

# Introducing Malaria Rapid Diagnostic Tests at Registered Drug Shops in Uganda: Limitations of Diagnostic Testing in the Reality of Diagnosis

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## **Abstract**

In Uganda, around two thirds of medicines are procured from the private sector, mostly from drug shops. The introduction of malaria rapid diagnostic tests (RDTs) at drug shops therefore has the potential to make a significant contribution to targeting antimalarial drugs to those with malaria parasites. We undertook formative research in a district in Uganda in preparation for a randomised trial of RDTs in drug shops. In May to July 2009, we interviewed 9 drug shop workers, 5 health workers and 4 district health officials and carried out 10 focus group discussions with a total of 75 community members to investigate the role of drug shops and the potential for implementation of RDTs at these health care outlets.

Drug shops were seen to provide an important service to community members, the nature of which is determined by responsiveness to client demands. However, drug shops hold a liminal status: in the eyes of different actors, these outlets are at once a shop and clinic; legitimate and illegitimate; and trusted and distrusted. Malaria treatment was found to be synonymous with diagnosis. Diagnostic testing was deemed useful in theory, and community members were curious about the results, with the expectation that a test would decrease uncertainty and help secure an end to illness. However, whether testing would be sought as a routine step in treatment decisions in practice is uncertain, since the appeal of the tests waned in light of their costs and potential for results to conflict with presumed diagnosis.

Interventions that increase awareness of multiple causes and management of malaria-like illness will be needed to support the new rationalisation for malaria treatment represented by parasitological diagnosis.

## Introduction

The treatment of febrile illnesses in malaria-endemic countries has received increasing attention in the past decade, with huge efforts to scale-up the use of Artemisinin Combination Therapies (ACTs) for malaria cases. The high cost of these treatments, together with recognition of the importance of non-malarial fevers, has prompted reconsideration of existing strategies of blanket antimalarial use for fever cases in favour of restricted antimalarial prescription based on evidence of malaria parasitaemia (D'Acremont, Lengeler, Mshinda, Mtasiwa, Tanner, & Genton, 2009). The World Health Organisation policy guidelines have recently changed to recommend parasitologically confirmed antimalarial treatment where possible (World Health Organisation, 2010).

Accurate microscopy testing for malaria is only available in limited locations due to its dependence upon skilled laboratory staff and technical equipment. The accuracy of results is compromised if either staff skills or equipment are lacking (Ibrahim, 1996; Ngasala, Mubi, Warsame, Petzold, Masele, Gustafsson et al., 2008). For parasitological diagnosis to be taken up in low-resource settings, tests that can be carried out without extensive skills or equipment are needed. The new generation of malaria rapid diagnostic tests (RDTs) fulfil these criteria, offering accurate diagnosis (Bell, Go, Miguel, Walker, Cacal, & Saul, 2001) in a relatively simple format that requires no electricity or specialized laboratory training (D'Acremont et al., 2009). RDTs are therefore seen as an important vehicle for achieving targeted malaria treatment.

To make the greatest impact on current use of antimalarials, testing needs to be available where patients currently seek treatment. RDTs are now being introduced at many government health facilities in malaria-endemic countries. However, policy makers recognise the limited reach of such activities, given that much treatment is sought outside of public health services. Several pilots and a country programme in Cambodia have also introduced the tests through community health workers

