

**SCHOOL OF PUBLIC HEALTH  
COLLEGE OF HEALTH SCIENCES  
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**PROVIDER ADHERENCE TO THE  
NEW MALARIA TREATMENT POLICY FOR  
UNCOMPLICATED MALARIA IN THE  
ASSIN NORTH DISTRICT**

**BY  
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## **DECLARATION**

I declare that except for references to other people's investigations which have been duly acknowledged, this dissertation is the result of my own research and that this dissertation either in whole or in part has not been presented for another degree elsewhere.

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## **DEDICATION**

I dedicate this dissertation to my nephew, Paa Kwesi.

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## **ABSTRACT**

One basic component of the strategy for malaria control is based on prompt and effective treatment. There was a high level of resistance of *P. falciparum* to monotherapy medicines like chloroquine in most African countries including Ghana and thus the need to change to Artemisinin Combination Therapy (ACT) as recommended by WHO. Ghana has adopted a new antimalarial policy and has implemented it since 2005. It specifies artesunate/amodiaquine as the first line treatment for uncomplicated malaria.

The main objective of the study was to assess the adherence to the treatment of uncomplicated malaria in Assin North District in line with the new antimalarial policy of the Ghana National Malaria Control Programme.

The design was a cross sectional descriptive study which used systematic sampling to collect quantitative data at the facility, provider and patient levels. Inclusion criteria for patients were males and females of all ages who have had uncomplicated malaria between November 2006 and April 2007 and reported at any of the six health facilities used for the study. Inclusion criteria for facilities were those under Ghana Health Service. Inclusion criteria for providers were all providers present at the selected facilities at the time of data collection.

Though 100% providers have heard of the policy, 76.5% providers have received training and 70.5% have copies of the reference documents; new National Malaria Policy (NMP) and new Standard Treatment Guidelines (STG).

Though 83.3% of records reviewed had Artesunate/Amodiaquine (AT/AQ) as treatment for diagnosed uncomplicated malaria, only 30% and 50.8% were right according to the NMP and STG respectively. There was 19.5% adherence, (i.e. percentage of records of patients, diagnosed with uncomplicated malaria and given right dose of AT/AQ treatment) as specified by the policy was given. And there was acceptable adherence of 31.8% with the STG standard for patients diagnosed with uncomplicated malaria.

Though providers are prescribing, the dosages prescribed according to the NMCP charts are not right because the charts have too wide weight ranges and this leads to systematic underdosing and overdosing of some patients.

**Key word: provider, adherence, uncomplicated malaria, artesunate/amodiaquine, National Malaria Policy.**

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## LIST OF ABBREVIATIONS

ACT	Artemisinin Combination Therapy
AL	Artemisinin/Lumefantrine
AMDP	Anti-Malaria Drug Policy
AQ	Amodiaquine
AT	Artesunate
AT/AQ	Artesunate-Amodiaquine
CHQ	Chloroquine
IPT	Intermittent Preventive Treatment
mg/kg bw	Milligram per kilogram body weight
NMCP	National Malaria Control Programme
NMP	National Malaria Policy
OPD	Out Patient Department
P.	Plasmodium
S/P	Sulphadoxine/Pyrimethamine
STG	Standard Treatment Guidelines
TDR	Tropical Disease Research
UNDP	United Nations Development Programme
WHO	World Health Organization

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

#### **1.1 BACKGROUND INFORMATION ON MALARIA**

Malaria is a life threatening parasitic disease and the main vector for transmission is the female Anopheles mosquito which requires blood to nurture its eggs. The parasite that causes the disease is plasmodium (abbreviated P.) and there are four species of the human plasmodium namely P. vivax, P. malariae, P. ovale and P. falciparum. P. falciparum is the most virulent type and unfortunately the most common type in sub-Saharan Africa accounting for the extremely large mortality caused by malaria in Africa (Tropical Disease Research, 2004).

Malaria is one of the most important tropical diseases. It kills 1-2 million people every year (Press Dossier, 2005) and the most heavily affected are children under 5 years old.

Malaria is known to be the leading cause of mortality in children under 5 and the number one cause of morbidity. It causes more than 300 million acute illnesses and kills an African child every 30 seconds. Many of the children who survive an episode of severe malaria may suffer from learning impairment or brain damage (World Health Organization 1998). The disease is endemic throughout Ghana and is known to be a leading public health problem. It is estimated that malaria accounts for 40% of all out-patient attendances (OPD) and over 25% of all deaths in children under 5 years old (Cited by Abuaku et al, 2004).

Pregnant women and their unborn children are also vulnerable to the condition. In pregnant women 13.8% are affected and 9.4% of them die from malaria (Cited by Global

Fund 2004). Malaria in pregnancy is one of the causes of low birth weight deliveries world wide, severe maternal anaemia and contributes to maternal mortality. In pregnant women with little or no immunity, infection is associated with high risk of severe disease and maternal and perinatal mortality. (Shulman and Dorman, 2003).

Symptoms of malaria appear around 14 days after the bite of the mosquito but may vary with different species of the plasmodium parasite. Common symptoms include fever, headache, vomiting and others. Malaria can kill by infecting and destroying red blood cells, causing anaemia and by clogging the capillaries that carry blood to the brain (cerebral malaria) or other vital organs. In event of the unavailability of drugs for treatment or in the case of resistance of the parasites to the drugs, the disease can progress rapidly to threaten life.

## **1.2 MALARIA CONTROL**

Control has traditionally relied on two arms: control of the anopheles mosquito vector and effective case management. A long-hoped-for third arm, an effective malaria vaccine, has not materialized. Case management relies largely on antimalarials which together with antipyretics, are among the most commonly used medications in tropical areas of the world (White, 2004).

Resistance has already developed to all the antimalarial drug classes with one notable exception — the artemisinins which are already an essential component of treatments for multidrug-resistant falciparum malaria (WHO 2001).

Years of vaccine research have produced few positive results and although scientists are redoubling the search, an effective vaccine is not yet in sight.

### **1.3 STATEMENT OF THE PROBLEM**

In Assin North, the occurrence of malaria in all ages is not too different from the national picture. For the year 2006, for instance, out of 13,881 OPD visits among children under 5 years, there were 6,469 (46.6%) clinical malaria cases, and 1359 out of 2,651 total admissions (51.3%) were due to malaria. For the ages 5 years and above, 12,676 (24.2%) out of 52,408 OPD visits had clinical malaria while 474 out of 4,047 (11.7%) admissions were due to malaria.

On the mortality scene of the district, 26 malaria deaths were recorded out of 84 (31%) total deaths for under 5 year olds. For above 5 year olds, there were 6 deaths due to malaria out of the 184.

From data on malaria from the six centres of the district used for this study, the total OPD cases for the period between December 2006 and May 2007 was 35,932. Out of this, 33.2% (11943) was due to malaria including, 2474 under 5 years and 241 pregnant women. This puts the under 5 morbidity at 20.7% of the total malaria burden.

### **1.4 JUSTIFICATION FOR THE STUDY**

Medicines are recommended to be dispensed based on body weight of an individual. Reports of serious adverse effects in some patients treated with some brands of the

AT/AQ at the launch of the new malaria policy had big media publicity (WHO 2006). This created tension which could have impaired confidence in providers as well as the general public about the Artemisinin Combination Therapy (ACT) and thus the need to assess the implementation of the policy so far.

After the implementation of the new policy in January 2005, there is the need to assess the success or otherwise after a period. The study will therefore give a picture of the situation and will also provide baseline information to the district for subsequent follow-up studies. It will also raise awareness and expand knowledge on the new malaria treatment policy in Assin North.

The study also falls in line with monitoring of the policy which seeks to assess the prescriber prescription habits and availability of quality antimalarial medicines in health facilities. The study will gather information to support the policy.

## **1.5 OBJECTIVES**

The main objective of this study is to assess the adherence to the treatment of uncomplicated malaria in Assin North District in line with the new antimalarial policy of the Ghana Malaria Control Programme.

### **1.5.1 Specific Objectives**

- To determine the extent of awareness of the new antimalarial policy among health providers;

- To assess the level of adherence to the new antimalarial treatment policy in the treatment of uncomplicated malaria by prescribers at health facilities;
- To determine factors that influence prescribers on the choice of antimalarial treatment prescribed to patients for uncomplicated malaria;
- To determine if the right doses are being prescribed;
- To determine the availability of artesunate/amodiaquine stocks at the various facilities; and
- To make recommendations to guide policy interventions.

## **CHAPTER TWO**

### **2.0 LITERATURE REVIEW**

One of the basic components of the strategy for the control of malaria is based on prompt and effective treatment. High resistance levels of *P. falciparum* to the most affordable drugs like chloroquine and sulfadoxine-pyrimethamine (SP) limits the choice of efficacious chemotherapy in the treatment of malaria and Artemisinin based Combination Therapies (ACTs) are presently being used in many countries (Sirima and Gansané, 2007).

WHO (2001) recommends the use of artemisinin based combination therapies as first line treatment for countries experiencing resistance to monotherapies in the treatment of *P. falciparum* malaria.

### **2.1 MALARIA TREATMENT**

The life-span of most drugs used for the treatment and prevention of malaria could be prolonged if better deployed, and also if they are rationally combined on pharmacokinetic and pharmacodynamic properties (Majori, 2004).

#### **2.1.2 Artemisinin Combinations Treatments (ACTs)**

The combination therapy (CT) concept is based on the synergistic potential of two or more drugs, to improve therapeutic efficacy and also delay the development of resistance to the individual components of the combination (Majori, 2004).

The key goal of combining artesunate with an existing antimalarial medicine is to improve cure rates; delay emergence of resistance to component drugs and reduce parasite clearance time, (Barenness et al, 2004). By this, the combination could also reduce treatment failure and transmission potential (Adjuik et al, 2004). Though they are expensive, their advantages over monotherapy far outweigh the cost.

Artemisinin-based combination chemotherapies have been documented to consistently produce faster relief of clinical symptoms and parasite clearance in uncomplicated falciparum malaria than any other currently used antimalarial drug (Owusu-Agyei et al, 2005). However, the short half-lives of artemisinins result in frequent recrudescence infections when used alone and therefore, much interest lies on the choice of the combination partner drug.

Amodiaquine still has efficacy against falciparum malaria in many countries. A study done to assess the safety, treatment efficacy and effect on gametocyte carriage of AQ alone and AT/AQ in children 10 years and older in Kenya, Senegal and Gabon for uncomplicated malaria revealed a 91% cure rates on day 14 in the combination as against 74% in AQ alone in Kenya; 93% versus 94% in Senegal and 98% versus 90% in Gabon (Adjuik et al, 2002) and the corresponding rates for day 28 are respectfully for AT/AQ versus AQ alone; 68% versus 41% in Kenya, 82% versus 79% in Senegal and 85% versus 71% in Gabon. This implied that though AQ alone is effective, the combination of AT and AQ improved treatment efficacy in Gabon and Kenya and was equivalent in Senegal and thus the AT/AQ is a potential combination for use in Africa.

