

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY  
KUMASI,  
COLLEGE OF HEALTH SCIENCES  
FACULTY OF PHARMACY AND PHARMACEUTICAL SCIENCES  
DEPARTMENT OF CLINICAL AND SOCIAL PHARMACY**



**DETERMINATION OF ADHERENCE TO ARTEMISININ-BASED  
COMBINATION THERAPY (ACT) AS THE FIRST LINE TREATMENT OF  
UNCOMPLICATED MALARIA IN THE MAMPONG MUNICIPALITY,  
ASHANTI**

**POKU KWABENA OKAE  
B. PHARM. (HONS.)  
FEBRUARY 2010**

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ASHANTI**

**A THESIS SUBMITTED TO THE DEPARTMENT OF CLINICAL AND SOCIAL  
PHARMACY  
IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF  
MASTER OF  
CLINICAL PHARMACY**

**POKU KWABENA OKAE  
B. PHARM. (HONS.)**

**FEBRUARY 2010**

## **DECLARATION**

I declare that this is the result of my own research. References from the work of others have been clearly stated. I hereby declare that this work is an original one and has not been submitted for any degree, nor is it being submitted to any other university or institute for any other degree.

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**Name: Dr. Mrs. Frances Owusu-Daaku  
(HEAD OF DEPARTMENT)**

## **DEDICATION**

This work is dedicated to my wife and children, Mrs. Selina Sakyiwaa Poku Okae, Poku Kwadwo Okae, Poku Kwabena Okae Amaning and Selina Sakyiwaa Poku Okae, for their prayers, patience and support during the period of the programme.

## **SPONSORSHIP**

Self sponsored

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## **DEFINITION OF TERMS**

### **Order A-Z**

Adherence	Adherence is the degree to which a person takes prescribed drugs as directed or agrees to prescribe or use ACT as the first line treatment for uncomplicated malaria.
Client	Patient or carer
Medicine bulletin	List of medicines and their quantities in stock in health facilities
Prescriber	Doctor, nurse, medical assistant, midwife or community health nurse who diagnosed uncomplicated malaria in a health facility in the district during the period of the study.
Prescription aid	Policy guidelines, treatment wall chart, medicine bulletin

## **ABBREVIATIONS/ACRONYMS**

ACT	-	Artemisinin-based Combination Therapy
AL	-	Artemether/Lumefantrine
ANC	-	Ante-Natal Clinic
ASHP	-	American Society of Health-System Pharmacists
CI	-	Confidence Interval
CFR	-	Case Fatality Rate
CHPS	-	Community-based Health Planning Services
EML	-	Essential Medicine List
FDA	-	Food and Drug Administration
HMM	-	Home-based Management of Malaria
IMCI	-	Integrated Management of Childhood Illnesses
INRUD	-	International Network for the Rational Use of Drugs
IPT	-	Intermittent Preventive Treatment
ITNs	-	Insecticide Treated Nets
MAM	-	Mobilize Against Malaria
MDG	-	Millennium Development Goals
MHMT	-	Municipal Health Management Team

NMCP	-	National Malaria Control Programme
NHIS	-	National Health Insurance Scheme
NMIMR	-	Noguchi Memorial Institute for Medical Research
OPD	-	Out- Patients Department
OTC	-	Over the counter drugs
RBM	-	Roll Back Malaria
SP	-	Sulfadoxine/Pyrimethamine
STG	-	Standard Treatment Guidelines
UNICEF	-	United Nations Children's Fund
WHO	-	World Health Organization

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## **ABSTRACT**

### **INTRODUCTION**

Following the failure of chloroquine as first line for the treatment of uncomplicated malaria, many countries including Ghana have changed their anti-malarial treatment policy to artemisinin-based combination therapy (ACT). However, adherence remains the key to the realisation of the goals of the new policy.

### **OBJECTIVES**

The main objective was to determine the adherence of prescribers and clients to ACT as the first line treatment of uncomplicated malaria in Mampong Municipality.

### **METHODOLOGY**

A descriptive cross-sectional survey using methods recommended in the WHO guidelines on “How to investigate drug use in health facilities” by the “International Network for the Rational Use of Drugs (INRUD)” was employed. A total of 2,776 OPD records of cases of uncomplicated malaria between 1<sup>st</sup> January, 2006 to 31<sup>st</sup> December, 2008 were systematically sampled and reviewed. Fifteen prescribers, eleven pharmacist/dispensing technicians and 250 clients were interviewed. All the six accredited NHIS Pharmacies (2) and chemical shops (4) and ten randomly selected chemical shops were also surveyed for the availability of ACT.

### **FINDINGS**

Prescribers and clients adherence to ACT was found to be moderate (75.4 percent and 74.4 percent for prescribers and clients respectively) although prescribers had been trained and were prescribing ACT as first line treatment for uncomplicated. Some prescribers still prescribe mono-therapies such as suspension amodiaquine since they claimed there is no better formulation of ACT (Artesunate-Amodiaquine) for children.

ACT was available in all public health facilities in the municipality. ACT prescribing increased from 2006 to 2008 as chloroquine and sulfadoxine pyrimethamine prescribing reduced to zero in 2008. Major side effect of ACT was bodily weakness.

## **CONCLUSION**

Adherence to the new anti-malaria treatment policy was found to be 75.4 percent and 74.4 percent for prescribers and clients respectively at the time of the survey.

## CHAPTER ONE

### 1 INTRODUCTION

**1.1 BACKGROUND:** Malaria is a vector borne communicable disease caused by the Plasmodium parasite with *Plasmodium falciparum* being the most common. O

n the global front, malaria threatens the lives of about 3.2 billion people. At least, five hundred million people are infected annually and about one million victims die. Children under five years and pregnant women are the most affected group. Ninety percent of malaria deaths occur in Africa where malaria accounts for about one fifth of all under-five mortality (Bellamy, 2009).

Malaria is hyper endemic in Ghana and accounts for about 44% of health facilities' outpatient department (OPD) attendance and 13% of all hospital deaths. Malaria accounts for about 22% of mortality among children under 5 years and contributes to about 9% of overall mortality in Ghana. At least 40% of malaria deaths occur among infants and children under 5 years (Asenso-Okyere and Dzator, 1997).

In an attempt to control diseases with such a huge burden and high economic implications like malaria, policies are formulated by countries to standardize treatment and also to make treatment available and accessible to the average person. The policies, if adhered to, help in the rational utilization of the limited resources for the treatment of the disease and invariably lead to the prolongation of the effective life span of the medicines being used. When there is appreciable extent of adherence but a deviation occurs from the expected goals, the need arises for policy review. Failure of treatment policy in achieving its goals leads to dissatisfaction of stakeholders which in the long term leads to non-

adherence. Non-adherence to an effective treatment policy also leads to failure in achieving the goals of the policy. Thus, in order to evaluate the success or otherwise of a treatment policy in achieving its goals, the extent of adherence must first be established.

Lack of adherence can stem from:

1. Prescribers not being aware of the policy and/or not willing to give the prescribed treatment to patients for any reason.
2. The medicine not being available in its specified form,
3. Patients not understanding treatment instructions, or
4. Patients not adhering to the treatment instructions when given the prescribed treatment.

Lack of adherence on the part of manufacturers, prescribers and patients among other factors, led to the failure of chloroquine in treating uncomplicated malaria worldwide.

This has necessitated the change in anti-malarial treatment policies from chloroquine to Artemisinin-based combination therapy (ACT) in many countries including Ghana.

It is expected that the change in policy will bring a reduction in the malaria toll as a result of expected reduction in treatment failure, recrudescence and gametocyte transmissibility effect of the ACT, if the policy is adhered to. Thus, by ensuring adherence to the new anti-malaria policy, morbidity and mortality due to malaria may be reduced.

## **1.2 PROBLEM AND RATIONALE**

“Malaria, hinders social progress and development, negatively affects the intellectual and physical development of children and the growth of national economies” (Bellamy, 2009). Consequences of malaria among pregnant women include anaemia, spontaneous abortion, preterm deliveries and low birth weight. Among adults, malaria morbidity reduces productivity and increases the overall health care budget. However, malaria is both preventable and curable.

In the year 2006, 2007 and 2008 the Mampong municipality (then Sekyere West district) reported 24,158, 44,747 and 33,262 respectively of the total OPD cases being uncomplicated malaria (Appendix VI). In all the years uncomplicated malaria was the number one in the ten top OPD diseases burden and malaria in pregnancy which did not appear in the previous years, appeared in 2008 at the 9<sup>th</sup> position.

For the top ten causes of admission severe malaria in 2006, 2007 and 2008 were at the 4<sup>th</sup>, 3<sup>rd</sup> and 2<sup>nd</sup> positions and the percentages were 11.64%, 12.10% and 20.20% respectively.

In the case of top ten causes of death malaria was 4<sup>th</sup> in 2006 (8 deaths representing 6.5%); 2007 was 4<sup>th</sup> (10 deaths representing 7.4%) and 2008 was 5<sup>th</sup> (9 deaths representing 4.8%).

Total under 5 OPD cases of malaria for 2006, 2007 and 2008 were 7,359, 5,806 and 7,545; admissions were 323, 182 and 605; and under 5 deaths were 9(2.7%), 1(0.6%) and 1(0.2%) respectively.



The total number of malaria in pregnancy in 2006, 2007 and 2008 were 356, 383 and 967 and malaria in pregnancy admissions were 101, 97 and 142 respectively. In the entire three year frame no mortality was recorded in malaria in pregnancy.

Contrary to expectation of reducing malaria cases and mortality, the malaria burden in the municipality was still on the increase after the change in treatment policy.

It is not yet known, whether this new policy is being adhered to, since its implementation in Ghana about three and half years ago.

Some educational campaigns and awareness creation were done prior to its implementation. In spite of this, there has been a public outcry about the incidence of serious side effects of artesunate-amodiaquine, following the implementation of the policy. This led to modification of the dosage regimen (that daily doses should be taken in two equal divided doses twelve hourly, instead of a single daily dose), and this might have compromised adherence. However, no work has yet been done in the municipality on its monitoring and evaluation. This study will help ascertain the extent of acceptability and adherence to the policy in the face of the initial complaints of serious side effects from the public and will therefore serve as a tool for the National Malaria Control Programme (NMCP), as the findings will form the baseline for the evaluation of the policy implementation in the municipality. Moreover, the findings of this study will be beneficial towards the achievement of the goals of the Roll Back Malaria (RBM) initiative and the achievement of the 4<sup>th</sup> and 6<sup>th</sup> Millennium Development Goals (MDGs). The study can also be scaled up across the country, to give the national picture of the extent of acceptability and adherence to the new anti-malaria policy and help in malaria control.

