Tinkering and Tailoring:
Use of medicines and rapid diagnostic tests for malaria by private providers in Cambodia

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Summary

FGD Background: Marketing and subsidising health commodities through the private sector may provide an opportunity to increase access of populations to technologies deemed important by public health practitioners, such as rapid diagnostic tests (RDTs) and artemisinin combination therapies (ACTs) for the effective detection and treatment of malaria. However, little is known about how tests would be assimilated into practice by private providers, and how this may affect care provided to their clientele. In this report, we learn from the implementation of RDTs and ACTs in Cambodia, the first country to have introduced these products through subsidies and social marketing.

FGD Objectives/methods: The role of ACTs and RDTs in the practice of private providers was explored through focus group discussions (FGDs) and rapid ethnography as part of a wider evaluation in 5 malaria endemic provinces in Cambodia including an outlet census and mystery client study. Eight FGDs involved 53 medicine providers working in kiosks, drug shops, pharmacies and private clinics in 5 provinces to hear about their experiences with recognising, testing and treating for malaria. We aimed to understand how fevers are managed by private providers in terms of use of RDTs, artemisinin based drugs and drug mixes in different areas of Cambodia. Analysis was thematic and interpreted in reference to local medical, historic and political economic contexts.

FGD Results: Several concepts relevant to the research concern emerged from participants across the different groups. These can be grouped into (1) conceptualisations of the perceived roles of providers, in turn important to understanding (2) the way medicines were used, including ACTs and artemisinin monotherapy, and together important for understanding (3) the way testing in general, and RDTs in particular, are conceived and used.

The roles of providers was prominent in their discussions. A notable distinction was made between the roles of 'selling' *(louktnam)* and 'treating' *(pchierbal).* A majority considered themselves as providing the former type of service, their role being to distribute drugs, but not to attempt to *cure* individuals of their illnesses. This resulted in dispensing of drugs seen as 'effective' for getting the customer through the illness with few side-effects, including artemisinin monotherapy tablets or injections. By contrast, 'treatment' entailed diagnostic and more intensive curing processes. This included carrying out examinations, batteries of tests and the use of drugs that required the patient to invest more money, energy and time to achieve a cure.

The way to use different medicines was also a popular topic for discussion. Overall, the *modus operandi* could be described as 'tailoring' to the individual case, taking into account their condition and energy levels as well as knowledges about the side-effects of different drugs. This resulted in frequent dispensing of small packets of mixed drugs and tinkering of dosages to lessen the harsh interaction of drugs with the *mero* (akin to the biomedical concept of 'microbes').

Compared with these topics, malaria RDTs were less favoured topics of discussion. This reflected their use on the margins of practice. They were used along with both 'selling' and 'treating' practices, although did not appear central to dispensing decisions for either, situated in a grey area between the two. The principle of testing appeared to be assimilated into practices related to the ideal of *curing* the patient; they *should* be used, or preferably microscopy and other laboratory tests should be used, to show the parasites and other causes of illness, leading to prescription of drugs to cure. However, providers reported reluctance to use RDTs for a number of reasons, identifying

problems with the tests not 'showing' malaria, and other logistical issues with the syringes and buffer solution. In Pailin, the urge to ensure patients were tested before receiving malaria drugs was stronger than elsewhere. Whilst the given rationale for these practices referred to an adjusted version of public health instructions, the regulatory enforcement of drug shops in Zone One may also have affected perception of the use of antimalarial and testing commodities.

FGD Implications: These findings have several implications for programmes interested in incorporating the private sector into strategies to increase access to ACTs together with RDTs. Firstly, it may be most cost-effective to target RDTs to those who consider their role to be 'treatment' – usually providers trained in health care. These providers may be more interested in a 'cure' for the patient, identified through a process of seeing the parasites and then cured through taking a full dose of ACT, enduring side effects. In order to improve use of RDTs with these providers, implementers must respond to concerns over logistics, provide reassurances over trusting results, address concerns over identifying typhoid and dengue and focus on facilitating referral for more serious cases. Providers whose principal role is 'selling' could be encouraged to sell over-the-counter drugs to help people in the short term, and to dispense drugs from prescriptions. Referrals should be encouraged and facilitated. Drugs should be regulated at high levels, targeting wholesalers and importers to enforce bans on artemesinin monotherapies. Changing the national first line artemisinin partner drug from mefloquine would reduce avoidance from side effects.

List of abbreviations

ACT	Artemisinin Combination Therapy
AMFm	Affordable Medicines Facility – malaria
CNM	National Centre for Malaria, Parasitology and Entomology
FGD	focus group discussions
MoH	Ministry of Health
NECHR	National Ethics Committee for Health Research, Cambodia
RDT	rapid diagnostic tests
WWARN	Worldwide Antimalarial Resistance Network

1 Background

The use of parasitological diagnosis to target effective Artemisinin based Combination Therapy for malaria cases has become a prevailing discourse in malaria control in recent years (World Health Organisation, 2012). This has superseded targets for universal rapid access to effective treatment, now regarded as contributing to mass overuse of precious antimalarial drugs for non-malarial illnesses (D'Acremont et al., 2009). With the advent of rapid diagnostic tests that can be used at the point of care (Bell et al., 2006), universal access to parasitological diagnosis is now promoted, with recommendations for incorporation of RDTs into all health service sectors including by those selling antimalarial drugs privately (World Health Organisation et al., 2011).

The private sector is recognised to provide a significant proportion of antimalarial drugs amongst those seeking treatment for fever (World Health Organisation, 2012). A recent initiative to improve the appropriateness and quality of antimalarial drugs available over the counter, the Affordable Medicines Facility – malaria (AMFm), has provided a manufacturer level co-payment for the purchase of ACTs in 7 pilot countries, resulting in increased availability and decreased price of quality assured ACTs at private outlets (Tougher et al., 2012). Whilst this should improve access to quality antimalarial drugs by malaria affected populations, concerns have been voiced about the overuse of ACTs (Moon et al., 2009). The inclusion of RDTs in such a subsidy has therefore been proposed, to ensure ACTs are targeted to those who need them (Laxminarayan et al., 2012).

The introduction of RDTs to private providers is a controversial public health strategy. Little is known about how tests may be assimilated into practice by these providers, and how this may affect care provided to their clientele (Adeyi & Atun, 2010).A range of practitioners operate under the 'private sector' rubric, from private hospitals and clinics, through pharmacies to drug shops, village kiosks and itinerant vendors, presenting significant challenges for regulation of practices (Bennett et al., 1997). Some have argued that introducing diagnostic tests and their paraphernalia into drug shops may be delegating health care responsibilities too far to those with little training in managing the tests, let alone non-malarial illnesses (De Allegri et al., 2011).