Resistance of the parasite to the respective partner drug is very important. ACTs are recommended for use as first-line treatment for uncomplicated malaria, even in resource-poor areas where multi-drug resistant *P. falciparum* infection is a problem (WHO 2001). ACTs have been used for a long time as first-line treatment in some South-East Asian countries (Lefevre et al, 2001).

In view of the recognition of the role of combination therapy, WHO (2001) convened a technical consultation to review existing evidence on combination therapy for malaria and to make specific choices on appropriate combinations for use. The Technical Consultation strongly endorsed the potential of combination therapy for use in Africa. It recommended the following four combination therapies with potential for deployment, on the basis of the available safety and efficacy data, which are listed below in prioritized order, if costs were not an issue:

- Artemether/lumefantrine (AL)
- Artesunate (3 days) plus amodiaquine.
- Artesunate (3 days) plus S/P, in areas where SP efficacy is high.
- Amodiaquine plus SP, in areas where efficacy of both drugs remains high—mainly limited to countries in West Africa.

In a study to assess the therapeutic efficacy of artesunate plus amodiaquine (a 3-day course) and a 6-dose course of artemether/lumefantrine (AL) in an area of Nigeria with high levels of *P. falciparum* resistance to chloroquine and S/P in children aged 6 to 59 months with uncomplicated *P. falciparum* infection and parasite density 1,000 to 200,000

parasites/ $\mu$ L, a day 14 standard WHO in vivo antimalarial drug test protocol, there was 87% adequate clinical response versus 82.5% parasitological response (ACPR) (Meremikwu et. al, 2005). Early treatment failure (ETF) occurred in 1.8% treated with AT/AQ but in none of those with AL whilst 3.7% patients in the AL group and none in the AT/AQ group had late clinical failure. Late parasitological failure (LPF) was observed in 15.8% and 9.3% of patients treated with AT/AQ and AL respectively. None of the participants had a serious adverse event. This implies that AT/AQ and AL have high and comparable cure rates and tolerability among children under-five in Calabar, Nigeria.

## **2.2 THE NEW POLICY**

Due to the high level of resistance of *P. falciparum* to antimalarials like chloroquine (CHQ), amodiaquine (AQ), and S/P (Oduro et al, 2005), there was the need to test the safety and efficacy of antimalarial medicines in specific sites to provide the basis to make appropriate policies on treatment.

### **2.2.1 Efficacy of Chloroquine**

Chloroquine lost its efficacy in the the management of malaria (Koram et al, 2005). Several studies and anecdotal reports in Ghana threw doubt on the efficacy of chloroquine in the management of malaria.

In 1998, the National Malaria Control Programme (NMCP) in collaboration with Noguchi Memorial Institute for Medical Research (NMIMR) started a study centred at 6

district hospitals around the country to examine the responses of *P. falciparum* to chloroquine in the treatment of uncomplicated malaria and the results showed a resistance of the parasite to chloroquine. Treatment failure in this study using chloroquine of good quality was between 6% and 25% among the different demographic cohorts. This put Ghana's state between 'Alert Period' and 'Change Period' according to suggested WHO Global response to Anti-malarial Drug Resistance four tier action framework. There was therefore a call for a review of the current policy to replace CHQ as a first line drug for malaria treatment, introduce alternatives and review the treatment guidelines.

A task force of experts of various aspects of malaria control, set up by the NMCP reviewed the evidence on efficacy of chloroquine in the treatment of malaria and chemoprophylaxis in pregnancy between October 2002 and January 2004. (Cited by Global Fund 2004)

### **2.2.2 The Policy Adoption**

Ghana had to follow the WHO (2001) recommendation to use combination therapies containing artemisinin derivatives as a country experiencing resistance to monotherapies in the treatment of *falciparum* malaria (Koram et al, 2003).

The choice of the combination adopted is based on characteristics including efficacy levels, compliance, route of administration, side effects, cost effectiveness, impact on local industry and key demographic variables such as the appropriateness for treating malaria in children under 5 years and in pregnancy. Ghana adopted and later implemented a new antimalarial policy effective from January 2005 with the objective to

treat all malaria cases in all categories of the population in order to reduce morbidity and mortality especially in children under five and pregnant women.

The new policy chose Artesunate/Amodiaquine because it is an efficacious combination drug with low side effects, known worldwide for its high parasitic clearance and cure rate with adequate treatment duration. The combination is also safe for use in children and can also be used with caution in pregnancy after the first trimester, comparatively less expensive to all other alternatives and compliance can be improved with unit-dose co-packaging. (Global Fund 2004).

### **2.2 3 The Changing Process**

The implementation required that, both CHQ and AT/AQ should be allowed on the market for one year whilst efforts are made to de-emphasise production of the CHQ and its use in the treatment for uncomplicated malaria. Efforts were also to be made to increase availability of the AT/AQ. A well planned nationwide public education campaign and training for health professionals and health care providers on the policy was to be embarked on.

The Ministry of Health (MOH) was also to embark on appropriate continuing education programme to educate all health professionals in both public and private sector on the policy. The curriculum of pre-service training institutions of health professionals was to be reviewed to be in line with the policy. (Global Fund 2004).

#### **2.2.4 Policy Monitoring**

As part of monitoring, focus was to be on availability and quality of AT/AQ, quinine and S/P in health institutions, prescriber prescribing habits and dispensing habits of medicines selling outlets. The NMCP was to liaise with Pharmacovigilance Centre to develop procedure for adverse drug reporting (ADR). (Global Fund 2004).

#### **2.2.5 Challenges of The New Policy**

Implementation of the new policy has not been that smooth right from the onset. At the launch of the new treatment policy, some clients experienced severe adverse reaction that were publicised. This created doubts in many providers and the general public about the combination. The policy may therefore not achieve the main objective for which it was adopted if the pattern remains as it is now (Yeboah, 2006).

After the policy change, a study conducted by National Centre for Pharmacovigilance in 2006 on prescribers and dispensers indicated that 45.9% of respondents prescribed or dispensed AT/AQ combination, 40.5% of respondents were still prescribing monotherapies of Artemisinin derivative, 21.6% gave out only AQ and 45.9% prescribed or dispensed SP (Fansidar) for uncomplicated malaria. (Centre for Pharmacovigilance, 2006, unpublished).

A study conducted in December 2006 by the Quality Health Partners (QHP), a five-year USAID funded bi-lateral assistance project that aims to improve the quality of reproductive and child health in 30 target districts of Ghana including the Assin North

District in a routine monitoring, found that 100% of facilities in Assin North were prescribing the new combination therapy, but only 16.7% of them knew the correct dosage according to weight (Bruce, 2007). But more detail is needed to understand the level of adherence. It therefore calls for regular monitoring to assess its success or otherwise.

### **2.3 DOSAGE REGIMES**

Effectiveness of medicines depends a lot on appropriate dosage regime to avoid treatment failure or toxicity. The best way of dosing is to use milligram per kilogram body weights (mg/kg bw) of patients which means that, the weight of the patient in kilogram is multiplied by a specific factor usually in milligram specified for each particular medicine in order to get a specific dose for each specific patient based on his/her weight.

Weight based dosing in mg/kg body weight prevents the possibility of some children receiving drug doses below and above those recommended with the attendant risks of treatment failure or toxicity. (Taylor et al, 2006).

The policy states the dose for the combination as: Artesunate (AT) 4mg/kg body weight and Amodiaquine (AQ), 10mg/kg body weight, administered concurrently for three consecutive days. By convention, the maximum dose of artesunate for a 50 kilogram adult is 200mg per dose.

Patient adherence to prescribed antimalarial is important to clear infections, reduce the chances of complicated malaria and slow down the rate of development of resistance and adherence is affected by form of drug, packaging, as well as cost. (Agyepong 2002).

For the purposes of simplicity of doses sometimes, doses are simplified into specified quantities such as number of tablets or volumes allocated to average weights/ages. And the Standard Treatment Guidelines (STG) compiled such a dosage regime for the new combination but the weight/age ranges are so wide that, some weight are systematically underdosed or overdosed. The regime stabilises only for weights 50 kilogram and above.

The recommended dosage for amodiaquine oral in the STG is 25-30 mg/kg body weight over 3 days and then gives a recommended dosage regime for the artesunate/amodiaquine combination as shown in Table 1 (STG, 2004).

**Table 1- STG RECOMMENDED DOSAGE REGIME FOR AT/AQ COMBINATION.**

		Number of Tablets					
Weight (kg)	Age (years)	Artesunate Tablets			Amodiaquine base tablets		
		Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
5-10	Infants	25mg	25mg	25mg	75mg	75mg	75mg
11-24	1-6	50mg	50mg	50mg	150mg	150mg	150mg
24-50	7-13	100mg	100mg	100mg	300mg	300mg	300mg
50+	14+	200mg	200mg	200mg	600mg	600mg	600mg

Because of these wide ranges in the chart, dosage specifications of the new policy and new STG do not fully compliment each other as a dose that may be seen as right in the policy could be incorrect in the STG.

To complicate the dosage regime further, the National Malaria Control Programme came out with dosage charts well distributed across the country's health facilities.

It differs from the STG at weight 70 kilogram and above (Fig 1, Appendix). The chart specifies dosage using weight/age corresponding to divisions or number of whole tablets of specific strengths of a particular brand of the combination which comes in strengths of 50mg artesunate and 150mg amodiaquine.

The NMCP charts further divides the daily dose of both AT and AQ into twice daily dosing which for artesunate is alright but for amodiaquine, cannot be confirmed. Ghana is the first country to be dosing AQ twice daily making each particular dose less than it should.

But an effective method of ensuring slowing the emergence of antimalarial drug resistance is that patients with high parasitemias receive a full course of adequate doses of ACT irrespective of the epidemiological setting, (White, 2004).

In addition to the effectiveness of 3 days of treatment (rapid clearance of fever and malaria parasites) in Western and Central Africa, where resistance to amodiaquine is low, the concept of adding AQ (a long half life drug) to AT (a short half life drug) is for a higher concentration of the AQ to kill off the remaining malaria parasites after the AT has achieved substantial and rapid parasite clearance (Sirima and Gansané, 2007). It is therefore clear that major immediate effect of the artemisinin component is to reduce the parasite biomass. The residual biomass is exposed to maximum concentrations of the partner drug, well above its minimum inhibitory concentration, resulting in a lesser likelihood of resistant mutations breaking through (White, 2004). This also implies that

an initial dose of AQ should not be below a threshold dose that is enough to illicit a response, otherwise, the purpose for the combination might be defeated.

