Independent Evaluation of Artemisinin Monotherapy Replacement in the Private Sector to Support the Containment of Artemisinin Resistant Malaria in Burma

Burma AMTR Evaluation

DFID Global Evaluation Framework
PO 6073

Progress report January-June 2014

Submitted: 30th June 2014

Montrose

TROPICAL HEALTH

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ACRONYMS

AMTR	Artemisinin Mono-Therapy Replacement
BCC	Behaviour Change Communication
CHW	Community Health Worker
DALY	Disability-adjusted Life Years
DFID	Department for International Development
EOP	End of Project
LQAS	Lot Quality Assurance Sampling
MARC	Myanmar Artemisinin Resistance Containment
MOU	Memorandum of Understanding
oAMT	Oral Artemisinin Mono-Therapy
PSI	Population Services International
QA-ACT	Quality-assured Artemisinin-based Combination Therapy
RDT	Rapid Diagnostic Test
TBD	To be determined
VFM	Value for Money

1 INTRODUCTION

This is the second six-monthly report of the independent evaluation of the Burma Artemisinin Mono-therapy Replacement (AMTR) project. It covers the period January 2014 to the end of June 2014. This current report focuses on a review of existing data from the project (routine and survey data) and presents the interim Value for Money (VFM) report.

The report also looks at work plan activities during this second implementation phase and describes progress made against them. It then presents more detail on the major developments and findings of the AMTR project itself, followed by a brief review of other relevant developments that might impact on project assumptions and theory of change. A risk management update and budget overview are also included. A revised workplan for an extended evaluation period and a discussion of potential revisions to activities during this period is annexed to this report.

2 PROGRESS AGAINST WORK PLAN

The table below presents the planned activities during the reporting period and their status. There are only two minor deviations:

- Submission dates of working papers 1 and 4 have been reversed to align with research dates. Working paper 4 (corporate private sector) is being submitted now, and working paper 1 (sensitivity analysis of DALY) will be submitted during the next reporting period.
- Finalization of case study 1 (Rapid Diagnostic Test - RDT) is on hold to enable inclusion of the PSI RDT roll-out and implementation strategy (this was considered an essential element which, however, has not yet been finalized).

Table 1: Overview of the status of activities for the reporting period

Activity during the period	Status	Implications for the evaluation work plan
Ongoing collection and review of costing data, routine data from PSI, survey reports and other outputs	Completed (see sections 3.2 and section 4)	None
Field visit for VFM interim report	Completed April 2014	None
Work for case studies 1 and 2 with field trips	Completed February 2014	None
Write-up and presentation of case studies 1 and 2	Finalisation of case study 1 (RDT) is on hold (after discussion with DFID and PSI) in order to incorporate the implementation strategy for RDT. Case study 2 completed	Case study 1 completion shifted to next reporting period
Desk-based work for working paper 1	Initial discussion on methodology held with PSI. Report to be prepared and submitted in next reporting period.	Submission in next reporting period.
Field work for working paper 2	Completed February 2014	None
Write-up and presentation of draft working papers 1 and 2	Write-up working paper 2 completed, write up of working paper 1 on-going	None
Additional activities		
Field visit for working paper 4	Completed	None
Write-up of working paper 4	Completed	Submission moved forward from next reporting period.

3 DELIVERABLES FOR THE PERIOD AND KEY FINDINGS

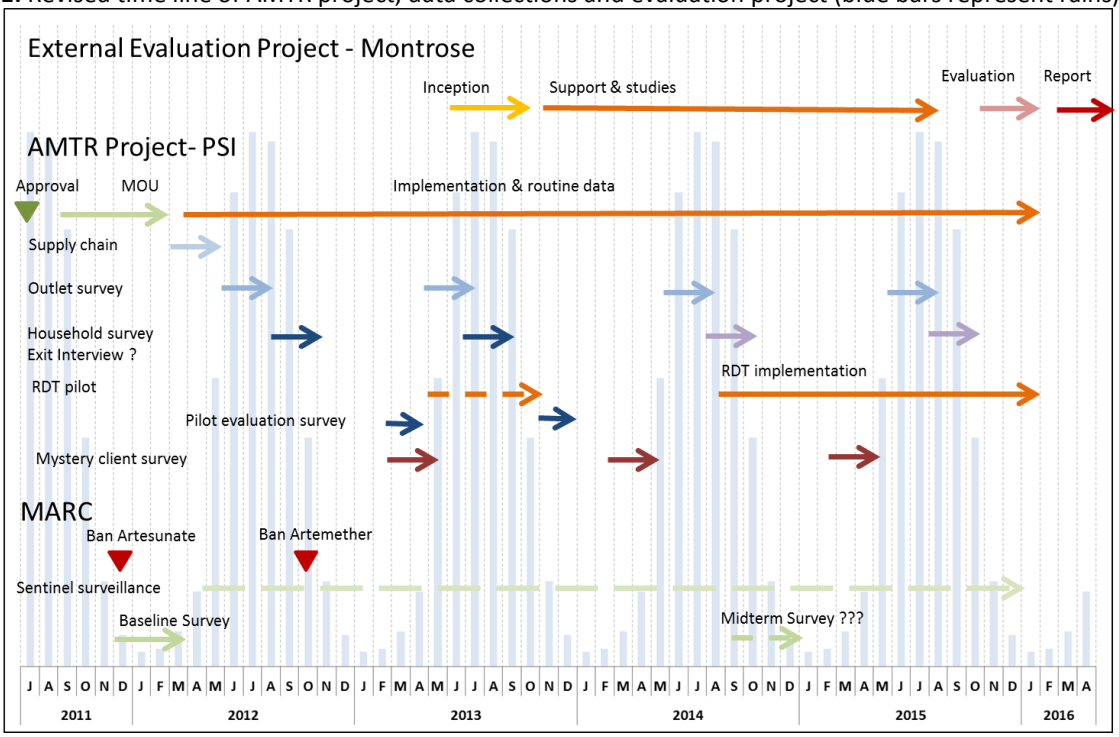
3.1 Communications with DFID and PSI

As a follow-up to our last progress report; discussions were held between the evaluation team, PSI and DFID to find a solution to one of the outcome indicators in the AMTR project log frame (indicator 4) that refers to a DFID Burma related indicator. The indicator was thought by PSI and the evaluation team to not be measurable. A compromise was found that satisfied all sides (see last DFID annual review report).

The evaluation team is also currently engaged in a discussion with the PSI AMTR team on the best way to measure log frame outcome indicators 1-3; which refer to treatment seeking behaviour of the population, and output 2; perception and recognition of the Padonmar quality seal. These are currently measured in the household survey, but it was felt that the sample size for cases of fever in the last two weeks, found in the household surveys, was too small, and alternative methods should be sought. A recommendation to this effect is included in the DFID annual review of February 2014. A detailed discussion of this issue and the suggestions of the evaluation team, are presented in this report in section 3.2.

In May of 2014 DFID informed the evaluation team of a no-cost extension of the AMTR project from October 2014 to March 2016. Based on information obtained from PSI this will imply an additional round of surveys in 2015 with the last data needed for the final evaluation of the project becoming available in approximately October 2015. Montrose is currently in discussion with DFID with regards to the impact of a project extension on the evaluation project scope, timeline and budget. A revised workplan incorporating new project dates and a discussion of potential activities to be conducted during an extended evaluation period is attached at Annex A.

Figure 1: Revised time line of AMTR project, data collections and evaluation project (blue bars represent rains)



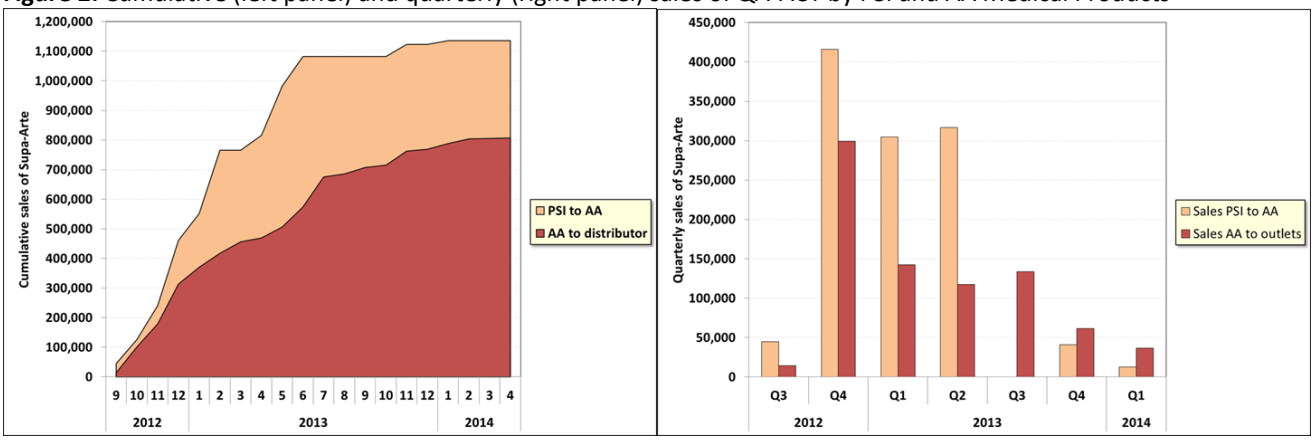
3.2 Review of data collections by PSI

During the reporting period two surveys were completed by PSI, the 2013 outlet survey undertaken in June and July and the 2013 household survey conducted in August and Spetember. In addition, the first round of the mystery client survey of January to March 2013 became available. This is complemented by the routine QA-ACT sales data and data on the RDT positivty rate from the PSI Sun Health franchise. While results as they refer to the key indicators of the AMTR logframe are discussed in detail in the DFID Annual Review of February 2014, we here take a closer look at the available data with respect to data quality, triangulation and interpretation of results, and assess potential implications for the project theory of change and project impact.

3.2.1. Routine Data

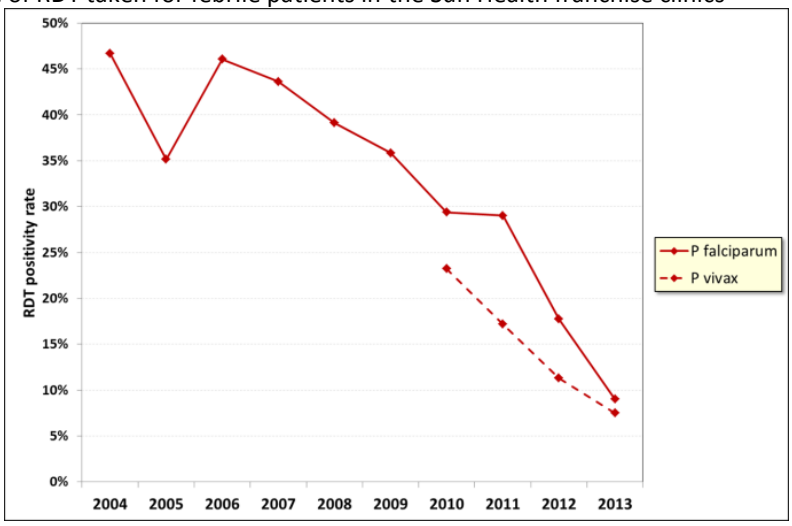
Sales of QA-ACT (Supa Arte) to AA Medical Products, and from AA to their distribution network, are available from the beginning of the project in September 2012 up to April 2014. These are, to date, the only sales to have taken place through the project, as the contract with the second distributor (PolyGold) will only commence in July 2014. As shown in Figure 2 (left panel), there was an initial rapid output of QA-ACT to AA Medical Products which reached just over a million total doses by June 2013. Although the sales were matched with rapidly increasing sales from AA to their distribution and outlet network, the total sales of AA by June 2013 were only 574,000 or 56% of what had been sold to AA by PSI, i.e. 44% of the supply was in AA warehouses or in the supply chain. Accordingly, PSI sales of Supa Arte to AA then slowed down, reaching only 53,000 doses between July 2013 and April 2014. This brought down the proportion of sales to AA, being sold by AA, to 71% because sales of AA to outlets also slowed down during this period to only 233,000. This continuous drop in output of QA-ACT to retail outlets is also seen in Figure 2 (right panel) when presented as quarterly sales. If one considers Q4 of 2012 as an outlier with almost 300,000 packs of Supa Arte sold (possibly filling the supply chain), then there is at least a 75% drop in sales comparing Q1 2013 to Q1 2014.