So far, Cambodia is the only country to have an established nationwide programme of socially marketed, subsidised ACTs and RDTs in the private sector, where a majority of fever treatments are sought (Littrell et al., 2011). In addition to a desire to reduce malaria related morbidity and mortality, the government is urging detection and treatment of cases in line with new targets for elimination by 2025 (Kingdom of Cambodia Ministry of Health, 2011) as well as to halt the spread of resistance of malaria parasites to artemisinin (Dondorp et al., 2009). The social marketing of ACT and RDT programme has been running for over a decade, together with supporting interventions of behaviour change communication, provider training and medical detailing (Yeung et al., 2011). Nevertheless, results from ACT Watch outlet and household surveys in three malaria endemic zones in 2011 suggest that the availability and use of ACTs and RDTs has room for improvement. ACTs were available at around two thirds of private pharmacies, clinics and drug shops that had any antimalarials in stock and RDTs/microscopy were available at just over half of the providers who stocked antimalarials in the last three months (ACTwatch Group and PSI/Cambodia, 2011b). Amongst household respondents reporting 'malaria fevers' (defined here as fever with chills) "cocktails" (a mixed bag of tablets and pills, sometimes containing one or two tablets of an anti-malarial) were by far the most common treatment. Of those who reported taking antimalarials rather than a cocktail, ACTs were most commonly used. Around 44% respondents reporting 'malaria

fever' had been tested for malaria, and positive cases were infrequently (28%) but more likely to receive antimalarials than negatives or non-tested cases (ACTwatch Group and PSI/Cambodia, 2011a).

The aim of this study was to explore the social context of fever management by private providers, including the use of RDTs, artemisinin based drugs and mixed bags of drugs in different containment areas of Cambodia. Others have investigated the treatment of malaria and use of RDTs from a patient perspective (O'Connell et al., 2012) but this study aimed to understand providers´ point of view in order to learn how ACT and RDT technologies are incorporated into their practices. While other qualitative studies looking at the development and evaluation of RDTs in registered drug shops have also been conducted in Uganda (Chandler et al., 2011; Hutchinson et al., 2014), Cambodia, at the epicentre of malaria resistance, represents a very different health care context and malaria scenario.

Significant investments have been made in Cambodia to educate health providers on the need for proper diagnostic of malaria before initiating treatment – a recommendation in contradiction with previous guidelines recommending symptomatic treatment of fevers. It was hypothesised that realities of practice are at the intersection of guideline recommendations and social constructions of illness and treatment, and that these are shaped by wider historic, political and economic context. As such, this perspective follows anthropologists such as Singer (2004) who question 'the assumption is made in biomedicine that, as contrasted with patient reported symptoms, the numbers and other findings generated by medical technology are unambiguously neutral and rigorously objective, devoid of cultural input.' Understanding how practices are influenced by public health recommendations while being situated in social, economic and political realities of life will enable paradigms that shape current programmes to be challenged in the light of local realities.

2 Objectives

We aimed to understand how fevers are managed by private providers in terms of use of RDTs, artemisinin based drugs and drug mixes in different areas of Cambodia. To achieve this, our objectives were:

- **i.** To explore providers' perception of febrile illness and its management, including the use of different malaria medicines, particularly artesunate.
- **ii.** To understand how the perception and use of RDTs fits with these views and practices.
- **iii.** To explore concepts related to RDT quality and quality assurance.
- **iv.** To identify challenges and opportunities for increasing appropriate use of RDTs and of assuring quality.

3 Methods

3.1 Study setting

3.1.1 Malaria in Cambodia

Malaria transmission in Cambodia occurs as *Plasmodium falciparum* and *P. vivax* in 21 districts, covering much of the country except for the central plains. Incidence is highest in the East, with 50-100 new cases per 1000 population in 2010 [12]. *P. falciparum* parasites have developed resistance to three consecutive first-line antimalarial drugs on the Thai-Cambodian border since the 1950s [13] and concern over observed tolerance of parasites to artemisinin in the same area led to the launch of a containment programme and the definition of containment zones [21]. Containment Zone 1, mainly around Pailin, is the focus of efforts to limit the spread of resistance with activities including strengthening the policing of regulation of the private sector, with the 'justice police' trained to enforce a ban on the sale of oral artemisinin as a monotherapy[22], a practice associated with development of drug resistance[23]. In some containment areas, small scale private providers are advised to test for malaria but not to sell antimalarial drugs.

3.1.2 Study areas

Study areas were randomly selected to represent different containment areas of the country: operational districts were grouped geographically and part of an earlier outlet census and mystery client study. Districts were then randomly selected from these groups.

The districts included were located in Mondul Kiri and Kratie provinces from provinces in the East, where malaria transmission is highest and drug resistance is relatively low; Kampong Thom in the Centre, where malaria transmission is moderate; Siem Reap in the North, with moderate transmission and part of the buffer area for resistance containment, known as Zone Two; and in the West, Pailin, where malaria transmission is lower and the centre of the resistance Containment Zone One.

3.1.3 Findings from ethnography, census and mystery client studies

Details of studies preceding these focus group discussions are presented elsewhere [24].

A rapid ethnographic study, carried out over a period of 8 weeks between April and July 2010, involved observation of providers and clients and 20 informal interviews with providers, health staff and villagers in districts of Preah Vihear and Kampot. The findings presented different degree of awareness, use of RDTs and an appeal of RDTs but concern over their utility as the malaria-only diagnostic, and lack on guidance for "typhoid fever", considered as the "by default" cause of fever for RDT negative patients [25]. This rapid observational work helped informing the scenario used for the Mystery Client study described below as well as the topic guides for the focus group discussion study. The ethnographic study allowed us to establish the scenario of a "typical" customer-provider relationship. More observational research would however be needed describing "typical" relationships, how customers approach shop attendants, the wording of their request, and whether requests are usually based on stating symptoms, names of diseases, or names of specific drugs.
In an outlet census survey conducted in the last quarter of 2010, 430 private providers were visited of which 217 were eligible for inclusion in the survey. Two hundred and three providers sold antimalarial drugs of whom 108 (53%, (95%CI: 46-60)) also stocked malaria blood tests. Overall 120 outlets reported selling RDTs of whom 100 (83%) reported performing them themselves.