(CHWs) (Bell et al., 2001; Harvey, Jennings, Chinyama, Masaninga, Mulholland, & Bell, 2008; Yeung, Van Damme, Socheat, White, & Mills, 2008). A major source of antimalarial treatment in many settings is private drug shops, and this has led to calls to consider including these drug shops in the scale-up of RDTs (Moon, Pe´ rez Casas, Kindermans, de Smet, & von Schoen-Angerer, 2009). There is limited evidence of the best way to scale up RDTs in any sector, with evidence that public providers may continue to overprescribe antimalarials in spite of negative RDT results (Bisoffi, Sirima, Angheben, Lodesani, Gobbi, Tinto et al., 2009; Hamer, Ndhlovu, Zurovac, Fox, Yeboah-Antwi, Chanda et al., 2007; Kyabayinze, Asimwe, Nakanjako, Nabakooza, Counihan, & Tibenderana, 2010; Reyburn, Mbakilwa, Mwangi, Mwerinde, Olomi, Drakeley et al., 2007; Skarbinski, Ouma, Causer, Kariuki, Barnwell, Alaii et al., 2009). The context into which RDTs are introduced has been an important determinant of adherence to test results, with public sector workers holding a long established mindset of presumptive treatment that has been hard to leave behind (Chandler, Jones, Boniface, Juma, Reyburn, & Whitty, 2008; Chandler, Whitty, & Ansah, 2010). Pilots of more supportive packages for provider behaviour change, particularly supportive supervision, have been more effective in restricting antimalarials to parasite positive patients (D'Acremont, 2009; Hopkins, 2008; Msellem, Martensson, Rotllant, Bhattarai, Stromberg, Kahigwa et al., 2009; Williams, Causer, Metta, Malila, O'Reilly, Abdulla et al., 2008). There is less evidence of the effectiveness of RDTs in community level programmes, but findings so far suggest community volunteers are able to do tests when given suitable instructions (Harvey et al., 2008) and have adhered well to guidelines for testing and treatment (Counihan, 2009). In the Philippines, CHWs reported positive impacts of the tests on job satisfaction and standing in the community (Bell et al., 2001). In the scale up of RDTs in the periphery, implementers have stressed the need for extended initial training and continued supervision and training at the peripheral level. There is far less evidence about how RDTs are used when they are implemented in the private sector, with no published data on frequency of use or adherence to results.

Uganda has a policy of free health care and medicines at public health facilities and rapid diagnostic tests are in the process of being introduced at health centres across the country. However the public health care system has been plagued by stockouts in recent times. Perhaps related to this, an estimated 63 percent of medicines are procured from the private sector, mostly from drug shops (Rutebemberwa, Pariyo, Peterson, Tomson, & Kallander, 2009). The introduction of RDTs at drug shops therefore has the potential to make a significant contribution to targeting antimalarial drugs to those with malaria parasites. However, this contribution will be contingent upon how the tests are used, as well as the extent to which test results will affect treatment decisions. An understanding of the context into which the tests will be introduced is essential for framing analysis of the uptake and impacts of their introduction.

In this paper, we describe the context into which RDTs will be introduced in a peri-urban district in Uganda. We look at the position of drug shops for community members and the public health system and analyse the role of diagnostic tests in treatment decisions.

## **Methods**

### *Setting and study sample*

The results presented in this paper were collected as a formative research component prior to a randomized trial of the introduction of RDTs in registered private drug shops in the Mukono District of Uganda, a peri-urban area east of Kampala with a population of 850,900. This formative qualitative study was conducted in May to July 2009 with the aim to understand how people perceive the role of registered drug shops, and attitudes toward malaria treatment and diagnosis in drug shops in order to inform intervention and evaluation design.

In-depth interviews were conducted with nine registered drug shop workers randomly selected from a list kept by the District Assistant Drugs Inspector. In-depth interviews (IDIs) were also conducted with five health workers purposively sampled to represent health centre levels II, III and IV. Four district health officials were also interviewed, selected to represent different departments of the district health management team. In addition, ten focus group discussions (FGDs) were held with community members, selected on a convenience basis with the assistance of local leaders, to represent three groups: women (n=4) and men (n=3) with children under five years of age and community leaders (n=3). The total number of FGD participants was 75, with a median group size of 8.

#### *Data collection*

The in-depth interviews and focus group discussions were conducted in Luganda by a team of four (two women, two men) local social scientists who took part in an intensive training programme in preparation for the research including a major component on communication skills (Haaland, Molyneux, & Marsh, 2006). The interviews and discussions explored experiences with diagnosis and treatment of malaria and perceptions of their affordability, with a particular focus on treatment patterns in drug shops, and perceptions of the affordability of malaria. Interview and focus group discussion guides were translated, piloted and revised before and during the fieldwork to improve clarity of questions, and the interviewers were trained on implementation of the guides and study protocols for data management.

Each interview was held in a private space at drug shops and health facilities where the individual was employed, and focus group discussions were held in community centres. Study participants were informed of the objectives of the study prior to participation, and verbal consent was obtained from all participants who participated in the study. Incentives were refreshments after participation as well as the opportunity to express opinions and experiences to researchers associated with the

Ministry of Health. Voice-recordings were made of all interviews and focus group discussions, with the consent of participants, and interviewers also made notes of the content, non-verbal behaviour, and setting of the interaction.

