was maintained by teams of sales representatives that frequently visited wholesalers and retailers to take and deliver orders, with some conducting 'van sales' using stock carried in their vehicles. One intermediate wholesaler commented that this distribution strategy created intense competition as importers attempted to reach retailers directly, bypassing wholesale businesses such as his own (ID 1).
- *Wholesalers:* Wholesalers described receiving daily visits from at least one importer sales team with whom they place their order directly or otherwise by phone. Orders may be delivered in as little as a few hours or the following day by sales teams, but wholesalers may also receive stock immediately if available through van sales teams, although this seemed to be less common.
- When intermediate wholesalers were supplied by others operating at the same level of the chain, it was generally to satisfy an immediate customer demand for a product that was out of stock. In these cases, wholesalers chose the closest business stocking the product and collected it themselves.
- *Retailers:* Retailers were also supplied via importers' sales teams, placing orders in person or by phone. Deliveries typically arrived within a week if located in a relatively large market such as those found in provincial cities, or every 2-3 months for smaller and more remote markets. Urgent orders placed outside the importer's planned distribution schedule were also delivered using hired private transport.
- However, not all businesses were served by these importer delivery networks. Several retailers described never receiving visits from importers' sales teams because they did not visit the area or did not stop at their shops (ID 19; ID 20); and one importer explained that they did not distribute to all areas or businesses because of high transport costs and low expected sales volumes (ID 9). These small retailers were more likely to be supplied by wholesalers operating at lower levels of the distribution chain, often located in provincial cities or further afield who may deliver through a somewhat ad hoc distribution system using private taxis and public buses. These wholesalers did not typically employ distribution teams and rarely conducted promotion activities at provincial levels, but tended to stock small quantities of a wide range of products on their own premises (i.e. they did not maintain separate warehouses). Recognising the opportunity to supply outlets in remote areas, one village shop respondent began wholesaling antimalarials (ID 23).

#### **4.2.7. Cooperation among businesses**

- The types of cooperation between businesses described by respondents were of limited scope and informal in nature.
- *Borrowing from competitors:* Several respondents reported borrowing single or several antimalarial drug packs from neighbouring businesses in order to meet an immediate demand for a product that was out of stock and 'paying back' the lender one or two days later by returning the quantity borrowed of the corresponding product.
- *Filling prescriptions:* Respondents also described two different cooperative scenarios involving customers presenting a prescription for antimalarials at the time of their visit. In the first scenario, one village shopkeeper reported that customers would arrive with a prescription issued by *Kru Pets* from whom they had first sought care, but who was stocked out of the prescribed drug. After purchasing the antimalarial from the retailer, the customers would then return to the *Kru Pet* to administer the treatment (e.g. for injections). In the second scenario, a drug shop respondent explained that it was common for staff working in government health facilities who also owned private drug shops to write prescriptions for their patients and send them to their shop (typically managed by their wives) or to the shop of someone they knew to fill the prescription (ID 20).
- *No price fixing:* As noted above, all wholesale and retail respondents said that they did not collaborate with other businesses on price.