Within two weeks of the census, the same outlets were visited by a "mystery client", a young man, stating having malaria-like symptoms, and requesting some drugs (while refusing to test). In the mystery client study, 44% (88 of 199) of the providers advised the mystery client to be tested, and this was more common in the containment area. Of those recommending testing, half offered to do the test themselves. Overall however, the mystery client was offered a test in only a quarter of all the interactions where he was able to buy some sort of antimalarials. This finding is in line with surveys since 2002 that suggest levels of routine testing of fevers for malaria has been low amongst private providers in Cambodia over the past decade [14].All artemisinin containing antimalarials bought through the census and mystery client studies contained the stated active ingredient, 69% being considered of satisfactory quality. The census team were more likely to obtain injectable artemether and the mystery clients were more likely to obtain oral artemisinin based monotherapies but overall there was no difference in the quality of the artemisinin based antimalarials obtained.

3.2 Focus Group Discussions

In February 2011, 53 private providers operating in the eight study districts participated in 8 focus group discussions to discuss their experiences with using medicines and tests for malaria. The main themes of the discussion were to understand better the customer-provider relationship, perception and management of malaria-like fevers and use and experiences with Malarine (the socially marketed ACT of co-blistered artesunate and mefloquine) and malaria tests. During the FGDs, participants who had been involved in both the census and mystery client studies were asked to respond to feedback on discrepancies between their stated and performed practices.

Each FGD was held in a hired room that was not associated with health authorities. FGDs were facilitated by one of three Cambodian social scientists who had participated in interactive training on field methods and the study's research questions. All FGDs were also attended by a European investigator (MDS) who received real-time translation from a member of the field team and asked additional probing questions at the end of the discussion. With the consent of participants, discussions were audio recorded and detailed notes were taken.

4 Study participants

A total of 53 providers participated in 8 focus group discussions held in 8 operational districts across the five provinces included in the study. Private hospitals were not the focus of the study and were therefore excluded. When possible, all providers who had been part of the preceding mystery client study were invited to be part of the FGDs (four providers could not be traced back to invite them for group discussions after the mystery client study). One exception was Siem Reap where – due to a large number of providers – a random selection of providers were invited and out of the 24 providers who were invited for FGD, 4 had not had the visit of a mystery client.

Of 113 private providers that were invited to attend the focus group discussions, 53 (47%) of them attended. Of those who did not participate, 30 declined, and 25 agreed to take part in the discussions but did not attend. More research would be needed to assess whether those who attend differ significantly from those who do not attend.

Each FGDs lasted for around two hours and typically involved 6 to 8 participants, except for FGD No. 6 that had only three participants and was not audio recorded due to a technical fault, although notes of the discussion were taken.

FGD participant characteristics are shown in Table 1. In each FGD, the participants represented a mix of at least two provider types, including those selling drugs in kiosks, drug shops, pharmacies and at private clinics. Various typologies of private providers exist for understanding the spectrum operating in different areas of Cambodia [26-28] and each typology is different, reflecting the diversity and shifting nature of these providers in space and time. Many participants owned their shop, pharmacy or clinic, whilst others were attendants who worked for others and several were relatives, mostly husbands, wives or siblings. Ages ranged from 23 to 66, with an overall average of 41 years. Around half of the participants were women. Providers had worked in their profession for an average of 9 years, ranging from 1 to 31 years. Around half of all providers had received some form of training, mostly in nursing or midwifery, although three were doctors (in FGDs #3 and #7). Fewer than half of all providers (44%) had attended any malaria or RDT training in the past three years, although some had attended several trainings over this time, especially those in Pailin where one pharmacist had attended 8 trainings over the last three years.

4.1 Data management and analysis

Audio recordings of FGDs were transcribed in Khmer and then translated into English following meaning-based translation[29]. The translated phrases were inserted immediately after each original Khmer phrase to enable review of concepts in the original language at the analysis stage. All transcriptions and translations were checked by a second translator and discrepancies discussed, with uncertainties agreed with the involvement of a third translator.

Transcripts were reviewed in full and coded line-by-line to label ideas emerging from participants and groups. Coding was carried out on paper and using NVivo software (www.qsrinternational.com). These ideas were grouped into themes and analysed for underlying concepts by exploring them in relation to literature on Cambodia's social and medical history, particularly relating to malaria, as well as anthropological theory relating to use of medicines, private practices and new technologies. Interpretations were checked by on-going discussions with the field team regarding translations and by returning to the field for follow-up interviews. This paper provides a narrative summary of key concepts identified in the transcripts that were relevant to the study objectives.

4.2 Ethics

Ethical approval for this study was granted by the National Ethics Committee for Health Research, Cambodia (169 NECHR) and the London School of Hygiene and Tropical Medicine (A215 5809).

Table 1 Focus Group Discussion Participants

FGD	District	Containment zone	Number of participants	Provider type (n)	Role of providers (n)	Mean Age in years	Number women in group (%)	Mean years as provider	Number providers trained in health care (%)	Number providers attended malaria/RDT trainings in the last 3 years (%)
#1	Kratie	Zone 3 (no containment)	7	Grocery-drug stores (5), mobile providers (2)	Owners (4), relatives (3)	50	4 (57%)	13	1 (14%)	1 (14%)
#2	Kratie	Zone 3 (no containment)	6	Private clinics (3), pharmacies (2), midwife (1)	Workers (4), owners (2)	36	3 (50%)	11	5 (83%)	3 (50%)
#3	Mondul Kiri	Zone 3 (no containment)	9	Grocery-drug stores (5), drug store (1), pharmacy (1), mobile provider (1), nurse (1)	Owners (6), relatives (2)	37	5 (63%)	9	3 (38%)	2 (25%)
#4	Kampong Thom	Zone 3 (no containment)	8	Pharmacies (5), private clinics (3)	Owners (7), Relative (1)	36	2 (25%)	7	6 (75%)	3 (38%)
#5	Kampong Thom	Zone 3 (no containment)	7	Groceries (3), drug stores (3), private clinic (1)	Owners (5), relatives (2)	43	4 (57%)	8	3 (43%)	5 (71%)
#6	Siem Reap	Zone 2 Intensified malaria control	3	Pharmacies (3)	Owners (2), relative (1)	30	2 (67%)	5	1 (33%)	2 (67%)
#7	Siem Reap	Zone 2 Intensified malaria control	6	Pharmacies (4), private clinics (2)	Owners (4), workers (2)	44	5 (83%)	7	4 (75%)	2 (33%)
#8	Pailin	Zone 1 Containment	7	Pharmacies (4), private clinic (1),	Owners (5), Workers (2)	44	2 (29%)	10	4 (57%)	5 (71%)

	Elimination strategy	drug store (1), midwife (1)

5 Results

There were many different ideas discussed in the FGDs across the different areas. However, some key concepts relevant to the research concern emerged from participants across the different groups. The conceptualisations of the role of RDTs hinged on the perceived roles of providers and the way medicines are used. We therefore outline these concepts first, providing context for interpretation of perceptions of RDTs.