### 1.3 CONCEPTUAL FRAMEWORK

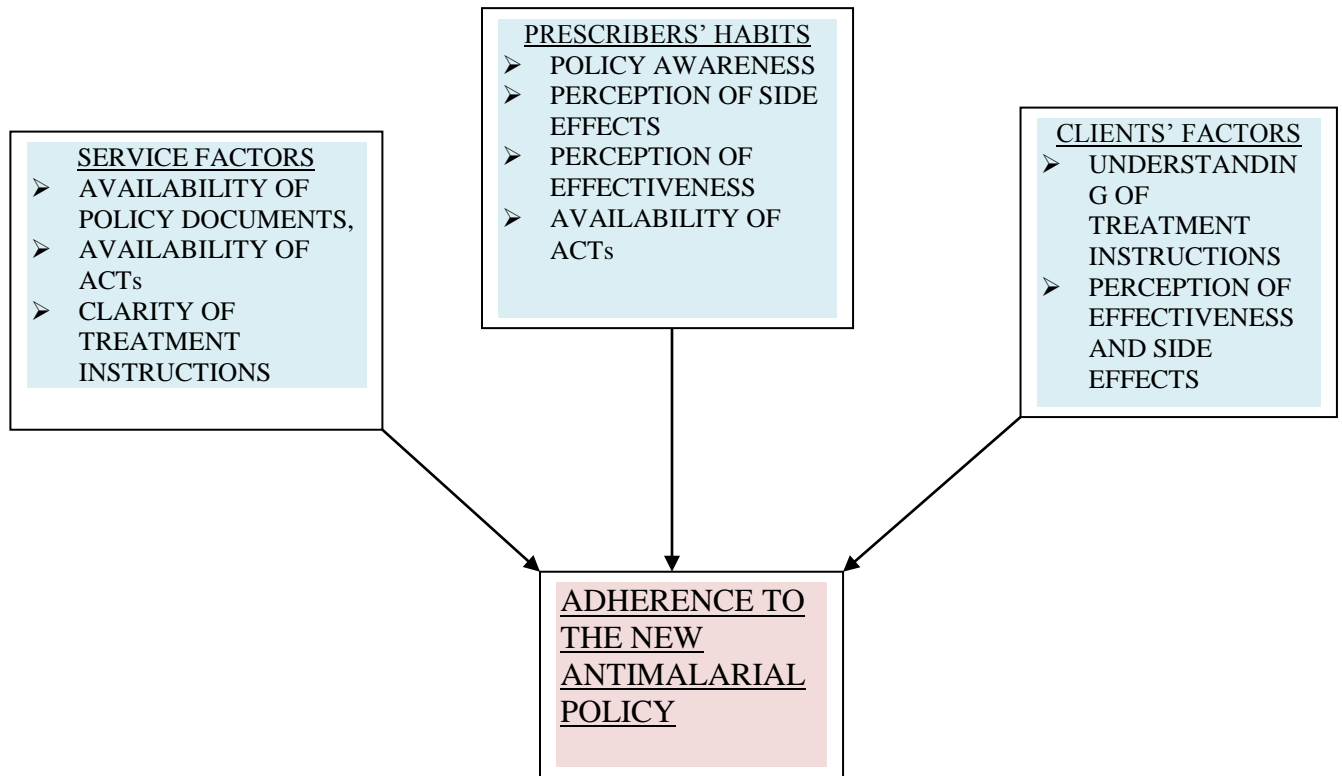


Figure 1: CONCEPTUAL FRAMEWORK (SOURCE: AUTHOR, 2008)

#### 1.3.1 EXPLANATION OF THE CONCEPTUAL FRAME WORK

As indicated in Figure 1, adherence is a very broad issue embracing the way and manner the drug is designed, the manufacturing processes employed, the distribution and storage systems used. These factors determine the availability of safe and efficacious drugs in the country, but they were not considered in this study because of limited time and resources.

Key issues that may influence adherence with the new anti-malarial drug policy for uncomplicated malaria in the study included the following:-

1. Service factors, (the policy being disseminated to health care providers, availability of ACTs in health facilities, determined by the competencies of logistics managers in

procurement and storage of medicine, availability of prescription aides – policy guidelines, treatment wall charts and medicine bulletins, as well as the quality of service rendered with regards to clarity of instructions given).

2. Adherence of prescribers in prescribing ACT as the first line treatment for uncomplicated malaria, (which is determined by their awareness of the policy, their perception about the effectiveness and safety of the medication, patients acceptance and the availability of the medicine)

3. Clients' acceptance and utilization of ACT (which depends on their understanding of treatment instructions, as well as their knowledge and perception about the effectiveness and safety of the medicine).

#### **1.4 RESEARCH QUESTIONS**

1. Have prescribers been trained and do they have access to policy guidelines, prescription charts and/or drug bulletins, to enable them adhere to the policy?
2. Are prescribers complying with the policy in prescribing artemisinin-based combination therapy as the first line treatment for uncomplicated malaria?
3. Are the recommended medicines available in the health facilities' dispensaries and the community medicine outlets (pharmacies and licensed chemical shops)?
4. Do patients complete the full dosage regimen when ACT has been dispensed to them?
5. Do patients experienced any side effects when they take ACTs?

## **1.5 OBJECTIVES**

### **1.5.1 AIM**

To determine the adherence of prescribers and clients to Artemisinin-based combination therapy (ACT) as the first line treatment of uncomplicated malaria in the populace in Mampong Municipality.

### **1.5.2 SPECIFIC OBJECTIVES**

- 1) To determine the adherence of the policy by the prescribers within the Municipality.
- 2) To determine the adherence of the medicine among patients.
- 3) To determine the availability of ACTs in the facilities.
- 4) To compare the rate of prescribing of the various anti-malarial treatment in use.
- 5) To determine the side effects associated with the ACTs.

## **CHAPTER TWO**

### **2 LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

A number of drugs have been used for the case management of uncomplicated malaria over the years. “Quinine, extracted from the bark of Cinchona tree, was used to treat malaria from 1632. Primaquine and Quinacrine were produced and used after the First World War and was followed shortly by chloroquine in 1934, which later became the first line drug for malaria treatment” (Talisuna et al., 2004). However, the development of resistance by the plasmodium parasite to these drugs had limited their use in malaria treatment.

For example, resistance to quinine was reported in 1844 and 1914 and the first report on chloroquine resistance was from South-East Asia in 1957 (White, 2004). Similar reports came from South America in 1960, Kenya and Tanzania in 1978, and Sudan in 1983. (Malariasite, 2009)

In Ghana, chloroquine resistance was first reported in the early 1980’s and by the year 2000, studies conducted by the Noguchi Memorial Institute for Medical Research (NMIMR) across the nation showed that clinical and parasitological resistance had gone beyond acceptable limits. This was confirmed by other studies in 2003 (Ghana Health Service, 2005).

Factors contributing to anti-malarial drug resistance include the use of substandard medications, inappropriate prescribing habits (Yousif and Adeel, 2000) and non adherence among patients (Djimde et al., 1998). In view of the fact that the discovery and

formulation of safe and efficacious medicines require a lot of efforts, capital and time, it becomes necessary that resistance development is prevented. In an attempt to guard against the development of resistance by the plasmodium parasite to anti-malarial drugs, malaria treatment protocols are standardized and regulated. This is done through the enactment of anti-malarial treatment policies, which could be reviewed when the need arises.

## **2.2 REVIEW OF ANTI-MALARIA TREATMENT POLICY**

An anti-malaria treatment policy is a set of recommendations and regulations concerning the availability and rational utilization of anti-malarial drugs in a country (Atta, 2002).

Review of drug policies becomes necessary whenever available evidence proves failure on the part of existing ones in achieving the purposes for which they were enacted (WHO, 1999).

Indicators usually used for policy review include:

1. Increased morbidity and mortality associated with malaria.
2. Consumer and provider dissatisfaction with the current policy.
3. Increasing evidence of treatment failure of the current drug above a certain threshold.
4. Evidence from new drugs, strategies and approaches indicating that the current policy may not be the best (WHO, 1999).

According to the WHO framework for the review of anti-malarial drug policies, treatment failure rate of up to 5% is considered as a grace period, 6%-15% as an alert period, 16%-24% as action period and above 25% as the change period.

These guidelines informed the change from chloroquine to sulfadoxine-pyrimethamine (SP) in 1993 in Malawi (Baker and Barnes, 2001); from chloroquine to artemether-lumefantrine (AL) in 2001 in South Africa (Baker and Barnes, 2001); from chloroquine to SP in 1998 in Kenya (Shretta et al., 2000) and again from SP to AL in 2004 (Amin et al., 2007); from chloroquine to SP in 2001 in Tanzania (Eriksen J et al, 2005); and from chloroquine to ACT (artesunate-amodiaquine) in 2005 in Ghana (Ministry of Health, 2004b).

Among the possible artemisinin-based combination therapies are artesunate-sulfadoxine/pyrimethamine, artesunate-mefloquine, artesunate-amodiaquine, dihydroartemisinin-piperaquine and artemther-lumefantrine.

The reason for combining anti-malarials is to increase the cure rate. Additionally, drug combinations can shorten duration of artemisinin-based treatment and hence increase adherence. The risk of development of resistant strains of the parasites through mutation during therapy is also reduced (Kremsner et al., 2004; Nosten et al., 2000). “Artemisinin derivatives serves as important combination partners, in that they produce about ten thousand fold reductions in parasite biomass per asexual cycle, reduce malaria transmissibility-effect on the gametocytes (Barnes et al., 2005) and no resistance by parasites has yet been reported” (White, 1999).

The general objective of the new anti-malarial drug policy is to ensure the effective treatment of all malaria cases in all categories of the population in order to reduce the morbidity and mortality especially in children under five and pregnant women (Ministry of Health, 2004a).

The specific objectives are:

1. To provide rapid and long lasting clinical cure.
2. To reduce morbidity including malaria-related anaemia.
3. To halt progression of uncomplicated malaria into severe and potentially fatal disease.
4. To halt progression of uncomplicated malaria infection and maternal malaria

associated anaemia through chemoprophylaxis or intermittent therapy.

5. To minimize the occurrence and rate of development of drug resistance (Ministry of Health, 2004b).

It is therefore hoped that if the new policy is adhered to, malaria control in the country will be enhanced.

### **2.3 ADHERENCE**

Adherence is the degree to which a person takes prescribed drugs as directed. Adherence to drug treatment is important. However, only about half the people who leave a doctor's office with a prescription take the drug as directed (Ellis, 2005). Among the many reasons people give for not adhering to drug treatment, forgetfulness is the most common. The key question then is: Why do people forget? Sometimes, the psychological mechanism of denial is at work. Having a disorder causes concern, and having to take a drug is a constant reminder of the disorder. Or, something about the treatment, such as possible side effects, may greatly concern the person, resulting in a reluctance to follow the plan (Ellis, 2005)



### **2.3.1 PRESCRIBERS ADHERENCE TO ACT**

Drug treatment policy adherence invariably dwells very much on the prescribers who may be influenced positively or otherwise by a number of factors. These factors include lack of knowledge about the policy, availability of medicines, cost considerations, perceptions about side effects and client demands for treatment outside the policy guidelines (Tawfik, 2005; Zurovac et al., 2004). The success of any drug policy implementation depends on the extent to which it is disseminated among health care providers. This in turn depends on initial training, refresher training and reminders, as well as supervision. (Trap et al., 2001; Zurovac et al., 2004)

It has been reported that higher level practitioners are less likely to comply with treatment policies than their lower level counterparts. This is due to the fact that they may consider the policy to be just a guide and not a rule and therefore overrule policy demands by their clinical judgement. They also have more insight into the use of alternative treatment and are likely to be more empathetic about clients' complaints and demands (Rowe et al., 2003; Zurovac et al., 2004). Sometimes, prescribers' perception about the safety or effectiveness of some medication can influence adherence with treatment policy. The low level of artemether-lumefantrine prescriptions in Zambia among children less than two years of age, had been attributed to prescribers thinking that the drug may be "too strong" for those tender aged children (Zurovac et al., 2005).