#### **4.2.8. Sources of capital**

- *Cash vs. credit:* When restocking, both wholesalers and retailers reported paying with cash on delivery or with credit. For wholesalers, the decision of whether to pay using cash or credit was influenced by the discount they would receive by paying in cash, with reported discounts ranging from 2% to 10%. Wholesalers generally received credit terms of 30 days. Retailers used credit less frequently, and credit terms ranged from 15 to 45 days.
- *Limited credit offered due to risks:* As previously mentioned (section 4.2.1), credit was sometimes used as a strategy for attracting custom. However, many wholesalers indicated that credit was only offered to long-term customers, a statement which was supported by wholesalers operating at lower levels of the chain. The main reason for not offering credit more widely was the risk of non-payment. For example, a female wholesaler reported she did not provide credit because it would be impossible for a woman to chase customers to obtain payment, though not offering credit drove customers away to other shops (ID 5). In some instances, a system of informal credit was used among intermediate wholesalers experiencing a stock out of a given product who 'borrow' a few packs from another wholesaler and return them a few days later when they have been resupplied.
- *Low use of bank loans:* Despite the perceived lack of supplier credit, nearly all respondents reported that they did not borrow money from banks either because the bank in their area did not make loans or because they foresaw not earning enough to repay the loan. The sole respondent who reported using a bank loan to finance his inventory borrowed at a monthly interest rate of 3% for sums less than US\$ 1000 and 2.5% for sums above US\$ 1000 (ID 15). The only other source of financial resources mentioned, although rarely, was family members who had provided the initial capital for setting up a business.
- *Importers desire better access to credit:* Importers in particular argued for better access to capital, especially for those not receiving credit from their suppliers (ID 11). For some, the lack of capital was reported to be addressed through financial contributions from foreign suppliers, although conditions were tied to the assistance provided (ID 9). See section 4.2.5 for more information about vertical restraints.



### 4.3. Sales Revenue and Expenses

Respondents were asked questions about sales revenue, and the costs of starting and operating a pharmaceutical business, including taxes and tariffs, to examine potential cost drivers. Considering the sensitivity of these topics, many respondents preferred to speak in general terms rather than give specific figures. For start-up costs, respondents were asked to estimate how much they would need to spend today if they were to set up a similar business on furniture, fittings, initial stock purchase, equipment and vehicles.

#### 4.3.1. Revenue from antimalarial sales and fluctuations

- *Revenue from antimalarials varies:* The proportion of total revenue from antimalarial sales varied considerably, ranging between 1% and up to 70% for retailers, reflecting the heterogeneity of outlet types selling antimalarials; and for wholesalers between 1% and 30%, although most reported proportions between 10% and 30%.
- *Fluctuation in antimalarial sales:* Respondents also reported that antimalarial sales revenue fluctuated, with nearly all saying that sales were higher during the high malaria transmission season corresponding with the rainy periods (some estimated anywhere between 2 to 5 times higher), and one respondent also stated that antimalarial sales also increased during harvest periods when people spend more time in fields putting them at greater risk.

#### 4.3.2. Start-up costs

- *Start-up costs significant:* Setting up a pharmaceutical business was reported to require significant financial resources. One importer estimated that setting up a business like his would cost around US\$ 250,000, with 80% of the total cost going towards buying the initial drug stock, and the remainder mainly covering vehicles and furniture (ID 12), while other respondents estimated start-up costs of around US\$ 10,000 to US\$ 25,000 for a wholesale or retail pharmacy business. For other types of retail outlet, US\$ 540 was reportedly sufficient although it could be 10 times more at US\$ 5,000.
- *Types of initial costs:* Resources included renting a house, purchasing shop furniture such as shelves and a drug cabinet, fittings and an initial stock of drugs, with the latter accounting for the largest share of capital required (40-97% of all capital reportedly required). Many respondents operating at the lower levels of the distribution chain did not report rent as an initial cost as they often operated their business out of their own home.

#### 4.3.3. Cost structure

- Respondents were asked about their typical expenditure on a number of recurrent expenses, including rent, electricity, gas, inventory, water, telephone, regular and casual employment salaries, stationery, marketing, transportation to both deliver and collect orders, fees for trading and pharmacy licences, insurance, and security.
- *Inventory then electricity:* Across all levels of the distribution chain, expenditure tended to be highest for purchasing new inventory by a considerable margin, often followed by costs for electricity.
- *Retailer rental, salaries, distribution:* Because private retail outlets were generally small and located at the front of providers' homes, many did not incur expenses for rent, salaries, marketing, etc.; however, for those that did pay rent to operate a wholesale or retail pharmacy or market stall, this was one of the highest recurrent expenses.