The concentration of a drug at the site of action controls the effect and drug effect is a function of dose. Dose response determines the required dose and frequency as well as therapeutic index for a drug in a population. (Merck 2005).The twice dosing of amodiaquine by the NMCP therefore leaves much to be desired.

Amodiaquine is an antimalarial medicine well established and WHO recommends a dose of 30mg/kg body weight just as specified in the STG of Ghana. That brings the daily dose of 10mg/kg body weight.

In Southern Senegal, using a therapeutic dose range of 7.5-15mg/kg of AQ per day (22.5-45mg/kg over 3 days) of AT/AQ produced cure rate of 95%. A total amodiaquine dose of 15-50mg/kg were well tolerated in 397 of all ages. This brings the daily dose of 5-16.7mg/kg body weight. In Cameroon, clinical experience found that, replacing initial AQ dose of 15mg/kg body weight with 10mg/kg body weight (as established with STG of Ghana) reduced the vomiting which was trouble shooting in school children aged 5-15years. Severe asymptomatic neutropenia has been reported in 6% of children with falciparum malaria when treated with 30mg/kg of AQ alone or in combination with artesunate. (Cited by Taylor et al, 2006).

Based on these data, the therapeutic dose for AQ is set at 7.5-15mg/kg/day (i.e 22.5-45mg/kg body weight over 3 days), thus it has less flexibility, (therapeutic index of 2, i.e.

ratio of dose required to produce toxic effect divided by the therapeutic dose (Therapeutic index, 2007) is 2) because it has dose limited toxicity. (Taylor et al. 2006). Ghana's 10mg/kg falls within the safe and acceptable dose range.

The artemisinin class of compounds are remarkably well tolerated, (Taylor et al. 2004). The current recommended target dosage for artesunate is 4mg/kg daily for 3 days which takes into account the wide variation of artesunate concentration between individual malaria patients and thus reduces the probability of underdosing. Therapeutic dosage range based on some published data defines AT dose as 2-10mg/kg/day (i.e. 6-30kg/kg over 3 days). This gives AT a high therapeutic index (5 folds) with excellent safety and tolerability (Cited by Taylor et al, 2006).

## **2.4 STOCK AVAILABILITY**

In order to minimize monotherapy with the components of a particular combination therapy, it is necessary to guarantee consistent access to the combination therapy and restrict access to related drugs throughout the health sector, both private and public (White, 2004)

Ghana was initially to import quantities of the AT/AQ while supporting the private sector for local production. The Ministry was to collaborate with the sector to produce pre-packaged blister packs of the combination drugs. (Global Fund 2004).

Thus one of the steps in the implementation of the policy included systematic management of procurement, supply and delivery of medicines (WHO 2006).

## **CHAPTER THREE**

### **3.0 METHODOLOGY**

#### **3.1 STUDY AREA**

##### **Political Characteristics**

The Assin North is a 3-year old district created out of the Assin District in August 2004 when the district was divided into two, Assin North and Assin South due to its large size. The district has 6 sub districts, Akropong, Bereku, Praso, Kushea, Bediadia and the district capital, Assin Fosu.

##### **Geographical characteristics**

The district is located in the northern part of the Central Region and it is the largest of its 13 constituent districts. It shares boundaries with Adansi East district (Ashanti Region) to the north, Assin South to the south, Birim South district (Eastern Region), Asikuma-Odoben-Brakwa and Ajumako-Enyan-Essiam districts to the east and Upper Denkyira, and Twifo-Heman-Lower-Denkyira to the west. The district lies in the southern rain forest belt. It lies within Longitudes 1° 05' East and 1° 25 West and Latitudes 6 ° 05' North and 6° 40 South. The district covers an area of about 1,500 sq. km. and comprises about 1000 settlements including Assin Foso (the District Capital).

The District is characterized by undulating topography and has an average height of about 200m above sea level and has numerous small rivers and streams. The main rivers include the Pra, Offin, Betinsin and Fum Swamps.

## Demographic characteristics

The district has six sub-districts with 127 communities and the population by 2006 is shown Table 2.

**Table 2: POPULATION DISTRIBUTION IN ASSIN NORTH DISTRICT**

Sub-District	Number Of Communities	Population
Foso	40	38,921
Akropong	20	20,677
Bereku	31	26,758
Praso	3	7,299
Kushea	12	9,730
Bediadia	21	18,244
Total	127	121,629

Source: Assin North District Health Directorate.

It has a population of 121,629 projected from 2000 census. About half of the population, 51.1%, reside in and around the district capital with the rest living in the rural communities.

## Social and Communication Systems

The main language of the district is Akan. There are also inhabitants of Ewe, Fante, Guan origin who have settled on the land. Generally, there is electricity supply in the district but there is no pipe borne water and so most of the communities depend on boreholes, hand dug wells and streams. Telecommunication facilities are mostly the use of cellular

phones that have generally good coverage. The Kumasi-Cape Coast road runs through the district capital and some of its sub districts. The district is basically rural and the main occupation of the people is farming of cash crops such as cocoa, oil palm and citrus as well as food crop like cassava, plantain and maize. Other economic activities include trading, lumbering and saw milling and local gin distilling (akpeteshie).

In terms of education, in the 2006/2007 academic year, the district has 85 Pre-schools, 103 Primary Schools, 73 Junior Secondary Schools, 4 Senior Secondary Schools and 1 Teacher Training College and one National Vocational Training Institute (Maks Publication and Media 2006).

### **Health Profile**

The district has one hospital, which is a member of Christian Health Association of Ghana (CHAG), six health centres, two Community based Health Planning and Services (CHPS) zones, four clinics and three private maternity homes. The only hospital is always under pressure since it serves the entire district in addition to the neighbouring districts. Top ten causes of death in the district for the first half of the year include AIDS, septicaemia, malaria, meningitis and anaemia among others.

### **3.2 TYPE OF STUDY**

A cross sectional descriptive study at Assin North district that was conducted to collect quantitative data.

### **3.3 SAMPLING**

#### **3.3.1 Study population**

The target population for patients was males and females of all ages in the district who have had uncomplicated malaria and had reported in any of the health facilities under study between November 2006 and April 2007. The study population was made up of all health care providers and managers within the selected facilities under study. All health providers (prescribers) who were available at the time of data collection were interviewed.

#### **3.3.2 Sample size determination**

Population of District is 121,629. Estimated number of cases of malaria in a month = 5,070. This assumes that 50% of the population will have malaria in a year and that in any given month there will be approximately 5,070 cases of malaria.

Expected frequency of factor under study (i.e. percentage of clients treated correctly for malaria = 17%), with a margin of error of 5%.

At confidence interval of 95%, Sample size = 383. Making allowance of losses, it comes to approximately 400 patients treated for malaria.

#### **3.3.3 Sampling Method**

A census of health care facilities (n=6) was conducted to collect basic information about infrastructure and management. For the providers, all providers of the selected health facilities who take care of patients and were present at the time of data collection were interviewed. For the record review, using proportional allocation fractions based on

available information on malaria burden within each sub district between January and May 2007, a total of 400 (section 3.3.1) records were proportionally allocated to each of the 6 sub district with an allocation factor of  $400/8639 = 0.0463$  as indicated in Table 3.

**Table 3: SAMPLE SIZE ALLOCATION TO SUB DISTRICTS**

Sub district	Estimated Malaria case load from Jan-May '07	Calculated Sample Size	Allocated Sample size
Akropong	421	19.5	20
Bediadua	493	22.8	20
Bereku	1298	60.1	60
Kushea	405	18.8	20
Praso	726	33.6	30
Fosu	5295	245.2	250
Total	8638	400	400

The calculated sample sizes were then rounded up or down to the nearest tenth number as shown in Table 3. For each particular facility, the total number of uncomplicated malaria cases reported at OPD was counted using the OPD attendance book.

Based on the total number of cases per facility, a sampling interval “k”, was calculated. To select the patients’ records, systematic sampling was used. Starting from a random point of total malaria cases over the six-month under review, i.e. November 2006 to April 2007, each “k”th record was noted and picked from the record archives as part of the sample. This continued until the total number of records required for the sample allocated to that facility has been selected. Then the enumerator filled in the information from the record onto the patient’s record review tool. Patient records were assessed for diagnosis made, the antimalarial prescribing patterns, choice of other malaria drugs prescribed, and

their doses to see if they tally with the recommended doses according to weights of the patients.

Three experienced research assistants were trained on how to cross check information from records to ascertain the correct answers. Research assistants were used to collect information for the record review.

Questionnaires were pre-tested in Awutu Efutu Senya and for a second time in Assin Akropong sub district to address mistakes and omissions. Certain sentences were rephrased and additions and subtractions made where necessary to properly address the issues under the study.

### **3.4 DATA COLLECTION TECHNIQUES AND TOOLS**

The study involved the collection of quantitative data. Three tools were used to collect these data. The tools were:

- **Facility Audit Questionnaire:** This questionnaire looked at general issues that affected adherence at the facility including staffing and supervision and the availability of standards and guidelines. This questionnaire also looked at the availability of drugs and overall service statistics for the facility. One questionnaire was filled for each facility. A census of all Ghana Health Service and the only hospital facilities in the District was conducted.
- **Provider Interview:** This questionnaire interviewed all providers present on the day of the assessment who. This questionnaire assessed training, knowledge and

practice for prescribing. It also reviewed supervision and the availability of guidelines and looking at providers' experience with side effects.

- **Patient Record Review:** This questionnaire collected information on the practice of documenting treatment for malaria in each of the facilities in the district for the period November 2006 – April 2007 to ascertain trends in ACT prescribing implementation. Actual prescriptions of antimalarial medications were written out to be ascertained later by the principal investigator, which of them were correct or otherwise using the different documents available. A total of 400 records were reviewed.

### 3.5 VARIABLES

The main dependent variable is the percentage of providers who accurately prescribe the new AT/AQ. The independent variables that affect correct provider treatment are numerous (see Table 4).

**Table 4: INDEPENDENT VARIABLES AFFECTING PROVIDER ADHERENCE**

<b>Facility Variables</b>	<b>Provider Variables</b>
<ul style="list-style-type: none"> <li>▪ Stock-outs of ACTs</li> <li>▪ availability of other anti-malarial treatment</li> <li>▪ availability of key equipment (weighing scales)</li> <li>▪ availability of guidelines and protocols</li> <li>▪ caseload</li> <li>▪ staff strength</li> </ul>	<ul style="list-style-type: none"> <li>• Provider training on ACT</li> <li>• Provider experience with side effects</li> <li>• Provider practice of prescribing (mg/kg or by chart)</li> <li>• Supervision</li> <li>• Availability of new policy document with provider</li> </ul>

### **3.6 ETHICAL CLEARANCE**

Ethical clearance was sought from the Ghana Health Service Ethical Review Board.