#### *Data entry and analysis*

Interviews and focus group discussions were transcribed into English by the research team and then coded using QSR NVivo 8 software. Data were coded by topics and ideas, which were grouped into overarching themes and theoretical constructs through an iterative process with local social scientists and project collaborators. A description of the main pros and cons of RDTs as described by participants in this study sample has been published elsewhere (Mbonye, Ndyomugenyi, Turinde, Magnussen, Clarke, & Chandler, 2010). In this current paper, we deconstruct the roles, values and ethics of workers in drug shops and their current and potential diagnostic practices.

#### *Ethics*

Ethical approval for the research was granted from review boards at the Uganda National Council of Science and Technology (Reference: HS 546) and the London School of Hygiene and Tropical Medicine. Further approval and permission was sought from district and local authorities before interviews and discussions.

## **Results**

We start by describing the roles of drug shops for clients and for the public health system. We describe the liminal status of drug shops in this study: at once a shop and a clinic; legitimate and illegitimate; and trusted and distrusted. This forms the context for the second part of our results, which focuses on the role of diagnostic tests within the current use of antimalarials and laboratory tests. We describe how treatment of symptoms in practice is in effect a 'diagnosis', but how

participants were curious about testing, although this was not played out in the reality of treatment decisions.

Although some drug shop workers (DSWs) were trained health workers, we reserve the term 'health worker' (HW) for those working in public health facilities. We have replaced any real names with a respondent (R) identification number or pseudonym and refer to district health officials as DHOs. We have preserved the terminology used by respondents to describe drug shops: in some cases, this was *eduka eritunda edagala*, or 'drug shop'; in other cases, respondents referred to the same establishments as *akadwaliro/akaclinic akatunda edagala*, meaning a 'clinic that sells drugs', or simply *edwaliro*, 'clinic.' When asking questions about malaria, we used the Luganda term *omusujja gwe'ensiri*, the closest translation for malaria as a disease and illness category (Mbonye, Neema, & Magnussen, 2006).

### **Liminal status of drug shops**

#### *At once a shop and a clinic*

The registered drug shops in this study consisted of 1-2 rooms, with 1-2 staff serving at any one time. Most were located in or around trading centres and had the appearance of pharmacies, denoted with a blue cross, with medicines clearly on display behind the counter. Most were not connected to electricity or water and did not have refrigerators. Some displayed educational materials, and some drug shop workers wore white coats whilst others were smartly dressed.

Drug shops in our study were an important source of medical treatment for their communities. They were described as a source of health care that is both more accessible in terms of convenience, cost, time spent, social proximity and better quality in terms of services and reliability of stocks than public health care facilities,

'The good thing is that they provide fast services, they care, and counsel and mind the patients, not like public health centres' (R2, FGD#06 – community leaders).

'Now, I have told you about the clinics because the health centre disappointed us, because of going there and we do not get the drugs' (R5, FGD#04 – men).

'We go to drug shops because our health centres close early and drug shops are always there, and even if it is closed, we can knock and they open for you because for them they want money' (R1, FGD#10 – men).

As this man has illustrated, community members are aware of the power they hold over drug shop workers, in providing their income. This contributes to a sense of agency in the process of seeking treatment, including asking for advice and purchasing or rejecting treatment, including incomplete dose. This is described by one community leader who chose to put treatment decisions into the hand of the drug shop worker but chose when to complete his dose himself,

R3. I first feel joint pains, become very weak then I move slowly to the nearby clinic [drug shop]. When I reach there I tell the health worker that I have malaria but don't know or have a particular drug that I take so I have given you all the authority to get me those that you think will do the best, so she gives me the drugs and I can go back home.

M. You don't know the drug?

R3. No. I don't know it. I just give her the chance to treat me. I just say one thing, "I have malaria". Then I look at her. She goes to her counter, looks round and gets me what I think is best for me and gives it to me. I don't even bother asking that, "eh, which tablets have you given me?"

All. [Laughter]

R3. Aha, I just come and swallow. When I feel I'm not yet okay I continue taking the tablets. But when I feel better, I don't even wait to complete the dose. I stop there and then.