Health workers' prescribing habits can be assessed by direct observation, health worker interview, patient or carer interview (Zurovac et al., 2005), or retrospectively by analyzing prescription cards or out-patient records (Aina et al., 2004).

### **2.3.2 PATIENTS ADHERENCE**

It is the acceptance with adherence to treatment by clients which bring into fruition the efforts rendered by health care providers, and these are also influenced by a number of factors.

Understanding of treatment instructions is very crucial to client adherence. This is often aided by unit packaging and clear labeling of medicines (Fogg et al., 2004; Quigjun et al., 1998; Yeboah-Antwi et al., 2001). ACT should be taken with meals or after meals and are dosed based on patient's body weight (Mobilized Against Malaria Licensed Chemical Sellers (MAM LCS) training manual, 2008)

It has also been reported that lack of formal education is associated with non compliance, as this is likely to hinder prescriber and client interactions and understanding of treatment instructions (Fogg et al., 2004). The language for communication can also influence understanding of treatment instructions, where differences exist between the dialects of the provider and the client.

Misconceptions about the effectiveness and side effects of medications are likely to influence clients' acceptability and adherence. Clients are more likely to accept treatment, if they think they can tolerate the side effects. Whereas client perception about effectiveness of treatment is likely to promote acceptance, there is some perception that rapid clinical cure could lead to non-completion of the dosage regimen. (Fogg et al., 2004).

Directly observed therapy can increase patients' adherence but not at all times (Kachur et al., 2004). In some other studies, (Kofoed et al., 2003; Marsh et al., 2004), researchers found that blood chloroquine levels in children whose carers reported full adherence to a 25mg/kg dose taken unsupervised at home were not significantly different from the levels in children who had received the same dose under supervision. These studies did not support the association of adherence with directly observed therapy, but showed some reliability about self reports of carers, (usually mothers), about their children's medication.

Adherence on the part of patients can be measured by self or carer report, pill counts or container inspection and by blood or urine drug assays (Fogg et al., 2004; Yeboah-Antwi et al., 2001; Yeung and White, 2005).

In measuring patients' adherence to chloroquine in household surveys, drug histories with or without pill-count and container inspection, were used and results were validated with focus group discussions and key informant interviews (Yeboah-Antwi et al., 2001). It was realized that unit dose packaging leads to increased patient adherence.

In an earlier investigation, measurement of patient adherence to chloroquine and primaquine by drug assay of the urine was found to be comparable to assessment by self report (Quigjun et al., 1998). This buttresses the fact that, patients' (or carers') report could be used for measuring patients' adherence. In a baseline survey conducted in Uganda, patients' adherence to a six days treatment with artemether-lumefantrine for uncomplicated malaria was reported to be 90% (Fogg et al., 2004). In another study conducted in Tanzania, it was reported that adherence to sulfadoxine-pyrimethamine and

artemunate combination for the treatment of uncomplicated malaria was 75% (Kachur et al., 2004). These two studies give the indication that, if the service factors and prescribers co-operation are well harmonized, patients' adherence level could be high.

### **2.3.3 CHILDREN AND ADHERENCE**

Children are less likely than adults to take or be given drugs as directed. Children often will refuse bitter taste medicines and are frightened when given injections. Sometimes parents do not understand a doctor's instructions. Also, parents (and patients) forget, on average, about half the information 15 minutes after meeting with a doctor. They remember the first third of the discussion best and remember more about diagnosis than about the details of treatment. That is why doctors should try to keep the treatment plan simple and often provide written instructions (Osterberg et al., 2005).

### **2.3.4 OLDER PEOPLE AND ADHERENCE**

Although adherence is probably not affected by old age itself, it is affected by several factors that are common among older people, such as physical or mental impairments, the use of more drugs, and an increased risk of drug-drug interactions and side effects. Taking several drugs makes remembering when to take each drug harder and increases the risk of adverse drug-drug interactions, particularly when over-the-counter drugs are also being taken. Doctors may be able to simplify the drug regimen—by using one drug that serves two purposes or by reducing the number of times a drug must be taken—to improve adherence and to reduce the risk of interactions.

For many patients, one of the biggest stumbling blocks to taking their medicines is the complexity of the regimen. Studies find that patients on once-daily regimens are much

more likely to comply than patients who are required to take their medicine(s) multiple times each day.

Conversely, the number of medications a person takes has a negative impact on adherence. Of special concern are adults aged 65 and older, who take more prescription and over the counter (OTC) medicines than any other age group. According to a 2001 survey of older Americans conducted by the American Society of Health-System Pharmacists (ASHP), 82% of patients over age 65 take at least one prescription medicine, more than half (54%) take three or four prescription medicines, and as many as a third (33%) take eight or more prescription medicines to treat their health condition. (Osterberg et al., 2005).

## **CHAPTER THREE**

### **3 METHODOLOGY**

#### **3.1 PROFILE OF STUDY AREA (MAMPONG MUNICIPALITY)**

Mampong Municipality is one of the 27 districts in the Ashanti Region which has Mampong as its capital with a population of 97,049 and 74 communities (urban and rural). The municipality capital is about 57 km radius from the regional capital, Kumasi. It is bounded on the south and west by Sekyere South, the north through to the east and to the south east by Sekyere Central district. The municipality forms about 2.2% of the total land area of Ashanti Region. It is within the forest zone of Ghana as such malaria burden is all year round. (Mampong Municipality Health Directorate Annual Report (MMHD), 2008)

##### **3.1.1 HEALTH SERVICE DELIVERY IN MAMPONG MUNICIPALITY**

The municipality has been demarcated into five (5) sub-districts, to facilitate access to health care services. There are five (5) health centres, one Community-based Health Planning Services (CHPS) centre, one Government Hospital, three clinics and two maternity homes. The hospital is being managed by medical officers and medical assistance, health centres by medical assistants and midwives, the maternity homes, clinics and the CHPS compounds are being manned by midwives, nurses and community health nurses. (MMHD, 2008)

### **3.1.2 THE NATURE OF MALARIA IN THE MUNICIPALITY**

Since the year 2006, malaria had remained the most common cause for OPD attendance in the municipality, the primary cause of hospital admissions and the number one killer disease in the municipal hospital. (MMHD, 2008)

### **3.1.3 ACTIVITIES IN THE MUNICIPALITY TO CONTROL MALARIA**

Training on the new anti malarial drug policy and intermittent preventive treatment (IPT) was organized in the year 2005, for health facility in-charges, midwives, public health nurses, medical assistants, disease control officers, laboratory technicians, dispensary technicians, community health nurses, and ward assistants/health aides in the municipality. There had also been the scaling up of Intermittent Preventive Treatment of malaria (IPT) among pregnant women through antenatal clinics and the sales of highly subsidised insecticide treated bed nets (ITN) is said to have also gone up. (MMDH, 2006). Mampong Hospital is also among five hospitals selected for the President's Malaria Initiative (PMI) within the nation which represent middle belt malaria zone under the USA to assist in eradicate of malaria in Africa, thus the facility had been earmarked as a sentinel site.

### **3.1.4 NATIONAL HEALTH INSURANCE SCHEME SUBSCRIPTION**

The municipality was part of the Ashanti Region Civil Servant Health Insurance Scheme until the inception of the National Health Insurance Scheme (NHIS) in the year 2005, the average annual coverage had been about sixty percent (60%) of the municipal population and about eighty percent of the clients who visited the facilities were NHIS holders. (MMDH, 2008). NHIS service package covers all malaria cases, so finance may not be a

burden to subscribers who want to seek treatment for uncomplicated malaria in health facilities.

### **3.2 STUDY DESIGN AND METHODS**

From the twenty-sixth day of January to the twenty-fourth day of April, 2009, a cross sectional survey using methods recommended in the WHO guidelines on “How to investigate drug use in health facilities, International Network for Rational use of Medicines (INRUD) (World Health Organization, 1993), was employed. This involved reviewing health facility OPD records, administering questionnaires to prescribers, pharmacist/pharmacy technologist and conducting patients/carer interviews. In addition, stocks of anti-malarial drugs in health facilities and private medicine outlets as at the time of this study were observed.

In this study, the focus was on completion of dosage regimen, so tablet count and package inspection were used in addition to self reports.

#### **3.2.1 OPD RECORDS REVIEW**

OPD history cards registering uncomplicated malaria from 1<sup>st</sup> January, 2006 to December 31<sup>st</sup> 2008 were reviewed in all the seven public health facilities and the five private facilities in the municipality to give a clear picture of the anti-malaria prescription trend.

Each month's records extraction was done by systematic random sampling. All OPD history cards which registered uncomplicated malaria within the study period were extracted for each month and grouped into two depending on the age category. Each



group was then arranged chronologically by their dates of diagnosis. The anti-malarial medicine prescribed on each were noted as well as other important indicators such as age, sex, year, weight, symptoms, laboratory investigations, diagnosis, dosage and duration were recorded. The records were then summed up into yearly aggregates per facility and summarized to show the district anti-malaria prescription pattern, for the period under consideration.

### **3.2.2 PRESCRIBERS SELF ADMINISTERED QUESTIONNAIRE**

Self administered questionnaires were given to 15 prescribers in the municipality who consented to be part of the study. The questionnaire was centered on:-

1. Participation in any training programme in connection with the new anti-malarial treatment policy before and after policy implementation.
2. Presence of policy reminders (the anti-malaria drug policy, treatment protocol and medicine bulletin) in consulting rooms.
3. Indicators usually used for uncomplicated malaria diagnosis.
4. The medicine usually prescribed as first line treatment for uncomplicated malaria.
5. Recommendation, type of ACT modification and perception of ACT.

### **3.2.3 CLIENTS AND CARE GIVERS INTERVIEW**

All patients who were diagnosed as having uncomplicated malaria and were given artemisinin-based combination therapy for treatment (or their carers), were interviewed for the purpose of this research. Questionnaire with close ended questions were used. Sample size of the community survey was 250 household heads (Lwanga and Lemeshow, 1991).

The interview in each case centered on:-

1. Subscription to the National Health Insurance Scheme.
2. Complaints that led to the diagnosis.
3. Initial action taken.
4. Awareness of the new anti-malaria policy.
5. Whether client was told his/her diagnosis.
6. Whether name of medication was mentioned to client at the consulting room or at the pharmacy.
7. Description and understanding of medication given.
8. Dosage and frequency taken.
9. Whether ACT was taken with food and the outcome.
10. Side effects associated with ACTs and how the side effect was treated.

11. Recommendation of medication.

12. Level of formal education.

Patients/carers who had had malaria and had attended any health facility (private/public) and were given ACT within three years (i.e. from 2006 to 2008) were interviewed by systematic random sampling. Questionnaires were distributed for the sub-districts according to their populations.