The roles of providers was prominent in their discussions. A notable distinction was made between the roles of 'selling' *(louk tnam)* and 'treating' *(pinit pchier bal).* A majority considered themselves as providing the former type of service, their role being to distribute drugs, but not to attempt to *cure* individuals of their illnesses. This resulted in dispensing of drugs seen as 'effective' for getting the customer through the illness with few side-effects, including artemisinin monotherapy tablets or injections. By contrast, 'treatment' entailed diagnostic and more intensive curing processes. This included carrying out examinations, batteries of tests and the use of drugs that required the patient to invest more money, energy and time to achieve a cure.

The way to use different medicines was also a popular topic for discussion. Overall, the *modus operandi* could be described as 'tailoring' to the individual case, taking into account their condition and energy levels as well as knowledges about the side-effects of different drugs. This resulted in frequent dispensing of small packets of mixed drugs and tinkering of dosages to lessen the harsh interaction of drugs with the *mero* (akin to the biomedical concept of 'microbes').

Compared with these topics, malaria RDTs were less favoured topics of discussion. This reflected their use on the margins of practice. They were used along with both 'selling' and 'treating' practices, situated in a grey area between the two. The principle of testing appeared to be assimilated into practices related to the ideal of *curing* the patient; they *should* be used, or preferably microscopy and other laboratory tests should be used, to show the parasites and other causes of illness, leading to prescription of drugs to cure. However, providers reported reluctance to use RDTs for a number of reasons, identifying problems with the tests not 'showing' malaria, and other logistical issues with the syringes and buffer solution. In Pailin, providers seemed more keen than respondents elsewhere to report the need to ensure patients were tested before receiving malaria drugs. Whilst the given rationale for these practices referred to an adjusted version of public health instructions, the regulatory enforcement of drug shops in Zone One may also have affected perception of the use of antimalarial and testing commodities.

5.1 Provider roles: selling and treating in a personal service

A notable distinction was made by respondents between their roles as 'selling drugs' *(louktnam)* and 'treating' *(picherbal).*Although most identified themselves primarily as sellers, a single provider could fill either role, depending on the clients'/patient's demand, and perceived gravity of the illness.

5.1.1 Selling drugs

The objective of selling drugs appeared to be to identify and provide the most effective drugs for getting a customer through their particular symptoms of illness with as few side effects as possible, but not to attempt to *cure* their illness.

> ‘I am not a medic (*kru pet*) who provides mobile injections like him. I only sell some groceries and make some mixed drugs. I never provide treatment (*picherbal)*.’ (FGD#1, P7, untrained husband of kiosk owner)

The majority of providers in our study considered themselves to be sellers, across different provider types from those working in kiosks and drug stores to pharmacies and clinics and including those with no medical education to qualified nurses and midwives. The practices of selling revolved around taking a history and matching drugs to the customer’s needs or requests,

> ‘I ask them in detail before I provide the drug. They said they suspect themselves that they’ve got typhoid, and then I ask them “how are your stools, watery stool or normal?” Because I give them a mix of drug based on the situation, whether they had diarrhoea or were normal. If they got diarrhoea *(reak)*, I would give them a kind of diarrhoea drug. But if they got diarrhoea, and I give the constipation drug, they would be constipated. [All participants laugh]’ (FGD#5, P4, female untrained kiosk owner)

When “selling”, providers saw themselves as meeting the needs of customers to have a solution that fits into their lives, requiring the least investment of time, money and sickness from side effects. This was particularly important for those needing to continue to work through an illness episode,

> ‘The patients want a drug which is cheap and effective [“fast cure”], because they are poor. If the doctor has a bit more care to the patients, they could be cured’ (FGD#3,P1, male nurse, drug shop owner)

> ‘Sometimes they want to go to the hospital too but because of the time [they don’t] ... they want to buy everything in the morning because they are busy with their farming.’ (FGD#2, P4, female midwife)

Providers recognised the limitations of “selling” only, including only providing a short-term fix, and often talked of trying to persuade customers to go through a more thorough diagnostic and treatment, or to refer them to *kru pet* or health facilities, but reported that customers rarely followed through, preferring the convenience of buying drugs according to their symptoms from the local seller,

> ‘Mostly the people here, they want to buy drugs, they do not usually go to hospital. Some people who use those drugs, they do not go to the *kru pet* for diagnosis and prescription. In the village, mostly the villagers when they get fever or headache, they say “I have this fever or headache” and they come to buy [drugs] by themselves. But we are the seller. We have the pharmacy, we understand [biomedicine]. We tell them to go for diagnosis, how to do like this, how to do like that. Because after the discussion and diagnosis, they come to buy drugs so when they take [the drugs] they can be cured according to the prescription. We introduce them like that, [but] some people they do not understand it like this. They say “I want to buy this, I want to buy that,” so we are the seller, we follow their preference.’(FGD03, P4, male untrained grocery owner)

5.1.2 Treating for a cure

By contrast with selling, the objective of a treatment role was to diagnose more precisely the disease, and find a longer term cure. This entailed more intensive diagnostic processes and drugs that necessitate that the usual patterns of life be interrupted. Here, treatment required the customer to invest more money, energy and time to achieve a cure. Testing was described as an important step in enabling precise treatment,

> 'In the past, we could help the patients only 80% to 85%. Personally, when I was sick, my uncle, he is a doctor, treated me, [and I] recovered by just telling him the symptoms; however, [with this method] it is not recovered 100% ... It is better to have a diagnostic test because when there is typhoid, the test could be matched [to treatment].'(FGD#4, P6, male untrained clinic owner's nephew)

Providers were particularly keen to communicate that the customer must be willing to bear tougher side-effects in order to reach a longer-term cure.

