

**Article Title:** 'As a clinician, you are not managing lab results, you are managing the patient': how the enactment of malaria at health facilities in Cameroon compares with new WHO guidelines for the use of malaria tests

**Authors:** Clare I.R. Chandler<sup>1</sup>, Lindsay Mangham<sup>1</sup>, Abanda Ngu Njei<sup>2</sup>, Olivia Achonduh<sup>2</sup>, Wilfred F. Mbacham<sup>2</sup>, Virginia Wiseman<sup>1</sup>

**Affiliations:** <sup>1</sup>Department of Global Health and Development, London School of Hygiene & Tropical Medicine, 15-17 Tavistock Place, London WC1H 9SH

<sup>2</sup> The Laboratory for Public Health Research Biotechnologies, University of Yaoundé, Cameroon

**Corresponding author:** Clare I.R. Chandler [clare.chandler@lshtm.ac.uk](mailto:clare.chandler@lshtm.ac.uk)

**Key words:** Malaria enactment, rapid diagnostic test, use of medicines, evidence based medicine, Cameroon

**Acknowledgements:** We are very grateful to all of the health workers who gave their time and shared insights with us. We thank the field team for their commitment and valuable work: Ndong Ignatius Cheng, Joelle Pamen Ngako, Rachel Nguella, Albertine Lele, Joel Ambebilla, Mirabel Ayuk, Sarah Ndivé, Theresia Njuabe and Akindeh Mbuh Nji. We thank James Kizito, Miriam Kayendeke and Christine Nabirye for their hard work and dedication to the coding of the FGD transcripts. We are also grateful for the helpful comments of the anonymous reviewers. This project is part of the ACT Consortium, which is funded through a grant from the Bill & Melinda Gates Foundation to the London School of Hygiene and Tropical Medicine.

## **Abstract**

In response to widespread overuse of antimalarial drugs, the World Health Organisation changed guidelines in 2010 to restrict the use of antimalarials to parasitologically confirmed malaria cases.

Malaria rapid diagnostic tests (RDTs) have been presented as a means to realize the new guidelines, and National Malaria Control Programmes, including that of Cameroon, are developing plans to introduce the tests to replace microscopy or clinical diagnosis at public health facilities across the country.

We aimed to understand how malaria tests and antimalarial drugs are currently used as part of social interactions between health workers and patients at public and mission health facilities in Yaoundé and Bamenda and surrounding districts in the Northwest region of Cameroon. In May to June 2010, we held 17 focus group discussions with 146 health workers involved in clinical care from 49 health facilities.

Clinicians enacted malaria as a 'juggling' exercise, involving attention to pathophysiology of the patient as well as their desires and medical reputations, utilising tests and medicines for their therapeutic effects as symbols in the process of care. Parasites were rarely mentioned in describing diagnostic decisions.

These enactments of malaria contrast with evidence-based guidelines emanating from WHO, which assume the parasite is the central driver of practice. If RDTs are to be taken up in practice, public health practitioners need to pay careful attention to the values and priorities of health workers and patients if they are to work with them to improve diagnosis and treatment of febrile illnesses.

## Background

In response to the recognition of widespread overuse of antimalarial drugs, and the consequent potential for unnecessary expenditure on subsidised antimalarial drugs, the WHO revised its guidelines in 2010 to restrict the use of ACT to parasitologically confirmed malaria cases, where diagnostics are available (World Health Organisation, 2010). This change intends new technologies to be adapted into the everyday practice of malaria.

Although microscopy is considered to be the gold standard for malaria diagnosis (World Health Organisation, 2010), it has been found to be impractical in many remote and resource-poor settings due to its requirements for trained personnel, equipment, regular supply of reagents and continued quality assurance supervision (Bell & Peeling, 2006; Moody, 2002; Zikusooka et al., 2008). Rapid Diagnostic Tests (RDTs) are being promoted as a solution to these diagnostic challenges in settings with no or poor quality microscopy. Malaria RDTs have been found to be accurate under controlled conditions, easy to use and interpret and can be performed with basic training and equipment (Nankabirwa et al., 2009; Zikusooka et al., 2008). Several studies have also suggested RDTs can be cost-effective when compared with no testing or microscopy although this depends on the prevalence of malaria, costs of testing and treatment and critically whether the treatment prescribed is consistent with the outcome of the malaria test (Lubell et al., 2008; Shillcutt et al., 2008; Zikusooka et al., 2008; Zurovac et al., 2008).

This kind of evidence has encouraged the global procurement of malaria RDTs which rose from approximately 2.9 million tests in 2000 to an estimated 80 – 90 million in 2008 (Baik & Bell, 2007).

Unfortunately many of the perceived benefits to malaria management are yet to be realized. In many settings where RDTs have been introduced, the tests have been underused and the overuse of antimalarial drugs has remained high. Even when tests are carried out, findings are accumulating from studies in different countries that show between 35 and 85% of RDT negative patients have been prescribed antimalarials (Ansah et al., 2010; Bisoffi et al., 2009; Chinkhumba et al., 2010; Elmardi et al., 2009; Hamer et al., 2007; Kyabayinze et al., 2010; Reyburn et al., 2007; Skarbinski et al., 2009). By contrast, other studies have found a reduction in overdiagnosis, down to between 4% and 16% RDT negative patients receiving antimalarials after the introduction of RDTs with various supporting interventions (Bastiaens et al., 2011; D'Acromont et al., 2009; Hopkins, 2008; Masanja et al., 2010; Mawili-Mboumba et al., 2009; Msellem et al., 2009; Thiam et al., 2011; Williams et al., 2008). In spite of this mixed evidence over the effect of introducing RDTs, and in the absence of good information about the best way to support their introduction for effective adoption, scale-up of the tests is being promoted (World Health Organisation, 2010), and many countries including Cameroon have included the tests in their Global Fund grant applications (Ministry of Public Health, 2009).

An understanding of how testing is conceptualised is needed in order to maximise investment in the scale-up of RDTs. In spite of the high quality of many RDTs (World Health Organisation et al., 2008), studies have suggested that providers are unsure about the accuracy of tests, especially negative results. This persists even when they perform the test themselves and particularly when the results clash with observed signs and symptoms (Kyabayinze et al., 2010; Moonasar et al., 2007; Rowe et al., 2009; Uzochukwu et al., 2010). Results from a recent survey of health facilities in Cameroon in 2009 indicate malaria is significantly overdiagnosed and mistreated (Mangham et al., 2011). The Ministry of Public Health in Cameroon promotes the rational use of ACTs using microscopy before providing treatment in all cases of fever in patients over five years (Ministry of Public Health, 2008). The survey, a baseline to

the current qualitative study and precursor to a randomised controlled trial to introduce RDTs, found that 81% of febrile patients on exit from public and mission health facilities were prescribed antimalarials, though only 35% of febrile patients on exit had malaria parasites according to the results of RDTs conducted by the study team.