Figure 2: Cumulative (left panel) and quarterly (right panel) sales of QA-ACT by PSI and AA Medical Products



Rate of infection with malaria parasites have continued to drop in Burma as evidenced by the RDT positivity rates of suspected malaria cases in the Sun Health franchise clinics as shown in Figure 3. These now reach about 9% of *Plasmodium falciparum* country wide and rates in the MARC intervention area are even lower with only 5%. However, it is not very likely that this decline in malaria incidence is the main reason for the lower QA-ACT sales, as the testing rate for suspected malaria cases remains rather low (see below).

Figure 3: Positivity rate of RDT taken for febrile patients in the Sun Health franchise clinics



3.2.2. Surveys

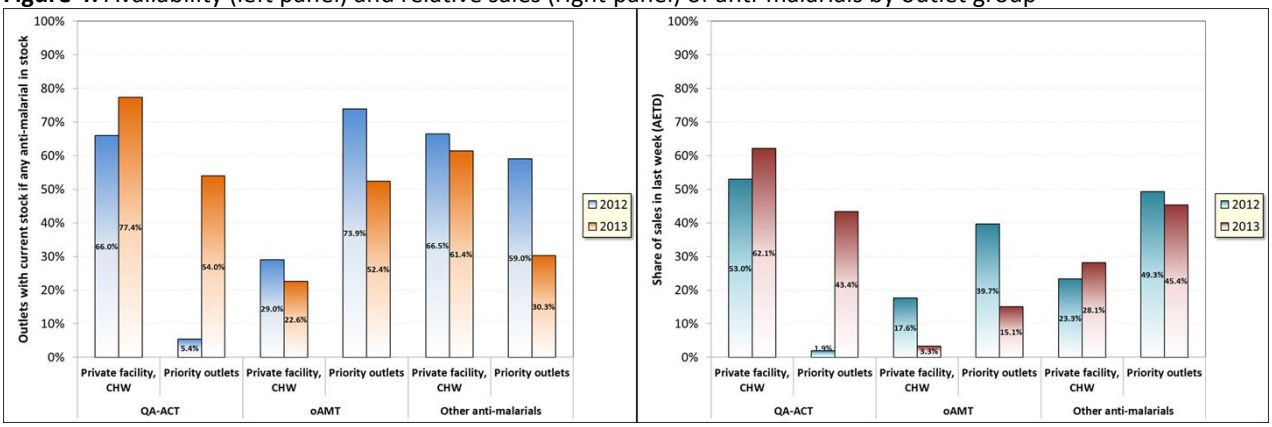
The **outlet survey** of 2013 was successfully completed using the same methodology and sampling approach as in 2012, with a similar number of outlets sampled; 3658 in 2012 and 3520 in 2013. The proportion of outlets that had any anti-malarial medicines in stock dropped slightly from 32% to 26%, but these estimates were not statistically different from one another.

The major change from 2012 to 2013 is an impressive shift in the relative sales of QA-ACT and oral AMT (oAMT) from a ratio of 97:3 in favour of oAMT to 27:73 in 2013, i.e. QA-ACT out-selling oAMT 2.3 fold. This is a major success of the project in replacing oAMT with QA-ACT and has been commented as such in the DFID annual review. But since the replacement of oAMT by QA-ACT in the Theory of Change has the major objective to treat all *P.falciparum* infections in the private sector with QA-ACT in order to prevent survival of and selection for any artemisinin-resistant strains, in that respect, treatment of *P.falciparum* with other non-artemisinin anti-malarials such as chloroquine is as ineffective and harmful as treating with oAMT. It is, therefore, worthwhile to also look at the development of sales of other malaria relevant medicines.

Using the detailed tables A2 and B1 in the 2013 outlet survey report data on availability of medicines of interest and their relative share in sales, Equivalent Adult Treatment Doses (EATD) in the previous week were aggregated for two groups of outlets that appear reasonably similar in their pattern: private clinics and Community Health Workers (CHW) on the one hand; and the pharmacies, shops and medicine vendors on the other which are the PSI priority outlets. Results are shown in Figure 4. They show the dramatic increase in QA-ACT availability in the priority outlets that go along with a 225-point decrease in oAMT availability, and a 29%-point decrease in the availability of other anti-malarials. However, even in June 2013 when QA-ACT sales were at their peak, there were still oAMT available in half the priority outlets and at the same proportion as QA-ACT. In contrast, changes in the other outlets (private clinics and CHW) moved in the right direction, but were much more moderate, and oAMT had low availability at both time points. While availability of medicines can be interpreted as expression of some level of demand, the more important indicator is the actual relative sales shown in the right panel of Figure 4. These are even more favourable for the priority outlets where QA-ACT increased to a 43% sales share in 2013 (up from 2%), while oAMT decreased to 15% (down from 40%). Somewhat worrying, however, is the continued high sale of non-artemisinin medicines, representing a total share of 45%. One can argue that these are needed for the *P. vivax* infections, but that would be correct only if the level of parasitological diagnosis is high. But RDT availability did not change in the priority outlets from 2012 to 2013, remaining very low, at 6.0% and 6.5%

respectively, and higher but also unchanged in the private clinics and among CHW at 61.2% and 58.3% respectively.

Figure 4: Availability (left panel) and relative sales (right panel) of anti-malarials by outlet group

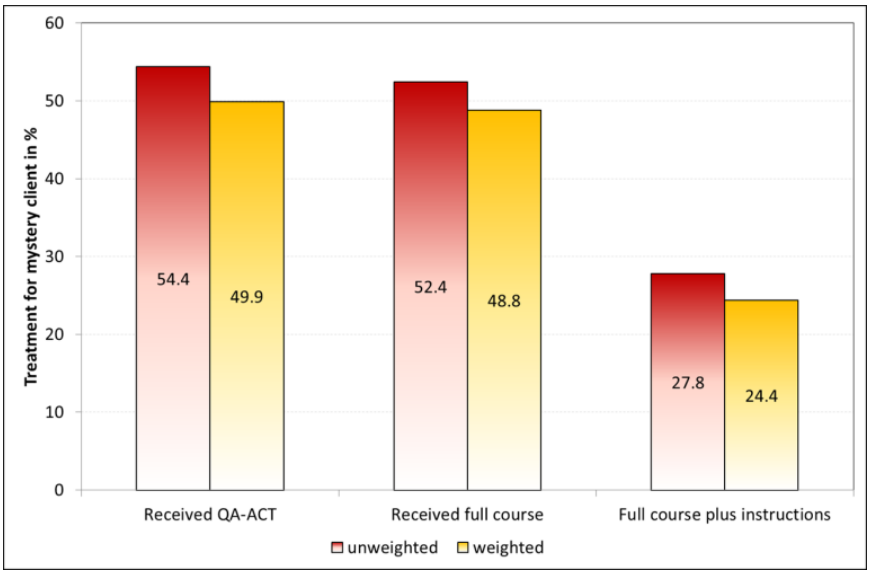


What treatment and diagnosis patients with suspected malaria actually receive, when they consult one of the priority outlets is determined in the mystery client survey. So far only the first survey from early 2013 has been analysed and reported on, while the second round has been undertaken earlier in 2014 but results are not yet available.

Mystery clients are sent only to the priority outlets and the sample consists of all those outlets registered by the PSI programme (6865 at the time of the survey), of which general shops make up 70%, drug vendors 20% and pharmacies 10%. However, an equal number of mystery clients are sent to each type of outlet, stratified by the 6 regions involved, meaning that the combined results are potentially biased if there are significant variations between the three outlet types. This was discussed with the PSI M&E team during the June 2013 visit but has not yet been addressed in the current mystery client survey report. Ideally, the weight applied should be based on the relative frequency with which patients consult the outlets, but since this data is not available, the frequency of the outlet type in the sample is the next best alternative. This has been undertaken by the evaluation team and the unweighted and weighted results are shown in Figure 5. There is some bias, as pharmacies performed best in the results but only represent 10% of the sample; but the differences are moderate and do not distort the results dramatically.

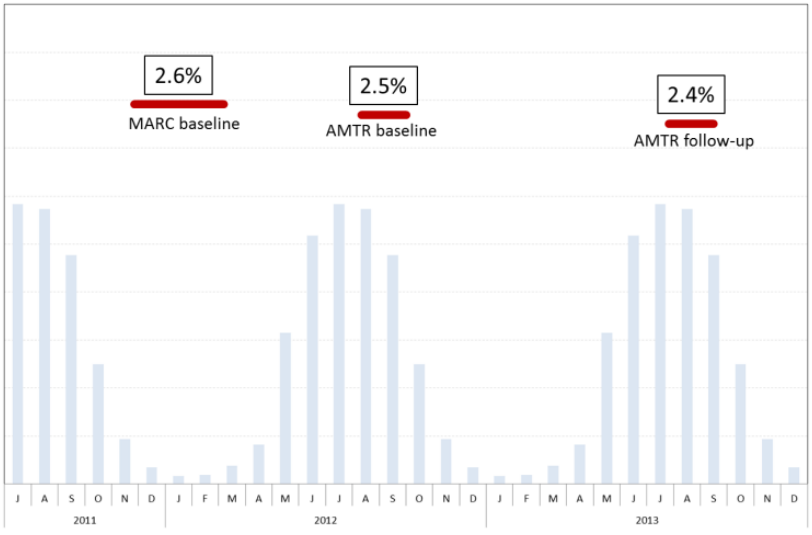
Overall only 11% of mystery clients were offered a diagnostic test which fits very well with the RDT availability (around 6%) as well as the results from the RDT pilot surveys (6% to 13% tests done), and suggests that the data are of good quality. Only half of the potential malaria cases were given QA-ACT, although the rate of giving a full course, if any ACT was given, was very high with 97%. Among those not given an ACT, 15% received oAMT which tallies with the relative sales share seen in the outlet survey, but as mentioned above, if the client indeed had an artemisinin-resistant *P. falciparum* infection, treatment with chloroquine or an antibiotic would be equally detrimental for resistance containment.