- *License costs:* In terms of licenses, the reported costs of acquiring and renewing licences were relatively small overall. In addition to the typical business trading licences and pharmacy licences, some respondents also reported the cost of ‘renting the name’ of an existing licensee (see section 4.5.2 for a description of this and alternative means of obtaining a retail license) as another important cost that sometimes was sometime considerably more expensive than the cost of maintaining a pharmacy licence itself. Most wholesalers reported paying annually to renew their trading and pharmacy licence; however, few retailers reported paying to maintain their pharmacy licence.
- *Taxes:* In a few instances, respondents also reported paying either local government or corporate taxes, which tended to be small in comparison to overall monthly expenses; in one case, a small monthly tax for those operating in *phsars* was also mentioned, but turnover/revenue taxes were not mentioned.

#### **4.4. Non-Regulatory Interventions**

The term non-regulatory intervention is used to describe activities designed to influence provider conduct and business practices within the pharmaceutical distribution chain that do not involve regulatory action. These activities may be driven by actors in the public, private, parastatal or civil society sectors, and may include training of providers, information dissemination, marketing, demand generation, etc.

##### **4.4.1. Provision of information and creating industry demand**

- *Creating demand – social marketing:* The impact of PSI Cambodia’s social marketing campaign promoting Malarine was evident in a number of comments from both wholesalers and retailers, although opinions varied. For example, one retailer explained that attending PSI Cambodia’s training session influenced him to stock Malarine and stop selling other antimalarial drug types, believing it to be of superior quality (ID 23); while one wholesaler was sceptical of the social marketing programme’s intent and questioned whether it was being driven more by a profit motive to benefit government coffers (ID 24).
- *Product promotion:* Product promotion for antimalarials was commonly conducted by importers who sometimes employed specialised promotions teams with roles often distinct from sales teams (ID 34). Teams from importers were reported to visit both wholesale and retail customers at least once a month to conduct promotional activities, although the type of team sent was sometimes tailored to the customer or product. For example, teams of sales representatives who typically take orders and make deliveries were sometimes sent to conduct promotions among retail outlets, while promotions teams composed of medical representatives were sent to private clinics and doctors to provide more technical information relevant to treatment providers (e.g. action of the drug, side effects). Promotion teams were generally based in provinces, and in some instances, they also conducted sales activities from their vans.
- *Bonuses, gifts and discounts:* Importers also attempted to increase sales by offering bonuses, gifts and discounts. Bonuses, such as ‘buy 10, get 1 free’ or ‘buy 20, get 3 free’ promotions, were generally used in transactions with wholesalers; while gifts, such as fans and refrigerators, were generally given to retailers when they placed orders of a certain volume or value within a given period. Discounts of 2% to 10% were also offered, sometimes on top of bonuses and gifts, generally depending on whether customers bought using cash or credit.
- *Manufacturers target importers with promotional activities:* Importers themselves were also targets for promotion activities conducted by manufacturers hosting workshops or group training sessions. These types of activities were also organised by some importers for other businesses and were reported to have some positive influence on wholesaler and retailer stocking practices. For example, one importer

reported that drug manufacturers organised medical congresses, which provided him with the skills and information needed to increase sales (ID 9).

## **4.5. Regulation**

Wholesalers and retailers were asked to discuss their opinions on the regulation of the pharmaceutical sector. Specific topics discussed related to importation, product registration, business licensing, bans on particular products or practices, inspections, over-the-counter medications, the black market, counterfeits, substandard products, and suggestions to improve regulation of the pharmaceutical sector.