Informed consent of all participants was sought from the District Health Director and at the facility levels, the health provider in-charge of each facility after explaining the rationale for the study and their liberty to allow records of patients and facility itself to participate or otherwise in the study.

Informed consent was also sought from all providers before they were interviewed.

### **3.7 QUALITY ASSURANCE AND DATA PROCESSING**

To enhance quality, experienced field workers were used and all record review forms were critically examined at the end of each day. Field workers were also asked to cross-check the principal investigator's work.

Almost all filled record review questionnaire were examined by the Principal Investigator and data collected was crossed checked with that in the patient's record for completeness and accuracy.

At the end of each session the responses were examined critically to check that they were consistent and complete. At the end of the data collection period there was double data entry using EPIDATA version 3.1 and consistency was later checked for quality control purposes. SPSS version 11.5 was then used for the cleaning and analysis.

## **CHAPTER FOUR**

### **4.0 RESULTS AND FINDINGS**

#### **4.1 STAFF STRENGTH**

Data were collected from 6 facilities from the 6 sub districts, 1 hospital in the district capital, Fosu and 5 health centres (H.C.) each from the remaining 5 sub districts. Among the 6 facilities used for the data collection, the total picture of the staff strength is as follows; 5 medical doctors, 2 medical assistants, 46 nurses, 1 pharmacist, 8 dispensing assistants, 3 laboratory technicians/technologists, 29 ward assistant/orderlies/health aids, 11 record assistants, 2 anaesthetic assistants, 1 X-ray operator. Other staffs include labourers, casual workers and watchmen.

In all 17 providers comprising 8 males and 9 females were interviewed. They were; 3 doctors, 2 medical assistants, 5 nurses, 1 community health nurse, 5 midwives and another health worker who happened to be an orderly. Per each sub district the composition was, 1 from Akropong, 2 each from Bediada, Bereku and Kushea, 3 from Praso and 7 from the district capital and the only hospital, Fosu.

#### **4.2 DEMOGRAPHIC CHARACTERISTICS**

In all 400 records of males and females of all ages from the general population were systematically sampled out from the 6 sub districts of Assin North in quantities according to the malaria case load in each sub districts and the composition was as seen in Section 3.3.3. The records were made up of 158 males, 229 females and 13 records had no sex indication on their records as indicated in Table 5.

**Table 5: AGE AND SEX DISTRIBUTION OF PATIENTS WHOSE RECORDS WERE REVIEWED**

Sub district	SEX			Age					Total
	Male	Female	Missing	Infant (<1yr)	Under 5yrs	5-17	Adult (>17)	Missing	
Fosu	105	135	10	31	32	56	122	9	250
Bereku	25	35	0	1	5	17	37	0	60
Praso	7	21	2	1	4	10	15	0	30
Kushea	6	13	1	0	2	5	13	0	20
Akropong	6	14	0	1	6	3	10	0	20
Bediadia	9	11	0	0	1	4	15	0	20
Total	158	229	13	34	50	95	212	9	400

Out of 400 records picked, 364 (91%) had their weights recorded and the weight range was between 2-110kg. A total of 36 (9%) records had no information on weight.

Age categories of the records were 84 children under 5 years, 95 older children of 5-17 years, 212 adults older than 17 years and 9 records with no information on age (Table 5).

Temperatures of patients ranged from less than 35°C to above 37.5°C at the time of presenting but majority of records, 262 (65.5%) had no information on temperature of patients.

Records indicated that patients presented with a lot of symptoms mainly fever and headache, others include chills, rigors, and abdominal pain.

Diagnosis must have been made based mainly on symptoms because out of the 382 records (95.5%) that had diagnosis including 295 uncomplicated malaria, 1 severe malaria and 86 mixed infection of malaria with other diseases indicated, only 21 (5.5%) had laboratory investigation of blood film for malaria parasite to confirm the diagnosis of malaria as shown in Table 6. There was no diagnosis on 18 records.

**Table 6- DIAGNOSIS OF MALARIA**

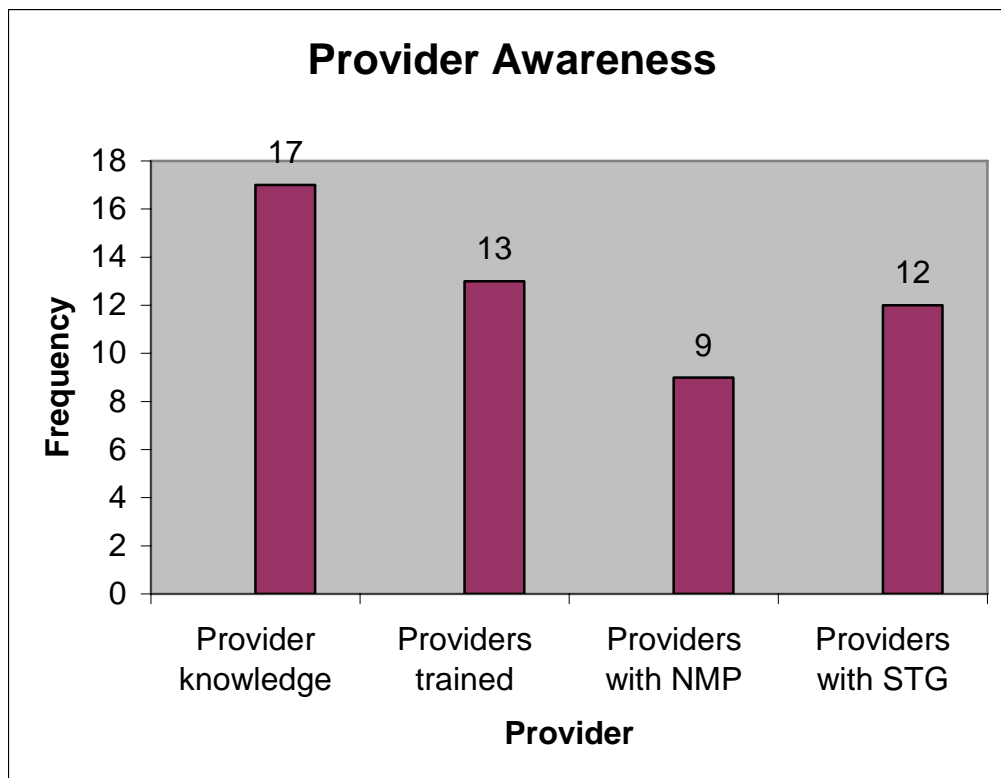
Diagnosis	Uncomplicated Malaria	Severe Malaria	Malaria + other diseases	Missing	Total
Frequency	295	1	86	18	400
Percent	73.8%	0.3%	21.5%	4.5%	100

### 4.3 PROVIDER AWARENESS

#### 4.3.1 Awareness of New Policy

All of the 17 providers interviewed had heard of the new policy in the treatment of uncomplicated malaria, and knew that the treatment is by the use of AT/AQ. Thirteen of them have been trained specifically on that (Fig 2). Out of this, 5 were trained in 2005 and 8, in 2006. Sixteen (94.1%) providers thought there change was necessary, 9 had copies of the new National Malaria Policy (NMP) document and 12 had copies of the new S.T.G (Figure 2).

**Figure 2: PROVIDER AWARENESS**



### **4.3.2 Malaria Treatment Protocols**

In this text provider awareness is defined as a provider who;

1. has heard that there is a new policy;
2. has received training specifically with the introduction of the policy;
3. has a copy of the new national malaria policy, and
4. has a copy of the latest edition of the STG (2004).

By this definition, there were 8 providers out of the 17 interviewed that met this criterion.

At the hospital there was a copy of the new STG in each consulting room whereas at the health centres there is only one copy which is usually kept at the only consulting room that seemed to be the officer in-charge's office. Five out of the 6 facilities had copies of the latest edition of STG, 2004, new NMP, treatment protocols in consulting rooms and IPT manuals but one facility, Bereku, had none of these.

### **4.4 PROVIDER ADHERENCE**

In this text, provider adherence is defined on a patient record review as a record;

1. with a diagnosis of uncomplicated malaria;
2. with the drug treatment of AT/AQ; and
3. the right dosage as specified by the NMP.

By this definition, only 78 records (19.5%) reviewed met the criterion.

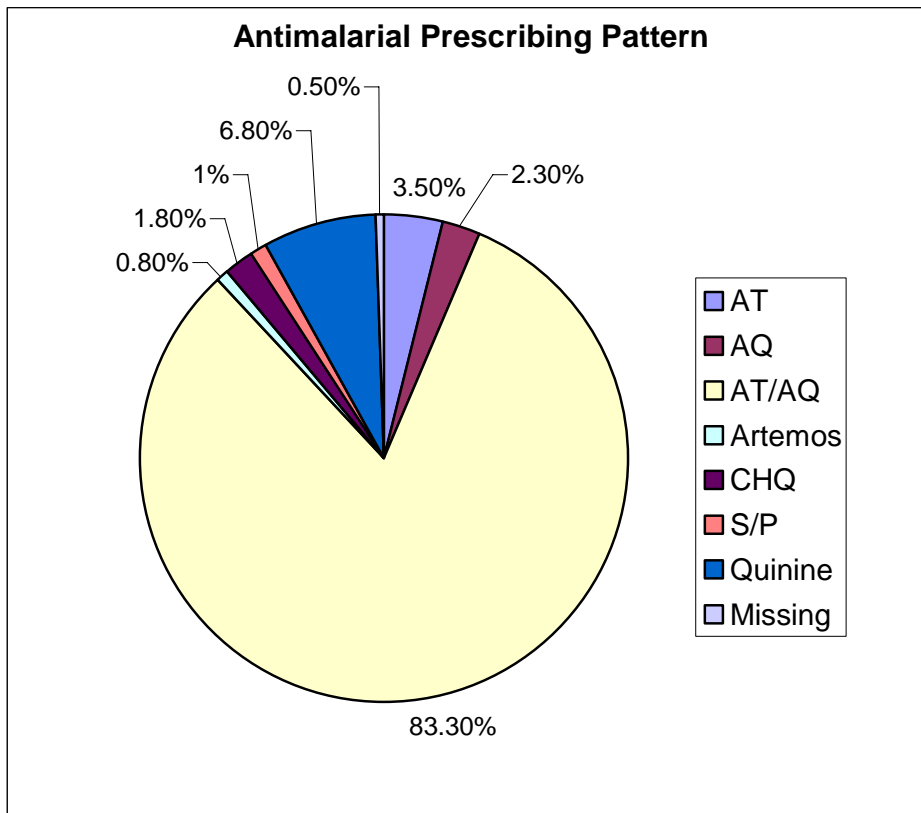
Acceptable adherence is defined as percentage of record with diagnosis of uncomplicated malaria and right dosage of AT/AQ by the new STG standard. The picture then became different as 127 records (31.8%) met the criteria.