Figure 5: Results from the mystery client survey with or without weighting by frequency of the three outlet types in the sample



Household surveys have been conducted for 2012-2013 using the same methodology and sampling design which has been discussed in detail in the inception report. While the official report for the 2013 survey is not yet disseminated, some key information was made available by PSI. The number of sampled households in 2012 was 4,894 with a population of 24,470[1], and resulted in 609 respondents with a fever episode in the preceding two weeks. In 2013 there were 4,680 households with a population of 23,432 and 560 fever cases in the last two weeks. This leads to an estimated two-week fever incidence of 2.5% and 2.4% respectively, and is very similar to the results from the MARC baseline survey of 2012 which was 2.6% overall and 2.8% in Tier 1, and 2.4% in Tier 2[2]. Even though the MARC data were collected at a different time of the year (see Figure 6) these data could indicate a slight decline in fever incidence, but certainly do not suggest a dramatic decline.

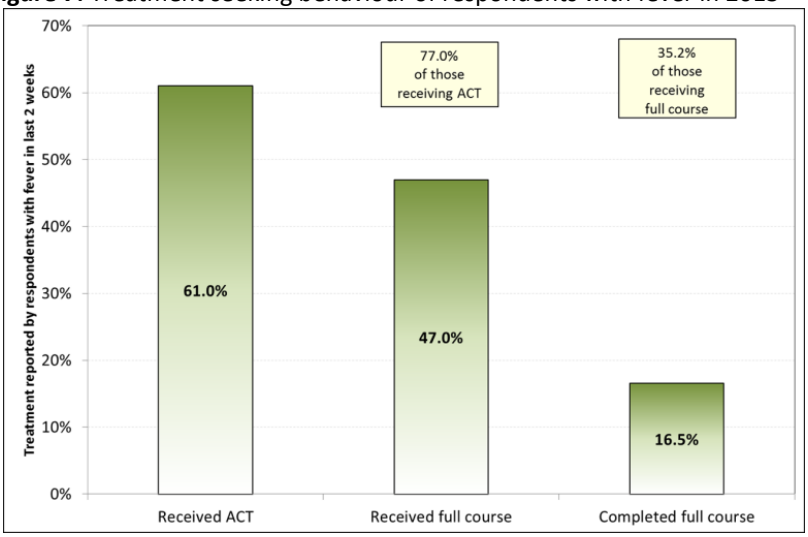
Figure 6: Two-week fever incidence from household surveys



[1] The actual population is not given in the report and calculated assuming that mean household size in 2012 was the same as in 2013.
[2] MARC baseline survey report

The key results of the 2013 household survey are shown in Figure 7. While in 2012 none of the fever cases had received an ACT, 61% did in 2013. However, the proportion of fever cases that received a full course was only 47% and those who completed a full course 17%. No break down by source of treatment is available yet, nor data on the proportion of fever cases that received a parasitological diagnosis in 2013 (it was 6% in 2012).

Figure 7: Treatment seeking behaviour of respondents with fever in 2013



The presentation of the data as in Figure 7, i.e. refering all indicators to the fever cases rather than using sub-denominators as in the indicators of the AMTR log-frame, appears advantagous for two reasons:

- It avoids an unecessary loss of sample size and hence power to detect differences
- The ultimate indicator of interest for resistance containment and the final evaluation of the AMTR project, is what proportion of suspected and potential *P.falciparum* cases or infections get correctly diagnosed and/or treated with QA-ACT overall, and in particular those treated in the private sector.

3.2.3. Interpretation of findings and outlook for next six months

1. Expectation of sales of QA-ACT and possible impact on replacement of AMT

As outlined above (Figure 2), sales of Supa Arte from AA Medical Products to their retail network has consistently declined in the last two quarters of 2013 and first quarter of 2014, which – at least based on the data available to date – is not primarily due to a significant increase in the use of RDTs in the private sector and subsequently more targeted therapy of *P. falciparum* malaria. Nor is there data to suggest an increase in sales price, as the outlet and mystery client surveys suggest that the subsidy provided through the AMTR project is passed on to the consumer. On the other hand, there are anecdotal reports (DFID review team, evaluation team field visits) of oAMT still appearing in the market (e.g. from Liberty Pharmaceuticals) which could compete with the QA-ACT. Another possible reason for low sales, particularly in Q1 of 2014, is the issue of expiring Supa Arte which has been removed by PSI following the DFID annual review of February 2014. It will, therefore, be critical to very thoroughly analyse the data of the outlet survey 2014 (which is currently ongoing), and the updated routine sales data, to assess whether the trend towards increase of QA-ACT and decline of oAMT in the relative sales of anti-malarials in the private sector, is continuing or possibly stagnating. Unfortunately, the additional

sales of QA-ACT through PolyGold, to be over-branded as Artel Plus, will only start in July 2014 and will not yet impact the outlet survey results.

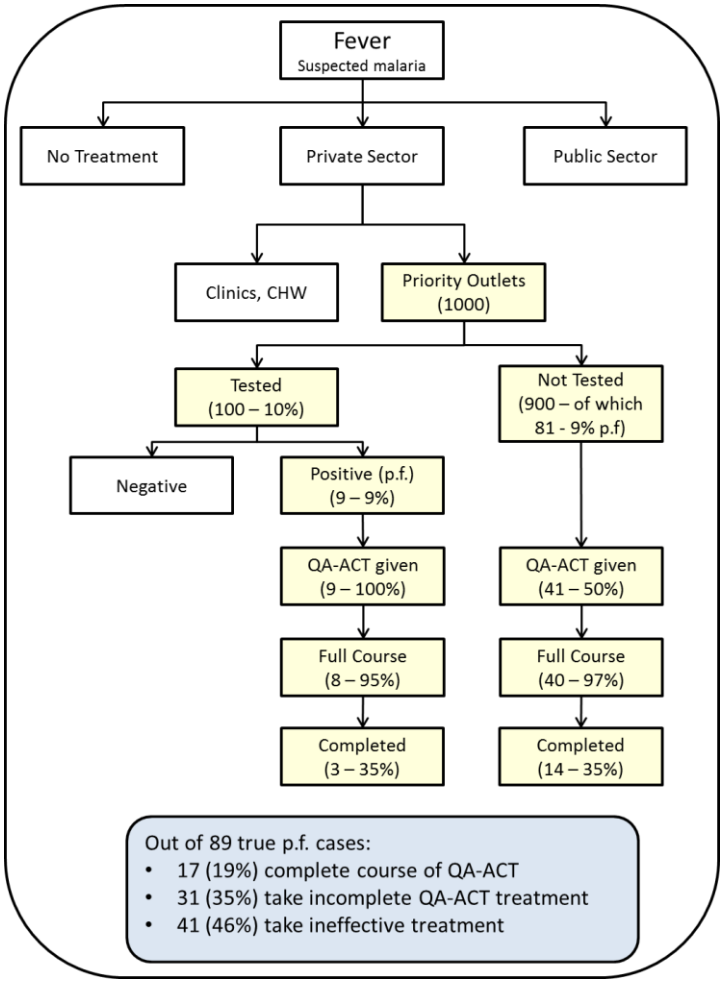
2. Estimation of treatment outcome of cases of *P.falciparum* malaria in the private sector with respect to containment of resistance.

Replacing oAMT with QA-ACT in the private sector in Burma, and especially in areas where artemisinin resistance of *P.falciparum* is confirmed or suspected (Tiers 1 and 2), is the first critical step in the Theory of Change of the AMTR project. This is to ensure that all malaria cases with potentially resistant strains are treated such that these parasites are no longer transmitted. This implies early treatment with QA-ACT[3] where the partner drug has sufficient efficacy against the prevailing *P.falciparum* strains, (the issue of additional "radical" treatment with primaquine is discussed in detail in working paper 2). Based on the currently available data we have attempted to estimate the treatment outcomes for patients with falciparum malaria consulting any of the priority outlets (pharmacies, shops and drug vendors). Based on the RDT pilot results we have assumed a 100% compliance with a positive test, i.e. QA-ACT is given, and for those not tested we have estimated the number of malaria cases from the RDT positivity rates in the Sun Health clinics. Treatment rates from the mystery client survey were then applied and the completion rate for treatments was taken from the 2013 household survey[4]. Results are presented in Figure 8 based on a hypothetical cohort of 1,000 clients consulting a priority outlet and suggest that only 19% of *P.falciparum* cases are currently treated adequately in these outlets, with another 35% possibly clearing the infection based on the level of incompleteness of the QA-ACT treatment. However, almost half the cases would not receive a treatment that would stop transmission of a potentially resistant parasite by receiving either non-artemisinin anti-malarials, oAMT or no anti-malaria at all. The positive aspect is that with the oAMT treatments being reduced to just 15% of the non-ACT treatments (mystery client survey 2013), the proportion of cases exposed to increased selection pressure for artemisinin resistance is estimated to be only 7% which is clearly a big success of the AMTR project.

Figure 8: Estimation of the treatment outcome for malaria cases (*P.falciparum*) seen in priority outlets:

[3] See also article by Johnston et al. discussed in section 5 of this report

[4] Given that the household survey is based on recall of tablets taken, it is possible that the survey estimate is an under-estimation of completed treatments.



There is currently not enough data from the other private sector outlets (private clinics and CHW), to make a similar estimation for all the private sector contribution; but based on the much higher availability of RDTs and even lower use of oAMT in these outlets, it is very likely that the overall situation is much more favourable than estimated for the priority outlets alone. The point to be made here however, is that for a successful contribution of the AMTR to resistance containment two aspects are critical:

- A rapid increase in parasitological diagnosis in the private sector with targeted, adequate treatment of *P.falciparum* cases.
- A significant increase of consumer compliance with the full course of QA-ACT.

3. Options for treatment seeking data collection methods and indicators

The discussion with PSI on the best way to improve survey methodologies and indicators regarding treatment seeking behaviour, consumer perceptions and compliance with treatment, is still ongoing, with definite results expected in the next few weeks. The initial considerations of the evaluation team are as follows:

Household survey: Obtaining information on the diagnosis and treatment of fever cases at population level, with disaggregation by private and public sector, will be critical for the final evaluation of the success of the AMTR project with respect to its contribution towards artemisinin resistance

containment and/or elimination. Such data cannot be obtained from exit interviews or patient follow up. On the other hand, the fever incidence rate is falling only moderately, implying that only a slight increase in sample size of the household survey will ensure a sample of around 600 fever cases per round, of which 30-40% (180-240 fever cases) will be treated in the private sector. This should be sufficient to obtain estimates of "% of fever cases tested for malaria", which is the most important indicator needed from such data (in addition to consumer knowledge and perceptions which are independent of the fever cases). The other indicator of significance is the "completed treatment course with ACT" which can be measured from patient follow-up. Therefore, a possible solution could be to:

- Keep the household survey with slightly increased sample size, but focus on diagnosis of fever cases, and calculate all indicators based on the fever cases with the only disaggregation considered being whether or not a diagnostic test was done.
- Add the diagnosis indicator to the outcome measure in the log frame and change the others accordingly, or only keep the treatment compliance indicator from the household survey while adding the "complete course" from exit interviews and patient follow-up.

Exit surveys and patient follow-up: This could still be a useful addition, particularly for the "non-priority" outlets of private clinics and CHW for which no provider performance data are currently available (alternatively the mystery client survey could be expanded to cover these outlets). Patient follow-up would be another way to obtain data on treatment compliance with a full course, and could be useful to triangulate the data from the household survey.

LQAS-based consumer survey: This option would only become relevant if the household survey is dropped, in which case an alternative method to measure testing rates of fever cases will be needed. It should be kept in mind, however, that LQAS is not a study design but simply a sampling technique meant to allow lower sample sizes at the price of lower precision, and whether such savings can actually be realised will depend on the definition of the "lot" and how many lots or strata are included.