### **4.5.1. Importation and product registration**

- Many respondents perceived the legal process for importing pharmaceutical products to be lengthy, opaque and costly, creating incentives for some businesses to operate illegally.
- *Product registration/import permits costly and complicated:* Several respondents considered the costs of registering products, obtaining an import permit and clearing customs to be excessive. Because only drugs registered with the DDF may be legally imported in Cambodia, importers must first seek to register any new products they wish to bring to market. At the time of the study, registering a drug required the submission of several documents, including documents on drug provenance (marketing authorisation in the country of origin, manufacturer contact details and good manufacturing practice certificate), and qualitative and quantitative data on methods of preparation, ingredients, and clinical trial results (ID 12). The various costs for drug registration and import are described in section 4.1.3.
- *Time lags:* Institutional lags associated with each step of the importing process were also said to be major hurdles to importing pharmaceuticals. Following regulatory changes in 2009, the time to obtain a permit was expected to decrease significantly from 30-45 days to 1-3 days, depending on the number of permits to be processed by the DDF. However, importers viewed this target as an aspiration only, as registration was reported to still take up to 5-6 months. One respondent said they preferred the previous regulatory system where it was possible to import under a temporary permit issued while waiting for the final permit (ID 9). In addition, repeat applications required for each shipment were thought to be time consuming, as was the process for obtaining customs clearance (ID 9).

### **4.5.2. Licensing**

- *Limited number of drug outlet licences:* As previously mentioned in section 4.1.3, the cap on the number of new drug outlet licenses that could be issued in each commune was a common frustration for those wishing to enter the retail pharmaceutical trade, which at the time of data collection, was limited to 1 outlet per 2000 inhabitants. However, several respondents indicated that, in practice, many providers had overcome this barrier by operating without the required license.
- *Outlet license process:* Respondents also took issue with the process of applying for a drug outlet license, perceiving it to be complicated, expensive and opaque. For example, although the DDF encourages applicants to submit the required documentation as soon as possible in order for new licenses to be issued on a first-come, first-served basis, there was no official fixed license fee at the time of data collection and the DDF suggested provincial offices charge a small fee. Respondents reported that fees paid to the MOH Provincial Health Departments to obtain a drug outlet license were typically around US\$ 20, although one provider reported that the fee could be as high as US\$ 180, which for some, provided another incentive to operate without a license (ID 17).

- *Other requirements to open a drug outlet:* As described in section 4.1.3, other requirements for opening a drug outlet were said to be hard to fulfil, particularly regarding the premises in which a drug business could be set up. Buying an established drug business from an existing licensee was one strategy used to circumvent this regulatory requirement; however, these opportunities only arose in particular circumstances, such as when an existing licensee decided to retire. Retailers also reported renting licensees' names for setting up their own shop. At the time of this study, the legislation authorised such practice provided that 'new' entrants had the relevant qualifications. However, opportunities to rent a license were reported to be rare due to the limited number of pharmacists in Cambodia and the number of existing retailers already 'renting' their names. When licensees' names or premises were available for sale or rent, their cost was considered to be unaffordable at around US\$ 200 per month (ID 29).

#### **4.5.3. Unlicensed businesses and regulatory enforcement**

- Although the issue of unlicensed providers was widely recognised, a number of retailers believed the situation to be improving through the introduction of new regulatory interventions and increased enforcement activities.
- *Closure of outlets:* Several respondents referred to an ongoing controversial campaign led by the local regulatory authorities where private outlets providing clinical services, such as *Kru Pets*, were being closed down (ID 16); and a few also reported that the sale of drugs at general shops would soon be forbidden by their local authorities.
- *Enforcing licences:* Others mentioned that enforcement had become stringent for outlets operating without a licence in *Phsars* (marketplaces) which were being asked to obtain a license if they wished to continue operating. Shortly after the end of data collection, the MOH began a new drive to curb unlicensed providers, and a few months later in March 2010 announced that 65% of unlicensed outlets had been closed. [17]
- *Capacity to close down unlicensed businesses:* However, one mobile provider who also worked at a local health facility argued that the authorities had limited capacity to close unlicensed businesses because enforcement had been delegated to the operational district and to government health workers themselves, who were wary of the possibility of retribution (ID 13).