#### 4.4.1 Prescribing Pattern

All 17 providers interviewed claimed they do prescribe AT/AQ; a total of 11 said they prescribe it always for patients with uncomplicated malaria, 5 prescribe very often and 1 seldomly prescribe it.

The patients' record review confirmed the claim of the providers to some extent (Fig 3) as 333 representing 83.3% of records had AT/AQ treatment for malaria. There were also 27(6.8%) with quinine treatment all from the hospital, 14(3.5%) artesunate monotherapy , 9(2.3%) amodiaquin monotherapy, 7(1.8%) chloroquine , 4(1%) S/P and 3(0.8%) artemos drug treatments. Most of the patients (93.4%) also had analgesics and 32.3% had haematinic/multivitamin as well.

**Figure 3: ANTIMALARIAL MEDICINES PRESCRIBING PATTERN**



#### 4.4.2 Other Antimalarial Medicines Prescribed

A total of 10 providers gave reasons why they would sometimes prescribe outside the combination. Reasons given were mainly patients' refusal (50% of the 10 providers who responded to the question) and personal experience of providers or with a patient (3), fear of adverse effects, among other reasons.

Some providers also gave conditions under which they prescribe other antimalarials as patients' preference and patients condition. Other conditions given were dispensary stock-outs of AT/AQ, NHIS status of patients, treatment failure with combination, stage of pregnancy, patient's allergy to any of the components of the combination and others (Tables 7).

**Table 7: CONDITIONS FOR PRESCRIBING ANTIMALARIALS OTHER THAN AT/AQ**

Response	Patients' preference	Dispensary stock-out	Patients' condition	Patients' NHIS status	Treatment failure with combination	Other
Frequency	8	2	4	2	2	5
Percent	47.1%	11.8%	23.5%	11.8%	11.8%	29.4%

#### 4.4.3 Provider Opinion of Policy

Responding to questions of rating the effectiveness of the new combination, 14 out of the 16 who responded thought it is effective, 2 of them thought it was effective but for the side effects associated with it. The provider who did not respond thinks it is too early to decide, she could make a comment only after 2 or even 3 years.

Providers were asked to suggest the fate of the policy and majority think it should continue. One provider thinks it should be modified while 5 gave recommendations

including making available syrup formulation for children, other alternatives should be made available, consideration of patients' preference among others.

## **4.5 DOSAGES**

### **4.5.1 Provider Dosage Pattern**

Providers were asked how they prescribe antimalarials doses in general, AT/AQ in particular. Only three providers prescribe the combination based on mg/kg body weight. The rest of them prescribe just by looking on the NMCP dose charts. One provider who did not have the chart in his consulting room said he wrote the medicine on the patient card and left it to the dispensary to calculate the dose.

Doses of other antimalarials had a similar pattern. i.e. by milligram per kilogram body weights or by quantified number of tablets. All facilities were seen to have weighing scales. And this is confirmed by the percentage of records with weights recorded, 91%.

The health centres hardly prescribe Quinine but rather refer to the hospital. From the records, doses of AT/AQ and the other antimalarials medicines prescribed by providers were assessed.

### **4.5.2 Right Dosage**

Doses of were prescribed either by calculating milligram per kilogram body weights (as described earlier) or referring to the NMCP charts in the case of AT/AQ.

Some of doses of antimalarials were not indicated on the prescription; 39 AT/AQ, 1 S/P, 1 quinine and 1 artemos.

From the records review as mentioned earlier, 333 of the 400 records picked had AT/AQ as treatment for malaria. Out of this, only 5.4% (18) of doses were prescribed based on milligram per kilogram body weight and half of them (9) were incorrect. In total, 100 (30%) of the total AT/AQ treatments were right by the standard of the NMP including the 9 that were written using mg/kg body weight.

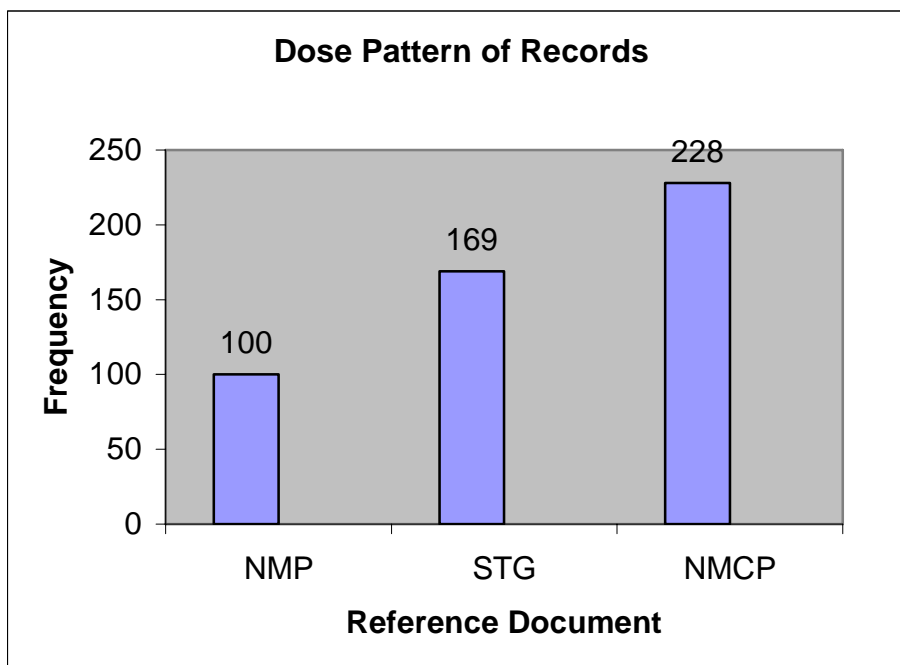
None of the providers mentioned the STG as a reference for prescribing, but 169 (50.8%) of the doses of the AT/AQ treatments were right by its standard, majority of which (150) were also right using the NMCP charts.

Only 87 (26.1%) AT/AQ dose treatments, were right by both the Policy and the STG references. But 82 (24.6%) doses of AT/AQ treatment, which were incorrect by the NMP were right by the STG reference.

As many as 274 (82.3%) of the total of 333 AT/AQ treatments were written using the NMCP dosage charts and out of this, only 70 were right by the NMP reference. But 228(83.2%) doses of the 274 would have been right and the rest of 46, incorrect if the charts were right.

Figure 4 shows the quantities of records that were right by the NMP, STG and the chart.

**Figure 4: DOSAGE PATTERN OF PATIENTS' RECORDS REVIEW**



Quinine prescriptions were generally of the milligram per kilogram body weight pattern, 26 out of the 27 prescriptions were such but 3 of them were incorrect and one prescription had no dose specification. Doses of the few prescriptions of CHQ and S/P were generally by quantity of tablets over the required period.

To confirm the prescription pattern of the providers, the facility audit tool enquired from the dispensary/ pharmacy about the general picture of prescriptions they receive from providers and the pattern is as shown in Table 8.

**Table 8: ORDER OF FREQUENCY OF ANTI MALARIALS PRESCRIBED**

Sub district	Most Frequent	2nd most frequent	3rd most frequency	4 <sup>th</sup> most frequent	5 <sup>th</sup> most frequent
Fosu	AT/AQ	Quinine	Artesunate	Amodiaquine	Artemos
Kushea	AT/AQ	Not mentioned	Not mentioned	NA	NA
Praso	AT/AQ	CHQ	NA	NA	NA
The Rest	AT/AQ	NA	NA	NA	NA

The most frequently prescribed antimalarial in all facilities was AT/AQ and 3 facilities stock only this. For the Praso Health Centre, the second most prescribed and only other antimalarial was CHQ. The order could not be determined in Kushea.

To ascertain if pharmacy staff actually understand the combination policy and what goes with it, staff were asked if they have received any training on the new policy. Four of the 6 facilities have some dispensary staff (between 3 and 5) trained. The other 2, Akropong and Kushea had no staff trained and ironically most prescriptions from Akropong do not bear dosage of AT/AQ.

Dispensary staffs were also asked how they dispense doses of antimalarials particularly AT/AQ to patients from their cards, Five dispensaries dispense as prescribed by the prescriber. In the hospital, staff usually calculate the dose based on weight irrespective of whether the prescriber had written the dose or not.

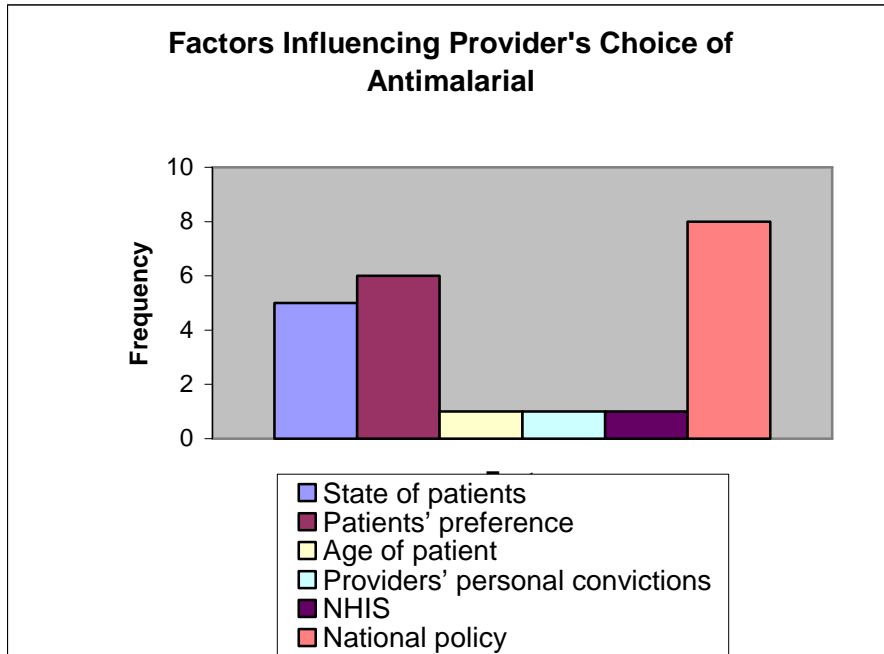
## **4.6 THE CHOICE OF ANTIMALARIAL MEDICINES PRESCRIBED**

### **4.6.1 Factors Influencing Choice of Antimalarial Medicine**

Providers gave factors that influence the choice of what they prescribe to patients. Five providers said, the state of the patient like elderly, 6 mentioned that they listen to the preference of the patients. One provider would prescribe amodiaquine alone to children since they tolerate that but artesunate alone to an adult.