### **3.2.4 HEALTH FACILITY DISPENSARIES SURVEY OF ANTI-MALARIA DRUGS**

All managers of health facility dispensaries were also interviewed using a checklist.

1. Qualified persons working within the various facilities.
2. Number of prescriptions received per day and the percentage containing ACT.
3. Whether drugs were prescribed rationally and the indicator used in prescribing.
4. Clients understanding their medication and some comments passed when given ACT.
5. The quantities in stock were checked by physical count and recorded as well as stock outs and the length of stock out days.
6. The total amount of funds spent on ACT as against other medications was calculated for each health facility.
7. Recommendation on the combination therapy, modification necessary and comments.

### **3.2.5 PRIVATE MEDICINE OUTLETS SURVEY**

All the Pharmacies and Licensed Chemical shops which were National Health Insurance Authority (NHIA) accredited as well as 10 Licensed Chemical shops which were non - NHIA accredited were randomly selected and interviewed on ACT usage for uncomplicated malaria. Stock levels were recorded as well as stock out days.

### **3.2.6 IN-DEPTH INTERVIEW OF INSTITUTIONAL HEADS**

In-depth interviews were also conducted with institutional heads (the Municipal Director of Health Service, Medical superintendent, the Hospital Administrator and the in-charges of the Private institutions) to find out the factors that might have or otherwise, promoted adherence with the new anti-malaria policy.

## **3.3 STUDY POPULATION**

### **3.3.1 SAMPLE SIZE**

The WHO guidelines on “How to investigate drug use in health facilities” recommend the review of at least 600 records for the entire survey” (WHO, 1993). However, a total of 2,776 patients’ OPD records spanning the period between 1st January, 2006 and 31st December, 2008 were reviewed. The larger sample size taken was to make the findings more representative of the population, so that conclusions drawn will be of significant power. From 1<sup>st</sup> January to 31<sup>st</sup> December, 2006, 570 OPD records were reviewed of which 73 were for children under 5years. For the year 2007 (January to December), 1,047 OPD records were reviewed of which 190 were for children under 5years. From 1<sup>st</sup>

January to 31<sup>st</sup> June, 2008, 1,159 OPD records were reviewed and 246 of that were for children under 5years.

For clients adherence in the community, EPI cluster sampling technique was modified to (5X5X10) i.e. five sub-districts, five communities and ten household heads were interviewed giving a total of 250.

Out of a total of 17 prescribers in the district, 15 consented to participate in the study and were given self administered questionnaire to determine prescriber characteristics. The two who did not participate in the study were both Cuban medical doctors who had just arrived into the country to work in the hospital.

All the eleven health facility dispensaries, the six accredited NHIS medicines outlets (four chemical shops and two pharmacies) and ten other licensed chemical shops which were randomly selected across the entire municipality were included in the community outlet stock availability survey.

### **3.3.2 PRE-TESTING**

Pre-testing of tools was carried out in the Nsuta Polyclinic in Sekyere Central District, and the outcome was used to modify the questionnaires and checklist.

### **3.3.3 DATA HANDLING AND ANALYSIS**

Records from the survey were packed in plastic files and kept in a locker at the Municipal Pharmacist office, Mampong. Data were then entered and analysed with SPSS 12.0.1 for windows.

### **3.4 ETHICAL CONSIDERATION**

Consent was obtained from the relevant authorities (Regional Health Directorate, Ashanti Region, Municipal Chief Executive and the Municipal Director of Health Services, Mampong), community heads and opinion leaders of the various communities in which the research was carried out.

Secondly the consent of individuals (prescribers, patient/carers and dispensaries) were sought and only those who agreed were included in the study. The consent of the Head of the Clinical and Social Pharmacy department of the Faculty of Pharmacy was also sought.

### **3.5 LIMITATIONS OF STUDY**

1. The study did not consider the health seeking behaviour of the people and health facility reporting times of clients (that is the state in which malaria cases are reported to the health facilities), due to time constraints. This could be a reason why there is a high hospital admissions rate due to malaria, and could be taken up in another study.
2. The study did not cover home-based management of malaria (HMM); this can be taken up in another research.
3. The distal factors like drug design, manufacturing practices, storage and distribution network which can affect the availability of safe and efficacious medicine in the country were not considered due to time and resources constraints.

### **3.6 ASSUMPTIONS**

All out-patient diagnosed cases of malaria without admission were assumed to be uncomplicated malaria, in accordance with the new national anti-malaria drug policy (Ministry of Health, 2004a). It was also assumed that respondents were telling the truth.

## CHAPTER FOUR

### 4 RESULTS

#### 4.1 DISTRIBUTION OF OPD CARDS

**Table 4.1 OPD Cards Distribution**

<b>NO.</b>	<b>FACILITY</b>	<b>NO. OF OPD CARDS</b>	<b>PERCENTAGE</b>
<b>1</b>	<b>MAMPONG</b>	<b>1192</b>	<b>42.94</b>
<b>2</b>	<b>KOFIASE</b>	<b>223</b>	<b>8.04</b>
<b>3</b>	<b>BENIM</b>	<b>226</b>	<b>8.14</b>
<b>4</b>	<b>ADIDWAN</b>	<b>191</b>	<b>6.88</b>
<b>5</b>	<b>APAA</b>	<b>150</b>	<b>5.40</b>
<b>6</b>	<b>NADAWOROMA</b>	<b>150</b>	<b>5.40</b>
<b>7</b>	<b>QUALITY</b>	<b>150</b>	<b>5.40</b>
<b>8</b>	<b>SIS. PHILIPA</b>	<b>150</b>	<b>5.40</b>
<b>9</b>	<b>ASAAM</b>	<b>142</b>	<b>5.12</b>
<b>10</b>	<b>KROBO</b>	<b>102</b>	<b>3.68</b>
<b>11</b>	<b>YONSO</b>	<b>100</b>	<b>3.6</b>
<b>TOTAL</b>		<b>2,776</b>	<b>100</b>



## 4.2 PRESCRIBERS ADHERENCE TO ACT

Table 4.2 Anti-malarials prescribed at the facilities

FACILITY		Type of medication given						Total
		SP	ACT	Amodia quine	Artesunate	Quinine	Chloroquine	
Mampong	Count	5	1079	60	18	15	15	1192
	% of Total	.2%	38.9%	2.2%	.6%	.5%	.5%	42.9%
Philipah	Count	0	80	50	10	0	10	150
	% of Total	.0%	2.9%	1.8%	.4%	.0%	.4%	5.4%
Apaa	Count	10	50	80	10	0	0	150
	% of Total	.4%	1.8%	2.9%	.4%	.0%	.0%	5.4%
Kofiase	Count	1	149	6	62	5	0	223
	% of Total	.0%	5.4%	.2%	2.2%	.2%	.0%	8.0%
Asaam	Count	0	120	22	0	0	0	142
	% of Total	.0%	4.3%	.8%	.0%	.0%	.0%	5.1%
Benim	Count	7	208	1	0	1	9	226
	% of Total	.3%	7.5%	.0%	.0%	.0%	.3%	8.1%
Krobo	Count	14	44	9	21	0	14	102
	% of Total	.5%	1.6%	.3%	.8%	.0%	.5%	3.7%
Adidwan	Count	0	89	65	0	4	33	191
	% of Total	.0%	3.2%	2.3%	.0%	.1%	1.2%	6.9%
Yonso	Count	0	94	1	0	5	0	100
	% of Total	.0%	3.4%	.0%	.0%	.2%	.0%	3.6%
Nadaworoma	Count	0	60	70	20	0	0	150
	% of Total	.0%	2.2%	2.5%	.7%	.0%	.0%	5.4%
Quality	Count	10	120	10	10	0	0	150
	% of Total	.4%	4.3%	.4%	.4%	.0%	.0%	5.4%
TOTAL	Count	47	2093	374	151	30	81	2776
	% of Total	1.7%	75.4%	13.5%	5.4%	1.1%	2.9%	100.0%

**Table 4.3 Prescribers adherence in each facility**

<b>FACILITY</b>	<b>PRESCRIBER ADHERANCE %</b>
Yonso	94.0
Benim	92.0
Mampong	90.5
Asaam	84.5
Quality	80.0
Kofiase	66.8
Sis. Philipah	53.3
Adidwan	46.6
Krobo	43.0
Nadaworoma	40.0
Apaa	33.3

#### 4.2.1 Anti-malaria prescribing trend in Mampong Municipality over the years

Table 4.4 Anti-malaria prescribing trend within the facilities over the years

Facility			Type of medication given						Total
			SP	ACT	Amodiaquine	Artesunate	Quinine	Chloroquine	
Mampong	Year	2006	0	155	5	11	5	14	190
		2007	5	401	40	7	8	1	462
		2008	0	523	15	0	2	0	540
	Total		5	1079	60	18	15	15	1192
Sister Philipah	Year	2007		0	10	0		10	20
		2008		80	40	10		0	130
	Total			80	50	10		10	150
Apaa	Year	2006	10	10	20	10			50
		2007	0	10	40	0			50
		2008	0	30	20	0			50
	Total		10	50	80	10			150
Kofiase	Year	2006	1	52	1	31	0		85
		2007	0	40	0	25	1		66
		2008	0	57	5	6	4		72
	Total		1	149	6	62	5		223
Asaam	Year	2006		11	7				18
		2007		41	4				45
		2008		68	11				79
	Total			120	22				142
Benim	Year	2006	6	13	0		0	9	28
		2007	1	68	1		1	0	71
		2008	0	127	0		0	0	127
	Total		7	208	1		1	9	226
Krobo	Year	2006	12	11	4	6		13	46

		2007	2	17	1	10		1	31
		2008	0	16	4	5		0	25
	Total		14	44	9	21		14	102
Adidwan	Year	2006		6	17		1	19	43
		2007		28	35		0	14	77
		2008		55	13		3	0	71
	Total			89	65		4	33	191
Yonso	Year	2007		58	0		5		63
		2008		36	1		0		37
	Total			94	1		5		100
Nadawroma	Year	2006		40	0	10			50
		2008		20	70	10			100
	Total			60	70	20			150
Quality	Year	2006	10	30	10	10			60
		2007	0	40	0	0			40
		2008	0	50	0	0			50
	Total		10	120	10	10			150

**Table 4.5 Adherence to ACT from 2006-2008**

			Type of medication given						Total
			SP	ACT	Amodia quine	Artesunate	Quinine	Chloroquine	
Year	2006	Count	39	328	64	78	6	55	570
		% of Total	1.4%	11.8%	2.3%	2.8%	.2%	2.0%	20.5%
	2007	Count	8	825	131	42	15	26	1047
		% of Total	.3%	29.7%	4.7%	1.5%	.5%	.9%	37.7%
	2008	Count	0	940	179	31	9	0	1159
		% of Total	.0%	33.9%	6.4%	1.1%	.3%	.0%	41.8%
Total		Count	47	2093	374	151	30	81	2776
		% of Total	1.7%	75.4%	13.5%	5.4%	1.1%	2.9%	100.0%