Alternative assessment methods for fever cases: If the household surveys are ultimately considered too cost-ineffective, alternative ways of measuring the malaria diagnosis in fever cases need to be found (LQAS is not an alternative here), and methods such as respondent driven sampling can be considered.

4 INTERIM VALUE FOR MONEY REPORT

This section presents the revised AMTR Value for Money (VFM) analysis framework that we have proposed, as well as the justification for the revision. It then presents findings from the mid-term VFM analysis that was conducted between March and June 2014, and concludes with some recommendations.

During this reporting period, our VFM expert visited the AMTR project in Burma for two weeks in May 2014.

4.1 Proposed revised AMTR Value for Money analysis plan

Further work on VFM conducted between the inception phase and June 2014, highlighted two factors which called for a revision of the AMTR VFM analysis plan as initially proposed in the evaluation inception report. These are:

1. The initial VFM plan proposed focus areas for which data is unavailable or questionable. For example, accurate demographic and beneficiary numbers are questionable; consumer demand assumptions at project design were based on a weak evidence base; and reliable malaria prevalence data is not available as confirmed by a recent visit to the Myanmar Department of Medical Research in Yangon
2. The cost-drivers of AMTR have now been identified and are focused in a few operational areas: staffing, procurement, distribution, demand and behavior change communication and subsidies. The revised VFM plan examines these primary cost-drivers.

During his in country visit in May 2014 our VFM expert discussed these issues with PSI and proposed a revised plan that would adequately assess the focused market interventions at the core of the AMTR project.

The revised plan is presented in Table 2 below and requires formal agreement between DFID, PSI and the evaluation team. It separately presents what is included in the mid-term VFM analysis reported upon in this report; and what will be included, in addition, for the final evaluation VFM analysis.

Table 2: Revised AMTR Value for Money Analysis Matrix

VFM focus area	VFM analysis	VFM Indicator	VFM Factors	Data requirement	Reporting frequency
AMTR Mid-Term VFM Analysis					
Performance to budget review	Overall performance vs. target analysis per logframe	Actual vs. target	Efficiency Effectiveness	M&E reporting of performance to targets per latest logframe	Semi-annual
	Overall expenditure vs. budget analysis	Actual vs. target	Economy Efficiency	Expenditure to latest approved budget reporting by logframe output level	Semi annual
Procurement	Procurement systems	A clear defined procurement plan exists and is used	Economy Efficiency	Procurement plan; ACT procurement reports	Annual
	Procurement execution	Verified procurement control exists outside procurement	Economy Efficiency	Procurement reports	Annual
	Timeliness	Delays are minimised	Efficiency	Procurement reports	Annual
	Product handling/waste	Spoilage/loss is minimised	Economy Efficiency	Procurement reports	Semi-annual
ACT unit cost analysis	Unit cost delivered to end-user	All in costs divided by estimated user uptake	Economy	Total all in costs divided by estimated beneficiaries	Annual
	Unit cost delivered to outlet	Pricing structure from importer to end user is aligned with local supply chain norms	Economy	Total all in costs per unit delivered to outlet	Annual
	Unit cost in AMTR vs. reported international private sector benchmarks, if available	Unit costs are aligned with international benchmarks, if available	Economy	Above data comparison with international data	EOP
Human Resources	Project administration to service delivery cost analysis	Percentage of project administration to service delivery below 35% or other justified level	Economy Efficiency	Annual project HR expenditures by Objective per DFID budget	Annual
End-user behaviour change communication	Input vs. performance review; budget to expenditures; performance vs. targets;	Actual expenditure to budget and performance to target	Efficiency, effectiveness	HH and outlet surveys data (or other survey design if HH survey is dropped)	When surveys completed
	BCC performance; provider and end users	Brand and treatment preference data	Effectiveness	HH and outlet surveys data (or other survey design if HH survey is dropped)	When surveys completed
Provider behaviour change communication	Input vs. performance review; budget to expenditures; performance vs. targets;	Actual expenditure to budget and performance to target	Efficiency, effectiveness	HH and outlet surveys data (or other survey design if HH survey is dropped)	When surveys completed
Distribution of ACTs/ availability of ACTs vs AMTs	Distribution analysis	Pre and post AMTR ACT and AMT prevalence.	Efficiency, effectiveness	HH and outlet surveys data (or other survey design if HH survey is dropped)	When surveys completed

VFM focus area	VFM analysis	VFM Indicator	VFM Factors	Data requirement	Reporting frequency
Final Evaluation VFM Analysis (in addition to above analysis)					
Cost-benefit analysis of original plan	Cost benefit analysis of ACT distribution	Cost per DALY obtained Cost per DALY in project's business case	Economy, effectiveness	Business case and CBA using financial and beneficiary data	EOP
Subsidy analysis	TBD with PSI	TBD with PSI	Economy, effectiveness	TBD with PSI	EOP
Comparative cost-benefit analysis	Cost-benefit analysis of ACT uptake in target area after RDT expansion	Cost per DALY with/w/out RDT	Economy, efficiency, effectiveness	TBD with PSI	EOP
Catalytic Benefits	Assess benefits of AMTR that have changed MOH policy, engaged other partners, expanded AMT replacement beyond target area, etc.	Increased engagement, changed policy, new funding, geographic expansion	Effectiveness	From PSI	EOP

4.1.2 Mid Term Value for Money Analysis

This VFM report follows the matrix in Table 2. As indicated above, further and additional analysis will be undertaken for the final evaluation.

4.1.3 Performance to Budget Review

This section reviews AMTR performance against targets, and budget vs. expenditures in the major planned activities of AMTR.

The costs of delay

Substantial delays in implementing the AMTR project were experienced at inception, largely resultant from the process required to execute an MOU with the Ministry of Health (MoH) for the import and distribution of ACTs (see also Figure 1), and the corollary objective to change policy and ban the import of AMTs. Both performance and financial targets were shifted by at least six months.

Budget expenditures are also considerably lower than expected because of unanticipated lower demand for ACTs, the major cost-driver of the AMTR intervention. The reasons for the drop in demand are discussed further below. The gap between budgets and actual expenditure resulted in negotiation for a no-cost extension (NCE) for an additional 18 months until March 2016.

Annex C shows the original budget, and the actual expenditure, as well as the planned extension by objective for the DFID portion of AMTR. At contract award, the original budget anticipated a total project management expenditure of 15%. The administration to service delivery cost for years 1-2 were GBP 1,329,660 (or 19%) against total expenditures of GBP 7,014,044. With the NCE, the total administration expense is anticipated as GBP 5,674,051 (or 32.13%) against total anticipated expenditures of GBP 17,655,001.

As demonstrated above, increasing a project period to deliver the same or less performance inevitably increases management costs proportionately as there is a minimum management infrastructure required throughout a project period; this reduces the VFM of the project over its lifetime. From a VFM perspective, it is essential that such political risks and service demand are assessed as accurately as possible at the onset of a project to avoid such NCE.

Anticipated vs. actual demand gap and associated escalating cost

A significant gap exists between anticipated (at the start of the project), and actual demand for antimalarial treatment with QA-ACT in Burma and – as outlined in section 3.2 – there is also an observed decline of sales of QA-ACT in the second half of 2013 and early 2014 (see Figure 2). Various reasons have been posited to account for the initial gap. According to interviews conducted with the AMTR Technical Director, the gap between anticipated and actual demand likely results from a combination of overestimated malaria prevalence and the method PSI used at the planning stage to predict demand. PSI predicted expected demand on two factors: (1), an estimate of malaria prevalence (derived from prior estimates which were not verifiable and which were likely inaccurate), and (2), by making assumptions about the prevalence of blister-cutting and extrapolating the incidence of malaria by estimating the number of users of incomplete doses. The AMTR Technical Director has suggested that the initial demand estimates were based on

assumptions that were overambitious, likely incorrect, and not limited to PSI. NGOs across Myanmar appear to be awash in excess ACTs. Reasons for the more recent decline in sales are less clear and have been discussed in section 3.1.

As a result of the above, demand for ACTs at the retail level is substantially lower than was expected at the planning stage. While some savings can be captured by the responsiveness of the procurement system (as demand decreased, ordering and budgets were adjusted), significant stock is at risk of expiry and investment loss.

At risk and expired stock of product is increasing. As Annex D indicates, the August 2012 shipment of ACTs reached expiry in March/April 2014, beginning the first cycle of products approaching expiry. Expiry rates of already procured ACTs range from 8.4% of Supa Arte 1, to 36.3% of Supa Arte 4. Of the total ACT procured to date with DFID funding, 15.8% is at risk. The cost at risk from the March and April expiry alone is estimated by PSI Procurement as USD 779,408[5]. Costs at risk are likely to grow until supply and demand are aligned.

From a VFM perspective, significant input levels are wasted or at risk due to reduced demand. Two approaches need to be considered. Transparent donor reporting should be encouraged and should indicate the level of stock at risk and possible causes. Indication that reduced demand is experienced across sectors should be noted. The dramatic difference between expected and actual demand should spur a more targeted approach to ACT treatment, likely targeted treatment after proper RDT testing and increased provider and user compliance with results (especially negative)[6].

Performance metrics

A summary of progress of performance (to March 2014) to year 2 milestones as contained in the latest approved AMTR log frame is presented in Table 3 below. Technical considerations and recommendations presented in section 3.2 should be kept in mind, particularly regarding indicator 1.5 and the possible impact of non-ACT treatments other than oAMT. A color coded system is used to highlight level of performance as follows:

- Green = 85% or more of milestone achieved = milestone achieved or close to being achieved
- Amber = 70% to 84% of milestone achieved = close monitoring required for milestone to be achieved
- Red = 0 to 69% of milestone achieved = immediate action required to address project approach in order to achieve milestone

[5] Total at risk estimated by multiplying at risk stock as reported by PSI/M to the respective unit costs as reported by PSI/M for Supa Arte 1,2,3 and 4. Source SA 1 risk= USD2,967; SA 2 risk=USD7,637; SA 3 risk=USD42,108; SA 4 risk = USD726,696

[6] The use of RDTs may be complicated for at least two reasons. First, retail outlets have a profit motive to sell as much ACT as possible, so RDT testing that is intended to target and reduce the use of ACTs likely reduces outlet profit. Second, there appears to be evidence that RDT results, if negative, are often disregarded by the consumer and the retail outlet, resulting in unnecessary sales and treatment. If RDT is to capture VFM, careful planning and monitoring is required to strengthen provider and end-user compliance to test results.