#### **4.5.4. Counterfeit and substandard drugs**

- *Use of counterfeits and sub-standards during stock outs:* Several respondents believed that, although the majority of private sector patients bought Malarine, the ACT socially marketed by PSI Cambodia, many consumers still purchased poor quality products, mostly counterfeit and substandard, when Malarine was not available. Evidence from the 2009 ACTwatch Outlet Survey [16] supports this assertion as many antimalarials stocked in private shops did not have information on country of manufacture on the packaging, potentially indicating dubious provenance<sup>4</sup>.

#### **4.5.5. Ban on AMT**

- *Awareness of the ban and stocking:* Despite being banned since November 2008, oral AMTs were still widely available in Cambodia. Evidence from the 2009 ACTwatch Outlet Survey showed that artesunate sales volumes accounted for 6.3% of all antimalarial drug volumes sold and artemisinin monotherapies in

---

<sup>4</sup> Absence of information about country of manufacture may be due to products being imported from Thailand or other neighbouring countries for which data collectors were unable to read packaging, or products being stored loose as blisters or single ampoules so that this information was not available. For Malarine, it is also important to note that these products distributed by PSI Cambodia before May 2009 did not include manufacturer information on packaging.

general for 8.5%<sup>5</sup>. [16] Respondents who were aware of the ban but were still selling AMTs indicated that they were still trying to deplete their unsold stock of artesunate. Others reported being out of stock of AMTs, although this was unintentional because artesunate was no longer available from their suppliers. During one interview, a retailer presented a recent supplier's product list which listed artesunate as available (ID 1).

#### 4.6. *Public-Private Links and Public Sector Issues*

- *Public sector stock outs:* Stock-outs were said to be frequent in the public sector, particularly at lower level facilities such as health posts. One government health worker explained that their outlet received only 4 to 5 adult doses of A+M, the brand of ASMQ distributed in the public sector, per month. Requesting additional treatment packs from higher level facilities, either from the health centre or directly to the operational district, was possible, but supplies were said to arrive 1 or 2 days later or health post staff were required to travel long distances (e.g. 60 to 70 kilometres) to collect the antimalarials from the operational district office.
- *Leakage:* There was some evidence of leakages from public providers to private shops. One wholesaler described stocking A+M because it is prescribed by doctors; but this respondent also explained that because A+M is not promoted, there is less demand compared to the socially marketed Malarine (ID 29).

#### 4.7. *RDTs*

Similar to antimalarials, wholesale and retail respondents were asked a broad range of questions related to RDTs. Topics included the price setting, product availability, regulation of RDTs, and interventions or suggestions to improve their access and use.

- Although many retail businesses stocked RDTs at the time of interview, several did not and described their reasons for not stocking RDTs.
- *Tested already:* One reason for not providing blood tests mentioned by some retailers was that customers were reported to have visited private laboratories before visiting shops so that they already had a written prescription for a confirmed malaria infection and would therefore only buy antimalarials.
- *Buffer and home testing:* A few retailers also mentioned that the availability of a single buffer vial per box of 10 tests prevented them from selling single RDT units to individual patients as they could not perform the test at home.
- *Lack of confidence to test:* Respondents from general shops admitted being uncomfortable testing blood, a practice perceived to be within the remit of providers of treatment services only, such as clinical pharmacies and mobile providers (ID 23); while another reported not selling RDTs because regulations prohibited the drawing of blood at private shops (ID 16).
- *RDT stock outs:* Some retailers also reported frequent RDT stock outs among their suppliers. One respondent explained that he could not buy tests from his supplier due to problems with the manufacturer (ID 15).
- *Testing does not attract customers:* Even among those retailers stocking RDTs, the provision of blood testing services was not considered as a strategy for attracting customers. Several explained that customers were rarely interested in conducting a blood test in shops because customers believed themselves to be capable of recognising malaria (ID 32). When providers were probed about their

---

<sup>5</sup> Although the policy to ban oral AMTs was introduced in November 2008, implementation (i.e. communicating the policy to shopkeepers) of the ban began shortly before the 2009 ACTwatch Outlet Survey, in May 2009.

actions when customers refused to take a test, most explained that they would still sell them medicines, although a few would also warn customers about the possibility of treatment failure and would not accept responsibility in such cases or entertain any customer complaints. Worryingly, one provider also reported that in such cases he would still sell the antimalarial, but at a lower dose than usual (ID 26).