## 4.2.2 FACTORS INFLUENCING PRESCRIBERS ADHERENCE

### 4.2.2.1 TRAINING, AVAILABILITY OF PRESCRIPTION AID AND MODIFICATIONS

**Table 4.6 Training, availability of prescription aid and modifications**

No.	VARIABLE	FREQUENCY	PERCENTAGE
		n=15	100
<b>1</b>	<b>Prescriber category</b>		
	Doctor	4	26.7
	Medical assistant	4	26.7
	Midwife	4	26.7
	Nurse	2	13.3
	Community Health Nurse	1	6.7
<b>2</b>	<b>Training</b>		
	Training workshop	10	66.7
	Durbar	2	13.3
	Visitation from RHA/MHA	2	13.3
	Seminar presentation	1	6.7
<b>3</b>	<b>Refresher</b>		
	Refresher training	8	53.3
<b>4</b>	<b>Availability of prescription aides in consulting room</b>		
	Policy guidelines	9	60.0
<b>5</b>	<b>A measure used in given ACT</b>		
	Weight	14	93.3
	Age	1	6.7
<b>6</b>	<b>Awareness creation</b>		
	Awareness of the new anti-malaria policy	15	100
<b>7</b>	<b>Modification necessary</b>		
	Artesunate-Amodiaquine	14	93.3
<b>8</b>	<b>General perception of ACT</b>		
	Good	15	100

**SOURCE – FIELD SURVEY, 2009**

The fifteen respondents consisted of four medical doctors, four medical assistants, four midwives two nurses and one community health nurse. All the fifteen prescribers had worked more than a year. 40% had worked for about 1-5yrs, 6.7% had worked for about 6-10yrs and 53.3% had worked more than 11yrs. It was indicated that key indicator(s) use to diagnose uncomplicated malaria within the facilities in the municipal were fever (66.7%), laboratory (26.6%) and anaemia (6.7%).

All respondents indicated awareness of the new anti-malarial treatment policy and all had a training of a sort in which 53.3% of them had had refresher training and all indicated that they used ACT as first line treatment for uncomplicated malaria.

It was also indicated that 93.3% used weight in prescribing ACT and 6.7% used age as a result of lack of a weighing scale.

The main reasons assigned to the choice of first line anti-malarial treatment by prescribers were policy directives (40%) and effectiveness of medication (60%).

93.3% recommended for modification of artesunate –amodiaquine since it makes their clients weak irrespective of advising them to take the medication after meals but the general perception by all the prescribers was indicated to be good.

### 4.3 AVAILABILITY OF ACT IN HEALTH FACILITY PHARMACY/DISPENSARIES

**Table 4.7 Stock levels and inventory management in Health facilities**

HEALTH FACILITIES	MAXIMUM STOCK LEVEL (DOSAGE)	CURRENT STOCK LEVEL (DOSAGE)	MINIMUM STOCK LEVEL (DOSAGE)
MAMPONG HOSP.	6,843	6,430	3,424
KOFIASE H/C	1,250	528	625
ASAAM H/C	604	583	302
BENIM H/C	542	117	271
KROBO H/C	417	292	208
ADIDWAN H/C	750	1,1667	375
YONSO CHPS CENTRE	208	70	104

All the private facilities showed evidence of ACT s stock levels but had no tally cards to compute for the minimum and maximum stock levels.

The public facilities had stocks of artesunate-amodiaquine except the Municipal hospital that had in addition artemether-lumifantrine and none of them stocks dihydroartemether-piperaquine. All the private outlets had in stock of artesunate-amodiaquine and

artemether-lumifantrine. Quality Health Care had this combination as well as artesunate-sulfadoxine pyrimethamine.

#### **4.3.1 FACTORS AFFECTING DISPENSING OF ACTS**

All the facilities dispensers indicated that about 75% prescriptions received contained ACTs were rationally prescribed using age (28.6%) or weight (71.4%), and the drugs were affordable since about 80% of their clients subscribed to NHIS and all stated that the clients understood their medication.

Some of the comments passed by their clients when given ACTs especially artesunate-amodiaquine - reaction to ACTs (14.3%) and weakness when they take ACTs (85.7%).

With the exception of the municipal hospital which spent about 25% of its total fund on medication on ACT the rest spent up to 50% of their total fund on medication on ACT.

All the pharmacy/dispensing in charges recommended modification in ACT dosage especially artesunate-amodiaquine and added that the drug is good and therefore its usage should be continued.



#### 4.4 PRESCRIBING RATE OF THE VARIOUS ANTI-MALARIAS OVER THE YEARS UNDER REVIEW

Table 4.8 Rate of anti-malaria prescribing over the years.

<b>MEDICINE</b>	<b>YEAR</b>		
	<b>2006</b>	<b>2007</b>	<b>2008</b>
<b>ACT</b>	<b>57.57%</b>	<b>78.89%</b>	<b>81.12%</b>
<b>AMODIAQUINE</b>	<b>11.22%</b>	<b>12.51%</b>	<b>15.44%</b>
<b>ARTESUNATE</b>	<b>13.68%</b>	<b>4.01%</b>	<b>2.67%</b>
<b>CHLOROQUINE</b>	<b>9.64%</b>	<b>2.48%</b>	<b>0.00%</b>
<b>QUININE</b>	<b>1.05%</b>	<b>1.43%</b>	<b>0.77%</b>
<b>SP</b>	<b>6.84%</b>	<b>0.76%</b>	<b>0.00%</b>
<b>TOTAL</b>	<b>100.00%</b>	<b>100.00%</b>	<b>100.00%</b>

**Table 4.9 Prescribing rate of the various anti-malarias according to age groups over the years under review**

Type of medication given			Year			Total
			2006	2007	2008	
SP	Age	Under 5yrs	1	1		2
		5yrs-24yrs	18	4		22
		25yrs-45yrs	14	2		16
		46yrs-65yrs	6	1		7
	Total		39	8		47
ACT	Age	Under 5yrs	29	96	132	257
		5yrs-24yrs	169	302	389	860
		25yrs-45yrs	79	225	265	569
		46yrs-65yrs	51	202	154	407
	Total		328	825	940	2093
Amodiaquine	Age	Under 5yrs	22	53	100	175
		5yrs-24yrs	17	43	74	134
		25yrs-45yrs	8	10	3	21
		46yrs-65yrs	17	25	2	44
	Total		64	131	179	374
Artesunate	Age	Under 5yrs	13	24	9	46
		5yrs-24yrs	17	13	12	42
		25yrs-45yrs	19	4	10	33
		46yrs-65yrs	29	1	0	30
	Total		78	42	31	151
Quinine	Age	Under 5yrs	2	4	5	11
		5yrs-24yrs	2	4	0	6
		25yrs-45yrs	1	6	3	10
		46yrs-65yrs	1	1	1	3
	Total		6	15	9	30
Chloroquine	Age	Under 5yrs	6	12		18
		5yrs-24yrs	25	8		33
		25yrs-45yrs	16	3		19
		46yrs-65yrs	8	3		11
	Total		55	26		81

ACT prescribing increases over the years as chloroquine prescribing decreases.

Amodiaquine prescribing increases over the years for children less than five years as most of the prescribers complained of its effectiveness in children less than five years.

## 4.5 CLIENTS ADHERENCE

**Table 4.10 Socio-demographic characteristics of clients**

Variable	Frequency	Percentage
	n=250	100
<b>Age of patients (years)</b>		
Under five	14	5.6
Five & Above	236	94.4
<b>Sex of patients</b>		
Male	109	43.6
Female	141	56.4
<b>Ethnicity of patients</b>		
Akan	216	86.4
Ga	5	2.0
Ewe	4	1.6
Dagomba	21	8.4
Others	4	1.6
<b>Religion</b>		
Christian	225	94.8
Moslem	9	7.6
Traditionalist	5	2.0
Other	1	0.4
<b>Sub-district distribution of patients</b>		
Mampong	14	6.7
Kofiase	15	7.1
Krobo	9	4.3
Addidwan	31	14.7
Yonso	15	7.1
<b>Level of formal education of patients or carers</b>		
None	9	3.6
Primary	43	9.2
JHS/JSS/Middle school	68	27.2
SHS/O-level/A-level	52	20.8
Tertially	78	31.2
<b>Occupation of patients or carers</b>		
Civil or public service	64	25.6
Trading	46	18.4
Student/pupil	77	30.8
Farming	57	22.8
Other	6	2.4
<b>Awareness of the new anti-malarial policy</b>		
Aware of the new policy	153	61.2
Not aware of policy	95	38.8

#### 4.5.1 CLIENTS RESPONSE

**Table 4.11 Client Adherence to ACT**

				How was the outcome		Total
				Better	Worse	
With food	Was the full course of the ACT taken	Yes	Count	190	9	199
			% of Total	82.6%	3.9%	86.5%
		No	Count	27	4	31
			% of Total	11.7%	1.7%	13.5%
	Total		Count	217	13	230
			% of Total	94.3%	5.7%	100.0%
Without food	Was the full course of the ACT taken	Yes	x Count	2	8	10
			% of Total	10.0%	40.0%	50.0%
		No	Count	0	10	10
			% of Total	0.0%	50.0%	50.0%
	Total		Count	2	18	20
			% of Total	10.0%	90.0%	100.0%

Of the 250 clients, 209 (82.6%) took ACT fully, 230 (92.0%) took ACT with food, 20 (8.0%) took ACT without food, 219 (87.6%) got better and 31 (12.4%) got worse. 190 (76.0%) of the clients took a full course of the ACT with food and got better and 9 (3.6%) got worse. 41 (16.4%) did not take the ACT fully. Clients who took ACT fully without food and their condition got worsen were 8 (5.7%) and those who did not take ACT fully and without food and condition worsen were 10 (7.1%)

Those who took ACT fully without food and their condition got better were 28(20%). 82 (32.8%) were asked to go for laboratory investigation whereas 168 (67.2%) were not. 134 (53.6%) were told their diagnosis whereas 116 (46.4%) were not. Those who had the name of ACT mentioned to at the pharmacy/dispensary were 154 (61.6%) and those that ACT was not mentioned to them were 96 (38.4%). 96 (38.4%) were told what ACT was

indicated for and 149 (59.6%) were not. 236 (94.4%) said they understood their instructions from the pharmacy and 14 (5.6%) did not.

Clients who passed comments when ACTs were given to them were 92 (36.8%), 128 (51.2%) and 7 (2.8%) for excellent, good and cannot remember respectively. Those who were willing to commend ACT for others were 220 (88%) and those not willing were 30 (12%).

**Table 4.12 Clients adherence to ACT based on full course, with food and 12hrs time interval**

				At what time interval/frequency was the medication taken		Total
				12hrs	Others	
With food	Was the full course of the ACT taken	Yes	Count	186	13	199
			% of Total	80.9%	5.7%	86.5%
		No	Count	30	1	31
			% of Total	13.0%	.4%	13.5%
	Total		Count	216	14	230
			% of Total	93.9%	6.1%	100.0%
Without food	Was the full course of the ACT taken	Yes	Count	10	0	10
			% of Total	50.0%	.0%	50.0%
		No	Count	9	1	10
			% of Total	45.0%	5.0%	50.0%
	Total		Count	19	1	20
			% of Total	95.0%	5.0%	100.0%

The table above shows that those who took ACT fully with food at 12hours time interval were 186 representing 74.4%, thus the adherence of clients in the Mampong municipality.