Table 3: Performance to year 2 project milestones as of March 2014

Indicator			Milestone end Y2 (Mar 14)	Achieved by March 2014	Performance to milestone
Outcome level					
Indicator 1	% target pop. w/ suspected malaria rc'd ACT w/in 24 hrs.		50%	61%	122%
Indicator 2	% target pop. rc'd full course ACT w/in 24 hrs. if any ACT given		50%	77%	154%
Indicator 3	% target pop. completing full course ACT, if full course given		40%	35%	88%
Indicator 4	Estimated # P.f. cases treated with ACT through DFID funding		790,232 est.	NA	NA
Output level					
Output 1: Increased opportunity, ability and motivation of private sector providers to effectively prescribe and dispense nationally approved, quality assured ACT					
Indicator 1.1	% outlets with ACT in stock at survey	*In priority outlets* *In all outlets*	50% 70%	50% 62%	100% 89%
Indicator 1.2	% outlets reporting no ACT stock-outs	*In priority outlets* *In all outlets*	100% 100%	91% 94%	91% 94%
Indicator 1.3	% outlets selling ACTs at cost < or = to cost of most common AMT	*In priority outlets*	70%	94%	134%
Indicator 1.4	% providers correctly recommend ACT treatment	*In priority outlets* *In all outlets*	25% 50%	10% 25%	40% 51%
Indicator 1.5	Volume ratio of ACT to oAMT sold in past 7 days	*In priority outlets* *In all outlets*	50% 70%	73% 79%	146% 113%
Indicator 1.6	% outlet providers who prescribe mystery client with full ACT course and instructions		35%	29%	83%
Output 2: Increased opportunity, ability and motivation of the target population in eastern Myanmar to promptly and effectively treat suspected malaria with a nationally approved and quality assured ACT					
Indicator 2.1	% population associate Padonmar quality as most effective treatment		50%	14%	28%
Indicator 2.2	% population who can identify outlet for QA ACT can be purchased		50%	2%	5%
Output 3: Increased opportunity, ability, and motivation of private sector providers to conduct a rapid diagnostic test prior to the appropriate prescription and dispensing of nationally approved, quality assured ACT					
Indicator 3.1	% outlets with RDT in stock	*In priority outlets* *In all outlets*	5% 40%	6.5% 28%	130% 70%
Indicator 3.2	% priority outlet providers currently describe and demonstrate 5 steps for conducing RDT		Pilot underway	NA	NA

Notable in the summary above are the following conclusions:

1. Outcome Indicators generally indicate interim success of the project design and implementation, with achievements well above milestone target for two indicators, and achievements against a third indicator well on track.
2. Output Indicators indicate very good achievement to milestones in ACT distribution (1.1, 1.2); and subsidized pricing (1.3). The primary AMTR strategy of crowding out AMTs through subsidized pricing and ACT market flooding also appears to be successful (1.5), with the limitation that the contribution of non-ACT medicines in non-diagnosed fever cases (i.e. possible malaria) is still relatively high, with the implications of low "effective treatment" of potentially resistant malaria as indicated in Figure 8. During the VFM visits to the AMTR project, there was tentative indication that further funding would be allocated to AMTR to conduct studies of ACT uptake with and without RDT in the priority area. Thus, comment on Output 3 performance will be analysed at the end of the project.
3. BCC at provider level appears weaker in value. Provider level BCC and medical detailing (1.4) achieves less than 50% of a modest milestone. Stronger, but still below target is the provider provision of ACT and proper instructions for use (1.6).

4. BCC at the end-user level is quite weak, achieving minimal results in brand identification (2.1) or being able to identify an outlet for ACTs (2.2).

Budget metrics

In order to make a useful VFM assessment of input to performance, detailed activity or output budget reporting is required. Despite many attempts to secure such reporting, PSI has to date been unable to provide activity or output-based financial data. PSI has provided budgeted totals by objective vs. M&E results reporting but not actual expenditures against results at an activity level. Thus, the VFM analysis is unable to assess the VFM of various activities that each contribute to the measurement of performance by objective. This is a fundamental obstacle to granular VFM analysis and a major limitation of this assessment.

Budget to Performance Conclusions

1. As noted above, it is not possible to assess the value for money of the processes and expenditures that contribute to programme performance due to the lack of financial data of sufficient focus and granularity. This issue needs to be engaged more fully by PSI.

2. Due to the decreased demand, the beneficiary unit costs and the cost per DALY averted calculations at the Final Evaluation, are likely to be substantially higher than estimated in the AMTR Business Case. This is not surprising as it is evident that decreased demand increases unit costs and unit benefits, rendering the intervention less economic and efficient than planned.

3. Despite the lack of financial data at the level of granularity desired, it is noted that two of the central functions of AMTR appear on track to perform according to expectations and below cost (cost is depressed due to reduced demand). The nationwide strategy to distribute ACTs as a replacement for oral AMT appears to be successful to date, and subsidy of ACT to ensure that ACTs are available at a comparable cost to AMTs is also passed on to the consumer.

4. The number of *P.falciparum* malaria cases treated with ACTs provided through DFID funding is certainly fewer than the estimates provided by PSI. The PSI estimate extrapolates malaria cases from the number of ACT doses distributed by AA, without accounting for the 494,643 doses that are at or near expiration. At a minimum, the 494,643 doses that are close to, or at expiry, should be removed from estimates of malaria cases treated. In addition, since parasitological diagnosis in the private sector is still rather low, there can be expected to be a large number of people treated with QA-ACT that do not have malaria at all (up to 70-90%).

5. Behaviour change communication has not been successful, at least as far as designed to meet the milestones of the indicators concerned. Further analysis is provided in the BCC section below.

4.1.4 Procurement

The VFM review of commodity procurement within AMTR examines five indicators of value that approach international best-practice and value for money:

1. that procurement systems are well defined,
2. that procurement practice is closely linked with programme planning and financial management,
3. that procurement is demand-driven,
4. that procurement is executed according to expectation in a timely manner,
5. that product shipping and handling is economic and efficient.

Commodity Procurement Systems

PSI's international and local procurement plans and systems are well developed and summarized in Annex E.

From a VFM perspective best-practice features include immediate communication at the time of order requests between PSI Myanmar's International Procurement Unit (IP/M) and the corollary procurement at PSI Washington (IP/W). The efficiency advantage of immediate contact between the two departments accrues without being obvious. That is, early and frequent communication minimizes quantity and quality errors, shipping and handling waste, and develops an established procurement chain that is efficiently and effectively replicable.

Parallel to internal communication between PSI/W and PSI/M, PSI/M engages with the Government of Myanmar (GOM) Ministry of Health (MOH) to begin the approval process for import and distribution of the commodity. Multiple steps are required for approval by the GOM. Following approval, PSI/M indicates approval to PSI/W, which, in turn, authorizes shipment from the producer to PSI/M. The latter then authorizes storage under the control of PSI/M and shipment upon demand by AA pharmaceutical, the distributer.

The AMTR procurement chain appears to meet the five indicators of international best-practice procurement as noted above. We were not able to review the PSI/W procurement structure and process and cannot make an assessment of the competitive bidding, review and contract award process.

Procurement execution

International procurement, a primary cost-driver, appears to be tightly controlled by the Finance and Procurement Departments. Commodity procurement is planned and budgeted; each new procurement request is matched against planned budgets and requires PSI/Myanmar Finance Department approval and Procurement Department approval.

Virtually all procurement is competitively bid. An interaction on competitive bidding between IP/M, the Myanmar technical team, and the IP/W office was observed during the site visit in May, 2014. IP/W initiated a regular competitive re-bid for the supply and packaging of ACTs. The re-bid was normal best-practice procurement to seek low cost suppliers when new supplies of a commodity are required. The AMTR technical team was actively engaged in the procurement discussion, and pushed to reconsider the new supplier as the proposed new packaging threatened to undercut part of the BCC strategy which was to use familiar packaging that increased consumer confidence and reduced the opportunity for blister cutting and sale, or use of incomplete dosing. As it developed, while a potential new supplier promised slightly less unit-cost, the packaging change became a determinative factor with the technical team making the case that unfamiliar packaging could undercut consumer confidence in the product, and blister cutting would reinforce improper dosing practices evident in use of oAMTs.

Two VFM arguments emerge. It could be argued that effective communication between IP/W and IP/M would have halted the re-bid or revised the specifications, at an earlier stage. While certainly true, more persuasive is the argument that cost-savings are likely achieved across projects because PSI proactively re-bids major procurement. This engages local technical teams in the process, and the fact that IP/W leads the procurement discussion (and engages the technical team at key stages) frees up local teams to focus on PSI core activity: broad-scale distribution of health commodities. Separating the tasks of international procurement and local distribution builds economy and efficiency by capturing the strengths of each responsible team.

Despite a strong procurement system, two issues delayed procurement of ACTs for AMTR with a consequent front-loading of costs and delays in programme implementation. These are discussed below.

As with international procurement, the process and systems for local procurement is clearly defined. Procurement under a USD 10,000 threshold is handled locally. For AMTR this includes paper products, supplies and some wrapping and packaging. While the system is clearly defined, no spot-check has been performed to verify the local procurement practice.

Procurement Delays

The first delay was due to administrative hurdles and is familiar across projects worldwide. The MOU and the related agreement for the import and distribution of ACTs with the Ministry of Health encountered obstacles, which required multiple efforts to resolve. Substantial opportunity for inefficiency accompanied the politics of the delay in signing the MOU.

The second delay involved the choice of ACT. AMTR initially wanted to replace oAMTs with an ACT from Sigma Tau (Dihydroartemisinin-Piperaquine - DHA-PPQ) that was superior to alternatives and was supposedly close to getting WHO pre-qualification status. WHO pre-qualification status was significantly delayed, while AMTR was repeatedly assured that approval would be given, and ACT supply was imminent. The preferred ACT had a much simpler treatment regimen (thus potentially improving adherence). AMTR repeatedly delayed procuring any ACT, preferring to wait for the availability of HHA-PPQ. Ultimately the delays became unworkable and AMTR procured Artemether Lumefantrine from IPCA as the ACT to be distributed. The inefficiencies in the initial ACT procurement resulted from incomplete information-flow from the producer through the supply-chain. In this case, private sector providers in a market with limited supply choice may have signalled falsely to the consumer, AMTR. The initial decision to wait for the first choice ACT to become available was a necessary risk undertaken by AMTR as they considered this to be the best ACT option available when the strategy to drive oAMTs from the market was developed.

Product handling/waste

Two factors in product handing were examined:

1. The percentage of product damaged and/or unusable
2. The accuracy of the planned procurement quantities vs. actual commodity requirements.

In the case of PSI/AMTR the percentage of damaged or spoiled products is remarkably low, under one-tenth of one percent. Consistent low damaged and spoil rates indicate economic and efficient procurement practices leading to VFM capture.

The same table in 9.3 shows, however, that pharmaceutical expiry dates represent a large and growing percentage of total product procured. High volumes of expired drugs represent poor economy, and may represent poor efficiency, and limited effectiveness.

At this stage it is not possible to comment on the ability of PSI and AA to recall expired stock because March and April 2014 are the first months in which distributed ACT stock has approached expiry. This metric and the capacity to recall expired stock will be examined in the final evaluation.

Procurement conclusions

PSI's procurement systems are well established, well communicated, spot checks indicate compliance, and the well-honed systems have the potential to capture VFM at several stages in the procurement chain. In

the case of AMTR, this economical and efficient system is undermined by dramatic gaps between the anticipated demand and actual demand for ACTs. Most serious is the potential loss of 494,643 doses as a result of poor project planning, as opposed to procurement issues.

In retrospect it is easy to criticize this potential loss as a result of poor planning. The contrary argument is that AMTR was implemented nationwide in a context of scarce and unreliable prevalence and demand data, and was intended (primarily) to shock the market by flooding ACTs into the supply chain and driving out oAMTs. Retail outlet surveys show substantial progress towards that goal.

4.1.5 ACT Unit Cost Analysis

At mid-term, two unit cost measurements are undertaken:

1. Benchmarking the consumer purchase unit cost of adult ACT dose through private sector channels in AMTR, with published unit cost data from recent sources
2. A subsidy analysis to isolate the cost-factors at each stage of the supply-chain.