Social relationships have been underscored as important in diagnostic decision making and are shown to have an important bearing on whether negative test results are adhered to. Social relationships are often based on a perceived or real demand from patients for antimalarials (Chandler et al., 2008b; Onwujekwe et al., 2009) as well as habitual practice built on observation and expectations from colleagues within communities of practice (Chandler et al., 2008a; Chandler et al., 2010). Undertaking qualitative studies to understand local conceptualisations of malaria treatment and diagnosis is essential in order to design supporting interventions for the introduction of new technologies such as RDTs in different settings. In this study qualitative methods were used to understand how new diagnostic guidelines to restrict antimalarials to patients with malaria parasites on blood testing could be implemented, alongside the introduction of RDTs, in an upcoming cluster randomised controlled trial (clinicaltrials.gov NCT01350752).

## **Theoretical orientation**

In this work, we adopt a meaning-based, interpretive approach to understanding malaria in practice, well established in the field of medical anthropology (Nichter, 2008). We see 'malaria' as a term with multiple meanings, held by and communicated between health workers and their patients as well as other communities of stakeholders across educational, economic and geographic boundaries (Beisel,

2010). We conceive that constructions such as 'malaria' become apparent as such diseases are 'enacted' or practiced, following Mol (2002) who presented an ethnography or 'praxiography' of atherosclerosis as a disease, showing how medical technologies, arteries, doctors and patients enact different versions of the disease through coordination, interference and contradiction in medical practices.

We have problematised the enactment of malaria by health workers through analysis of the roles of different processes and paraphernalia. To do this, we draw on long-standing work on symbolism in medical practice (Kleinman, 1973) and the role of tangibles such as medicines that can facilitate communication about experiences that may be difficult to express (Van der Geest & Whyte, 1989). In the case of artefacts involved in diagnostic procedures, we are sentient to the arguments of the 'technological imperative' of medicine as practiced in Northern societies (Koenig, 1988), with diagnostic technologies representing reductionist notions of health as localised and identifiable within the body, privileged over clinical information gathered from listening, looking and feeling patients, as 'paraclinical' information (Feinstein, 1975).

We view the introduction of new guidelines and technologies for diagnosing 'malaria' that have emerged from outside of Cameroon through the analytical lens of evidence based medicine (EBM) as a social movement, following Pope (2003). Emerging within the medical profession in Northern countries, EBM has been observed to have shifted notions of 'evidence' from clinical reason, based on experience of what worked, and rooted in pathophysiology together with social and cultural knowledge of the individual patient, to probabilistic rationality based on the results of clinical trials (Armstrong, 2002; Mykhalovskiy & Weir, 2004). In this paper, we analyse how malaria and its treatment are enacted by health workers and consider how this relates to emergent evidence based guidelines.

## **Methods**

We carried out focus group discussions (FGDs) with health care providers and with community members in two areas of Cameroon. This paper presents analysis drawn from the provider side. Findings from the community FGDs will be presented elsewhere in order to allow sufficient space to present each perspective. The two areas were chosen by the broader study team to represent Anglophone and Francophone areas in which an upcoming trial of different supporting interventions for the introduction of RDTs would take place. This qualitative research aimed to contribute to the design of supporting interventions by identifying factors important to consider across different areas, cadres and administrative types of providers.

## **Study area**

The study areas were Yaoundé, the bustling capital city of Cameroon, situated in the Central region in the Francophone area of the country, and Bamenda and surrounding area in the Northwest region in the Anglophone area of the country. Yaoundé has 8 health districts within the urban capital, five of which were included in our study. In the Bamenda study area, we included the urban district plus seven neighbouring rural districts: Tubah, Batibo, Ndop, Santa, Bafut, Mbengwi and Bali. Both areas have a mix of formal health facilities and medicine retailers. Public and mission hospitals and health centres form the bulk of the formal health system, although there are many more private pharmacies and others selling medicines privately. Malaria is endemic in both study areas.

## **Participant selection**

Potential recipients for future introduction of malaria RDTs at health facilities were invited to participate in the FGDs. All health workers who had a role of prescribing or dispensing and administering medicines at public or mission health facilities in the study areas were therefore eligible. We separated the participants into different cadres of medical doctors or nurses/midwives/nurse assistants in order to foster more openness amongst participants. We identified potential participants from an earlier census survey of health facilities in the two study areas and from lists provided by the person in charge of the health facilities. We aimed for 8-12 participants per FGD, and if there were too few eligible to participate from one health facility, we grouped together participants from neighbouring health facilities. Health workers were invited to attend the FGD in a meeting area that was convenient for participants and provided a private space to discuss. No incentives were provided, other than transport refund for those health workers travelling to attend the discussion.

## **Focus group discussions**

We chose to carry out FGDs rather than one-to-one interviews in order to stimulate and observe discussion amongst participants about the research topics. Health workers were given information sheets and consent forms which were explained and discussed in the group. Those choosing to participate were asked to sign consent forms prior to the start of the FGD and were given identification numbers for anonymity. The FGDs were facilitated by one member of the study team, accompanied by a note taker and a co-ordinator. The facilitator followed a topic guide to stimulate discussion with open-ended questions on the role of antimalarial drugs and tests in participants' practice, perceived reliability and logistics of existing tests, perceptions of community preferences, and their relationships with practice. Discussions were held in French in Yaoundé and Pidgin English in Bamenda, although

facilitators were flexible to the preferences of participants to use different languages. The note taker recorded the discussion with a digital recording device and made detailed notes to record participants' contributions, non-verbal communication and the atmosphere of the FGD. The coordinator collected demographic and work history information and provided refreshments after the discussion. After each FGD, the study team reflected on the discussion held and any challenges faced in facilitation, or new ideas arising, and circulated a summary for further discussion with investigators.