Providers mainly in the health centres would want to follow the national protocol and policy because it was made for us. Only one provider was influenced by NHIS recommendation and another by personal conviction (Figure 5).

**Figure 5 : FACTORS THAT INFLUENCE PROVIDERS' CHOICE OF ANTIMALARIAL MEDICINE PRESCRIBED**



**4.6.2 Adverse Effects**

Asked if some of the patients given AT/AQ come back with complains, 15 providers responded 'yes' against 2 who said 'no'. Some of the side effects they mentioned included feeling of drowsiness/dizziness/weakness. Only one providers mentioned side effects like palpitation, only 2 mentioned vomiting, worsening of symptoms, confusion, and others such as itching and malaise.

If patients reported of adverse drug reactions, the facilities usually manage the patients mainly by rehydration and discharge when they are well. One health centre referred reports to the hospital. Out of the 15 respondents, only one provider at the hospital records Adverse Drug Reaction (ADR) and 5 providers withdrew the combination and change medication for the patient.

#### **4.7 AVAILABILITY OF ARTESUNATE/AMODIAQUINE STOCK AT THE VARIOUS FACILITIES**

In this text, stock availability is defined as presence of stocks of AT/AQ at the time of data collection and that facility had not had a stock-out within the last six months. By this criterion, 3 facilities out of the 6 had available stocks.

All 6 facilities had AT/AQ at the time of call but 3 facilities, Akropong, Bereku and Praso had experienced stock-outs within the last 6 months. The hospital had stocks of other antimalarials medicines such as amodiaquine, artesunate, S/P, CHQ and Artemos and there had not been any stock out of any of these for the past 6 months.

Chloroquine was still in stock at the hospital, Kushea and also Praso, stock levels were however not assessed. Kushea also had stocks of amodiaquin alone.

Responding to questions on source of medicine stocks, all 6 facilities stock from Central Medical Stores at the regional capital, Cape Coast, and all of them stock when necessary. The hospital also stocks from the Catholic Medical Stores in Accra quarterly. Praso also buys from a private local manufacturing pharmaceutical company in Accra, LETAP.

Brands of artesunate/amodiaquine available were mainly “Activa Phaemaceutica” in 5 facilities and one facility, Kushea H. C. had a brand called ‘ipca’.

## **CHAPTER FIVE**

### **5.0 DISCUSSIONS**

The facilities have care providers though not enough. Certain provider category work only in the hospital, the only referral centre, like the doctors, pharmacist, laboratory technician

The health centres sampled were those either directly under Ghana Health Service or quasi government. The health centres are usually supervised by midwives and supported by community health nurses.

The provider categories interviewed were doctors, medical assistants, midwives and a community health nurse. The only odd one out was an orderly prescriber who probably because the level of education, did not understand the policy issues. It could be due to shortage of staff or reluctance on the part of some staff members to perform certain duties or inappropriate allocation of duties by supervisors or the simple assumption by the supervisor that, having worked for sometime (7 years in this case), she could perform every duty and this is not appropriate. Any of the above could be the case as there are two community health nurses within the same facility who stand a better chance of providing this level of care.

### **5.1 DEMOGRAPHIC CHARACTERISTICS OF THE RECORD REVIEW**

Though participants were fairly sampled, there were more females (57.2%) than males (39.5%). The ages of the participants were predominantly adults over 17 years who formed 53%, followed by older children with 23.8%. The least was infants and children under 5 years, 21% of the total which coincides with the picture of malaria morbidity of

the district (Chapter 1). It shows the vulnerability of this age group to malaria. It could be ineffective vector control, e.g. poor sanitation, low ITN use etc.

## **5.2 CASE PRESENTATION**

From the records out of the 26% that had their temperature taken, the majority were of ages 0-59 months and very few older children. This could be because high body temperatures are usually a threat in children and therefore providers do not consider adult temperature taking important. Though the assumption is generally so, there is still the need to do it as there can always be outliers in any conditions.

The predominant symptoms presented were fever and headaches as usual with malaria and these are the main bases for diagnosing clinical malaria in endemic areas. Majority of records 95.5% had diagnosis indicated, which is encouraging.

## **5.3 PROVIDER AWARENESS**

The policy having been in place for 18 months, all providers interviewed have at least heard of the new policy and 75% have been trained, and 70.5% have copies of the new policy as well as new STG references.

The education campaign may not have been much at the beginning but the negative publicity could also have contributed to the current high level of awareness. Time could also have contributed. This is encouraging as it will in the process of time contribute to making those who do not know to inquire and by that awareness is likely to improve

translating into willingness to comply. The training was however not started earlier as only 5 of the 13 were trained in 2005, the year of implementation, and 8 trained in 2006. This could be due to training not planned or scheduled or implemented out well from national, regional or district level. But this is inappropriate because for a nationwide policy change, providers' education should have been well strategised to cover most of them before implementation or at least about six months into the policy and training should have been done with availability of the necessary references. Also, this should have been on-going to bring on board incoming professionals who were not trained in the various professional training institutions.

If provider awareness is for those who know of the new policy, have been trained on it and have copies of new policy and new STG, then only 47.1% (8) met the criteria. This is low due to lower level of training and availability of the new NMP and new STG.

#### **5.4 PROVIDER ADHERENCE**

Provider prescribing of AT/AQ to patients with malaria was quite high, 83.3%. There is still the need for improvement as monotherapies of the component drugs as well as chloroquine is still in use though not high.

All providers interviewed claim to prescribe AT/AQ for the treatment of uncomplicated malaria. Ten out of the 17 providers prescribe it always, 9 of them were from the health centres who seem to comply only with national protocol and might have little expertise to decide otherwise.

The picture was the same with the patient records as 91% of records from the health centres had AT/AQ for malaria treatment as against 79% from the hospital. It could be possible that at the hospital set up clinicians assess patients and may have clinical conditions for which AT/AQ might not be the best options and so do not just comply with policy as expressed by one clinician who said there should be alternatives for such purposes or that they do so by patients' preference or other reasons.

Quinine prescriptions were all from the hospital. Information from the records indicated that, there were only 2 patients with early pregnancy, one severe malaria case and there was no complicated malaria, the only 3 conditions stipulated by the policy which call for the use of quinine. The reasons for 24 out of the 27 quinine prescriptions could however not be determined from the records. Could it be patients' preference, dispensary stock-outs as expressed by some providers as the reasons for prescribing outside AT/AQ or other early pregnancies that were not indicated on the records? As far as documented information is concerned, nothing was obtained. If they happened to have been prescribed just by patients' or providers preference, then there is the need to address the situation.

There were also 14 artesunate alone, 9 amodiaquine alone, 7 chloroquine, 4 S/P and 3 artemos antimalarial treatment prescriptions.

The 26 (6.5%) artemisinin and amodiaquin monotherapies though not too high is not acceptable and should be given some attention to reduce it as early as possible to avoid development of resistance to the components of the combination therapy, especially in the health centres (Bereku and Kushea) prescribing them.

There were 2(0.5%) records with no malaria treatment though patients were diagnosed as having malaria. Could it be that they were not treated or that treatment was not documented? It may be necessary to address the issue because, though the number is not significant, the records were from one health centre where the providers said they give only analgesics when there is a stock-out of the combination which could lead to complicated malaria with fatal consequences.

The 1.8% of old chloroquine treatment is within control but should be discouraged totally by the end of the year as required by policy. The health centres in particular (Akropong and Praso) with 3 prescriptions each from the 20 and 30 records respectively is a cause for worry and must be discouraged in their prescribing pattern. It could be providers' or patients' choice but each party needs to be educated to desist from it as much as possible.

S/P treatment is being reserved for IPT use, and to preserve the potency for a long period, its use in treating malaria is not advisable. The health centres (Bediadia with 3 prescriptions (15%) out of 20 and Akropong 1 (5%) pose a problem because in such settings, there can be a lot of demand by the patients and the providers might want to listen to their wants.

On opinion of the effectiveness of the policy, 14 of the 16 who responded rate it effective perhaps due to the rate at which patients recover from the symptoms of malaria. Though effective, a few providers think the issue of the side effects pose a problem and so must be addressed. Most providers think the new policy should continue showing the massive

support of providers to the policy. Some providers strongly advocated for syrup formulations for children.

There are brands of amodiaquine and artemisinin based syrups (separate components) on the markets and they are in use in teaching hospitals. Could the problem be how to make the doses easy for understanding? There is also the need for other alternatives to take care of patients' preference and also conditions for which the combination is contraindicated in some special patients.

## **5.5 DOSAGES**

There were a lot of controversies on the doses prescribed. Only a few doses were right as the policy states. Most of the doses were written using the NMCP charts and though some of them fell right by either the policy or STG, a lot of them were incorrect. It also became evident that there is a high level of disagreement between even the two reference documents, NMP and STG.

Only 5.4% dose treatments, all from the hospital were attempts to prescribe doses by the specification of the policy i.e. mg/kg but 9 were incorrect. This shows the reluctance of providers to prescribe this way apparently because it seems a bit technical. However, the 5.4% attempt to do so is quite discouraging and needs to be improved. Is there the need to train dispensing assistants within health facilities in general, particularly the health centres in the sub districts for the purposes of calculation of doses of medication and dispensing? Or is it ignorance, inefficiency or mere reluctance of dispensary assistants/attendants or even providers within these facilities in adhering to dose? The

dose-made-easy charts could also have made providers relax. The other challenge will be when AQ/AT reaches a stage of being given to illiterate mothers to give at home on suspicion of malaria. Could they be asked to contact the trained community based volunteers to calculate dose for them?

If only 30% of the dose treatments were right by the policy, then there is the need to address the situation.

On the other hand, 169 (50.8%) doses of AT/AQ treatments were right by the STG, out of which 150 would have been right if the NMCP charts were right.

Looking at it, doses of AT/AQ that was right using both the policy and STG together as references were 182 representing 54.7% and still this is not impressive. If the different references agree with each other, there should be a higher percentage of dosages agreeing to a similar extent, but this is not so.

The agreement between the dose specification of the policy and STG is quite weak as only 26.1% doses of AT/AQ prescribed were right by both references and 24.6%, though incorrect by the policy is right by the STG. The policy may not have been the main bases for the development of the STG or that issues of dosage were not well addressed.