[FGD#02 – community leaders]

In addition to power that comes with paying for services, clients are empowered by the relative social proximity in the relationship with a health worker in a drug shop compared with a health worker in a public health facility. This social proximity is marked by the integration of drug shop workers in the local community. It is exhibited in the familiarity between DSWs and community members. For example, respondents often identified drug shops by the name of the owner, for example 'Albert's Clinic', as well as the relationship beyond a single consultation: respondents felt their DSWs really listened to their symptoms and cared about their health outcomes.

Conversely, social distance at government health centres is marked by a different set of norms in the space of the health facility and the nature of health worker – patient relationships. The stories of our participants demonstrated a palpable power imbalance between health workers and patients. Health workers treated them rudely, even shouting at them, and did not have time or inclination to care for each patient. One man explains,

'Most people run and will always run to the drugs shops because of the care they get from there. When you go to the drug shop, the drug seller minds so much, talks to you well since he/she expects something (money) from you, unlike in public health centres where health workers do not mind about us especially females, for instance when you go there, she will shout at you that "you are not the first one. We have seen enough," because they do not expect to get something from the patient' (R9, FGD#10 – men).

This respondent also shows that transaction-focused services of drug shops are easier to negotiate: as a result of spending money, the client can expect to receive polite and prompt care. The relationship with health workers is seen as difficult to manipulate in order to receive desired services. One respondent stated that even if offered money to treat you more kindly, public health workers 'cannot accept. He/she only prescribes for you and tells you to go and buy the drug' (R3, FGD#04 – men). By contrast, drug shops present the opportunity for community members to acquire

health services without having to endure the indignity associated with the social spaces of health centres.

Community members expect drug shops to perform health care functions in terms of offering advice and medicines, reflected in the terminology of drug shops as ‘clinics’ and clients as ‘patients’. However, the providers are not expected, or desired, to be formally recognised by the biomedical profession. The value of the advice of the provider rested not on their qualification or regulatory category, but on their experience and reputation for helping clients to get well, as illustrated by this woman,

‘For us we do not mind if one [DSW] is qualified or not because it is you that authorizes her/him to work, after all the documents are in the suitcase, and provided one becomes fine that is all [that matters]’ (R2, FGD#04 – women).

In providing expertise and client-centred services, drug shop workers are an attractive option for care seekers. They are at once a shop and a clinic, roles that fitted well with community demand for services.

#### *At once legitimate and illegitimate*

In contrast to their important position in local communities as a source of treatment, the position of drug shops is less secure from a regulatory standpoint. Whilst many more drug shops are now licensed, this licensure is as a business rather than as part of the country’s health system. Many drug shops continue to operate without a license, some simply due to a lapse in renewal. In order to be licensed, shops must undertake a long process of registration under the name of a trained health worker, typically a nurse, and pay an annual fee (USD 30). At the registered drug shops included in this study, we found the trained person listed on the license may in reality not be in attendance,

leaving the shop to be run by an untrained worker. In our sample, approximately half had formal training as nurses, usually at a private college, and the other half were nursing aides or assistants who usually learnt to dispense drugs through informal apprenticeships in a drug shop. None of our participants worked in the public as well as private sectors. In spite of their backgrounds and their ownership of licenses, drug shops were still under suspicion by government authorities,

‘They don’t stick to the terms of their license they seem to like to sell capsules, injecting people, which isn’t part of their license and so many other malpractices are exhibited by these drug shops’.

(DHO#02)

The shops are visited by regulators, to check ‘for the license? whether you have some antibiotics [which are illegal at drug shops]? Is the seller a qualified health worker? That you don’t have expired drugs with you.’ (DSW 08, nursing assistant). Case management training is not provided, however, nor are drug shops expected to keep case records. They are thus both legitimate in terms of licensure and illegitimate in terms of providing many of health services they offer.

### *At once trusted and distrusted*

Our interviews with drug shop workers indicated that they thrive, socially and economically, on the relationships of respect and trust that they build within their communities. DSWs emphasised the importance of interacting with clients in a particular way, including creating rapport with the client and helping them to feel at ease. This client-centred approach is well described by an enrolled nurse DSW, who showed awareness of the ability for clients to take their custom elsewhere,

‘You have to know his/her history very well, and this is through good interaction with them and [for] anything to happen, say treatment, [it] can be reached only after the patient has gained trust in you the health provider. And all this can only be achieved through good interaction. When they come and you just start writing and then treatment, a patient cannot feel well – this is like going to the shop to buy something, upon reaching there, the seller asks you what you want, he /she gives it to you and

then walk away. Such can never be a good buy and I don't think I can go back to such a shop. Therefore, we first create good rapport; re-assure the patient that he/she will get well soon. This consoles them and makes them happy in their sickness' (DSW#06, enrolled nurse).