Missing at this stage is unit costing of product delivered with provider education. Given the issues with demand, malaria prevalence, and data reliability, we prefer to engage PSI more fully in a comprehensive unit cost study between now and the Final Evaluation. This interim analysis is thus intended as baseline cost and subsidy data, which will be used in more extensive unit costing and subsidy studies for the Final Evaluation.

Table 4: Comparative ACT and AMT consumer purchase unit costs USD: private-sector channel

Country	Most Popular Anti-malarial (USD)	First-line quality-assured ACT (USD)	Oral Artemisinin Monotherapy (USD)
Benin	0.65 (0.43, 1.08) N = 462	3.24 (1.94, 5.77) N = 216	8.10 (8.07, 10.45) N = 56
DRC	0.39 (0.26, 0.52) N = 1, 258	1.86 (1.03, 3.61) N = 252	3.23 (2.45, 4.13) N = 956
Madagascar	0.36 (0.36, 0.36) N = 1, 847	0.14 (0.10, 0.57) N = 302	XX (0 and 7.33) N = 2
Nigeria	0.54 (0.40, 0.81) N = 4, 061	6.40 (5.05, 6.74) N = 372	3.24 (2.70, 3.77) N = 1, 438
Uganda	0.50 (0.30, 0.75) N = 653	4.48 (2.49, 5.97) N = 81	9.55 (7.96, 11.94) N = 229
Zambia	0.40 (0.30, 0.61) N = 261	9.63 (3.01, 11.04) N = 83	
Myanmar		1.80[1] (subsidised 0.51)	0.51

[1] Converted to the comparable 2009 USD to align with other country data; price taken from PSI subsidy documents

Source: O'Connell et al for all data except Myanmar; PSI AMTR project for Myanmar

Table 4 appears to show economies in private sector distribution channels in Burma. While requiring further study by PSI before the final evaluation, such savings are feasible considering that the predominant treatment channel is the private sector, the costs of oral AMTs are low and well-established for the consumer, and outlet surveys confirm the centrality of price as a determinative choice factor.

More data is awaited from PSI to fully understand the delivered cost of ACTs (BCC and other associated costs). Given the vast oversupply of ACTs, it is reasonable to expect higher unit costs when actual distribution vs. total costs are calculated. That calculation is not possible without further data.

From a VFM perspective, the fundamental factor that may contribute to poor economy in AMTR is the dramatic demand variance from the proposal. Lower uptake and expired product increase unit costs.

Table 5 disaggregates the price structure, profit, and subsidy at each level of the supply chain for ACTs. The consumer target prices are aligned to the average market price of oral AMTs determined by PSI through a Rapid Market Assessments used for the Business Case[7]. PSI then worked back from the AMT market price and proposed mark-up levels at each stage of the supply chain that were in line with AMT mark-ups, so that no party in the supply chain would have a profit-incentive to hoard AMTS or not supply ACTs.

Table 5: AMTR price structure for ACT and subsidy (Blue= PSI's selling price to AA; red=suggested maximum selling price of AA to customers

Level of Supply Chain	Proposed Mark-up	Anticipated Selling Price (Kyats)			
		SupaArte 4	SupaArte 3	SupaArte 2	SupaArte 1
Consumer	N/A	500	395	270	140
Provider/General store/village shop	50%	333	263	180	93
Retail/Pharmacy	30%	256	203	138	72
Wholesaler	3%	249	197	134	70
Distributor/Importer (PSI Selling Price To AA)	25%	199	157	108	56
Dose unit costs and subsidy breakdown					
Cost Price in USD (from IPCA)		1.627	1.287	0.875	0.453
Cost Price in MMK (1 USD = 835 Kyats)		1,359	1,075	731	378
Potential subsided amount/Blister (Kyats)		1,160	918	623	322
Level of Subsidy(%)		85%	85%	85%	85%

Source: PSI subsidy study

The unit subsidy was determined by working backward from the expected unit cost of an adult AMT dose at the outlet level, then adding the profit at each level of the supply chain, and adding that to the cost of the imported ACT. The subsidy costs are provided by PSI.

4.1.6 Human Resources

This analysis intended to conduct a human resources analysis in several areas:

1. An administration to service delivery cost review;
2. A review of the ratio of international to local staff and evidence of trends to replace international with local staff
3. A review of use of consultant days for programme functions.

[7] PSI Rapid Assessments 2011: "Supply Chain Analysis of Anti-Malarial Drugs Available on the Market in Kayin State, Myanmar" and "Findings from Rapid Assessment of Malaria Market Supply Chain Study in Shan and Kachin State"
Rapid Assessment: List of Main Anti-Malarial Drugs Found on the Market

The review assumed that PSI's management structure and business approach would capture some economies by spreading the cost of international and management staff across projects. Thus, AMTR would benefit from expert management while sharing that cost with other projects, demonstrating good VFM of PSI as a service provider in Burma.

Unfortunately, despite multiple requests since inception, we have been unable to obtain transparent and sufficiently detailed cost data on staff deployment. Following several requests, we did receive cumulative cost data for local staff. The same request for international staff generated an anonymized list of international staff hours dedicated to AMTR.

PSI's reluctance to provide cost data is presented as protecting confidentiality. Despite assurances of confidentially, the best that PSI is able to provide at this time is insufficient for VFM analysis. It should be pointed out that the VFM assessor has undertaken more than twenty VFM assessments and most organisations are concerned about sharing salary data. No other organisation has been unable to provide the requested HR data once assured of confidentiality.

This is a missed opportunity for PSI to demonstrate the economy and efficiency of its business model. Hopefully PSI will be able to rethink its response to this and other data requests.

4.1.7 Behaviour Change Communication

Behaviour change communication was planned in AMTR in two streams: (1), to increase demand for ACTs by the consumer and (2), to provide medical detailing and knowledge to the priority outlets[8]. A review of BCC performance targets vs. reported results was shown in Table 3 above (see indicators 1.4, 1.6, 2.1, 2.2 and 3.2). Round 1 (2012) and round 2 Outlet Surveys provide the data underpinning this section.

It is admittedly difficult to accurately disaggregate attitude and perception changes with behaviour, but the results of AMTR BCC activities to date do not demonstrate the strength of this labour-intensive effort.

BCC and oAMT vs. ACT availability

The primary drive of AMTR is to change antimalarial market dynamics by reducing consumer access to oAMTs while concurrently increasing access to ACTs. Results of the retail outlet surveys are discussed in detail in section 3.2.2, but as shown there in Figure 4, there has been decreasing availability, and more importantly sales of oAMTs in the market, while at the same time availability and sales of QA-ACT significantly increased among the priority outlets. This can be seen as a success of BCC targeted to the providers through medical detailing.

BCC and treatment choice

At this stage the VFM analysis is awaiting the detailed 2013 household survey data on consumer preferences; we are thus reliant upon internal M&E reports of progress against milestones. The next consumer assessment may possibly be conducted in a different format, as discussed in section 3.2.3 above. Until then, the log frame milestone results for output indicators 2.1 and 2.2 shown in Table 3 are indicative of weakness in consumer related BCC.

To date, there is little evidence that BCC has had nearly as much consumer impact on treatment choice, as did the primary AMTR drive to change market access to AMTs and flood the market with subsidised ACTs doses.

[8] Private health facility, pharmacy, itinerant drug vendors, general retailers, and health workers

AMTR's activity contributed to significant market changes (reduction in the supply of oAMTs) and promoted the use of a new, superior product at the same price as oAMTs. Most consumers appear to have had minimal choice of treatment when the supply of oAMTs was reduced. When a new product was made available at a similar price, the consumer had little reason to identify with a brand or treatment type. Instead, they used what was recommended at a familiar price level. Thus, the lack of consumer brand knowledge is easily understood. The need for consumer BCC to change purchasing patterns is less clear in a changed market.

There is some indication in the 2013 outlet survey that BCC may have a positive impact on knowledge of correct dosing. This most likely results from increased provider instruction to the consumer. The slightly stronger provider results, and the 2013 outlet survey indications of provider recommendation as key to treatment choice, could indicate that the BCC provider stream is a more effective channel to promote increasing and proper use of ACTs over oAMTs.

BCC and perception change at outlet level

Based on the Retail Outlet surveys, the most pronounced impact of the BCC campaign aimed at providers was in response to asking for reasons why an outlet stocked any particular anti-malarial. Between 2012 and 2013 government recommendation increased as a perceived factor motivating an outlet to stock certain antimalarial for health facilities, pharmacies and IDVs; while little or no change was seen in the stocking decisions by general retailers and community health workers.

Perhaps the most significant indicator of success of the BCC campaign for providers was on perceptions of effectiveness as a reason for stocking an antimalarial. This change in provider perception of treatment effectiveness is a key to the long term effectiveness of AMTR. As providers increasingly recommend ACTS as a preferred treatment, the long term effectiveness of the AMTR strategy of driving AMTs out of the market and meeting demand with ACTs, is strengthened. In the absence of other education and training targeting outlets, it is reasonable to assume that the AMTR BCC campaign had an attributable effect on changed provider perceptions of antimalarial effectiveness.

The BCC approaches used by AMTR should be questioned and re-evaluated on two levels:

a. To what degree is consumer-level BCC useful and for what purpose? Current BCC appears to focus on brand recognition (presumably to encourage consumer to buy the preferred product). Due to the success of AMTR in crowding out AMTs, and the subsidy enabling wide ACT access at a comparable price point, it is not clear how much BCC is actually motivating treatment choice. Price and provider recommendation appear to be the most important factors for treatment choice. If this assumption is confirmed by the upcoming HH surveys, consumer BCC should be refocused or ended. In a distorted market where consumers have limited choice, is BCC a necessary or efficient use of funds to build brand identity?

b. Provider level BCC and medical detailing appears to have impact, but slowly and below targets. If the assumption that provider recommendation and price are key determinants motivating consumer choice is correct, AMTR expenditures for focused BCC to providers is recommended.

It is notable that both provider and consumer level BCC is underperforming. VFM analysis asks why. Does the kind of change promoted by BCC take longer than the period reviewed? Are the messaging and means of delivery effective? Is the BCC team assembled by PSI the right mix of professionals? These and related questions should be thoroughly explored before refocussing and reinvesting funds for BCC.

4.1.8 Catalytic Benefits

Though intended as a VFM indicator at the Final Evaluation, new catalytic value may be generated by AMTR as a result of its activities.

The government of Burma and PSI have recently signed a new 3-year MOU (until May 2017) to continue PSI's existing work, and allows some important geographic and programmatic expansion. PSI is now able to move ahead on activities such as malaria elimination among plantation workers (operational research and subsequent intervention scale up), RDT phase II scale up in the informal private sector and other activities related to P.f malaria elimination in Burma.

PSI is also moving forward to expand the RDT pilot in the private sector, which if fully engaged, will result in targeted and more cost-effective ACT treatment.

4.2 Recommendation for VFM

Below we list next steps in VFM analysis before summarising our recommendations.

Next Steps in VFM analysis

1. Between now and the next evaluation, PSI and the Independent Evaluation VFM expert will continue to share data in the agreed areas of analysis as proposed in Table 2 above.
2. Lines of inquiry for the next evaluation point will continue the studies undertaken for this MTR, and expand to conduct cost-benefit analyses of ACT distribution; a CBA of ACT distribution with and without RDT.
3. A subsidy analysis is desired. The VFM analysis will work with PSI to determine what data can be generated from regional studies that will contribute to greater understanding of subsidy mechanics within AMTR.