The study team consisted of five facilitators, all of whom were researchers at the University of Yaoundé in biomedical departments, although none were health care providers, and eight note takers/coordinators. The team completed an intensive 7-day training carried out by CC, an experienced social researcher, to orient them to the study's objectives and methods and to practice skills in carrying out FGDs, following exercises for communication skills development (Haaland et al., 2006). Fieldwork took place after a period of pretesting and revision of tools, in May and June 2010.

## **Data handling and analysis**

Audio recordings and notes were transcribed using a word processor. The transcription was then checked and edited by another member of the study team before it was translated into English.

Translations were then cross-checked and finalised by the study coordinator.

FGD summaries, translations and enrolment form information were imported into NVivo 8 (QSR International). They were read carefully for the overall flow of the discussion and then coded line-by-line, labelling ideas described or implied by participants. These ideas were then grouped together into themes in a continuous revision process as more transcripts were reviewed. A coding template was set up by CC and two social science research assistants completed the coding, with agreements on coding reached through close communication and frequent reviews and revisions to the template. Higher level

concepts were interpreted from the themes together with review of literature and theory relevant to the themes emerging. Findings in the paper represent a narrative of the central conceptualisations developed through this analysis process.

## **Ethics**

The study was approved by the National Ethics Committee, Cameroon (reference: 030/CNE/DNM/09) and ethics review board of the London School of Hygiene & Tropical Medicine, UK (reference: 5885).

## **Study participants**

We held 17 focus group discussions with health workers from public and mission facilities across the two study areas in Bamenda and Yaoundé. A total of 146 health workers participated in focus groups, with a median FGD size of 9 participants. Eight health worker FGDs were held in the Bamenda study area and 9 in Yaoundé and each site included FGDs with medical doctors and with nurses of different cadres, the majority (90%) of whom reported their responsibilities currently included prescribing treatment (Table 1). In Yaoundé, nurses who prescribed were of a higher cadre, including staff nurses and registered nurses. In Bamenda, nurses also included nurse assistants. Otherwise, characteristics of health workers were similar between sites (Table 2). Most of the health workers were female, although the medical doctors were predominantly male. The median age was 39 and around a third of the participants were originally from the region in which they were now working. Most had at least a secondary school education, and 34 held medical degrees. Most health workers had undergone at least 3 years of professional training, although Yaoundé participants had undergone more years of training than staff in Bamenda. Overall, almost half had graduated in the past 10 years. Many (56% overall) had never

received malaria related in-service training, while a small minority had attended more than three malaria trainings. None had used a rapid diagnostic test for malaria, whilst almost all facilities did have microscopy available.

## **Results**

We identified key themes that were important across the different sub-groups in the study. We found antimalarial prescriptions, antimalarial drugs and malaria tests to have multiple functions in the practice of health care, including but not limited to pathophysiological functions. Malaria drugs and tests also performed psychological and social functions. Drugs, prescriptions and testing procedures were imbued with different meanings, based on an understanding of what is required by patients in general, and each patient in particular. Underlying the varied use of malaria drugs and tests was flexibility in the category of 'malaria' that allowed various ailments to be incorporated within its socially acceptable label. This flexibility is assisted by the ambiguity of malaria in local clinical guidelines, with presumptive malaria treatment recommended as the default course of action.

### **Enacting malaria: pathophysiology**

Foremost amongst reasons given by health workers in all groups for antimalarial prescription was to treat particular signs and symptoms, particularly fever, headache, vomiting and body or joint pains. Such symptoms were 'clearly' malaria, a diagnosis that overshadowed all potential others in the narratives of participants. Health workers talked about how their clinical experience shaped their recognition of malaria symptoms, particularly observing positive responses to antimalarial drugs:

'From my day to day experience, the patients to whom I had prescribed, they got well. So, that one can also influence me to go on with the sign and symptoms that they are giving, so that I know that the other one had it and I gave this drug and the patient is well, so I can continue with it to the others.' (P5, FGD104 Bamenda, mission facility midwives/nurses)

Health workers described tests as important and desirable, but their results were overshadowed by the role of clinical judgement when it came to prescribing,

'There are clinical and biological reasons [to prescribe antimalarials]. Biologically, the thick blood smear, or a previous history. Priority is always given to the clinical despite the results of the thick blood smear. But at least, the malaria test is an important stage.' (P4, FGD307 Yaoundé, mission facility medical doctors)

The importance of treating cases as malaria presumptively was highlighted by many respondents who discussed their personal experiences of the risks of malaria – both in its frequency and its dangers,

'I would also like to say, we are in an endemic zone. That is, in particular, in Cameroon, the species of malaria is the *Plasmodium falciparum* ... It is the most devastating species which has after effects. There are some children who remain paralysed ... I saw children at the Central Hospital who were completely in a vegetative state because of malaria ... And for us, the first thought is that it is malaria. When we fall ill we think it is malaria' (P10, FGD300, Yaoundé public facility nurses).

In contrast with the strong feeling that malaria is well known, common and serious and therefore must be treated presumptively, feelings about testing were ambivalent. When asked about practice with negative malaria test results, respondents in all 17 FGDs stated that results do not change their treatment with antimalarials. In most cases, what health workers saw and heard from patients ('signs and symptoms') dictated treatment regardless of test results,

‘When we do the malaria test and it comes out negative, it does not prevent the patient from having his malaria ... We continue with the antimalarial treatment.’ (P11, FGD305 Yaoundé, mission facility midwives/nurses)

Malaria as a clinical entity was thus defined beyond the boundaries of laboratory diagnosis. Clinical judgement of the health worker was most important, especially as the quality of laboratory staff and resources was sometimes questioned. Notable was the absence of statements of the reason for prescribing antimalarials being related to killing parasites, mentioned in only one focus group.

### **Enacting malaria: psychology**

Health workers in both regions and across cadres repeatedly emphasised the importance of ‘psychological treatment’ for patients as central to their healing and satisfaction,

‘In the definition of medicine, we say the doctor treats the body and the soul, isn’t it? It implies that when a patient comes to you, if he is uncomfortable in his head, even if you give him the best drug, he would not be healed, isn’t it? So, a patient who comes, the psychological treatment is the first thing.’ (P3, FGD306 Yaoundé, public facility medical doctors)

Health workers related that it was the welcome they gave to patients (at 15 FGDs) and the good interpersonal skills of the staff (at 13 FGDs) that satisfied patients. In only four FGDs did health workers discuss the availability of testing services as important to patients.