**Table 4.13 Age groups with adherence to ACT**

		Was the full course of the ACT taken		Total
Age	%	Yes	No	
Under 5	85.7	12	2	14
5yrs-24yrs	83.3	75	15	90
25yrs-45yrs	82.4	89	19	108
46yrs-65yrs	86.8	33	5	38
Total		209	41	250

This shows that age had not much influence on adherence to ACT in Mamampog Municipality.

**Table 4.14 Sub-district adherence to ACT**

Sub-District	%	Was the full course of the ACT taken		Total
		Yes	No	
Mampong	82.1	101	22	123
Kofiase	90.9	40	4	44
Adidwan	82.8	24	5	29
Krobo	74.2	23	8	31
Yonso	91.3	21	2	23
Total		209	41	250

#### 4.6 SIDE EFFECTS OF ACTS

**Table 4.15 Side effects associated with ACT**

			How was the side effect treated?				Total
			Hospital ization	Took medication to treat	Resolved by itself	No s/effects	
No side effect	Did you experience any side effect(s)?	No				217	217
Skin rash/irritati on	Did you experience any side effect(s)?	Yes		1	3		4
Vomiting	Did you experience any side effect(s)?	Yes		1	3		4
Abdominal discomfort	Did you experience any side effect(s)?	Yes	1		3		4
Difficulty in breathing	Did you experience any side effect(s)?	Yes			3		3
Body weakness	Did you experience any side effect(s)?	Yes	2	5	11		18
	Total		3	7	23		33

## **CHAPTER FIVE**

### **5 DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 PRESCRIBERS ADHERENCE**

The study conducted within the Mampong Municipality proves wrong the hypothesis that more than 85% prescribers adhered to ACT prescribing since the average adherence by prescribers within the municipality was 75.4%. The Yonso CHPS zone had the highest prescriber's adherence to ACT (94.0%) which conforms to Rowe et al., (2003) and Zurovac et al., (2004) statement that low level prescribers comply with policies than high level prescribers. This is followed by Benim (92.0%), Mampong (90.5%), Asaam (84.5%), Quality Health (80.0%), Kofiase (66.8%), Phillipah (53.3%), Adidwan (46.6%), Krobo (43.0%), Nadaworoma (40.0%) and Apaa (33.3%).

As the years went by prescribers adherence to ACT improved – 57.5% in 2006, 78.8 in 2007 and 81.1% in 2008 - as that of ahloroquine decreased – 9.6% in 2006, 2.5% in 2007 and 0% in 2008 - but that of amodiaquine kept on increasing as shown in table 4.5 because most of the prescribers prescribed suspension amodiaquine to children under 10yrs thinking that the artesunate – amodiaquine which is commonly used at most of the facilities was strong and this compares well to Zurovac et al.,(2005). The prescribers interviewed also indicated that the syrup formulations of the commonly used ACTs - artesunate-amodiaquine was not available for the children unless the tablets were broken into pieces and that made it difficult for accurate dosages. The decreased in chloroquine prescribed and increased in ACT prescribed were very encouraging since it showed that the prescribers were gaining confidence in the effectiveness of ACT.



Factors that affects prescribers' adherence in the study included lack of refresher training, only 53% had had refresher training after the national training in 2005 and 60% had a copy of the policy guidelines.

All the prescribers interviewed claimed to have used weight in prescribing except one prescriber who was prescribing according to age only and this does not conform to the MAM LCS training manual, (2008) which states that ACTs should be prescribed according to weight.

Although prescribers' general perception of ACT effectiveness was good and all were aware of the new anti-malaria policy, 93.3% agitated for modification of artesunate – amodiaquine as a result of weaknesses complained by most of their clients. Prescribers should not look at artesunate-amodiaquine as the only drug of ACT since there are other alternatives like artemether-lumefantrine and dihydroartemisinin-piperaquine, which although expensive are covered by the NHIS which cause less weakness or no weakness at all.

It was observed that both the public and the private facilities had stocks of ACT and with the exception of Benim and Yonso that had stocks less than the minimum stock level the rest exceeded the minimum levels (Table 4.5) and that was very encouraging.

The Mampong Municipality had about 80% of the clients who attend the health facilities being National Health Insurance Scheme (NHIS) card bearers, thus the Government should make it a point to reimburse amount spent on clients on time in order not to collapse the facilities by depleting it of essential medicines.

## **5.2 CLIENTS ADHERENCE**

The study also proves wrong the hypothesis that more than 90% of clients adhere to ACT treatment for uncomplicated malaria since 186 (74.4%) of the clients reported adhering to ACT treatment (i.e. taking ACT fully with meals at 12hr time intervals). This falls short of studies conducted in Uganda that showed 90% adherence to six days treatment for artemether – lumefantrine for uncomplicated malaria (Fogg et al., 2004) and Tanzania study for SP and artesunate in which adherence was 75% for uncomplicated malaria (Kachur et al., 2004). Factors that might have caused the moderate adherence of patients to ACT may be due to not understanding of instructions at the pharmacy since the study showed that 5.6% (14) did not understand their instruction which is rather unfortunate. The level of formal education could not have been a problem in the municipality since 96.7% of those interviewed had had some formal education, thus adherence should have rather been higher. This disproves of Fogg et al. (2004) statement that lack of formal education is associated with non-adherence and this is likely to hinder prescriber and client interaction and understanding of treatment instructions. There should be good communication between patients and prescribers as well as the pharmacy staff (Osterberg et al., 2005). But the study showed that language barrier could not be of much problem since all the prescribers spoke Twi and 86.4% of the clients also spoke Twi. ACTs have rapid clinical cure for uncomplicated malaria and this could lead to non-adherence by some clients - by not completing their treatment thinking that they are better- since there is a perception that rapid clinical cure could lead to non-completion of the dosage regimen, (Fogg et al., 2004) and this is mainly based on client's habit and not the rapid clinical cure of the medication.

The influence of media regarding about safety or risk issues associated with ACTs had contributed to non-adherence of most of the clients interviewed as most of them attributed their non-adherence to ACTs as media speculations.

Along with these attitudes and beliefs, the duration of the course of therapy also contributes to whether patients take their medicines, though it might not be a key factor in ACT since the dosage regimen is three consecutive days.

39% of the clients were also not aware of the new anti-malaria policy after three and half years of its inception, which is rather unfortunate and much education should be conducted by the air waves, municipal assembly and the health directorate, championed by the Municipal Health Director.

As far as the this study is concerned, age had not much influence on adherence to ACT as all showed around 82.4%-86.8% ( Table 4.11) and this does not conform to the assertion that children are less likely to adhere to medication than grownups (Osterberg et al., 2005).

The study showed that Yonso sub-district had the highest client adherence to ACT (91.3%), followed by Kofiase (90.9%), Adidwan (82.8%), Mampong (82.1%) and lastly Krobo (74.2%). People are more likely to adhere to treatment if there is a cordial relationship with the health care team. Such a relationship usually involves two-way communication. By interacting with patients they can come to terms with the severity of their disorder, intelligently weigh the advantages and disadvantages of a treatment plan, and also have adequate understanding of their situation. Furthermore patients can learn that denial of their disorder and misconceptions about their treatment can lead to forgetfulness to take drugs as directed, resulting in unwanted side effects. The health care

team can encourage adherence by providing clear explanations on how to take drugs, why the drugs are necessary, and what to expect during treatment.

### **5.3 ACT SIDE EFFECTS**

Side effects remain a powerful barrier to patient adherence as such there is a need to involve clients in the planning of dosage regimen and this will make it easier for a client to adhere. Taking responsibility includes helping monitor the good and bad effects of treatment and discussing concerns with at least one of their health care practitioners—doctor, physician's assistant, pharmacist or nurse. People should report unwanted or unexpected effects to a health care practitioner rather than adjust a drug dose or discontinue a drug on their own. When a person has good reasons for not following a plan and explains them, the doctor or other health care practitioner can usually make an appropriate adjustment.

217 (86.8%) out of the 250 clients had no side effects and 33(13.2%) experienced side effects and this might have accounted for non-adherence to ACT by some patients as indicated by Fogg et al., (2004) and Osterberg et al., (2009).

4(1.6%) of the client had skin rash/irritation and 3 clients out of the 4 said their side effect resolved without using any medication and one took medication. 4(1.6%) clients complained of vomiting after taking ACT and one client used medication to stop the vomiting and 3 had the condition resolved without any pharmacological intervention. 4(1.6) had abdominal pain, one was hospitalized and the rest had their condition resolved without taking medication. 3(1.2%) experienced difficulty in breathing but the condition resolved without taking medication. 18(7.2%) had body weakness and 5 used medication, 2 were hospitalized and 11 had their conditions resolved without medical intervention. The

study showed that 33 (13.2%) had side effects. Most of the patients who experienced side effects were those who did not adhere to instructions. The major side effect was body weakness which accounted for 54.5% (18 out of 33).

## **5.4 CONCLUSIONS**

1. On the basis of the study, clients adherence to ACT as the first line treatment of uncomplicated malaria in Mampong Municipality was 74.4% which is moderate and therefore much education should be conducted to allay the fears of the populace to adhere to the medication.
2. Prescribers' adherence to ACT which was observed to be 75.4% is also moderate and much should be done by the prescribers to improve upon that once they have also shown that the medication is effective.
3. All the public and the private facilities showed evidence of ACT stocks availability as well as the chemical shops and the pharmacies.
4. The rate of ACT prescribing was much encouraging as chloroquine and sulfadoxine pyrimethamine prescribing diminished to zero in 2008 and amodiaquine suspension for children kept on increasing.
5. Bodily weakness featured prominently as the major side effect followed by skin rash/irritation, vomiting, abdominal discomfort and difficulty in breathing.

## **5.5 RECOMMENDATIONS**

1. There should be effective counseling of clients by the prescribers and the pharmacist/dispensing technicians to comply with their medication irrespective of early relief of clinical symptoms, and report any side effect to the health facilities.
2. There should be municipality wide education on ACT championed by MMHD, Municipal Chief Executive and Chiefs at the local FM stations, information centres, beating of gongons and issuing of brochures.
3. Training and refresher training should be organized for the new entrant prescribers and trained prescribers respectively by the Mampong Municipality training co-coordinator.
4. Anti-malaria drug policy documents, treatment wall charts, drug bulletin and other policy reminders should be made available at all consulting rooms by the institutional in-charges.
5. Private facilities should be trained by the municipal pharmacist to use bin cards in order to calculate minimum, maximum, re-order and emergency levels of drugs.
6. There should be paediatric dosage formulations of ACTs (especially Artesunate-Amodiaquine) and NMCP should work hand in hand with the pharmaceutical companies producing ACTs to obtain a better formulation for paediatric dosage for uncomplicated malaria.
7. The study should be scaled up by NMCP to cover the whole nation, so as to give the national picture on the extent of adherence with the new anti-malaria treatment policy and also form the baseline for further evaluation of the policy implementation.