But a higher majority of AT/AQ, 82.3% being prescribed according to the NMCP dose charts is simply because it is easier to just look and write. This also means that if a more appropriate one is made available, adherence will be much higher. Interestingly 228 of

the 333 AT/AQ treatments (68.5%) could be assessed right if the doses on the charts were in line with the policy. But because it is not so, only 70 out of these fell within right range of the policy and the rest of them, 158 were actually incorrect

The main problem is the wide weight/age ranges that make doses of some portions of the range incorrect. Still with this, 16.8% being incorrect even with charts means sometimes some providers write dosages without following treatment manuals which can be practically acceptable only if the dosage manual does not spell out explicitly all conditions for which that medication should be used.

With this policy, there is the need to adhere to right dosage for the success of the policy since the drugs are being widely used across the nation for a common condition. And the NMCP must have designed their charts using the STG to some extent and thus the situation at hand. These STG should be restructured to bring a higher level of agreement between it and the policy, so must the dosage chart be revised.

By definition of provider adherence in this text, i.e. by treating diagnosed uncomplicated malaria with the right dose of AT/AQ by the policy standard, only 19.5% (78 out of the 400 records) passed and if acceptable adherence is the same as above but by the new STG standard instead of the policy, then 127 record (31.8%) met the requirement. This poses a big problem for the health sector and leaves much work to be done. The main factor contributing to the low adherence has been the available NMCP dose charts which might have been made to make dose calculation easier in the health facilities. However, if making it easier will be to the detriment of the policy, then it is not worth it. There must therefore be a way of streamlining the situation.

For the Quinine treatments, except for one treatment for which the dose was not indicated, all the prescriptions were by mg/kg/bw. It could be because they were all from the hospital with doctors around or that, that has been the only option given to providers for the use of quinine. If this happens to be the case, then when it is extended to other medicines including AT/AQ, a similar goal can be achieved. In any way it is not too difficult to do, it is simple multiplication and as long as a provider is educated, it must not be too much of a problem.

Most of the treatments without dosage specification, 31 (79%) were from the health centres some of whose dispensary staff have received no training. Only 8 of such were from the hospital and must be from the provider at the hospital, who said he leaves the doses to be calculated by the pharmacy staff. There may still not be much problem here because at the hospital, the pharmacy staff said, they calculate dose by weight whether the prescriber had written it or not.

The order of prescribing of antimalarial medicines is quite encouraging as AT/AQ was first on the list in all the facilities. Quinine was the second most frequently prescribed, followed by artesunate and amodiaquine monotherapies. Though not justified by the data available, providers at the hospital gave reasons why they sometimes prescribe other anti-malarial medications and these include patients' preference and dispensary stock-outs. Using any of these medicines in a way that is not specified by the policy, comes with its own consequences. The use of the components medicines of the combination therapy as

monotherapies would result in evolution of resistance to the components and thus the combination and this will put the policy at risk.

## **5.6 CHOICE OF ANTIMALARIAL MEDICINES PRESCRIBED**

Most providers are careful about the combination therapy and so they do not hesitate in listening to the patients to decide on the drug of choice for treatment.

Generally, the main factors that influence the choice of antimalarial medicines prescribed by providers is patients' preference since some patients come with prejudices against the ACT. But especially in the health centres, they see the AT/AQ as a national policy and so they must adhere to it.

Fifteen providers interviewed admitted that some patients come back at times after taking AT/AQ with complaints of adverse effects, mainly weakness or dizziness and most providers manage such patients mainly by rehydration (ORS in the health centres and infusions in the hospital) and discharge when well. Many of them withdraw the combination and give another one, usually a monotherapy treatment. Others will just reassure the patient to eat well and send them back home to continue the dosage regimen.

Though it was not mentioned by any provider, could the choice of antimalarial medicines prescribed be influenced by these complains? It is possible because providers might not want to be associated with any bad consequences of a particular medicine or might not want to have a second and double duty of taking care of adverse effects on a medication prescribed to a patient. Only one doctor records ADR.

It was clear that there is no proper documentation of reports of adverse effects and there was not a copy of the standard ADR forms in any of the facilities visited. The hospital had a similar form and was using it for its own purposes. This then implies that the aspect of monitoring aspect of NMCP liaising with the Pharmacovigilance centre has either been left unattended to or has been limited to only a section of the health sector and needs to be properly revisited.

### **5.7 AVAILABILITY OF ARTESUNATE/AMODIAQUINE STOCKS**

Generally, stocks are usually available, but regularity of flow of stocks is a bit of a problem. It could be from the procurement boards at the various levels or at the facilities. It became evident that there were as frequent stock-outs of AT/AQ as there was stock available. Though at the time of call, all facilities had stocks, 3 out of the 6 had experienced stock-outs within the previous six months. In such situation, providers may have no alternate but to give other treatments putting the policy at risk. The study did not however determine the source of the stock-out, whether locally or from the regional central medical stores.

If the source of stock-out is central, either by region or national, then the procurement board in charge is not procuring according to stock capacity or the unexpected long protocols disrupt the process. But no reason can be an acceptable excuse for shortage of the only choice of medicine for the most predominant O.P.D condition, and of a new policy whose fate can be put at risk easily. In all facilities, there is no regularity in the frequency of stocking and the brands available were generally the specific government approved one.

## CHAPTER SIX

### 6.0 SUMMARY OF CONCLUSIONS AND RECOMMENDATION

#### 6.1 SUMMARY

There is a good level of awareness among providers to the policy as every provider interviewed knew about the policy, 75% have received training and 71% have the necessary reference documents, STG and the NMP. Only 8 of the 17 providers had all the requirements.

Out of the 17 providers, 16 claim they prescribe AT/AQ always or very often to patients diagnosed with uncomplicated malaria. 83.3% of the reviewed patients' records had AT/AQ treatment. The rest of the records had the following treatments; 6.8% quinine, 4.3% artemisinin monotherapy, 2.3% AQ monotherapy, 1.8% chloroquine and 1% S/P. Chloroquine use on the minimum.

Only 30% of the doses were right in accordance with the policy and 50.1% right by reference to the STG. Only 24.6% of doses prescribed were right both by the policy and STG. Thus the level of agreement between the 2 reference documents is quite low. This is because of the wide weight range dosage charts in the STG.

There are also NMCP charts distributed well in health facilities across the country which most providers use in prescribing dosages of the combination. These also have wide weight/age range that does not make some doses to particular weights tally with the policy.

Provider adherence, i.e. treating uncomplicated malaria with the right dosage of AT/AQ as the policy states is only 19.5%.

Generally, the main factor that influences provider's choice of antimalarial medicines to uncomplicated malaria is patients' preference.

All the six facilities visited had stocks of AT/AQ at the time of call but three of them had a stock-out in the last 6 months.

## **6.2 CONCLUDING REMARKS**

There is high awareness among health providers of the new policy.

Most diagnosed uncomplicated malaria cases (83.3%) are treated with AT/AQ, but only 30% of these have right dosage with reference to the NMP reference.

Health facilities of Ghana Health Service have stocks of the government approved brand of the combination but sometimes, there are stock-outs.

## **6.3 RECOMMENDATIONS**

### **6.3.1 Ghana Health Service**

- In the midst of shortage of staff, the District Health Management Teams should ensure that for each level of care, there is a minimum qualification required of a staff before he/she can deliver so that optimum care for patients is obtained even in remote areas. Certain duties like medicines prescribing is delicate and as such calls for certain minimum technical qualification otherwise medicines could be given out in contraindicated cases.

- Malaria in children under 5 years is quite high in the district. Education should be intensified on effective vector control e.g. ITN use among such age group.

### **6.3.2 Ministry of Health (MOH) - Education and Training**

For the success of a policy, training of all stakeholders should be structured such that it precedes the implementation or at least 6 months into the policy to get everybody involved, on board early enough. And it should be on-going. NMCP should ensure adequate distribution of the new NMP and STG in the districts to ensure easy referral when necessary. Providers should be provided as soon as they are trained.

- Education of providers should be intensified to ensure that, for each case of uncomplicated malaria diagnosed, if any reason for not giving AT/AQ is ruled out, the choice must be the combination to ensure the success of the new policy.
- There must be intensive public education to disabuse the minds of the general public on the adverse effects of AT/AQ and the need to adhere to it; when and how to take it to avoid the side effects and what to do when one experiences the side effects to minimise the public prejudice. This will improve the public acceptability.

### **6.3.3 Ministry of Health- Medicines Availability**

With almost 2 years into the policy, the other doses of the medicine components of the combination specified in the policy, 25mg AT and 75mg AQ, must be made available on the market as these will further make dosage regime easier.

#### **6.3.4 Ministry of Health/NMCP- Dosage Regimen**

- Dosage disparities between the policy and STG should be streamlined to be similar in each document for the smooth reference by providers and all stakeholders.
  
- Retraining and monitoring of providers especially dispensary/attendants on how to calculate doses of AT/AQ with mg/kg body weight will be very useful to ensure accuracy of dosages dispensed to secure the life span of the combination.
  
- Dosage charts should be revised to reduce the weight/age range to ensure that for each weight/age range, the dose given is as close to that require in the policy as possible. If possible, different charts should be created for each of the component drug i.e. AT different from that of AQ. It may look cumbersome at the beginning but with training and time, providers will get used to it just as they are to the current one.
  
- The programme should as part of ensuring accuracy of dosing and the success of the policy, make available different types of table cutters, e.g. that which can divide a tablet into 3 equal parts to be able to take care of certain doses that may not be right for either half or quarter.

### **6.3.5 Ministry of Health-Procurement and Monitoring**

- The National and Regional Procurement Board should sit up and ensure that stocks of AT/AQ are always available to avoid providers resorting to other antimalarial medicines that may put the fate of policy at risk.
- District Health Management Teams should as part of their monitoring duties ensure that, there are always adequate stocks of AT/AQ in health facilities under their jurisdictions.

### **6.3.6 NMCP- Antimalarials Medicines on The Market**

For the other antimalarial medicines on the market, it is only chloroquine that has been specified how it should fade out of the system i.e. by the end of 2007. There is nothing for the rest of the other antimalarial medicines in the system. At least reference should be made on how each antimalarial medicine registered by the Food and Drugs Board should be contained in the system especially monotherapy with the component drugs of the combination.

### **6.3.7 NMCP/ MOH Syrup Formulation**

There should be consideration for syrup formulation of the combination for children in the long term after a massive education to ensure their proper dispensing. For the initial stages they could be given out only from hospitals before it gradually scales up to other facilities.