In this context, where psychological treatment of patients was apparently so central to practice, it is perhaps unsurprising that medicines were sometimes given to patients as a ‘placebo,’ including antimalarials, other medicines and the mode of delivery. For example, drips were often symbols of care for patients,

'We can just put an IV line and some B-complex inside just for placebo to flatter them. Because when they see that thing they think that it is malaria, but we are giving our antibiotic!' (P8, FGD100 Bamenda, public facility nurses).

However, health workers also described diagnostic tests as psychological, or 'placebo' treatment. Health workers from different cadres and in both areas said they felt that most patients liked to have tests performed, although there are some who did not 'know the lab.' Respondents made it clear that a key reason tests were done was for the psychological rather than diagnostic benefits,

'Some patients when they come, they already have in mind that they must do a laboratory test. So even when you observe that they do not necessarily need the test, we simply request the test because they want it to be done. We also request the test because they also require some psychological treatment. If you observe the symptoms they present, we simply prescribe them drugs, and to boost their psychological treatment we prescribe the test.' (P8, FGD301 Yaoundé, mission facility nurses)

'According to me, most of the times I will send the patient for a malaria test just for the psychology of the patient, just to please the patient... but if I have to decide, the lab test will not count. Clinically I take my decision to treat my patients.' (P4, FGD107 Bamenda, mission facility medical doctors)

## **Enacting malaria: social context**

In addition to responding to clinical and psychological needs of patients, health workers across different sub-groups recognised the importance of considering other aspects of the backgrounds and needs of

their patients, including their educational background, their financial capabilities and the beliefs of the patient about their illness.

### **Considering education and economics**

Health workers identified differences amongst their patients in expectations for malaria treatment and laboratory investigations. Broadly, those considered better educated and more able to pay would ask more questions and expect laboratory tests in order to know what their disease was. For others, who were described as 'not knowing' the lab, or who could not afford it, health workers reported that they would usually not test but move straight to treatment. For context, our baseline survey suggests patients pay on average 1 USD for a consultation, 2-3 USD for a malaria test and around 6 USD for all medicines received.

'When a patient comes in and then you see that the patient hasn't money you just go straight to giving the treatment rather than sending the patient to the lab, while when coming back from the lab he will not be able to buy drugs.' (P6 FGD103 Bamenda, public facility nurses)

This may be partly based on fears that patients may be dissatisfied upon receiving negative results,

'Yes, we have already had a lot of problems with patients as regards the results. Because some patients, when you tell them it is negative, he puts in his mind that he has lost his money whereas when it is positive, he is happy.' (P3 FGD302 Yaoundé, public facility nurses)

Some health workers in Bamenda also expressed fears that they may be left to pay the expenses for very poor patients, leading to decisions for a less expensive consultation.

### **Considering the patient's concerns**

Aside from the patient's educational and financial status, health workers described that for a patient to feel properly 'treated,' their concerns needed to be recognised and responded to. In some cases, this meant treating *their* malaria, even if it wasn't strictly what the health worker would define as malaria,

'So they come in saying "I have malaria," so they consider all fevers to be malaria. So if you do not prescribe what treats their malaria, you have not prescribed what treats their illness. So, they feel well. They feel satisfied because you have responded to their concerns.' (P6, FGD301, Yaoundé Mission facility nurses)

Proper management of patients also meant giving confidence to the patient in the ability of the health worker. This involved specific processes of care and the use of particular artefacts such as drips and tests, and the declaration of 'malaria' if this was suspected to be the patient's expectation. Health workers in all groups noted malaria as a more acceptable diagnosis than others. The acceptability of malaria was demonstrated by the ownership participants attributed to the disease, as 'my malaria',

'Patients prefer malaria because, when they have malaria, they already conclude that it is "their malaria." They even come to the hospital and say: "no, I know that it is malaria that has been troubling me. It is my illness." And when you confirm to them that it is malaria, he is happy.' (P9 FGD100 Bamenda, public facility nurses)

Health workers identified that patients were generally relieved to receive malaria treatment or diagnoses because it is a disease that is common and well known, possible to cure, with simple treatment, and a less distressing diagnosis overall than others such as diabetes, hypertension, TB or HIV, which health workers found far harder to deliver to patients.

'I usually say that it [malaria] is an elegant sickness. "What do you have?" "I have malaria!" So when they get to the hospital and it is truly confirmed that they have malaria, they are happy. They say to themselves "No, it's ok." It means he knows that malaria is easy. It is a sickness which can be easily treated. (P3 FGD301 Yaoundé, mission facility nurses)

### **Juggling patient concerns and clinical reputation**

The many reasons for malaria acceptability meant that health workers found it hard to give non-malaria diagnoses and treatments, with an array of difficult patient responses to navigate. In the case of negative results, some health workers reported the need to emphasise their knowledge of malaria over that of the patient in order to persuade them of another diagnosis. However, this was not always easy, particularly with ‘those who have been to school and believe that they know all in all the domains’ who would not accept a negative malaria diagnosis. For fear of their competence being undermined, participants, particularly the medical doctors, said they often made the malaria diagnosis anyway,

‘Yes as a clinician ... you are not managing lab results you are managing the patient ... when the lab results come back you are not going to tell the patient that you don’t have malaria. You are going to explain to the patient that “this test is negative but it doesn’t mean that you don’t have malaria,” so you still go ahead and treat. So it depends on how you disclose the information to the patient because if you just sit back and tell the patient that you don’t have malaria then the patient will even have the impression that you don’t know what you are doing.’ (P3 FGD107 Bamenda, mission facility medical doctors)

‘What could we also say to the patients who comes with a negative malaria test whereas we are suspecting malaria? We could only tell him that it is a drop of blood that was taken for analysis. If we had taken a good quantity of blood we could find malaria, we could find the parasites. So, it is just a drop of blood, he needs not worry, yes he has malaria.’ (P6 FGD306, Yaoundé public facility medical doctors)

This left health workers to juggle patient expectations alongside the need to maintain professional and institutional authority, sometimes through bending realities in explanations to patients and contributing

to malaria overdiagnosis,

‘If the test is negative whereas we suspect malaria in a patient, I try to, it would first of all depend on the attitude that I had with the patient at the start, the degree of confidence that I did have with him. I would not try to explain him the things of the hospital, like to tell him the laboratory things. I just try to tell him “it could happen that the thick blood smear, your blood that was taken, the parasitaemia was not high, but you are supposed to have malaria.” I tell him like that and I put him on treatment. So, I try to reassure him that it is just as a result of the blood that was collected, in order not to incriminate the hospital.’ (P2 FGD306, Yaoundé public facility medical doctors)

### **Enacting malaria: ‘evidence’**

In around half of the FGDs, across the participant sub-groups, discussions of malaria diagnosis included citation of guidelines, mostly noting that presumptive treatment was the malaria policy,

‘To respect the standard policy for the management of malaria, once there is a fever, you have to put an antimalarial treatment.’ (P3, FGD306 Yaounde, public facility medical doctors).