The benefits of this rapport with clients included satisfaction in successful healing as well as repeat custom and expansion of the provider's client base. Loyalty to specific drug shops was also attributed to the 'fit' between the provider and their clients as well as credit facilities,

'I have some families I treat and they [other drug shops] have some families they treat so I believe every one treats in his or her own way and that's why we all get customers, as in different customers go to different drug sellers'. (DSW#02, enrolled nurse)

'I decided to go at Albert's clinic because he is the one who usually /often treats me and more so, even if am not around or when I don't have money, I or my family just go there, treat them on credit and then pay the bill later'. (R4, FGD 02 – community leaders)

This trusting relationship between DSWs and their clients was not apparent between drug shops and the public health system. Government health workers and district health officials we interviewed expressed concern over the quality of care provided at drug shops, which was described as potentially dangerous. Some suggested drug shops should be closed down unless qualified health personnel worked there and were regularly trained. Specific concerns were: the use of expired drugs, described by a health worker (HW#01) as 'poison'; the misdiagnosis and consequent mistreatment of illnesses; and the prescription of underdoses and overdoses, which another health worker (HW#02) cautioned could 'lead to death'. There is currently much suspicion of drug shops selling black market ACTs that originate from the government and elsewhere. This adds to the difficult status of drug shops who are accused and blamed for these illegal activities, as exemplified by one district health official, 'the government has started labelling its drugs and we have been

cleared to go and check on the drug shops anytime you want and should you find any drug labelled “UG” that person should be arrested’ (DHO#03).

As well as concern over illegal activities, the abilities of drug shop workers were questioned, particularly concerning practices that are within the domain of the public sector, such as injections,

‘Of course when you are to inject, on injection on the buttocks there’s a specific position you love to inject. But you find that most drugs sellers don’t know that it is poison and so end up injecting in a different position... the child can become lame. And so if the drug seller wasn’t trained like us who were trained it becomes difficult. He/she just brings his head to inject anywhere’. (HW#01)

Underlying these concerns were suspicions of the motives of DSWs, with health workers describing drug shop practices as driven by self-interested profiteering regardless of consequences to patients. Health workers and district health officials were protective of the role of the formal sector and were wary of the trusting relationship drug shops built up with community members,

‘The community believes so much in these people because you find the drug shop is located in a place where the patients come from and the health workers there become part of the community. So if these people are not trained on new regulations like administering Coartem they will give false information and it will be very difficult for us to clear the air’. (HW#04)

The tension between these providers potentially affects access to quality care at health centres,

‘Parents never tell us the truth, they fear to tell us the exact place where they took the kid for they think we might go for the person... They deny for the fear that we might take the person to courts of law. But most times they come here and tell us that they bought some drugs from the drug shops but they will always say it was Panadol they bought. But when I tell the kid to turn for injections, I find the buttocks swollen, implying that they injected him/her but the parent still denies it in order not to reveal the person who helps them in the villages’ (HW#01)

The different perspectives of drug shops as voiced by community members, drug shop workers, district health officials and health workers from the public system demonstrate the liminal space in which drug shops operate. They are at the same time shops and clinics; legitimate and illegitimate and trusted and distrusted within the different spaces and social relations in which they operate.

### **Treatment as diagnosis**

#### *Malaria and its treatment, in practice*

Participants in our study described malaria as an individual disease that is identifiable from your symptoms at previous episodes, for example,

‘Ok, for me when I suspect malaria, the signs I get are: headache, it’s too severe; and sour mouth.

When I get that taste, and headache, I just know it’s malaria’. (R3, FGD#01 – women).