- *RDT accuracy*: Although RDTs were perceived as fast and easy to use, their accuracy and utility was sometimes questioned. One grocery shop owner who stopped stocking RDTs once microscopy became available in his area expressed preference for microscopy over RDTs, perceiving it to provide more precise results (ID 26). An owner of a clinical pharmacy argued that RDTs were only effective for detecting severe malaria cases (ID 34), while another respondent indicated that RDTs, such as Malackcheck, could only detect some of the malaria parasites circulating in the country<sup>6</sup> (ID 26). However, respondents recognised that microscopy services required greater levels of expertise than RDTs, creating barriers for untrained shopkeepers to test blood (ID 22).

---

<sup>6</sup> A new version of the Malackcheck RDT capable of detecting *Pv*, *Pf* and mixed infections was later introduced.

## 5. Summary of key findings

Viewed alongside the findings from the quantitative survey of the private commercial distribution chain for antimalarials in Cambodia (see [1] at [www.actwatch.info](http://www.actwatch.info)), this study has produced new insight into the perceptions and practices of private sector antimalarial wholesalers and retailers in Cambodia.

- As the bulk of antimalarial treatment is manufactured outside of the country, pharmaceutical importers, including PSI/Cambodia, constitute a critical component of Cambodia's private sector distribution chain for antimalarials by ensuring a regular national supply of antimalarials and also by facilitating their distribution throughout the country. Non-importing wholesalers also play a role in distributing antimalarials, particularly to more remote areas and to retail outlet types not targeted by importers, including more informal types such as drug shops, grocery stores, etc.
- The degree of competition varied by distribution chain level: at import level, competition was restrained by sole distributor and like agreements between foreign manufacturers and domestic importers, and also by a number of barriers to entry, including the costs of importing, the limited size of the overall market and lack of access to capital. Competition was less restrained at lower levels of the chain where the key barrier in theory to market entry was the difficulty of securing a license to operate, though many believed it was a barrier easily circumvented.
- Commodities for malaria treatment, including ACTs and RDTs, were perceived to be generally available in the private sector distribution chain; however, availability of ACTs and RDTs at lower levels of the chain was poorer. At both wholesale and retail levels, stocking decisions were driven by perceived drug quality, which was in turn affected by factors such as media promotion and social marketing targeting wholesalers, retailers and consumers, as in the case of Malarine. However, supplier stock outs of Malarine combined with its perceived side effects led some providers to continue stocking alternatives treatments, including artemisinin monotherapies, even though they were aware that sales of such products were prohibited.
- Most wholesalers and retailers purchased new stock from either one or two suppliers. When choosing a supplier, factors considered were supplier selling prices, availability of delivery services, and perceived knowledge/expertise of the supplier in the treatment of malaria. Offering credit facilities was also cited as a strategy to attract custom, but access to supplier credit was perceived to be restricted to customers known to suppliers.
- Retailers and wholesalers had similar price setting behaviours. Providers reported setting their price on the basis of antimalarial purchase price and their price mark-ups on the basis of transport costs. At the top of the chain, importers considered a broader range of costs when setting prices, including overhead and promotion costs among others. In addition, most providers admitted seeking profits, although many argued that their pricing decision was constrained by the price set by other shops. Second and third-degree price discrimination strategies were commonly reported by both retailers and wholesalers who varied prices on the basis of volume purchased and customer characteristics.
- Retailers employed a wide range of tactics to gain competitive advantage over other businesses, attract consumers and generate demand. A retailer's reputation for delivering high quality treatment, reflected in their length of operation in a market, positive consumer experiences, and through the provision of 'cocktail' therapies, was viewed as crucial to achieving this; however, providing added value services, such as of blood diagnostic testing, was not. Nevertheless, RDTs were available from many outlets and were perceived to be easy to use, although less precise than microscopy for confirming malaria infection.