Recommendations

1. As noted at the VFM inception report, PSI is encouraged to devote more efforts to providing the Independent Evaluation with the financial data at a level of granularity that will permit a review of the processes and activities that contribute to programme performance.
    a. The current levels of financial information are high-level and do not enable a transparent review of costs by activity;
    b. The VFM analysis will work with PSI to mutually determine the level of granularity required for robust assessment.
2. PSI is encouraged to provide full HR data to the VFM assessment so that a robust assessment can be made.
    a. The VFM analysis understands the need for confidentiality and assures that no HR data will be shared with anyone other than the VFM assessor for the IR.
    b. The VFM assessor agrees that no disclosure in any form will be made of any HR or other data.
3. All activities around provider and consumer-level behaviour-change communication should be reviewed.
    a. The results appear minimal in relation to the benefits achieved to date. This assessment would change if there were sufficient data to show that consumers make treatment choices, or dose accurately, as a result of information. Instead, provider recommendation and cost appear to determine choice, and provider instructions may affect dose compliance.

b. The next HH surveys and exit interviews should be provided to the VFM assessor.

4. DFID is encouraged to review the value of lost ACT doses due to expiration, and project overhead associated with the loss.

5 TECHNICAL UPDATE

A literature search was undertaken to identify publications relevant to the AMTR project since the last progress report and three articles have been found.

The first and probably most important publication is by Ariey and colleagues (*Nature* 2014, **505:** doi: 10.1038/nature12876) and refers to a potential molecular marker of artemisinin-resistant *Plasmodium falciparum* parasites (with a comment by White in *The Lancet* 2014, **383:**1439-1440). The team of researchers used a previously identified mutation in the "K13-propeller" domain of chromosome 13 of the parasite suspected to be associated with artemisinin resistance in a parasite from Tanzania, and tested it in *P.falciparum* isolates from areas in Cambodia where resistance prevalence is high, using the new Ring-stage Survival Assay (RSA) as an in-vitro measure of resistance phenotype and parasite clearance half-life from in-vivo assessments. They found a close correlation of mutations of the "K13 propeller domain" (PF3D7-1343700 polymorphisms) with artemisinin resistance, suggesting that this could, indeed, be the molecular marker that would allow a better mapping and monitoring of resistance in the Greater Mekong Region. However, as Nick White points out in his comment in The Lancet, questions remain to be answered, e.g. it is as yet unclear whether these mutations in the kelch protein directly cause artemisinin resistance (and if so, how), or whether additional genetic changes are needed. In any case, this has to be considered a major breakthrough and will trigger broad activities of monitoring of these markers.

The second paper of relevance is that by Johnston et al. (*PLOS Computational Biology* 2014, **10:**e1003434) in which they model the within-host effects of treatments with ACT and/or primaquine on the transmission potential of *Plasmodium falciparum,* and hence the potential of eliminating this type of malaria. The model is based on pharmacokinetic and pharmacodynamics data on anti-malarias and uses as the outcome the reproductive number of malaria infection under control, R_c, to estimate potential for transmission reduction and elimination. The model output suggests that in low transmission settings such as Southeast Asia the timely treatment (i.e. within 5 days of onset) of more than 93% of infections will be sufficient to interrupt malaria transmission in about 91% of the populations at risk. The model also suggests that at such treatment levels, addition of a gametocidal compound such as primaquine would not bring major additional gains in controlling transmission. If these modelling projections hold true, it would imply that the addition of primaquine as "radical treatment" of *P.falciparum* in the private sector – which has a considerable number of challenges in implementation as shown in our working paper 2 – would not be as essential as initially thought.

Finally, Pindolia and co-workers (*Malaria Journal* 2013, **12:**397) present a study that combines census and household survey data with networks analysis to estimate the importance of migration and travel patterns for the potential spread of malaria using East Africa (Uganda, Tanzania, Kenya) as an example. They find that while the age-group 20-30 years is the most mobile, malaria transmission potential is carried much more frequently by the age-group 10-20 years due to their higher infection rates and lower use of insecticide treated nets.

6 RISK MANAGEMENT

We have undertaken an updated Risk Assessment and our revised Risk Register is provided at Annex B.

7 BUDGET PERFORMANCE

This section presents our total budget and performance status against the existing budget and timeline as follows:

Period	Milestone	Evidence	Budget	Billed	Balance
Period 1 March to August 2013	Evaluation Framework	Inception Report Submitted	£549,535.	£131,642	£417,893.
	Inception Report				
Period 2 September to December 1st 2013	Six Monthly Report	Six Monthly Report Submitted	£417,893.	£74,367.	£343,526.
	Interim VFM analysis				
Period 3 December 2nd 2013 to 30th June 2014	Six Monthly Report	Six Monthly Report Submitted	£343,526.	£108,693.	£234,833.
	Working Paper 2	Submitted			
	Working Paper 4	Submitted			
	Case Study 1 (Outline)	Submitted			
	Case Study 2	Submitted			
	Interim VFM Analysis	Submitted within six monthly report			
Period 4 July 1st to 31st December 2014	Six Monthly Report				
	Working Paper 1				
	Working Paper 3				
	Case Study 1 (complete)				
	Case Study 3				
	Case Study 4				
	Interim VFM Analysis				
Period 5 January 1st to 1st April 2015	Final Evaluation Report				
	Stand Alone Paper 1				
	Stand Alone Paper 2				
	Stand Alone Paper 3				
	Stand Alone Paper 4				
	Final VFM analysis				
Total			**£549,535.**	**£314,702.**	**£234,833.**

8 SUMMARY AND CONCLUSIONS

The observations and findings for this reporting period can be summarized as follows:

1. Based on the findings of the 2013 round of surveys, the primary objective of the project to replace oral Artemisinin-based monotherapy (oAMT) with a subsidized, quality-assured ACT in the private sector has made excellent progress, and by July 2013 the relative sales volume of oAMT compared to QA-ACT had significantly decreased to only 15% in the priority outlets comprising pharmacies, itinerant drug vendors and general shops selling medicines.

2. There are, however, a few findings and developments that could prevent this success from being translated into significant gains in containing the spread of artemisinin-resistant strains of *Plasmodium falciparum*:

    a. Sales of QA-ACT have significantly declined since July 2013 which does not seem to be caused by increases in diagnostic practices as RDT availability and use are still within the range of 6-11%. This needs to be followed-up carefully as it could mean that the initial positive trend does not continue into 2014.

    b. With the diagnostic capacity still low (RDT implementation yet to be rolled out) many clients with fever, especially those attending the priority outlets, still receive non-artemisinin anti-malarials or antibiotics which will not result in adequate treatment if the fever is caused by *P.falciparum*.

    c. Based on results of the 2013 household survey, only 27% of respondents with fever who received any ACT, report completing a full course, either because they did not receive a full course or because they did not complete it.

3. Based on these findings, more emphasis must be put on quickly increasing appropriate diagnosis of fever cases in the private sector, as well as compliance with ACT treatment, and this should be reflected in the log frame. The household surveys should be retained as an important tool for population based data on these indicators, but could be complemented by exit-interviews for private sector outlets and patient follow-up for compliance.

4. The interim VFM analysis shows that the unit cost per QA-ACT dose delivered (the major cost driver of the project) is higher than originally anticipated due to the much lower demand for QA-ACT than originally estimated. Another area that did not perform as anticipated is the BCC component, especially regarding consumer behaviour and QA-ACT brand and outlet recognition. There are still some areas of the VFM analysis that cannot be conducted as planned, as key data has not yet been provided. This refers to financial performance and human resources.

5. Two significant developments and findings in the scientific community could have an important impact on the project:

a. The discovery of a very promising candidate for a molecular marker for artemisinin resistance in *P.falciparum* that could allow for a much more accurate mapping and monitoring of spread and/or containment of resistance.

b. The results from a modelling exercise that strongly suggests that the addition of primaquine to a timely and complete treatment with ACT would have very little advantage in low transmission settings such as in Southeast Asia with respect to interruption of malaria transmission.

Next steps for the evaluation are to confirm and agree with DFID an extension to the evaluation timeframe to bring evaluation activities in line with the extended project timeframe. The next evaluation visit is due to take place in October 2014.

ANNEXES

Annex A: Evaluation Extension – Proposed Activities and Revised Workplan

The PSI AMTR project has been granted an 18 month no cost extension. Project activities are to be extended throughout this period, and project end date has been pushed back from October 2014 to March 2016.

As the project timeline has been pushed back and the objective of the evaluation is to evaluate project activities, it will also be necessary to extend the time-line of the independent evaluation until after project close (presumably pushing evaluation end date from March 2015 to September 2016). In addition, as project activities are to be continued throughout the extension period and an additional round of surveys to be conducted in 2015, it will also be necessary to extend the evaluation scope and associated budget to accurately capture and reflect project activities and changing epidemiology at additional time points. Furthermore it would be possible to utilise the extended period to update existing working papers/case studies of continued interest, and potentially explore further areas of interest to DFID and the PSI project, particularly those areas raised in DFID's annual review of AMTR. Some of these suggestions are explored in more detail below:

Updated paper on the most conducive model for corporate private sector engagement: Following on from Working Paper 4 which posits a critical role for the private sector in supporting malaria control and artemisinin resistance containment strategies, a follow up paper could elaborate a potential model for successful engagement, defining roles and responsibilities for key actors including public and private sectors, donors and implementing partners.

Updated paper on migrant treatment seeking behaviour: Following on from Case Study 3 which provide a qualitative analysis of the decision making process amongst migrant populations in south-east Burma, this paper could examine sustainable delivery options to reach the most remote populations in high risk/emerging artemisinin resistant areas following the end of the AMTR project.

Sustainability of the private sector approach: An additional area of analysis, picking up on recommendations in the DFID annual review could be to examine in greater detail the sustainability of the private sector supply chain and delivery model utilised by the AMTR project. As transmission rates reduce the market for anti-malarials will likely dramatically shrink, potentially below the levels of profitability for private sector suppliers. As transmission decreases, foci of malaria and artemisinin resistance will most likely be mainly managed by the public sector. However, since fever incidence does not decline at the same rate as malaria there will remain a significant market for parasitological diagnosis (RDT and microscopy) which will remain until successful malaria elimination. Are private sector delivery models under these circumstances a likely scenario following the close of AMTR and the end of ACTt subsidisation in the retail market? What could be done to shift the private sector interest from medicine to diagnostics?

Theory of Change: Again in line with an area raised in the annual review, the evaluation could support the revision of the project Theory of Change and its timelines for the remainder of the project extension.

VFM: The VFM revised plan and interim analyses both refer to the need for more in-depth unit costing and subsidy analyses; equally, the VFM findings call for better understanding of the lower performance of the BCC interventions. PSI did mention that they were ready to undertake some of these studies themselves but at the time of writing this report had not shared any firm plan with the independent evaluation team. If PSI

should not have the capacity or time to undertake such reviews, the independent review team could consider providing this additional support.

We are communicating with DFID Burma with regards to an evaluation extension and propose the following changes to the evaluation timeline to reflect the AMTR project (outlined in the revised work-plan attached below).

A summary of key changes is as follows:

- Evaluation end date moved from March 2015 to May 2016
- Final evaluation visit moved from October 2014 to end 2015/early 2016
- October 2014 visit to take place as planned but reflect a mid-term instead of end-term evaluation. A mid-term evaluation can include process as well as impact to assess programme implementation and findings can feed into the PSI project extension period.
- Interim dissemination of findings to be carried out in March 2015 to communicate the findings of Working Papers 1-4, Case Studies 1-4 and the Mid Term Evaluation.
- Additional work conducted throughout the extension period to monitor PSI regular data flows, survey findings and VFM data.
- Additional VFM analysis visit to take place if additional VFM support required.
- Additional work to update working papers/case studies of interest and to potentially explore additional topics of interest if agreed.
- Final dissemination meeting to take place in May 2016 to communicate final evaluation findings and findings of updated/additional working papers and case studies.