Symptoms most commonly reported by community members as indicative of them suffering with malaria, in order of frequency, were: joint pains, high fever, headache, stomach ache, stiff neck, vomiting and yellow eyes. Additional symptoms were also reported that were unique to individuals within the study, demonstrating the individualisation of the experience of malaria. Correspondingly, treatment is individual, with each person knowing their preferred treatment that they respond well to and also knowing those treatments that do not work well with their bodies. This is illustrated by a discussion where each participant named a different treatment for their malaria,

R5 For me when I suspect malaria, I look for local herbs like *omululuza* and *bombo* and I take my whole cup. After taking it, usually, I feel a bit warm, aaaha, then become fine.

M Mr. [R1]? What do you do?

R1 When I feel feverish and get a sour mouth, I take *Nakasero* [a local herb], because it takes the lead in healing malaria. I get it, squeeze it, mix it with water, boil and drink. Malaria disappears...

M Umh?

- R3 For me, I most often I use *omulaluza* , I squeeze it, mix it with water, drink it, cover myself with a blanket and sweats. By the time I wake up, I am felling better.
- M Umh , Mr. [R4]?
- R4 I usually use aspirin and quinine and I become fine.
- R9 I do not usually get malaria but when I get it, I take strong drugs. I take two Fansidar [Sulfadoxine Pyremethamine (SP)] and two Panadols [Paracetamol], and I become fine, though I rarely suffer from malaria.
- M Umh, Mr. [R2], what do you do?
- R2 I usually get malaria and use two different drugs. I first use Neem tree but if it refuses to work for me, I go for tables, strong ones like Metaklifin [SP].
- R6 For me, I first take Panadol, then go to Chloroquine, and if I do not feel any improvement, I go for laboratory investigations...
- M7 How about you Mr. [R7]?
- R7 For me, I am near the health unit, so when I feel feverish, I just go to there and I get treatment.
- (FGD#10 – men)

If their first treatment fails, most respondents described trying either the drug shop or public health centre. Some preferred a mission facility where injections – a preferred treatment for some – could be procured. For many respondents this ‘trial-and-error’ style of treatment was equated with a ‘diagnosis’. This was how the disease was known: from the treatment that was successful in removing symptoms. In response to a discussion about the inability of RDTs to differentiate among multiple causes of fever, one father argued that trial-and-error with different treatments would enable a health worker to know the cause without the need for a test,

‘You know, when a health worker treats you and sees no improvement, they inject the child Chloroquine... [When] there is no improvement, he/she changes the drug. So with that, the health worker will know.’ (R5, FGD#04 – men)

Drug shop workers in our study were confident that they could diagnose malaria without testing. This comment by a nursing assistant working at a drug shop was typical, 'I examine him/her then I can be able to tell whether the person has malaria or not even if I don't test the blood' (DSW#08, nursing assistant). Health workers in the public sector also followed this logic: clinical diagnosis was the gold standard for treatment decisions.

### *Interest in diagnostic tests, in theory*

In spite of participants' assurances that they knew how malaria looked and how it should be treated, there was still interest in testing. This appeared to centre around a curiosity for a more specific diagnosis and confirmation of an assumed malaria diagnosis. However the tests were less relevant for subsequent behaviour.

Some community members saw testing as a means to fulfil curiosity about the 'type of malaria', saying that this should lead to 'proper' treatment,

'We hear there are different types of malaria. So I go to test my blood so that I know the type of malaria am suffering from and more so to help the doctor know it and give me proper treatment that will heal me other than guess work which might lead to improper treatment and I don't heal.' (R3, FGD#01 – women)

However, this curiosity waned when participants considered the financial implications, particularly for non-severe cases. This same respondent went on to complain that testing served the purposes of the business of the provider more than her own health,

'These days, testing blood is more of a business especially in private clinics for instance I can go with mild malaria, not that severe one that needs testing, then the doctor forces me to test because he wants money after all laboratory money is different from treatment and I also end up doing so because I have nothing to do. I want to get better.' (R3, FGD#01 – women).

Tests were particularly appealing as a means to confirm an expected malaria diagnosis. However, malaria tests were distrusted when they clashed with the patient's or provider's expectation for a

negative result. When asked what would happen if the RDT result was negative, most DSWs initially responded that they would refer the client to a health facility. However, if the patient had the signs and symptoms of malaria, most went on to argue that they would still give antimalarial treatment,

‘Sometimes that thing could show negative depending on the blood that came from the patient. Yet when the blood that remained in the patient has the parasite, thus, you put that person on treatment of malaria.’ (DSW#06, enrolled nurse)

And likewise, community members argued that negative test results might not be trusted, as described by these respondents,

‘But when I have all the malaria signs and they tell me that I do not have, there I do not believe.’ (R2, FGD#06 – community leaders).