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## **APPENDICES**

### **APPENDIX – I**

#### ***DATA COLLECTION FORM FOR DETERMINING CLIENTS/CAREGIVERS CHARACTERISTICS***

**FORM 1**

#### **DATA COLLECTION FORM**

#### **CLIENTS/CARE GIVERS QUESTIONNAIRE**

**LOCATION.....INVESTIGATOR.....DATE.....**

1.     i. When was the last time you attended a health facility within the  
Municipality? Years ☐ Months ☐ Weeks ☐ Days ☐  
  
      ii. What was wrong with you? Malaria ☐ Other ☐
2.     Facility attended was: Public ☐ Private ☐
3.     Level of care: District Hospital ☐ Health centre ☐ Clinic ☐  
Maternity Home ☐ CHIP Centre ☐
4.     Sub District: i. Mampong ☐ ii. Kofiasse ☐ iii. Adidwan ☐ iv. Krobo ☐ v. Yonso ☐
5.     Are you NHIS subscriber? Yes ☐ No ☐
6.     Please are you aware of the new anti-malaria policy?  
Aware of the new policy ☐  
Not aware of the policy ☐
7.     When was the last time you had malaria?  
      i. Few days ago ☐ v. Do not remember ☐  
      ii. Week(s) ago ☐  
      iii. Month(s) ago ☐  
      iv. Year(s) ago ☐
8.     Please could you make mention of one sign/symptom of malaria you had:  
Fever ☐ Headache ☐ Bitterness in mouth ☐ Chills/Cold ☐  
Fatigue/Joint weakness ☐ Other (Please state) ☐.....
9.     What initial action did you take? i) Attended health facility ☐ ii) Took a pain  
killer ☐

10. Did the prescriber ask you to go to the laboratory for blood investigation?  
Yes ☐ No ☐
11. Were you told by the prescriber what your illness was? Yes ☐ No ☐
- i) If yes, were you given instructions about your illness? Please state what the prescriber said. i. Return if illness persist ☐ ii. Rest ☐ iii. Sleep under ITN ☐ iv. Nothing ☐
- ii) If no, could you assign reason(s) why he/she did not tell you? i. Too busy ☐ ii. Privacy ☐ Other (Please state) ☐
12. Did the prescriber mention the name of the medicine you were supposed to take?  
Yes ☐ No ☐
- i) If yes, did he say what the medication was for? Yes ☐ No ☐
- If no, could you assign reason(s) why he/she did not tell you the medication that was given to you? i. Too busy ☐ ii. Privacy ☐ iii. Do not know ☐
13. Was the name of the medicines mentioned to you/ written on the envelopes for you at the pharmacy? Yes ☐ No ☐
14. What medication was given to you?  
i) ACT ☐ ii) Chloroquine ☐ iii) SP ☐ iv) Quinine ☐ v) Other (Please state) .....  
.....
15. Describe the medication:  
i) White & Yellow ☐ ii) White ☐ iii) Yellow ☐ iv) Other (Please state).....  
.....
16. Total number of ACT tablets given to you? i. (28) ☐ ii. (24) ☐ iii. (18) ☐ iv. (12) ☐  
☐ v. (9) ☐ vi. (6) ☐ vii. (3) ☐
17. Did you understand the medication instructions given by the dispenser? Yes ☐  
No ☐
18. How were you asked to take? i) Stat dose ii) Once daily for 3 days iii) Twice daily for 3 days iv) Other (Please state).....  
.....
19. How many tablets did you take in the morning..... and in the evening.....?
20. At what time interval/frequency was the medication taken? .....

21. Was the full course of the ACT taken? Yes ☐ No ☐  
 i) Was it taken; a) With Food ☐ b) Without food ☐ c) Do not know ☐  
 ii) If no, which type and how many were left?  
 a) Only Artesunate (White) left Quantity left.....  
 b) Only Amodiaquine (Yellow) left Quantity left.....  
 c) Portions of both medicines left Quantity left.....  
 d) Full dosage remaining  
 e) Do not remember  
 f) Other (Please state) Quantity left.....
22. How was the outcome? Better ☐ Worse ☐ Can not remember ☐ Other  
 (Please state)? .....
- If worse what did you do?
- a. Returned to the facility  
 b. Bought ACT at a drug store  
 c. Took a herbal preparation  
 d. Can not remember

### **SIDE EFFECT**

23. Did you experience any side effect(s)? Yes ☐ No ☐
- If yes what kind?
- i) Skin rash/irritation ☐ ii) Vomiting ☐ iii) Abdominal discomfort ☐  
 iv) Anaemic/ Blood disorder ☐ v) CNS effect ☐ vi) Difficulty in breathing ☐  
 vii) General bodily weakness viii) Other (Please state) ☐

### **TREATMENT OF SIDE EFFECT**

24. How was the side effect treated?  
 i) Hospitalization ☐ ii) Took medication to treat ☐ iii) Went by itself ☐  
 iv) Other (Please state) .....
25. When did you go back to the facility for malaria treatment after taking the ACT?  
 Year ☐ Month ☐ Week ☐ Not yet ☐  
 What can you say about the medication.....  
 i. Excellent ii. Good iii. Bad iv. Can not remember
- If bad, what will you say about the medicine? i. Should be withdrawn ii. Adjust the dosage iii. Use the formal drugs
26. Should the medication be recommended for others?  
 Yes ☐ No ☐

If excellent/good please what are your comments about the medication?

i. Continue usage/recommend for uncomplicated malaria

ii. Increase education on the drug

27. Sex: Male ☐

Female ☐

28. Age: Under 5 ☐

5yrs-24yrs ☐

25yrs-45yrs ☐

46yrs-65yrs ☐

29. Weight. 5-10kg ☐ 11-24kg ☐ 24-50kg ☐ 50-70kg ☐ 70kg+ ☐

30. Ethnicity: Akan ☐ Ga Adangbe ☐ Ewe ☐ Dagomba ☐ Other /  
Specify.....

31. Marital status: Married ☐ Single ☐ Divorced ☐ Separated ☐

32. Level of formal Education: Primary ☐ JHS/ JSS/Middle School ☐  
SHS/O-level/A-level ☐ Tertiary ☐ None ☐

33. Occupation of client: Civil/Public Services ☐ Trading ☐ Student/Pupil ☐  
Farming ☐ Others ☐

34. Religion: Christian ☐ Moslem ☐ Traditionalist ☐ Other  
(Please state).....



## **APPENDIX – II**

## **FORM 2**

### **DATA COLLECTION FORM FOR DETERMINING PHARMACIST/ DISPENSING TECHNICIANS' CHARACTERISTICS**

**LOCATION.....INVESTIGATOR.....DATE.....**

#### **PHARMACIST/DISPENSING I/C QUESTIONNAIRE**

1. Name of facility: i) Mampong ii) Kofiase iii) Asaam iv) Benim v) Krobo  
vi) Adedwan vii) Yonso viii) Private
2. No. of pharmacist(s): i) 1 ii) 2 iii) 3 & above
3. No. of dispensing technician(s): i) 1 ii) 2 iii) 3 & above
4. No of attendant(s): i) 1 ii) 2 iii) 3 & above
5. No. of prescription(s) received per day: i) 1-5 ii) 6-20 iii) 21-50 iv) 51-200 v) 200 & above
6. Percentage of prescription(s) containing suspension/tablet ACT per day. i) up to 25% ii) Up to 50% iii) Up to 75% iv) up to 100%
7. Do you have ACT on stock: i. Yes ii. No
8. Are the drugs rationally prescribed: Yes ☐ No ☐
9. Are ACT prescribed by prescribers using;  
i) Age ☐  
ii) Weight ☐  
iii) Height ☐  
iv) Size ☐  
v) Imagination ☐  
vi) Other (Please state).....
10. Are the ACTs affordable to patients? i) Yes ii) No
11. Did the clients/care givers understand their medication? Yes ☐ No ☐
12. If no state some of the comments passed by the clients/care givers:  
i) Forgetfulness ii) Just inscribe on the envelope iii) Close relations will assist iv) Other
13. Any comments passed by the clients when given ACT? Yes ☐ No ☐

If yes, give examples i) React to ACT  
 ii) React to Amodiaquine  
 iii) React to Artesunate  
 IV) Weakness  
 v) Other

14. Total amount of funds spent on ACT as against other medications in the pharmacy? i) up to 25% ii) Up to 50% iii) Up to 75% iv) up to 100%
15. Do you have stock outs? Yes ☐ No ☐
16. Length of days in which ACTs were out of stock?  
 i. 1-15days ii. 16-30days iii. 31 & above days v) Never
17. Types of ACT which were out of stock  
 i) Artesunate-amodiaquine ii) Artemether-lumifantrine iii) Dihydroartemisinin-piperaquine iv) Other
18. Any recommendations on the combinations? i) Modification of combination ii) Combination is alright
19. Which of the combinations is modification necessary? i) Artesunate-amodiaquine ii) Artemether-lumifantrine iii) Dihydroartemisinin-piperaquine iv) Other
20. Comments on ACT: i) Good ii) Not really iii) Bad

### **APPENDIX – III**

**FORM 3**

#### **DATA COLLECTION FORM FOR DETERMINING PRESCRIBERS' CHARACTERISTICS**

**LOCATION.....INVESTIGATOR.....DATE.....**

#### **PRESCRIBERS QUESTIONNAIRE**

##### **PRESCRIBERS CHARACTERISTICS:**

1. FACILITY.....TYPE: PUBLIC/ PRIVATE

2. PRESCRIBER

RANK

Medical Doctor

.....

Medical Assistant

.....

Midwife

.....

Nurse

.....

Community Health Nurse

.....

Other / Specify

.....

3. For how long have you worked as a clinician (prescriber)i) 1yr-5yr ☐ 6yrs-10yrs ☐  
11yrs & above ☐

4. Which of the following languages do you speak?

English ☐ Twi ☐ Dagari ☐ Frafra ☐ Dagomba ☐ Ewe  
☐ Hausa ☐ Other/ Specify .....

5. What key indicators do you normally use to diagnose uncomplicated malaria?

i.Fever ☐ ii.Diarrhoea ☐ iii. Anaemia ☐ iv.Enlarged spleen/liver ☐v.Chills ☐  
vi.Rigor ☐ vii.Joint pains ☐ viii.General body pains ☐ ix. Lab. Investigation ☐ x.  
Other / specify.....

6. What first line treatment do you normally give for uncomplicated malaria? i) ACT ☐  
ii) Chloroquine iii)SP iii)Quinine

7. Why?

i.Policy Demands      ii.Effectiveness      iii. Client Demands  
iv.Cost consideration      v.Side effects      vi.Interactions/incompatibilities

vii. Other/specify.....

8. Which of the following do you use in prescribing ACT;

- i) Age ☐
- ii) Weight ☐
- iii) Height ☐
- iv) Size ☐
- v) Imagination ☐
- vi) Other (Please state).....

9. Did you participate in any of these programmes in connection with the new anti-malaria treatment policy, prior to its implementation?