> 'They take one time and they get side effects, and then they stop taking, I advised them ... It will be cured if we struggle [with the side effect]' (FGD#7,P2, midwife pharmacy owner)

> 'When humans get that side effect then the *mero* [microbe] will die too. If the human doesn't have the side effect how can the *mero* die?'(FGD#2, chorus of participants: P2, P3, P4, P5 and P6)

The recommended first-line ACT, Malarine, , was particularly singled out as requiring the patient to withstand difficulty in the quest for a cure due to the drug interacting with the parasite,

> 'In the drug [Malarine] there is Artesunate and Mefloquine, and the one that gives side effect is Mefloquine. For Artesunate, it only pauses the *mero* [microbes] from growing. But Mefloquine is the one that kills the *mero*, and during the killing it goes all the way around in human's body. That makes a problem for a person that is weak, for instance, the one who has cardiopathy, and much lack of glucose disease because when it kills the *mero* it makes us even weaker.' (FGD#2, P6, male untrained pharmacy owner)

5.1.3 Providing a personal service

Whether selling or treating, the private providers in our study recognised the importance of their social proximity to customers,

> 'And sometimes it is about the matter of relationship for example, a person they know that there is a health centre nearby their house but he/she doesn't go there; they come to my house instead because they know me well for a long time.' (FGD#2, P4, female midwife)

This appeared to enable negotiation in the outcome of interactions between providers and customers: control over which medicines were sold or purchased appeared to be held jointly. Providers reported that a client is able to ask for specific drugs, or drugs for specific conditions, unlike at public health centres, where they were at the mercy of the decisions of the health worker.

At the same time, while favouring relationship with their customers, providers were keen to maintain a certain level of secrecy, and control over medical knowledge, that – they perceived – was required to create dependency of the patient upon their specific service,

> 'That they trust us, that is very important. They think that they are not clever and they come to a clever one, so they always come for consulting and visiting us. When they have illness, I provide drug. If they have fever, flu, we offer them a test. What we are doing is to make them trust us, if they do not trust they will not come to us again.' (FGD#4, P4, male nurse, clinic owner)

5.2 Use of medicines: tailoring and tinkering

Of central importance to the practice of the providers in our study was that the medicines dispensed worked well with the patient who would feel better and return to that provider with future illnesses. Provider practices in dealing with malaria can be interpreted as 'tailoring': to individual illnesses, patient conditions, customer preferences and to counteract side-effects known for different drugs. This frequently meant dispensing small packets of mixed drugs. Providers also described adapting medicines to control side-effects in the course of an illness: 'tinkering'.

5.2.1 Tailoring to the illness

Providers listed the illnesses commonly seen in their work using a combination of symptom and disease terms, including malaria, typhoid, stomach ache, diarrhoea, flu, headache and dengue. Often customers would present with several of these and providers typically described dispensing medicines for each,

> 'Mostly they came to say [they have got] flu, head ache, congestion, tooth ache or something like that. So we make a drug mix for them according to what they told us.' (FGD#1, P4, male untrained husband of kiosk owner)

For malaria, each symptom received a drug, for example to reduce temperature, reduce headache and to deal with malaria itself. The type of antimalarial dispensed depended in part on the type of malaria perceived, including its particular symptoms and whether the parasites were *P. vivax* or *P. falciparum*. A distinction between 'chills' and 'no chills' was often made, although there was no consistency in the interpretation of which type of malaria this indicated. On the whole, participants said chloroquine was suitable for *vivax* malaria, along with mefloquine, nivaquine and quinine (although 'quinine' is also appeared to be used as a general term for antimalarial drugs), whilst artesunate, artemether, quinine, amodiaquine and Malarine (artesunate and mefloquine) were popular for *P.falciparum.*

> 'I only used to use artesunate for normal malaria, and some patients they never take artesunate or mefloquine because they got this illness for the first time but later they take these drugs too. Another thing, for chills, we cannot use artesunate, we give Malarine. For malaria, there are chills and no chills. The chills one is *vivax* that we have to give mefloquine, and *falciparum* that one we can only give artesunate.'(FGD#2, P5, male nurse, pharmacy owner)

5.2.2 Tailoring to the patient's condition and preferences

Patients were considered to respond differently to drugs, for example if they were strong or weak, had pre-existing conditions such as heart problems, if they were pregnant or of a particular age group or weight. This would affect the choice of drug and dose dispensed, as discussed in FGD#3 by this doctor (P2) and untrained mobile provider (P7),

> P2: Drugs sometimes could cure ten patients, and sometimes could cure two patients. It means that there are differences of element in each person.
>
> P7: Yes! [P2] is right. The important [differences] are their illness and their weight. The first is their weight which could tell how the patient [should] take the drug. The second is the type of their illness which lets us know whether the patient is painful around the heart area or has a mental disorder, and then pregnant, adult or child.

Providers also described taking into account patient preferences, including responding to patient desires for the mode of delivery, particularly injections, specific drug names or specific brands,

> 'Artemether injections are the most popular for the children. And when the patients are lazy about taking the pills, they want to use Artemether injection. And if they do not want to inject, they could use Artesunate.' (FGD#3, P7, female untrained mobile provider)
>
> 'Sometimes when they believe in mosquitoes quinine,[1] if we give the drug, quinine, without the mosquito picture, they don't even accept.' (FGD#1, P6, female untrained grocery store owner)

5.2.3 Tailoring to account for side effects

Fears of side-effects appeared a key driver in selection of drugs for customers. The perceived strength of drugs was taken into account in decision making, together with the customer's condition, resulting in tailoring of drugs and doses on an individual basis.

Certain drugs were categorized as 'normal' or 'simple' included chloroquine, mebendazole, co-trimoxazole and paracetamol. These were considered benign and without consequences of side-effects and were used in the first instance for 'normal' illnesses,

> 'For me I have not many [drugs], I have only co-trimoxazole that we used to use in the health centre. So when the patient has this illness [typhoid] we mostly give that drug because it isn't a strong antibiotic, it is simple.' (FGD#2, P4, female midwife)

By contrast, certain antimalarial drugs, particularly mefloquine, were considered very strong. Side-effects described included severe vomiting, dizziness, 'blood break' (interpreted as haemolysis) and

[1]There is some variation in the use of the word "quinine," which can be used to describe chloroquine, antimalarials in general or any drug to treat fever. A commonly available antimalarial with the picture of a mosquito on one side of the tablet is actually chloroquine, and not quinine.

even death if the patient was not in a state to receive the drug. However, several participants stated that the drug was essential to completely cure malaria; weaker drugs could make the patient feel better but not lead to a long-term cure. This is illustrated by one Khmer Rouge trained mobile provider,

> 'If we use Artesunate or Artemether, it cannot make the illness definitely gone, it will come back in 28 days. That's why we use Mefloquine to avoid the malaria parasite coming back; it can be completely removed.' (FGD#1,P1, male)