When interpreting the findings of this study, there are a number of issues that need to be considered. First is that the sample selected for interview was purposefully chosen to capture the widest possible range of opinions and experiences of antimalarial wholesalers and retailers, rather than to be statistically representative of the entire study population. In order to protect the confidentiality of respondents and due to the sensitivity of the topics being discussed, interviews were documented using a note taker, rather than recorded. While this may have helped to improve the reliability of the data by allowing respondents to be more at ease, some of the richness and detail of the discourse is likely to have been lost. Some responses are also likely to be affected by social desirability bias, with respondents answering in a way that they think will meet the approval of the interviewer. Finally, data for this study were collected in 2009 and changes to the market since then are likely to have occurred.



## 6. Appendices

### 6.1. Characteristics of wholesalers and retailers interviewed

#### 6.1.1. Table A.1: Characteristics of retailers who participated in in-depth interviews

	All	Pharmacy/ Clinical Pharmacy	Drug Stores	Mobile Providers	Grocery Stores	Village Shops
<b>Total</b>	<b>11</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>1</b>	<b>1</b>
Stratum <sup>+</sup> :						
MDR-Free	7	1	2	2	1	1
MDR-Suspected/Confirmed	3	0	1	2	0	0
Non-endemic area	1	1	0	0	0	0
Area type:						
Urban	2	1	1	0	0	0
Rural	9	1	2	4	1	1
Market Type*:						
Accessible market	4	1	1	1	0	1
Moderately accessible market	2	1	1	0	0	0
Remote market	5	0	1	3	1	0
Stock antimalarial at time of survey	9	1	3	4	0	1
Stock ACT	8	1	3	4	0	0
Stock RDT	5	1	2	2	0	0

+ Multi-drug resistant (MDR) malaria parasites which have emerged in Western Cambodia pose the greatest threat to the therapeutic life of ACTs and is of great concern to the international community because prolonged parasite clearance may spread to other parts of Asia and Africa, as has been the case in the past for older antimalarial drugs. Therefore, containing resistance to areas where it exists is a priority. Because containment strategies vary depending on the presence or levels of MRD parasites, Cambodia is divided into various strata: one where MDR is confirmed or suspected (North/North-East), one without MDR (West/South-West) and one where malaria is not endemic.

\* Accessibility of markets is divided into 3 groups, with markets located less than 2.5 hour-drive from the closest main commercial area categorised as 'accessible', within 2.5 and 4.5 hour-drive as 'moderately accessible', and more than 4.5 hour-drive as 'remote'. The suitability of this approach was validated during discussions with key informants working at Population Services International in Cambodia (PSI Cambodia) who were asked about what 'remote' or 'accessible' meant to them in terms of travel time using a 4-wheel vehicle. Source: ACTwatch Outlet Survey data, 38 sub-districts, June 2009

#### 6.1.2. Table A.2: Characteristics of wholesalers who participated in in-depth interviews

	All	Mutually Exclusive Categories of Wholesalers (WS)				
		Supply Retailers	Supply Retailers & Terminal WS	Supply Terminal WS	Supply Intermediate & Terminal WS	Supply Intermediate & Terminal WS & Retail
<b>Total</b>	<b>22</b>	<b>15</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>
Stock antimalarial at time of survey	18	13	2	2	0	1
Stock ACT	17	12	2	2	0	1
Stock RDT	16	11	2	2	0	1
Sell to end consumers	17	13	2	2	0	0
Import	3	0	0	1	1	1

ACT: artemisinin combination therapy; RDT: rapid diagnostic test for malaria; WS: wholesaler; Terminal wholesaler refers to wholesalers that supply retail outlets directly; Intermediate wholesaler refers to Wholesalers that supply other wholesalers directly. Source: ACTwatch Supply Chain Survey data, August-November 2009.