Indeed, the 2008 guidelines promote presumptive treatment of fevers with antimalarial drugs (Ministry of Public Health, 2008) by stating:

**‘Fever** is the most frequent symptom and the most reliable criterion in the diagnosis, treatment and follow-up of malaria.’ (emphasis in original)

Then,

‘Malaria diagnosis is based on the identification of plasmodium with the microscope either on a blood film and/or a thick blood smear. However, a negative result does not rule out the presence of malaria.’

And, as a ‘hint’ on the last page,

‘Malaria is a costly disease to the household and to society. The importance of an appropriate treatment cannot therefore be overemphasized.’

The word ‘evidence’ does not appear in the guidelines at all, and their style conveys authoritative information, based on objective knowledge. It also carries an implicit assumption that clinicians can identify malaria in spite of laboratory results that may be negative. Respondents, particularly medical doctors, did show awareness of an apparent paradox in this practice, but this awareness was not sufficient for most to challenge its premise,

‘[sending patients for tests] allows them to be reassured but it is a little bit paradoxical because there are patients who come, who would do the malaria test which would turn out negative, but you would nonetheless put him on antimalarial treatment.’ (P1, FGD307, Yaoundé, mission facility medical doctors)

Uniquely, one medical doctor did use the term ‘evidence based medicine’ to account for his decisions to restrict antimalarial drugs to those with parasites,

‘As I said earlier, I believe in evidence-based medicine. If I have a patient who has not taken antimalarial drug before coming to me and the malaria parasite is negative. I know that you people will disagree with me but I am not tempted in treating that patient for malaria. I know that you disagree with me. But I will look for other causes. Because we have the tendency of treating everybody in Africa for malaria, when we have many other pathologies who can present the

commonest symptoms which is fever. So I believe in evidence based medicine. I don't treat [by] giving malaria drugs [P1 and P5 and start smiling] just like that.' (P2 FGD307 Yaoundé, mission medical doctors)

However, in the main, malaria diagnosis and treatment at health facilities could be described as based on 'evidence' that could be captured from observation and listening to the patient. This is in line with existing guidelines. However, in line with the international move towards evidence-based medicine, the country's 2009 Global Fund application declared promotion of the 'rational use' of ACTs by using RDTs or microscopy before providing treatment in all cases of fever in patients over five years (Ministry of Public Health, 2009).

## Discussion

Antimalarials are overprescribed in Cameroon. This practice appears to be embedded in the social enactment of malaria, a wider concept than *Plasmodium* parasites. The richness of medical decision making is not usually targeted by evidence-based guidelines, but is crucial for understanding the context within which guidelines are enacted. This paper highlights three areas that are downplayed in such guidelines: individual experiences of clinicians, perceived psychological responses of patients and the social context of the patient and clinician; each reflecting what is valued as 'evidence' in local schools of medical thought.

The clinical rather than 'paraclinical' mode of diagnosis described here is in line with observations from elsewhere that clinicians often practice with a more 'interpretive' than 'probabilistic' model, whereby interpretation seeks to make sense of 'the whole story' of a patient's condition, and is 'therefore irreducible to probabilities, no matter how rigorously derived' (Tanenbaum, 1994)(p31). In this interpretive line of practice, based on a realist rather than empiricist school of medical thought, diagnosis is not limited to the black-and-white ideal of restricting treatment as dictated by a laboratory. The use of 'psychological' treatment – in the form of medicines but also procedures such as tests or drips – also demonstrates a more interpretive, as well as paternalistic approach, providing what is perceived as needed for that patient. Malaria test results may have been largely ignored in the face of clinical symptoms, but they served an important function in providing care to patients. This extends the idea of the 'placebo' beyond the idea of the accompanying therapeutic effect of giving a drug to a patient from a specific prescriber in a specific context (Claridge, 1970), to the therapeutic effect of entering a diagnostic process. The belief of health workers in this study that processes of care play a role in therapy mirrors findings of trials that various processes, including the use of instruments and labels

for diagnoses, affect health outcomes (Moerman, 2000), reflecting the power of their symbolic value. It is interesting to ask why the health workers in this study use these concepts of 'placebo' and 'psychological' treatment. This can be interpreted within the paternalistic paradigm of medicine, whereby the clinician is making decisions they believe are best for patients, including concealing certain truths, on their behalf (Lynoe et al., 1993). This presents a particular challenge for the expectation for clinicians to follow evidence solely based on laboratory data. Together with clinicians' consideration of the whole person, including their capacity for appreciating and/or paying for tests, this points to a broader interpretation of the role of clinician that is often neglected in simplified clinical algorithms and epidemiology based targets for 'rational drug use.' These findings, of broader context and expectations affecting diagnostic practice for malaria, are in line with the theory that clinicians operate with 'mindlines' rather than guidelines, as previously described in Tanzania (Chandler et al., 2008a) and Ghana (Chandler et al., 2010).

The 'juggling' that clinicians conveyed, between patients' desires, clinical guidelines and protecting medical reputations, was most commonly described by medical doctors, who perhaps feel in a stronger position to blame tests or 'quantity of blood' than lower cadre colleagues. This diversion of blame away from individuals and institutions may reflect difficulties with dealing with not knowing, and the primacy of the 'art' of medicine. The challenge of integrating new technologies and probabilistic-oriented guidelines into medicine is long standing and well described in Europe and the USA, where such 'evidence' has been doubted, reinterpreted, used as a starting point, added as one part of a tool-kit, or cast out in favour of other better established knowledges (Gordon, 1988; Kassirer, 1992; Tanenbaum, 1994). The introduction of parasite-based guidelines and equipment represents the same challenge, instigated by the evidence-based movement in the North, but expected to be played out far more rapidly in the South. Lessons from the adoption of evidence-based approaches elsewhere suggests

expectations for rapid scale-up of RDTs may need to be reined-in. In addition, those aiming for targets for all patients to be tested for malaria and treated in line with results may need to accept that while the strategy of appealing to 'the evidence' as the bottom line is attractive as a rationalisation project, this may be fought for at the expense of other aspects of the complex social process of health care (Goldenberg, 2006).