Recognising that certain drugs were very strong, providers (both 'sellers' and those providing 'treatment') described tailoring doses routinely to lessen side-effects, for example by giving them in smaller doses for a longer period to reduce their 'poison'. The same respondent went on to explain,

> 'But the side effect of Malarine is too much ... I dare not give it like that [according to the instruction] because it is too serious, I normally use the same for three days but I separate it. Nowadays, I use it, but I give some in the morning and some in the evening; it does make the patients relieved.' (FGD#1, P1)

Similarly, reduced dosages were recommended for weaker patients or those with pre-existing conditions,

> 'Most people dislike taking Malarine because it has more side effects. Then, we are the drug seller, we have to reduce to side effects by increasing the days for taking that drug if we could see that the patients are very weak of power. It could be taken for five days instead of three days, based on the weight and health condition of the patients. That change can[still] cure, and it helps to lessen the side effects. But if we give them 3 days of Malarine based on its instruction, the patients will be having a strong side effect.' (FGD#3, P4, male untrained kiosk owner)

Providers also frequently described adding components to the package of therapy in order to deal with anticipated side effects. These included pharmaceutical additions, such as iron or vitamins 'to create cells to be normal' and IV fluids to give the patient strength, as well as suggested foods and drinks to take or avoid.

5.2.4 Tinkering to control side effects

In addition to tailoring drugs at the initial interaction with a customer, providers described tinkering with drugs and doses in the course of the illness after observing the patient's response.

> 'For example, we inject one box of it [artemether] in the first day, second day, we give two days, and in the fourth day, we give mefloquine if the patient doesn't suffer from the side effect, he can possibly use the drug because of the biological system, but if they are weak, we are afraid to give them mefloquine, we stop giving them anymore.' (FGD#1, P1, male Khmer Rouge trained mobile provider)

By contrast with recommended first-line treatment of artesunate and mefloquine to be taken together on days 1, 2 and 3, providers often reported prescribing artesunate followed by mefloquine. The rationale for this tinkering was to enable the patient to have the drug with lesser side effects while they were sickest and the more powerful drug after a few days to achieve a complete cure,

> 'During the last five years, I treated Malaria. First of all, we give artesunate which has 12 pills in a blister to the patients, after they finished them, I give mefloquine too. Four pills of mefloquine, it can be completely cured as well, but we only give in different way. As it provided the serious side effect, we give artesunate first.' (FGD#1, P1, male Khmer Rouge trained mobile provider)

5.3 Showing the parasites

The private providers in our study talked about testing mainly in relation to the idea of 'treatment'; to cure a patient. Tests should 'show malaria parasites' and other causes of illness, and guide prescription of drugs for a cure, as part of a process of treatment. RDTs were not clearly incorporated into the practice of selling, being rarely discussed in relation to the routine sale of antimalarial drugs in most areas. When undertaking treatment, providers expressed a preference for microscopy and other laboratory tests over RDTs. Therefore, RDTs were used at the margins of practice for both sellers and treatment providers in this study. While the advantages of RDTs for rural areas were noted, a number of practical challenges with the tests undermined their use in practice.

5.3.1 Testing enables precise treatment

Some participants reported that testing was an important part of the process of curing an illness: through testing one could find the best treatment. However, providers wanted to test for multiple diseases, particularly typhoid, malaria and dengue. RDTs allowed the exclusion of malaria when the test was negative, but did not provide guidance on how to treat the illness if was diagnosed as "not being malaria". For this reason, microscopy was considered best to enable treatment, although with some debate amongst participants as to the limits of diseases possible to diagnose by microscopy.

> 'Yes, for instance, it [the microscope] can find typhoid, white cells increasing, laryngitis or inflame sore throat, etcetera [laughter] and it can also find worms in our body. That's the function of it, but Malacheck [RDT], that we use only to see malaria.'(FGD#2, P4, female midwife)

Interestingly, there was no strong difference between those provides who position themselves as proposing to treat a disease, and those who mainly sold drugs. The main difference was whether providers ever considered to conduct the tests themselves, or would refer customers elsewhere to be tested (before coming back to buy medicines), but not on the stated preferences for microscopy, and limitations of RDTs; with one exception: RDTs were seen to be useful in their ability to extend

the possibility of 'treating' people into more remote areas where people could access the test more quickly than going to a laboratory and the test is quick and relatively straight forward to use,

> 'It is easy because before we could do the test by machine [Microscope] only, and it was available in a big pharmacy or specialist, but now the test are available based in the community, it is easy and takes less time. (FGD#5, P1, female untrained grocery owner's wife)

5.3.2 RDTs may fail to show the parasites

At the time of invitation to the FGDs, 28 (54%) of those accepting to participate had RDTs available; many reported no experiences of RDTs. Those who had used RDTs reported that the new combination test to detect both *P. falciparum* and *P. vivax* is more useful than the previous *P. falciparum* only test.

> 'Nowadays I do believe it because it tells me correctly, if there is malaria I gave malaria drug, the next day, they came and I asked how is the illness, they said it was gone. So it means the test is right. If the test says there is no [malaria], we use the drug for stomach and typhoid, then it works [people recover], so it means the test is correct. When it shows malaria we use malaria drug that we have confidence in, it is always right.' (FGD#1, P2, female untrained grocery owner's wife)

However, many providers still expressed disappointment that the test failed to show positive results, often seen as due to a low parasite load (known as fewer 'crosses,' a term borrowed from microscopy). The inability to show 'crosses' as an indicator of severity was also a concern with RDTs. Negative RDT results conflicted with expectations built upon clinical experience and results subsequently received from laboratory microscopy,

> 'There are some cases when we ask the patient to stay in order to bring the blood to the laboratory but they say they are in a hurry so we do the blood test by using it [Malacheck]. But it is difficult too, we can't see [the result as positive, malaria] unless there are two crosses [i.e. more parasites according to microscopy reading]. If there is only one cross we cannot see so it is a bit difficult. It is hard for us to see it in particular, when we do the test for them we cannot see but when they go to another provider [at a laboratory] they can see. So we cannot see it by using this test [Malacheck] while they can find it in the laboratory.' (FGD#2, P4, female midwife)

The unreliable nature of the tests was repeated in the different groups, reporting that perhaps 1 to 3 out of 10 tests would not work well. This put off the providers from using the test, especially if they ended up losing patients to other providers. Practical problems reported with using the tests may have also affected provider trust in them. The main logistical problems reported by participants with regards to Malacheck RDTs related to the blood-taking device, the amount of blood dropped in being difficult to control and perceived to affect the test's accuracy, and problems with seeing the result. Providers also reported that there were too many RDTs in a box for only one bottle of buffer (10 tests per box, with one bottle of buffer), which affected whether they would open the box to rarely use the tests, or buy packs of tests at all.