‘They will say drug sellers are cheating them because they test them and give them negative results then they make them pay for nothing seen in their blood.’ (R3, FGD#07 – women).

‘For me, I don’t really believe or trust the results that come from drug shops because to me I see it is a fashion which they use to trap income.’ (R1, FGD#02 – community leaders)

Mistrust of negative results combined with cost of tests in terms of finances and time were responsible for reduced appeal of malaria tests. One community member stated that he avoided health centres with tests for this reason,

‘For me, what stops me from going to a health centre like that of public (government) just like that gentleman said is you go there, they test you, they tell you that you have malaria but you go and buy the drugs. So when I am in pain, instead of going there and wasting time, I go direct to the [drug shop].’ (R1, FGD#04 – men).

This same issue of wasting time with testing was raised by one of the drug shop workers, ‘The problem I see here is about those who do not want to test their blood, when you talk of testing first then treatment they will see it as time wasting’ (DSW#05, nursing assistant).

Thus, participants were curious about parasitological diagnosis but viewed this as insufficient to make a decision to buy antimalarials and unnecessary when short on time and money. In this setting, therefore, diagnosis of malaria can be seen as more closely defined by treatment rather than by diagnostic tests.

## **Discussion**

The idea of having malaria RDTs in drug shops was embraced by our study participants. However, our analysis of the context of care in this setting and the perception of the function of diagnostic tests suggests that RDTs could have limited impact on treatment decisions in the absence of efforts to support this new rationalisation for malaria treatment. At drug shops, malaria treatment was found to be synonymous with diagnosis. Diagnostic testing was deemed useful in theory, to satisfy curiosity for more information about an illness. However, this curiosity waned in the face of the potential costs involved, especially under the scenario where the test does not confirm syndromic diagnosis, when the purchase of antimalarials was more appealing. The drug shops in this study were an important source of health care services for community members, and we found that their services were guided by responsiveness to client demands. This bottom-up style of service provision contrasted with the biomedical model of top-down guidelines for clinical practice, as exemplified in the perceptions of public sector health workers and district health officials who valued biomedical standards above patient demands. Supporting interventions for DSWs to make the shift to RDT based treatment will require different approaches than those for public health workers, particularly in raising awareness in communities of the multitude of causes and managements for malaria-like illness.

### *Context of drug shops*

In line with earlier findings in Uganda (Adome, Whyte, & Hardon, 1996), we found that the drug shops in our study are an important source of medical treatment for their communities. In common

with other settings where drug shops are popular, community members highlighted benefits of convenience and quality of services (Whyte, Van der Geest, & Hardon, 2002). An additional appeal of drug shops was the social proximity of clients to providers. In seeking treatment at drug shops, community members were able to exert agency in the care process in a way that they are unable to at health centres. As has been described in other contexts, they were active 'customers' rather than passive 'patients' (Mol, 2008) with their relationship with the health provider taking on a more friendly nature (van der Geest, 1987) and the provider showing respect for the customer's opinion and giving flexible care according to the desire and budget of the customer (Whyte, 1992).

#### *Perceptions of diagnostic tests*

Community members and drug shop workers in our study were keen on the idea of having malaria tests at drug shops. Community members have also shown a desire for RDTs to be carried out by community medicine distributors in Uganda (Mukanga, Tibenderana, Kiguli, Pariyo, Waiswa, Bajunirwe et al., 2010). However, through the discussions in our study, it became clear that the role of these tests would not necessarily fit with the intended biomedical diagnostic paradigm of test-directed treatment decisions. Currently, as has been described elsewhere, it is medicines rather than tests that provide a diagnosis (Nichter & Vuckovic, 1994). Whilst community members were curious about tests, showing 'systematized thinking', when confronted by costs and potential disagreement between test results and known syndromic illness category, participants demonstrated 'everyday thinking' that fits with overall desired outcomes in real life (Young, 1976). To emphasize diagnostics in this context is, as Michael Taussig (2010) has said, to reify the 'phantom-objectivity of disease'; by expecting parasite-based diagnoses, we are narrowing the conceptualisation of malaria to parasitaemia, without recognising the wider social construction of 'malaria' (Williams & Jones, 2004).