We recommend that the interpretive style of medicine should be valued and maintained rather than attempting to overwrite this with a probabilistic approach. Clinicians should be supported in continuing to respond to the complex social context of their work including crucially to the patient as a whole. Change towards improved clinical care and better use of resources may be achieved within this approach through different means that go beyond training in case management. Firstly, raising consciousness amongst clinicians of the reasons for and consequences of certain practices, such as providing 'placebo' tests or drugs, and stimulating problem-solving to achieve desired results without compromising clinical outcomes could enable change (Freire, 1975). Secondly, encouraging clinicians to experiment with their new tools in practice, including assessing the responses of patients, may also help to shift behaviour (Armstrong & Ogden, 2006). Thirdly, equipping clinicians with skills to communicate with patients in order to elicit their specific needs, for example to understand the meaning of a negative malaria test result, and to respond to these without reliance on the use of commodities could provide a channel through which to implement change. Findings from elsewhere in Cameroon suggest that there is still significant room for improvement in patient-centred care from biomedical providers (Labhardt et al., 2010). Such clinician-oriented interventions have been successful elsewhere when carried out at a local level through participatory workshops (Fonn et al., 2001). We have designed a supporting intervention for providers based on these principles, which will be compared with standard introduction of RDTs in a cluster randomised controlled trial in 2011-12 (clinicaltrials.gov NCT01350752) (Wiseman et

al., 2012). Our results also suggest that the role of probabilistic guidelines in routine case management needs to be debated amongst the wider community of clinicians in the professions of medicine and nursing.

In this paper, we have attempted to outline the 'reality' of malaria from the perspective of health workers. We know that the enactment of malaria is also different from the perspective of patients, researchers of varying disciplines and those involved in public health enterprises (Beisel, 2010). We therefore only present our partial interpretation, and these other perspectives will also be important to explore when considering the uptake of RDTs. Our interpretation is also only partial because of the perspectives of those asking questions in FGDs and the set-up of the project as part of a biomedical research organisation. Participants may have aligned their responses with expected biomedical norms, although this could strengthen our conclusion that malaria is constructed as paramount amongst diseases. The study could have been strengthened further with the use of observational methods such as ethnography, particularly given our focus on the praxis of malaria. The use of FGDs rather than interviews reduces our ability to analyse findings across different health worker characteristics, such as length of professional experience. However, our intention was to understand factors in common between different groups, and although the study was only in two areas of Cameroon, we suggest the common ground between the sub-groups and with findings elsewhere does provide some transferable concepts, such as the important place of the social roles of health workers, tests and medicines in health care.

## **Conclusion**

Few would dispute that rapid diagnostic tests have a potentially useful role to play in limiting malaria over-diagnosis and over-treatment. This study illustrates the divide between parasite-based guidelines initiated in Geneva and patient-based practice in Cameroon for the diagnosis and treatment of malaria. Careful attention must be paid to the values and priorities of health workers and patients if they are to be partners in improving diagnosis and treatment of febrile illnesses.

## References

- Ansah, E.K., Narh-Bana, S., Epokor, M., Akanpigiabiam, S., Quartey, A.A., Gyapong, J., et al. (2010). Rapid testing for malaria in settings where microscopy is available and peripheral clinics where only presumptive treatment is available: a randomised controlled trial in Ghana. *Bmj*, 340, c930.
- Armstrong, D. (2002). Clinical autonomy, individual and collective: the problem of changing doctors' behaviour. *Soc Sci Med*, 55, 1771-1777.
- Armstrong, D., & Ogden, J. (2006). The role of etiquette and experimentation in explaining how doctors change behaviour: a qualitative study. *Social Health Illn*, 28, 951-968.
- Baik, F., & Bell, D. (2007). Forecasting global procurement of malaria rapid diagnostic tests: estimates and uncertainties. . WHO – Western Pacific Region. Online at [www.wpro.who.int/sites/rdt](http://www.wpro.who.int/sites/rdt).
- Bastiaens, G.J., Schaftenaar, E., Ndaro, A., Keuter, M., Bousema, T., & Shekalaghe, S.A. (2011). Malaria diagnostic testing and treatment practices in three different Plasmodium falciparum transmission settings in Tanzania: before and after a government policy change. *Malar J*, 10, 76.
- Beisel, U. (2010). Who bites back first? Malaria control in Ghana and the politics of co- existence. PhD Thesis.: The Open University.
- Bell, D., & Peeling, R.W. (2006). Evaluation of rapid diagnostic tests: malaria. *Nat Rev Microbiol*, 4, S34-38.
- Bisoffi, Z., Sirima, B.S., Angheben, A., Lodesani, C., Gobbi, F., Tinto, H., et al. (2009). Rapid malaria diagnostic tests vs. clinical management of malaria in rural Burkina Faso: safety and effect on clinical decisions. A randomized trial. *Trop Med Int Health*, 14, 491-498.
- Chandler, C.I., Jones, C., Boniface, G., Juma, K., Reyburn, H., & Whitty, C.J. (2008a). Guidelines and mindlines: why do clinical staff over-diagnose malaria in Tanzania? A qualitative study. *Malar J*, 7, 53.
- Chandler, C.I., Mwangi, R., Mbakilwa, H., Olomi, R., Whitty, C.J.M., & Reyburn, H. (2008b). Malaria overdiagnosis: is patient pressure the problem? *Health Policy Plan*, 23, 170 - 178.
- Chandler, C.I., Whitty, C.J., & Ansah, E.K. (2010). How can malaria rapid diagnostic tests achieve their potential? A qualitative study of a trial at health facilities in Ghana. *Malar J*, 9, 95.
- Chinkhumba, J., Skarbinski, J., Chilima, B., Campbell, C., Ewing, V., San Joaquin, M., et al. (2010). Comparative field performance and adherence to test results of four malaria rapid diagnostic tests among febrile patients more than five years of age in Blantyre, Malawi. *Malar J*, 9, 209.
- Claridge, G. (1970). *Drugs and Human Behaviour*. London: Allen Lane.
- D'Acremont, V., Kahama-Marro, J., Swai, N., Mtasiwa, D., Genton, B., & Lengeler, C. (2009). Massive reduction of antimalarial prescription after Rapid Diagnostic Test implementation in Dar es Salaam, Tanzania. Presented at MIM Pan-African Malaria Conference. Nairobi, Kenya.
- Elmardi, K.A., Malik, E.M., Abdelgadir, T., Ali, S.H., Elsyed, A.H., Mudather, M.A., et al. (2009). Feasibility and acceptability of home-based management of malaria strategy adapted to Sudan's conditions using artemisinin-based combination therapy and rapid diagnostic test. *Malaria Journal*, 8, 39.
- Feinstein, A.R. (1975). Science, clinical medicine, and the spectrum of disease. In P.B. Beeson, & W. McDermott (Eds.), *Textbook of Medicine*. Philadelphia: Saunders.
- Fonn, S., Mtonga, A.S., Nkoloma, H.C., Bantebya Kyomuhendo, G., daSilva, L., Kazilimani, E., et al. (2001). Health providers' opinions on provider-client relations: results of a multi-country study to test Health Workers for Change. *Health Policy Plan*, 16 Suppl 1, 19-23.
- Freire, P. (1975). *Education for critical consciousness*. New York: Seabury Press.
- Goldenberg, M.J. (2006). On evidence and evidence-based medicine: Lessons from the philosophy of science. *Social Science & Medicine*, 62, 2621-2632.