- i. Seminar Presentation
- ii. Training workshop
- iii. Durbar
- iv. Visitation from RHA/MHA
- v. Visitation from the NMCP

10. Have you participated in any of refresher programme(s) after the implementation of the policy? i) Yes ☐ ii) No ☐

11. In connection with the artemisinin-based combination therapy, do you have the following in place?

- i. Treatment protocol/Guidelines from NMCP
- ii. Drug Bulletin including ACT

12. Are you aware of the new anti-malaria drug policy? Yes ☐ No ☐

13. A) If yes, how did you get to know of it? i) GHS ☐ ii) Drug representatives ☐ iii) Air waves ☐ iv) Print media ☐ v) Other ☐

b) Do you have a copy of the policy? Yes ☐ No ☐

c) If yes, please can I have a look at it? Available ☐ Not available ☐

14. Any recommendations on the ACTs combination? i) Modification of the combination ☐ ii) Combination is alright ☐

15. Which of the combination is modification necessary? i) Artesunate-amodiaquine ☐ ii) Artemether-lumefantrine ☐ iii) Dihydroartemisinin-piperaquine ☐

16. What is your general perception of the new anti-malaria drug policy? i) Good ☐ ii) Bad ☐ iii) Not really ☐

## **APPENDIX – IV**

### **FORM 4 DATA COLLECTION FORM FOR HEALTH FACILITY OPD RECORDS**

**LOCATION.....INVESTIGATOR.....DATE.....**

1. Sex i) Male ii) Female
2. Age i) Under 5yrs ii) 5-24yrs iii) 25-45yrs iv) 46-65yrs
3. Year i) 2006 ii) 2007 iii) 2008
4. Weight i) 0-10kg ii) 11-24kg iii) 25-50kg iv) 50kg & above
5. Symptoms of malaria i) Malaria symptoms ii) No malaria symptoms
6. Diagnosis i) Uncomplicated malaria ii) Severe malaria
7. Lab test i) Yes ii) No
8. Type of medication given i) SP ii) ACT iii) Amodiaquine iv) Artesunate  
v) Quinine vi) Chloroquine
9. How were you asked to take the drugs i) Stat dose ii) Once daily iii) Twice daily  
for 3 days iv)
10. Facility i) Mampong ii) Kofiase iii) Asaam iv) Benim v) Krobo vi) Adidwan  
vii) Yonso viii) Nadawroma ix) Quality x) Sister Phillipa xi) Apaa

**APPENDIX – V**

**DATA COLLECTION FORM FOR ACT STOCK LEVELS**

**FORM 5**

**LOCATION.....INVESTIGATOR.....DATE.....**

**MANAGER OF PHARMACY/DISPENSARY.....RANK.....**

**Table I Stock levels and inventory management in Health facilities**

HEALTH FACILITIES	MAXIMUM STOCK LEVEL (DOSAGE)	CURRENT STOCK LEVEL(DOSAGE)	MINIMUM STOCK LEVEL(DOSAGE)
MAMPONG HOSP.			
KOFIASE H/C			
ASAAM H/C			
BENIM H/C			
KROBO H/C			
ADIDWAN H/C			
YONSO CHPS CENTRE			

**APPENDIX – V1**  
**MALARIA BURDEN STATE IN MAMPONG MUNICIPALITY**

Table II

<b>INDICATOR</b>	<b>2006</b>	<b>2007</b>	<b>TARGET 2008</b>	<b>ACHIEVED 2008</b>
OPD Attendance	65,611	89,804	92,626	<b>95,499</b>
OPD per capita	0.75	1.00	1.00	<b>1.03</b>
# of admissions	3,370	3,730	---	<b>5,307</b>
Admission rate	19/1000	21/1000	---	<b>56/1000</b>
Bed occupancy rate	37.00	29.22	---	<b>42.00</b>
No. of specialist visits from Region	0	0	1	<b>0</b>

The OPD attendance increased by 2,878 which represents 0.03% over the target in the year 2008. The target met did not reflect in the admission rate which was expected to be much lower, all things being equal. This indicates that more cases were delayed and got complicated before getting to the health facilities or subsequent revisits were not adhered to by both clients and patients which eventually relapsed treatment regimes into diverse complications hence more admissions especially in the area of **malaria** which contributed 77% and 20% for OPD cases and admissions respectively in 2008.

### TEN TOP OPD DISEASES BURDEN

Table III

MORBIDITY 2006				MORBIDITY 2007			MORBIDITY 2008		
No	Disease	Freq.	%	Disease	Freq.	%	Disease	Freq.	%
1	<b>Uncomp. Malaria</b>	24,158	66	<b>Uncomp. Malaria</b>	44,747	55.78	<b>Uncomp. Malaria</b>	33,262	77.0
2	Preg Rel. Comp.	3,035	8	Cough or Cold (IMCI)	4,643	6.0	Acute Resp Infect	5,767	13.4
3	Cough or Cold (IMCI)	1,958	5	Diarrhoea(no dehy)	2,860	3.64	Preg. Rel. Comp	3,508	8.1
4	Diarrhoea(no dehy)	1,771	5	Resp Tract Infection	2,507	3.19	Diarrhoea(no dehy)	2,450	5.7
5	Hypertension	1,379	4	Skin Disease and ulcers	2,060	2.62	Hypertension	1,895	4.4
6	Gyaeco. Conditions	1,208	3	Home/Occ. Injuries	1,939	2.47	Home/Occ. Injuries	1,483	3.5
7	RTA	1,199	3	Hypertension	1,698	2.16	Skin Disease and ulcers	1,349	3.2
8	Home/Occ. Injuries	1,108	3	Anaemia	1,405	1.79	Typhoid Fever	1,319	3.1
9	Anaemia	785	2	Rheumatic & joint cond	1,266	1.61	<b>Malaria in Pregnancy</b>	976	2.3
10	UTI	748	2	UTI	1,107	1.41	UTI	924	2.2

Malaria in pregnancy made an unprecedented appearance on the top ten morbidity chart in five years with no mean a record of 976. An indication of high reported cases of malaria especially, with malaria topping the chart with 77% dominance over the other diseases.

Table IV

### TOP TEN CAUSES OF ADMISSIONS

No	2006			2007			2008		
	DISEASE	No. of Cases	%	DISEASE	No. of Cases	%	DISEASE	No. of Cases	%
1	Preg. Rel. Comp	1,063	31.66	Preg. Rel. Comp	1,243	33.3	Preg. Rel. Comp	1,724	36.3
2	Gynae. Cond.	488	14.53	Gynae. Cond.	570	15.3	Severe Malaria	961	20.2
3	Severe Malaria	391	11.64	Severe Malaria	451	12.1	Gynae. Cond.	659	14.0
4	Severe Anaemia	128	3.81	Anaemia	148	3.9	Severe Pneumonia	255	0.54
5	Typhoid Fever	114	3.39	Severe Pneumonia	123	3.3	Anaemia	188	0.40
6	Severe Pneumonia	102	3.04	Hypertension	112	3.0	Malaria in Pregnancy	142	0.30
7	Malaria in Pregnancy	101	2.90	Malaria in Pregnancy	97	2.6	Hypertension	110	0.24
8	Hypertension	98	2.77	Typhoid Fever	49	1.3	Diarrhoea with sev. Dehy	103	0.22
9	Pneumonia	93	2.41	Diarrhoea with sev. Dehy	45	1.2	Typhoid Fever	99	0.21
10	Diarrh sev. Dehy	81	2.20	Resp.Tract Infect	44	1.2	Tuberculosis	51	0.11



Severe malaria which captured 12.1% of the entire morbidity for 2007 rose to occupy about 20% with a raw figure of 961 cases, a rise from 391, 451 in 2006 and 2007 respectively. By simple analysis, 22.6% increase is recorded every other year. A trend of debilitating future malaria situation in the Mampong Municipality if tested and recommended interventions are not adhered to.

### THE MORTALITY AND MOBILITY OF MALARIA ON TOP TEN CAUSES OF INSTITUTIONAL DEATHS

Table V

	2006				2007				2008			
No.	CUASE DEATH	No. CASES	%	CFR	CUASE OF DEATH	No. OF CASES	%	CFR	CUASE OF DEATH	No. CASES	%	CFR
1	Severe Pneumonia	14	11.38	13.7	Septicaemia	18	13.3	100	Septicaemia	19	10.2	100
2	CVA/Stroke	11	8.94	37.9	HIV/AIDS Related	14	10.4	100	Anaemia	16	8.6	8.51
3	Septicaemia	10	8.13	100	CVA/Stroke	10	7.4	100	HIV/AIDS Rel	15	8.1	71.43
4	<b>Severe Malaria</b>	8	6.50	2.0	<b>Sev. Malaria</b>	10	7.4	100	CVA/Stroke	12	6.5	100
5	Anaemia	8	6.50	10.8	Liver Cirrhosis	9	7.4	100	<b>Severe Malaria</b>	9	4.8	0.94
6	Liver Cirrhosis	7	5.69	100	TB	8	5.9	100	Cardiac diseases	6	3.2	85.70
7	HIV/AIDS Related	7	5.69	100	Cardiac diseases	8	5.9	100	Diabetes Mellitus	5	2.7	11.40
8	TB	5	4.06	100	Anaemia	4	2.9	2.7	Respiratory failure	4	2.2	15.40
9	Cardiac diseases	3	2.44	100	Severe Malaria	3	2.2	0.7	Typhoid	3	1.6	3.03
10	Respirator y Failure	3	2.44	8.8	Viral Hepatitis	2	1.5	11.8	Road Traffic Acc	2	1.0	4.25

From 2006, Malaria doubled its claims in 2007 to 10 with Case Fatality Rate (CFR) of 2% to 7.4% .though marginal difference of 10% reduction was noticed the fatality rate declined to approximately 1% (0.94%). This implies that in terms of prevention the communities and heath staff alike did not do much but the medical staff put up their best to minimize casualties. Health education in this regard should be strengthened to encourage sanitary practices and early reporting of cases to the health facilities.

**Table VI. THE MALARIA BURDEN ON CHILDREN UNDER 5 YEAR**

INDICATOR	2006	2007	2008
Total # of under 5 with malaria (OPD)	7,359	5,806	7,545
Total under 5 malaria, admissions.	323	182	605
Under 5 malaria Case Fatality Rate (CFR)	2.7(9)	0.6(1)	0.2(1)

The child indicator on *malaria* seems to portray some hope but the irony here is the resurface of sixth hundred mark and beyond in 2008 which subtly recorded 0.2% of case fatality rate. Interventions such as free Insecticide Treated Nets (ITNs) among others should be researched into its effective utilization, to measure the parents' responsiveness to rush the child to the nearest health facility and to appraise their adherence to home-based *malaria* management as part of Integrated Management Childhood Illness (IMCI) protocols

**Table VII THE STRESS OF MALARIA ON PREGNANCY**

INDICATOR	2006	2007	2008
Total # of malaria in pregnancy (OPD)	356	383	976
Total # of malaria in pregnancy, admissions.	101	97	142
Malaria in pregnancy Case Fatality Rate (CFR)	0	0	0

It is quite fascinating to notice the zero death for mothers, especially the pregnant mother. This can be linked to the SP use. However, for the high numbers in 2008 the last quarter of 2008 enjoyed free maternal care, a policy of government which ensured that all pregnant mothers had access to free maternal health service. Interestingly, the proportional change in the admissions was about 50% of the empirical figure that was likely, all things being equal.