5.3.3 Using RDTs in practice

Few participants actually described using RDTs in their routine practice. Low trust in the test results, preference of other diagnostic means, and customer preferences led to the fact that many saw the systematic use of RDTs is as outside of their role as sellers. Even though they stocked RDTs, they would not use them in their daily practice. Patient demand for tests from small-scale private providers was not reported to be high: respondents described recommending tests but meeting with resistance from customers who preferred to save money and receive a mix of drugs from a seller they trusted than invest in the process of testing and treatment.

> 'People in this area are a bit saving money, they are afraid of wasting their money in doing the test for one or two illnesses.' (FGD#1, P2, female untrained grocery owner's wife)

> 'If the patient tells us that they have malaria or another fever, firstly, we have to ask them for a test. In the case that they do not agree for having a test since they are busy or just say that they have made a test already, I still sell the drug to them. I have to sell it[Laughter].' (FGD#4, P2, male nurse, pharmacy owner)

In Pailin, the centre of artemisinin containment zone activities, providers seemed more keen than respondents elsewhere to report the need to ensure patients were tested before receiving malaria drugs. This was confirmed in the mystery client study, when fewer shops sold antimalarials (without a test) than in other surveyed parts of the country. Respondents in this area appeared careful to reiterate recent messages stated at meetings held by the Ministry of Health (MoH) about not selling artesunate monotherapy and that patients should be sent for testing for malaria before giving malaria medicine. Providers were acutely aware of regulatory requirements and consequences for them of traversing these on their business, and repeated these during the focus group discussion.

> 'We are afraid to treat malaria. They come to buy the malaria drug directly, so we have to ask them that did they get a blood test yet? So, if the test shows there is the malaria parasite, my house does not accept [to dispense to] these patients. But if they have already made the test but there was no malaria parasite, then we ask them to bring the result letter to check. If the test result letter does not show the malaria, so we can use the paracetamol or amoxicillin … Because we are afraid, as we have processed the business [become registered], if there are some problems with customers or authorities, we will get the problem which affects our business.' (FGD#8, P4, male nurse, pharmacy owner)

This group can therefore be seen as distinct from the others, being more closely aligned with regulations. However, rationales for these regulations were less clearly understood. The 'principle of resistance,' for example, was variously interpreted, being framed as concern for individual patients rather than risks for the population level, as demonstrated in this discussion amongst two male nurse pharmacy owners in Pailin (FGD#8),

> P3: Because Falciparum was resistant. Before, we were able to use artesunate with mefloquine to finish it, and later those drugs are not effective any more to kill malaria (krun chagn), it means the treatment did not kill it all.

P4: I can say that the patient had used one drug for many times. For example, they had treated the malaria (krun chagn) at the first time by taking Malarine, and they were cured at that time, but another time they have malaria (krun chagn) again then they used Malarine again. They often used Malarine, so that's why it is resistant, it means only one patient have used 4 or 5 times, so it is resistant.

P3: it is not our understanding, the national staff, he explained me like that.

P4: this is resistant because the illness or parasite in the body have known the drug and also known the cell.

Elsewhere, providers were also aware of the messages given by the government that artesunate should not be used anymore, and the potential consequences. Some thought the ban was due to fake drugs and licensure issues, others due to resistance. The significance of resistance was interpreted within the framework of curing the illness: individuals who take artesunate inappropriately can suffer from resistance, a condition that meant the malaria would be more difficult to cure, as discussed by providers in FGD#2,

> 'However, now there is a statement from the Ministry (MoH) not to use Artesunate alone, because it causes resistance. If there is resistance and the patient has malaria (krun chanch) again later it will be difficult to treat ... They completely warn this, they check.' (FGD#2, P5, male nurse, pharmacy owner)

> 'When they use Artesunate, it means that the *mero* (microbes) will stop for a while, there is no *mero* sign. It becomes normal so that some people think that they are recovered from the illness, but actually the *mero* is not yet killed that's why they recommended to use mefloquine to make the *mero* completely killed. And nowadays, because some of the drug users they just take the drug in advance before they leave for the forest, for instance, that make resistance to the disease, that's why they stop it [Artesunate] from being sold alone.' (FGD#2, P6, male untrained pharmacy owner)

> '[Artesunate] was not allowed to sell because it was resistant. It could not cure even if it is taken for 4 or 5 days or one week. But one week later or 10 days later or a fortnight later, the patient starts to have the fever again, and by seeing the test, that patient has malaria again. So mefloquine, which has side effects, is added.' (FGD#3, P3, female untrained grocery shop owner)

5.3.4 Aligning testing and modern medicine

The rationale for testing was framed by participants within the modern paradigm of finding the *mero* and making prescriptions, in line with the concept of 'treating' rather than selling medicines,

> 'Unless they go to see the place where they have modern instruments, if they are scanned they would know, so the doctor issues the prescription to them [laughter]' (FGD#8, P4, male nurse, pharmacy owner)

However, RDTs were still tailored for different uses, with more severe patients requiring microscopy for clearer knowledge and RDTs preferred for non-severe cases, even those who were curious about their parasite status,

> 'We used the Malacheck when the patients just got high temperature, and they doubt, so I used Malacheck to do the test for them because they just got a higher temperature than normal. We can know about [what to do from] the patient symptoms, but some patients who had serious symptoms, we used the microscope to do the test, to be clear. … [Others] mentioned that they used to get malaria, so they wanted to do the test for malaria, but they had normal temperature, they just want to make the test for malaria. So, I used the malacheck to test them.' (FGD#8, P2, female nurse, clinic attendant)

Some providers appeared to have aligned themselves with these 'modern' ideas, and with the MoH, through valuing registration status and regulations set out through instructions communicated during meetings with MoH staff,

> 'We are legal shops, we have registration, we follow the Ministry of Health instruction, so we are afraid to give [medicines]' (FGD#8, P3, male nurse, pharmacy owner)

> 'But now they came to instruct and CNM, they called to get the meeting, so we cannot do something beside their principles.' (FGD#8, P6, female midwife)

Whilst being together with the MoH and CNM was important to providers, their relationship with patients appeared different amongst this group: patients were talked about as ignorant or difficult, and their health outcomes were discussed less than the fear of business outcomes for the provider. When discussing the necessity to dispense only after the patient has a prescription, one provider appeared to abdicate responsibility over the patient's outcome, leaving this with the prescriber at the health centre,