- Gordon, D.R. (1988). Clinical Science and Clinical Expertise: Changing Boundaries between Art and Science in Medicine. In M. Lock, & D.R. Gordon (Eds.), *Biomedicine Examined* pp. 257-295. Dordrecht: Kluwer.
- Haaland, A., Molyneux, C.S., & Marsh, V. (2006). Quality information in field research: Training manual on practical communication skills for field researchers and project personnel. World Health Organization on behalf of the Special Programme for Research and Training in Tropical Diseases. Available online [http://whqlibdoc.who.int/hq/2006/TDR\\_IRM\\_PCT\\_05.1\\_eng.pdf](http://whqlibdoc.who.int/hq/2006/TDR_IRM_PCT_05.1_eng.pdf).
- Hamer, D.H., Ndhlovu, M., Zurovac, D., Fox, M., Yeboah-Antwi, K., Chanda, P., et al. (2007). Improved diagnostic testing and malaria treatment practices in Zambia. *JAMA*, 297, 2227-2231.
- Hopkins, H. (2008). Effectiveness and safety of training in fever case management and RDT use at health centres in Uganda. Presented at American Society of Tropical Medicine & Hygiene 57th Annual Meeting, New Orleans.
- Kassirer, J.P. (1992). Clinical Problem-Solving. A New Feature in the Journal. *N Engl J Med*, 326, 60-61.
- Kleinman, A. (1973). Medicine's Symbolic Reality: On a Central Problem in the Philosophy of Medicine. *Inquiry*, 16, 206-213.
- Koenig, B.A. (1988). The technological imperative in medical practice: the social creation of a 'routine' treatment'. In M. Lock, & D.R. Gordon (Eds.), *Biomedicine Examined* pp. 465-498). Dordrecht: Kluwer.
- Kyabayinze, D.J., Asimwe, C., Nakanjako, D., Nabakooza, J., Counihan, H., & Tibenderana, J.K. (2010). Use of RDTs to improve malaria diagnosis and fever case management at primary health care facilities in Uganda. *Malar J*, 9, 200.
- Labhardt, N.D., Aboa, S.M., Manga, E., Bensing, J.M., & Langewitz, W. (2010). Bridging the gap: how traditional healers interact with their patients. A comparative study in Cameroon. *Trop Med Int Health*.
- Lubell, Y., Reyburn, H., Mbakilwa, H., Mwangi, R., Chonya, S., Whitty, C.J.M., et al. (2008). The impact of response to the results of diagnostic tests for malaria: cost-benefit analysis. *Bmj*, 336, 202 - 205.
- Lynoe, N., Mattsson, B., & Sandlund, M. (1993). The attitudes of patients and physicians towards placebo treatment--a comparative study. *Soc Sci Med*, 36, 767-774.
- Mangham, L.J., Cundill, B., Achonduh, O.A., Ambabila, J.N., Lele, A.K., Metoh, T.N., et al. (2011). Malaria prevalence and treatment of febrile patients at health facilities and medicine retailers in Cameroon. *Trop Med Int Health*.
- Masanja, M.I., McMorro, M., Kahigwa, E., Kachur, S.P., & McElroy, P.D. (2010). Health workers' use of malaria rapid diagnostic tests (RDTs) to guide clinical decision making in rural dispensaries, Tanzania. *Am J Trop Med Hyg*, 83, 1238-1241.
- Mawili-Mboumba, D.P., Akotet, M.K., Ngoungou, E.B., & Kombila, M. (2009). Evaluation of rapid diagnostic tests for malaria case management in Gabon. *Diagn Microbiol Infect Dis*.
- Ministry of Public Health. (2008). Guidelines for the management of malaria in Cameroon. Intended for health personnel. Republic of Cameroon.
- Ministry of Public Health. (2009). Scaling up malaria control for impact in Cameroon. Global Fund Proposal (R9\_CCM\_CMCR\_HTM\_PF\_4Aug09\_ENG). Republic of Cameroon.
- Moerman, D.E. (2000). Cultural Variations in the Placebo Effect: Ulcers, Anxiety, and Blood Pressure. *Medical Anthropology Quarterly*, 14, 51 -72.
- Mol, A. (2002). *The body multiple: ontology in medical practice*. Durham and London: Duke University Press.
- Moody, A. (2002). Rapid diagnostic tests for malaria parasites. *Clin Microbiol Rev*, 15, 66-78.
- Moonasar, D., Goga, A.E., Freaan, J., Kruger, P., & Chandramohan, D. (2007). An exploratory study of factors that affect the performance and usage of rapid diagnostic tests for malaria in the Limpopo Province, South Africa. *Malar J*, 6, 74.