An extension of the evaluation period will have an associated budgetary implication, as will any additional work-packages DFID may wish us to take forward. We will need to cost approved activities once agreed.

Revised Implementation phase workplan:

Implementation phases	Implementation 3						Implementation 4						Implementation 5						Implementation 6				
	2014 Q3			Q 4			2015 Q1			Q 2			Q3			Q4			2016 Q1			Q2	
Activities, outputs & payment triggers	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Ongoing collection of costing data, routine data from PSI, survey reports and other outputs																							
Ongoing feed back to DFID, PSI and stakeholders																							
Analysis for working papers 1 and 3 and field work for working paper 3																							
Write-up and presentation of draft working papers 1 and 3																							
Preparation and implementation of mid-term evaluation field visit																							
Finalisation of case study 1																							
Write up of mid-term evaluation visit																							
Submission of 3rd six-monthly report with VFM update (payment trigger)																							
Analysis and write-up of draft case studies 3 and 4																							
Dissemination workshop for case studies and working papers 1-4																							
Potential additional research on working papers/case studies updates/topics to be agreed																							
Submission of 4th six-monthly report with VFM update (payment trigger)																							
Preparation and implementation of final evaluation field visit including VFM visit																							
Submission of 5th six-monthly report with VFM update (payment trigger)																							
Draft of final evaluation report																							
Incorporation of comments on final evaluation report																							
Dissemination workshop for evaluation findings, and any additional case study/working paper updates/topics																							
Output: End of project evaluation report including VFM findings (payment trigger)																							

Annex B: Risk Register – June 2014

Risk Category	Risk Description	Consequence Description	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)	Control Description (Mitigation Measures)	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)
1. Safety and Security									
Personal Safety and Security	**1.1Political unrest** Political instability and civil unrest in parts of the country related to political, ethnic and religious tensions May also lead to protests in the political and economic centers of Yangon and NPT	Being caught up in political violence during protests, civil unrest or government repression of civil society Risk of injury or death to project staff Risk of detention	1	4	4	Closely monitor situation through available channels including FCO/UN updates and through local and NGO contact networks on the ground in Burma, providing ongoing updates to field and project management staff as necessary. Keep updated on security situation in the field through frequent regular and ad hoc communications with field teams. Ensure staff are effectively briefed on risk and given appropriate training on emergency procedures such as evacuation plans and kidnap protocols on arrival in-country and/or upon commencement of employment. Ensure personnel are fully briefed on risk avoidance protocols e.g. avoiding political demonstrations, not photographing or videoing the military or the police, complying with curfews etc. Ensure designated staff are briefed on and prepared to manage emergency procedures. Establish incident reporting system and an in-country Security Focal Point Person responsible for communication, centralization and dissemination of security information to the field team. Establish incident reporting system.	1	4	4
	1.2 Threat of terrorism. There is an increased threat of terrorism following a spate of small bomb explosions in Rangoon, Taungoo and Sagaing in October 2013, including in destinations frequented by foreigners. Motivations for attacks currently unclear. Attacks could be indiscriminate, including places frequented by expatriates and foreign travellers, commercial premises and public transport.	Terrorist attack, either random or deliberate foreign target Risk of injury or death to project staff Risk of kidnap	1	4	4		1	4	4

Risk Category	Risk Description	Consequence Description	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)	Control Description (Mitigation Measures)	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)
	Previous attacks have targeted government buildings, commercial premises, public transport, festivals, hotels and cinemas.								
	1.3 Risk of religiously motivated violence due to tension between the majority Buddhist population and the minority Muslim population. Heightened risk for anyone assumed to be Muslim.	Risk of death/serious injury to personnel	1	4	4		1	4	4
	1.4 Natural disaster Potential risk of cyclone and flooding Risk is particularly present during the cyclone season April-October. Secondary problems may occur including landslides	Being caught up in flood waters or landslides or becoming isolated due to the cutting off of transportation networks. Risk of injury or death to project staff Risk of becoming stranded and unable to return to Yangon or to leave Burma Risk of damage to or loss of project property, including both equipment and project data Risk that data	2	3	6	Closely monitor situation through available channels including FCO/UN updates and through contact networks on the ground in Burma. Keep updated on local conditions through frequent communications with field teams; ensure staff are effectively briefed on risk and given appropriate briefing on emergency procedures such as evacuation plans. Ensure designated staff are briefed on and prepared to manage emergency procedures. Develop a business continuity plan to ensure minimum disruption of activities. Ensure all project property is adequately insured against identified risks. Ensure all project data is adequately protected and backed up in line with Montrose information protection and security policy. Use cloud computing options such as Dropbox to preserve	2	2	4

Risk Category	Risk Description	Consequence Description	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)	Control Description (Mitigation Measures)	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)
		collection is delayed or suspended				project data.			
	1.5 Risk of crime including thefts, burglaries, muggings – expatriate staff may be specifically targeted for money and/or equipment. Petty crime rates have generally increased particularly in Rangoon.	Harm, personal loss Project equipment/ property at potential risk, including project data (if stored on a hard drive).	1	2	2	Ensure personnel are effectively briefed on security risks and are aware of and follow protocols for managing risk i.e. carrying valuables out of sight; keeping valuables locked away; not travelling after dark; only using project transport. Ensure staff are aware of risks and are given reasonable opportunity to insure private equipment. Ensure project property and equipment is adequately insured against loss. Ensure all project data is adequately protected and backed up in line with Montrose information protection and security policy.	1	1	1
Transport Safety	**1.6 Poor local transportation networks including road, rail and air and water.** Road accidents due to many vehicles including taxis and public transport being in poor mechanical condition. Travel restrictions and curfews due to civil unrest or rebel activity. Fatal plane crashes due to poor enforcement of safety standards. Travel by train and water unlikely to occur for upcoming evaluation visits	Risk of death/serious injury to personnel	2	3	6	Ensure staff perform a risk assessment of vehicles and drivers prior to travel in line with relevant project checklists (Annex 1.3.4 below). Ensure vehicles rented are maintained and monitored in line with Montrose vehicle policy. Ensure only those qualified to do so are authorised to drive project vehicles and adhere to Montrose vehicle policy i.e. not driving after dark/curfew. Ensure that when driving outside of Yangon, all cars have appropriate safety equipment including First Aid kits and fire extinguishers. Where travel is to be conducted by air, ensure travel is in line with project air transportation procedure.	1	3	3

Risk Category	Risk Description	Consequence Description	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)	Control Description (Mitigation Measures)	Likelihood (1-4)	Impact (1-4)	Risk Rank (L x I)
Health	**1.7 Risk of infectious disease.** Malaria is not endemic to Yangon but, dengue is present. Avian influenza is also an emerging risk Risk of illness from unsanitary food preparation /hygiene facilities particularly salmonella. May be limited medical attention and supplies	Risk of death/serious injury to personnel	2	4	8	Ensure personnel are fully briefed on potential health risks prior to field work and are given guidance on necessary and recommended precautions including any vaccinations and any recommended prophylaxis. With regards to avian influenza, consumption of poultry and egg dishes should be avoided and travellers should avoid visiting live animal markets or being in close contact with domesticated or wild birds. Ensure personnel are aware of general guidelines for food and water consumption. Drink only bottled water and avoid ice in drinks. Carry first aid equipment and any essential medications you require in case you are not be able to obtain in country. Establish a medical evacuation plan in case of emergencies or the need for specialised medical care.	2	3	6

Annex C: VFM – PSI AMTR budget outline by objective

Organization Name: PSI
Project Title: Containment of Artemisinin Resistance in Eastern Myanmar (Revision 1)
Total Requested Amount (US$): **$17,655,001**
Date: 21-Feb-13

	Original Budget		Contract Budget Feb 13			Proposed Budget Realignment			
	Budget		Budget	Actual Reported Expenditure		Budget carried forward @ start of realignment	TOTAL	TOTAL New Budget	
Major Objectives	**Year 1 to 3**	**%**	**Year 1 to Year 3**	**Year 1-Year 2**	**%**	**End of Year 2**	**Yrs 3 to 5**	**Year 1 to Year 5**	**%**
Objective 1 to Providers	$ 2.537.419	**14%**	$ 1.823.622	$ 1.050.721	**15%**	$ 772.901	$ 1.555.623	$ **2.606.344**	**15%**
Objective 2 to Users	$ 10.877.867	**62%**	$ 10.369.724	$ 3.893.397	**56%**	$ 6.476.327	$ 2.706.245	$ **6.599.642**	**37%**
Objective 3 to Testing	$ 436.524	**2%**	$ 902.666	$ 269.900	**4%**	$ 632.766	$ 1.325.606	$ **1.595.507**	**9%**
Project Management	$ 2.648.190	**15%**	$ 3.382.756	$ 1.329.660	**19%**	$ 2.053.096	$ 4.344.391	$ **5.674.051**	**32%**
Total Direct Costs (of Primary)	$ 16.500.000	93%	$ 16.478.768	$ 6.543.678	93%	$ 9.935.090	$ 9.931.865	$ 16.475.544	93%
Total Indirect Costs (of Primary)	$ 1.155.000	**7%**	$ 1.176.232	$ 470.366	**7%**	$ 705.866	$ 709.091	$ **1.179.457**	**7%**
Grand Total Costs	$ **17.655.000**	**100%**	$ **17.655.000**	$ **7.014.044**	**100%**	$ **10.640.956**	$ **10.640.957**	$ **17.655.001**	**100%**

Annex D: VFM – Procurement history, damaged and at risk

AMTR (DFID)

Received Date	Product	Funding	Received Quantity	Damaged	% Damage	Expiry Date	Expiry Balance PSI-CWH	Expiry AA returns	Total Expiry Balance	% Expired
17-Aug-12	AL 1	DFID	14,400	29	0.20%	Apr-14				
17-Aug-12	AL 2	DFID	15,120	16	0.11%	Apr-14				
17-Aug-12	AL 3	DFID	29,690	8	0.03%	Mar-14				
17-Aug-12	AL 4	DFID	239,880	45	0.02%	Mar-14				
27-Aug-12	AL 1	DFID	77,760	119	0.15%	Apr-14	2,589	3,960	6,549	8.42%
27-Aug-12	AL 2	DFID	77,310	40	0.05%	Apr-14	3,171	5,557	8,728	11.29%
27-Aug-12	AL 3	DFID	154,500	14	0.01%	Mar-14	20,268	12,450	32,718	21.18%
27-Aug-12	AL 4	DFID	1,232,670	230	0.02%	Apr-14/ Mar-14	344,887	101,761	446,648	36.23%
11-Jun-13	AL 1	DFID	64,977	4	0.01%	Feb-15				
11-Jun-13	AL 2	DFID	64,980	16	0.02%	Feb-15				
11-Jun-13	AL 3	DFID	129,987	13	0.01%	Jan-15				
11-Jun-13	AL 4	DFID	1,039,980	28	0.00%	Jan-15/ Feb-15				

data as of 7 May 2014

Annex E: VFM – PSI AMTR Procurement Plans