## 7. References

1. Patouillard E, Palafox B, Tougher S, Sochea P, O'Connell K and the ACTwatch Study group. (2011) *2009 ACTwatch Supply Chain Survey Results, Cambodia*: ACTwatch, January 2011.
2. National Institute of Statistics Ministry of Planning of the Kingdom of Cambodia. (2008) *General Population Census of Cambodia 2008: National Report on Final Census Results*. Phnom Penh.
3. National Institute of Statistics Ministry of Planning of the Kingdom of Cambodia. (2008) *National Accounts*. Available at <http://www.nis.gov.kh/index.php/statistics/national-accounts>. Phnom Penh.
4. Central Intelligence Agency. *The World Factbook 2009*, <https://www.cia.gov/library/publications/the-world-factbook/geos/cb.html>. Washington, DC.
5. Grundy J, Khut QY, Oum S, Annear P and Ky V. (2009) "Health system strengthening in Cambodia-a case study of health policy response to social transition." *Health Policy* 92(2-3): 107-15.
6. Cambodia National Institute of Public Health and National Institute of Statistics and ORC Macro. (2006) *Cambodia Demographic and Health Survey 2005*. Phnom Penh.
7. Bigdeli M and Annear PL. (2009) "Barriers to access and the purchasing function of health equity funds: lessons from Cambodia." *Bull World Health Organ* 87(7): 560-4.
8. Cambodia National Institute of Public Health and Malaria Consortium. (2004) *Cambodia National Malaria Baseline Survey 2004*. Phnom Penh.
9. Ministry of Planning of the Kingdom of Cambodia and the World Bank. (1999) *Cambodia Poverty Assessment*. Phnom Penh.
10. Yeung S, Van Damme W, Socheat D, White NJ and Mills A. (2008) "Access to artemisinin combination therapy for malaria in remote areas of Cambodia." *Malar J* 7: 96.
11. National Centre for Parasitology Entomology & Malaria Control and Ministry of Health of the Kingdom of Cambodia. (2006) *Renewed efforts to achieve high coverage of proven malaria control interventions and scaling up the response to high antimalarial drug resistance in Cambodia, Round 6 proposal to the Global Fund To Fight Aids, Tuberculosis and Malaria*. Available from [http://www.theglobalfund.org/search/docs/6CAMMM\\_1282\\_0\\_full.pdf](http://www.theglobalfund.org/search/docs/6CAMMM_1282_0_full.pdf). Accessed 22 August 2008.
12. Yang D, Plianbangchang P, Visavarungroj N and Rujivipat S. (2004) "Quality of pharmaceutical items available from drugstores in Phnom Penh, Cambodia." *Southeast Asian J Trop Med Public Health* 35(3): 741-7.
13. Cambodia's Country Coordination Committee (2009) *Affordable Medicines Facility - Malaria (AMFm) Phase 1 Application form*.
14. Ministry of Health of the Kingdom of Cambodia. (2008) *Annual Progress Report of the National Centre for Parasitology, Entomology and Malaria Control Programme*.
15. World Health Organisation Regional Office for the Western Pacific. "Malaria epidemiology, Cambodia" Available at [http://www.wpro.who.int/sites/mvp/epidemiology/malaria/cam\\_profile.htm](http://www.wpro.who.int/sites/mvp/epidemiology/malaria/cam_profile.htm). Accessed 15 July 2008.
16. ACTwatch Group. (2009) *Outlet Survey Report (Baseline), Cambodia, 06/09 – 07/09*: Population Services International and London School of Hygiene & Tropical Medicine.
17. Moszynski P. (2010) "Cambodia cracks down on illegal drug vendors in bid to counter antimalarial resistance." *BMJ* 340: c2622.