> 'we can give the drugs according to the prescription, we just follow the prescription if it is right or wrong, it is the doctors' response' (FGD#8, P4, male nurse, pharmacy owner)

6 Discussion

In this FGD study with private providers in 5 provinces of Cambodia, it was found that RDTs were used at the margins of practice. The role of many providers entailed 'selling' medicines to help patients to feel better rather than 'treating' diseases that would lead to a full cure. Providers reported tailoring choices of medicines according to aspects of the patient's illness and condition, taking into account known side-effects of medicines and tinkering dosages accordingly. Testing was seen as part of 'treatment' practices, with a preference for microscopy over RDTs. Those identifying themselves as sellers did not routinely incorporate RDTs into their practices. RDT use was undermined by practical challenges, a lack of trust in tests to 'show the parasite', the inability of the tests to indicate severity of infection and to indicate diseases other than malaria. Social and economic factors at the local and structural level can be seen to shape provider roles and practices. The promotion of RDTs may be most effective amongst those identifying themselves as providing

'treatment', however adherence to guidelines was reported most in the context of intensive regulation activities.

The distinction between selling and treating that was emphasised by providers in study is subtle but nonetheless important. Other qualitative work in Cambodia has implied this distinction amongst drug sellers [27].From a biomedical perspective, the two activities are conceptualised as part of a sequential process: medicines are *sold* in order to *treat* a disease, the manifestation of a specific bodily pathology that has first been *diagnosed*. Anthropologists have observed before that this sequence is often more an ideal than practice within biomedicine, and that the processes are often conflated [30]. Our findings suggest that in a context when the goal of a cure is not assumed, the practice of selling can be distinct from, and not expectant of, a practice of treatment. A similar distinction has been noted in India, where providers in Delhi preferred to dispense rather than prescribe drugs, in order to help the patient's condition to improve [31].

Our finding that providers 'tailor' medicines for individual cases is reflected in the widespread sale of "cocktail" packets of mixed drugs in Cambodia [23 ,27 ,32 ,33]. Tailoring medicines to symptoms may relate to conceptualisations of symptoms as discrete, sometimes causing each other, and not necessarily all linked under one disease aetiology such as malaria [34]. Tailoring to perceived sensitivities of different individuals to medicines has also been observed elsewhere in Asia [35] alongside the use of smaller or larger doses of a medication than recommended. More broadly, the practices of tailoring and then tinkering medicines and doses is familiar within medicine: the idea of 'doctoring' with aspects of care for individual patients has been described elsewhere, 'it is a matter of trying things out and of being willing to revisit what has been done before… try again, adjust, improve.' [36], p64). In this logic of care, professionals (and technologies) do not have monopoly over expertise, but doctoring is shared; providers and patients 'experiment, experience and tinker together – practically' (ibid, p65).

The roles taken up by private providers in this study, of selling or treating, appeared to shape the use of malaria RDTs. Despite these tests being sold at very cheap prices directly to private providers, with the potential for significant mark-up, and with continuous encouragement for use through social marketing and visiting medical detailers, and despite an overall good understanding and knowledge of the regulations and recommendations for use of RDT prior to treatment, few took up RDTs into their routine practice. For those providing treatment, a range of laboratory procedures were preferred, particularly to test malaria, typhoid and dengue. In addition, microscopy was reported to be more accurate in detecting malaria, and the level of malaria than RDTs. The desire for tests for multiple diseases, and for RDTs to show some measure of the intensity of infection, have been reported in a previous study of provider perceptions of RDTs in Cambodia [27]. These and other challenges with practicalities of tests, particularly by untrained staff, have also been reported elsewhere[37]. In this setting, RDTs were seen as desirable for remote areas to enable treatment where laboratory and *kru pet* were inaccessible. However, for many of those considering themselves sellers, the use of RDTs did not fit within their existing practice of matching drugs to symptoms.

The need for providers to sell rather than test and treat for a cure, and to provide a tailored set of medicines, can be understood in broader economic and social contexts. Our findings suggest the interaction between providers and customers is more like dialogue than the didactic decision making inherent in clinical guidelines. Studies of Cambodian patients strengthen this interpretation,

suggesting that cooperation, experimentation and respect for autonomy are important elements of care from medicine providers [17 ,33]. This may reflect an indigenous model of use of services, whereby the provider would honor the customer's autonomy in choice of medication and choice of provider as well as in the amount and kind of payment [38]. Such autonomy is crucial to the healing process with indigenous *krukhmer* who are both healers and teachers, and work in cooperation with the sick person to restore order and consequently health [33]. Our findings also suggest providers are responding to economic needs of customers by offering services that are convenient in physical access and in payment. The need for purchase of medicines to fit into the patient's schedule may also relate to the need of individuals to continue to work: in Northwest Cambodia, villagers reported needing to go to pharmacies in order not to miss a day's work [32]. This need to minimize time and expense of health care reflects a landscape of acute poverty, necessitating continuous work as well as low out-lays of costs. The poverty rate in Cambodia was 35% in 2004, with inequalities widening [39]. This is reflected in high rates of internal migration for employment [40] that also contribute to needs for rapid tonics for illnesses rather than treatment that may take a longer time to seek and to take effect.

Population cooperation is central to the National Strategic Plan for the elimination of malaria [12], carrying an implicit assumption that individuals will adopt practices in the name of the health of the population; 'biological citizenship' [41]. The guidelines of testing and appropriate treatment in this Plan were followed by some in our study, with providers in the Containment Zone well versed in regulations, but the driving force for their adherence was most apparently the intensity of regulation activities rather than the appeal of biomedical logic or moral priorities. This has implications for 'supporting interventions' that may lack effectiveness if appeal to providers and populations is based on a premise of biological citizenship.

7 Conclusions

The small scale private providers in this study used RDTs infrequently. Understanding their perceptions of roles primarily as sellers of drugs, involving dispensing of tailored drugs to provide speedy recovery for a particular patient, in the context of expectations in social relationships between sellers and clients and urgent economic needs of clients, contextualises the position of RDTs at the margins of their practices. For those identifying themselves as providing 'treatment', for patients willing to invest for a cure, testing was important, but again RDTs were on the margins of practice, with microscopy preferred as well as additional investigations. Encouraging the uptake of RDTs may be most appropriate for those aspiring to provide treatment. Adherence to 'test before treating' guidelines in this context appeared to be achieved at the cost of intensive regulatory activities as seen in the Artemisinin Containment Zone.

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