#### *Tests and client expectations*

We have argued that treatment-seeking in drug shops in some ways empowers clients to make choices regarding their own care and to receive care that is responsive to their needs and demands. Yet, following a path of diagnostic testing takes agency away from both clients and the DSWs through limiting choice of (appropriate) treatment. This puts the provider in the position of serving as a gatekeeper of antimalarials in a way that departs from their previous role as an antimalarial provider. It also diverges from the conceptualisation of malaria as individually experienced with individual treatment needs. These factors could have an impact on uptake of tests and adherence to results. It is possible the attractiveness of tests could lead to high uptake but the expectation for treatment from these providers could lead to test results being ignored, as has been found in the public sector.

#### *Preparation for RDT introduction*

Introduction of RDTs in the private sector will require incentives to sell RDTs, support for responding to test results and monitoring of practice.

Incentives to sell RDTs will be required. Our findings of community curiosity about RDTs but ultimate pragmatism about results, coupled with drug shop worker motivation to satisfy customers, does not lend strong support to the financial viability for test uptake at drug shops at current market prices. In addition, we have found that low cost of the test is likely to be highly important to clients (Hansen et al., unpublished). Potential increase in profit margins has had some impact on drug shop worker practices (Labhardt, Manga, Ndam, Balo, Bischoff, & Stoll, 2009). We suggest that significant subsidy will be required at the drug shop level in order for equitable uptake of the tests to be achieved.

Support for adhering to guidelines for negative results will be required. Findings from public facilities in Uganda, as elsewhere, suggest the need for clear recommendations to health workers to follow test results as well as guidance for treating and referring negative patients (Kyabayinze et al., 2010).

This is also likely to apply to drug shop workers. However, we found a number of potential barriers to implementing such guidance. Firstly, the primacy for DSWs to ensure a satisfactory outcome of clients' visits, and the poor relationship between drug shops and public health centres suggests that recommendations to refer RDT negative clients to the public sector may not be followed, as has been found for other training recommendations (Goodman, Brieger, Unwin, Mills, Meek, & Greer, 2007), which could result in misdiagnosis and misuse of other drugs such as antibiotics. Raising awareness in communities of other causes and management of non-malarial illnesses will be key to changing expectations for diagnostics as the routine method of diagnosis. However, a second challenge is the liminal status of drug shops that reflects what Cross and MacGregor (2009) argue are concerns on the one hand for qualifications that can assure safety of practices but concerns on the other hand to protect and defend the legitimacy of biomedical experts. If non-severe non-malarial illnesses are to be managed appropriately, this may require that the protection of biomedical expertise is compromised. Finally, weak integration with the formal health system, despite registration and regulation, and distrust by government health workers presents a further practical barrier to effective referral of RDT-negative patients by drug shops. Public backing of the Ministry of Health for this programme, recognising and respecting the different roles drug shop workers and health centre workers have in providing services to community members, will therefore be essential. We recommend that health centre workers and district liaisons participate in RDT training of DSWs as well as in ongoing support to maintain links and sustain changes prompted by initial training (Marsh, Mutemi, Muturi, Haaland, Watkins, Otieno et al., 1999).

Sales and use of tests and drugs will need to be monitored. However, a regulatory approach may be less effective than supportive supervision. Our participants frequently mentioned buying or selling illegal antimalarial drugs, as has been observed in Tanzania where practices of pharmacists responded more closely to consumer demand more closely than government regulation (Kamat & Nyato, 2010). These authors suggested that a collaborative rather than blaming approach may be

more productive in changing practices, particularly if roles of pharmacies in the community are respected rather than demonised.

### **Conclusion**

Drug shops are currently the first step in seeking treatment for malaria for many in Uganda. The introduction of RDTs into drug shops has the potential to drastically increase access to diagnostic testing. However, their introduction will be into an existing system of care where tests are not a core component of treatment decisions. This will require a thoughtful approach to the design of supporting interventions and careful monitoring and evaluation to assess processes and impacts of the tests and to enhance methods to maximize RDT uptake. RDTs hold great promise for rational use of medicines within the biomedical paradigm of diagnostic-based treatment; their introduction at drug shops requires recognition of the rationale for the use of medicines within the local paradigm of treatment-based diagnosis.

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