- Msellem, M.I., Martensson, A., Rotllant, G., Bhattarai, A., Stromberg, J., Kahigwa, E., et al. (2009). Influence of rapid malaria diagnostic tests on treatment and health outcome in fever patients, Zanzibar: a crossover validation study. *PLoS Med*, 6, e1000070.
- Mykhalovskiy, E., & Weir, L. (2004). The problem of evidence-based medicine: directions for social science. *Social Science & Medicine*, 59, 1059-1069.
- Nankabirwa, J., Zurovac, D., Njogu, J.N., Rwakimari, J.B., Counihan, H., Snow, R.W., et al. (2009). Malaria misdiagnosis in Uganda--implications for policy change. *Malar J*, 8, 66.
- Nichter, M. (2008). *Global Health. Why cultural perceptions, social representations, and biopolitics matter*. Tucson: University of Arizona Press.
- Onwujekwe, O., Uzochukwu, B., Dike, N., Uguru, N., Nwobi, E., & Shu, E. (2009). Malaria treatment perceptions, practices and influences on provider behaviour: comparing hospitals and non-hospitals in south-east Nigeria. *Malar J*, 8, 246.
- Pope, C. (2003). Resisting evidence: the study of evidence-based medicine as a contemporary social movement. *Health*, 7, 267-282.
- Reyburn, H., Mbakilwa, H., Mwangi, R., Mwerinde, O., Olomi, R., Drakeley, C., et al. (2007). Rapid diagnostic tests compared with malaria microscopy for guiding outpatient treatment of febrile illness in Tanzania: randomised trial. *Bmj*, 334, 403.
- Rowe, A.K., de Leon, G.F., Mihigo, J., Santelli, A.C., Miller, N.P., & Van-Dunem, P. (2009). Quality of malaria case management at outpatient health facilities in Angola. *Malar J*, 8, 275.
- Shillcutt, S., Morel, C., Goodman, C., Coleman, P., Bell, D., Whitty, C.J., et al. (2008). Cost-effectiveness of malaria diagnostic methods in sub-Saharan Africa in an era of combination therapy. *Bull World Health Organ*, 86, 101-110.
- Skarbinski, J., Ouma, P.O., Causer, L.M., Kariuki, S.K., Barnwell, J.W., Alaii, J.A., et al. (2009). Effect of malaria rapid diagnostic tests on the management of uncomplicated malaria with artemether-lumefantrine in Kenya: a cluster randomized trial. *Am J Trop Med Hyg*, 80, 919-926.
- Tanenbaum, S.J. (1994). Knowing and Acting in Medical-Practice - the Epistemological Politics of Outcomes Research. *Journal of Health Politics Policy and Law*, 19, 27-44.
- Thiam, S., Thior, M., Faye, B., Ndiop, M., Diouf, M.L., Diouf, M.B., et al. (2011). Major reduction in anti-malarial drug consumption in Senegal after nation-wide introduction of malaria rapid diagnostic tests. *PLoS ONE*, 6, e18419.
- Uzochukwu, B.S., Chiegboka, L.O., Enwereuzo, C., Nwosu, U., Okorafor, D., Onwujekwe, O.E., et al. (2010). Examining appropriate diagnosis and treatment of malaria: availability and use of rapid diagnostic tests and artemisinin-based combination therapy in public and private health facilities in south east Nigeria. *BMC Public Health*, 10, 486.
- Van der Geest, S., & Whyte, S.R. (1989). The Charm of Medicines: Metaphors and Metonyms. *Medical Anthropology Quarterly*, 3, 345-367.
- Williams, H.A., Causer, L., Metta, E., Malila, A., O'Reilly, T., Abdulla, S., et al. (2008). Dispensary level pilot implementation of rapid diagnostic tests: an evaluation of RDT acceptance and usage by providers and patients--Tanzania, 2005. *Malar J*, 7, 239.
- Wiseman, V., Mangham, L.J., Cundill, B., Achonduh, O.A., Nji, A.M., Njei, A.N., et al. (2012). A cost-effectiveness analysis of provider interventions to improve health worker practice in providing treatment for uncomplicated malaria in Cameroon: a study protocol for a cluster randomized controlled trial. *Trials*, 13, 4.
- World Health Organisation. (2010). Guidelines for the Treatment of Malaria. Second edition. Geneva: Available online at <http://www.who.int/malaria/publications/atoz/9789241547925/en/index.html>

- World Health Organisation, FIND, CDC, & TDR (2008). Malaria rapid diagnostic test performance. Results of WHO product testing of malaria RDTs: Round 1 <http://apps.who.int/tdr/svc/publications/tdr-research-publications/rdt-performance>.
- Zikusooka, C.M., McIntyre, D., & Barnes, K.I. (2008). Should countries implementing an artemisinin-based combination malaria treatment policy also introduce rapid diagnostic tests? *Malar J*, 7, 176.
- Zurovac, D., Njogu, J., Akhwale, W., Hamer, D.H., Larson, B.A., & Snow, R.W. (2008). Effects of revised diagnostic recommendations on malaria treatment practices across age groups in Kenya. *Trop Med Int Health*, 13, 784-787.

## Tables

TABLE 1. SUB-GROUP CHARACTERISTICS OF HEALTH WORKER FGDS

	Number of FGDs	
	Bamenda	Yaoundé
<b>Health facility type</b>		
Public	5	5
Mission	3	4
<b>Cadre</b>		
Medical Doctors only	2	3
Staff nurses/registered nurses only	0	6
Nurses and nursing assistants mixed	6	0
<b>Total</b>	<b>8</b>	<b>9</b>

TABLE 2. DEMOGRAPHIC AND WORK HISTORY CHARACTERISTICS OF HW FGD PARTICIPANTS

	Number of participants (%)	
	Bamenda	Yaoundé
<b>Gender</b>		
Female	56 (82%)	55 (71%)
Male	12 (18%)	23 (29%)
<b>Age</b>		
30 and younger	15 (22%)	13 (17%)
31-45	39 (57%)	40 (51%)
46 and older	14 (21%)	25 (32%)
<b>Originally from region</b>		
Yes	24 (35%)	24 (31%)
No	44 (65%)	54 (69%)
<b>Highest education level</b>		
Primary School	7 (10%)	1 (1%)
Secondary School	18 (27%)	35 (45%)
High School	28 (41%)	22 (28%)
Bachelor's Degree/diploma	15 (22%)	20 (26%)
<b>Number of years health profession training</b>		
1 year	26 (38%)	1 (1%)
2 years	7 (10%)	23 (30%)
3 years	16 (24%)	32 (41%)
4 + years	19 (28%)	22 (28%)
<b>Health profession graduation year</b>		
1990 and before	14 (21%)	20 (25%)
1991-2000	18 (26%)	27 (35%)
2001-2010	36 (53%)	31 (40%)
<b>Number of malaria trainings attended</b>		
None	42 (62%)	40 (51%)
1	13 (19%)	24 (31%)
2	7 (10%)	7 (9%)
3+	6 (9%)	7 (9%)
<b>Total</b>	<b>68</b>	<b>78</b>