### **6.3.8 NMCP- Alternatives to AT/AQ**


It is just in order that there are two other alternatives combination to the current one as this addresses patient acceptability and take care of conditions under which the combination is contraindicated.

### **6.3.9 NMCP- Pharmacovigilance**

Health staff should be encouraged and endowed with logistics to document any reported adverse events of medicines especially on AT/AQ to inform decision making.

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**APPENDICES**  
**INFORMATION SHEET FOR PARTICIPANTS**

**PROVIDER ADHERENCE TO THE NEW MALARIA TREATMENT POLICY**  
**FOR UNCOMPLICATED MALARIA IN THE ASSIN NORTH DISTRICT**

Good day! I am .....My research assistants and I are carrying out a study to find out the extent of compliance and usage of the new antimalarial medicine combination treatment policy recently introduced into the country .

**Purpose of the study:**

Since January 2005, a new antimalarial treatment policy has been implemented nationwide. The main purpose of the study is to find out what Assin Fosu district knows about this new treatment regimen, what they think about the policy and whether the drugs are being used for the purpose for which it was implemented. The study will involve all categories of people in the district from care providers to the general public who consume or take drugs when they get malaria because malaria affects all age groups. In connection with this, you have been selected to participate in the study. The process will involve answering some questions that will be posed to you. The expected duration of the process is about 20-30minutes.

**Risks and discomforts:**

There are no risks in answering these questions. There is a chance however that you may feel a little uncomfortable answering some of the questions. We do not wish this to happen, and you may refuse to answer any question if answering it makes you uncomfortable.

**Benefits;**

There will be no direct benefit to you, but your participation is likely to help us assess the implementation of the new treatment regimen for malaria. At the end of the study, you will be contributing to support the implementation of the policy and thus reduce the burden of malaria in the country.

**Incentive:**

You will not be provided any incentive to take part in the study.

**Confidentiality:**

The information that we collect from this study will be kept confidential. All information about you will be stored in a file which will not have your name on it, but a number assigned to it. A number belonging to a particular name will be kept confidential and will not be revealed to anyone except the research team. In the dissemination of the information nothing will be said or done to make it possible for things you say to be linked to you.

**Right to refuse or withdraw:**

You do not have to take part in this research if you do not wish to do so, and this will not affect you in anyway. The study is not linked directly to the health facility in the district and will not affect your future treatment at the facility in any way. You may stop participating in the study any time you wish without losing any of your rights as a

member of this district. Your position in this district will not be affected in any way, even if you decide to stop participating in the study.

**Who to contact:**

This proposal has been reviewed and approved by Ghana Health Service Review Board which is a committee whose task it is to make sure that research participants are protected from harm. If you have any questions you may ask them now or later. If you wish to ask questions later you may contact any of the following:

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## Provider Interview Questionnaire Assin North District

**Instructions: Interview all providers at the facility who provide curative care services. At a minimum interview the person in-charge and a nurse.**

**INTERVIEWER: INTRODUCE YOURSELF TO THE PROVIDER./ CONSENT**

I am a student of the school of Public Health of the University of Ghana, Legon. In doing my MPH dissertation, I am collecting information on treatment of uncomplicated malaria with respect to the new anti malaria policy in the district. This information will be useful to the facility and DHMT in planning your health service delivery.

All information from this survey is confidential and participation in answering questions for this survey is voluntary. You can refuse to answer any question or all the questions. I am asking for your help to ensure that the information collected is accurate. If you need any further information please feel free to contact the people on this information sheet.

Do you have any questions for me?

Can we begin now?

100	SIGNATURE OF INTERVIEWER INDICATES PARTICIPANT AGREEMENT TO PARTICIPATE AND THAT THE TIME IS CONVENIENT
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<b>FACILITY IDENTIFICATION</b>	
Name of Region: <b>CENTRAL</b>	REGION CODE <input style="width: 40px; text-align: center;" type="text" value="3"/>
Name of District: <b>_ASSIN NORTH</b>	DISTRICT CODE <input style="width: 20px; text-align: center;" type="text" value="1"/> <input style="width: 20px; text-align: center;" type="text" value="5"/>
Name of the facility _____	FACILITY CODE <input style="width: 40px; height: 25px;" type="text"/>
Type of Health Facility : (1= Hospital; 2 = Health Centre;; 3= CHPs 4= Clinic; 5= Maternity home; 6= Other _____)	FACILITY TYPE <input style="width: 40px; height: 25px;" type="text"/>
Operating Authority: 1= Government; 2 = Quasi-government 3 = Non-governmental organization 4= Mission/Religious 5 = Private for profit 6 = Other _____)	OPERATING AUTHORITY <input style="width: 40px; height: 25px;" type="text"/>
Date: _____ DAY / MONTH / YEAR	INTERVIEWER CODE <input style="width: 20px; height: 20px;" type="text"/> <input style="width: 20px; height: 20px;" type="text"/>
Name of the interviewer _____	

Provider Information	
Provider category*: (1=Doctor; 2=Medical Assistant; 3=Nurse; 4=Midwife; 5= Community Health Officer; ; 6=other (specify_____)	PROVIDER CATEGORY <input type="checkbox"/>
Sex of Provider: (1=male; 2=female)	SEX OF PROVIDER <input type="checkbox"/>
Provider Code (start numbering the interviews at each facility with one and continue until you have interviewed all the providers who treat for malaria at the facility)	PROVIDER CODE <input type="checkbox"/> <input type="checkbox"/>

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
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**Provider Training and Experience**

101	Do you personally provide care for clients with malaria?	YES.....1 NO .....2	→END
102	In what year did you start working in this facility?	YEAR <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
103	What is your current technical qualification?	Medical Officer..... 10 Medical Asst.....20 Nurse.....30 Midwife .....40 Community Health Nurse ..... 50 Other ..... 96	
104	What year did you graduate with this qualification?	YEAR ..... <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	

**NOW I WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT THE SERVICES YOU PROVIDE HERE IN RELATION TO MALARIA**

NO.	QUESTIONS	CODING CLASSIFICATION	GO TO
201	Do you know of the new antimalarial drug therapy, Artesunate-Amodiaquin introduced by the Ministry of Health?	YES.....1 NO.....2	
202	Did you receive any training specifically with the introduction of this policy?	YES.....1 NO.....2	
202a	In what year did you receive the training?	2004.....1 2005.....2 2006.....3 2007.....4 Other (specify).....	
203	What did you learn about the new malaria policy? (circle all that apply)	p. CHQ is no longer effective...1 q. Parasite is resistance to CHQ.....2 r. Combination more effective...3 s. Easier to take combination...4 u. Other ..... 5 o. (specify) .....	

204	Do you agree to the need for a change?	YES.....1 NO.....2	
205	Do you have a copy of the national malaria policy? (ask to see a copy) ,.	Yes seen .....1 Yes, reported to have..... 2 No..... 3 Don't know.....8	
206	Do you have a copy of the new standard treatment guideline? (ask to see a copy)	Yes, seen.....1 Yes, reported to have.....2 No.....3 Don't know.....8	
207	Where is the copy/copies usually kept? (circle all that apply)	Each consulting room.....1 One consulting room.....2 Medical Assist's consulting room.....3 Med Sup's office.....4 Administrator's office.....5 Doctors' resting room.....6 Officer-in-charge's room...7 a. Other.....8 o. (specify).....	
208	Do you prescribe the Artesunate-Amodiaquin combination to patients?	YES.....1 NO.....2	→210
209	How often do you prescribe this combination?	a. Always.....1 b. Very often.....2 c. Sometimes.....3 d. Seldomly.....4 e. not at all.....5	→210 →210 →210 →210
210	Why will you sometimes prescribe the other antimalarials?  (CIRCLE ALL THAT APPLY)	p. fear of adverse reaction.....1 q. personal experience.....2 r. experience of a patient.....3 s. lack of confidence.....4 t. experience of a colleague...5 u. patients refusal/preference..6 v. stock out at dispensary.....7 w. other.....8 o. (specify) .....	
211	Under what conditions do you prescribe other anti-malaria other than Artesunate/Amodiaquin?	p. Patient's preference.....1 q. Dispensary stock out.....2 r. Patient's condition.....3 s. NHIS status of patient.....4 t. Treatment failure with combination.....5 u. Other.....6 o. (specify).....	
212	What other anti malarial do you prescribe other than Artesunate/Amodiaquin?	p. Amodiaquine only.....1 q. Artesunate only.....2 r. Alaxin.....3 s. Chloroquine.....4 t. S/P.....5 u. Coartem.....6 v. Quinine.....7 w. Other.....8 0. (specify).....	

213	What factors influence the choice of anti malaria you prescribe?	p. State of the patient.....1 q. Preference of patient.....2 r. Age of patient.....3 s. Personal conviction.....4 t. Standard treatment guideline.5 u. Other treatment protocols.....6 v. NHIS requirement.....7 w. Other.....8 o. (specify).....	
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**MALARIA**

301	What factors influence your dosage of drugs? (don't probe, tick as mentioned)	MENTIONED	NOT MENTIONED
	a. age	1	2
	b. weight	1	2
	c. cost of treatment	1	2
	d. side effects	1	2
	e. standard treatment guidelines	1	2
	f. available protocols / charts	1	2
	g. other	1	2
	o. (specify) .....		
302	Do you routinely write down your diagnosis	Yes.....1 No.....2	
303	Do you ask the patient to come back for review	Yes.....1 No.....2	
304	What do you counsel your patient on?(Don't probe)	MENTIONED(1)	NOT MENTIONED(2)
	a. the disease	1	2
	b. prevention	1	2
	c. how to correctly take drugs	1	2
	d. diets taken with medication	1	2
	e. other	1	2
	o. (specify).....		
305	When people are given the drug, do they come back still feeling sick or with complaints. (adverse effects)?	Yes.....1 No.....2 →308	

306	What side effects of artesunate-amodiaquin do clients complain of? (DON'T PROBE)	MENTIONED(1)	NOT MENTIONED(2)
	a. dizziness/drowsiness/weakness	1	2
	b. palpitation	1	2
	c. vomiting	1	2
	d. restlessness	1	2
	e. protruded tongue	1	2
	f. worsening of symptoms	1	2
	g. fits/confusion/coma	1	2
	h. others	1	2
	o. (specify).....		

307	How do you take care of reported adverse reactions? a) fill adverse drug reaction form b) record in a book c) manage the adverse reaction and discharge when well d) refer patients to hospital e) other o) (specify).....	YES(1)		NO(2)		
		1		2		
		1		2		
		1		2		
		1		2		
308	What dose of anti-malarial do you prescribe?  A. Artesunate 4mg/kg body weight bid for 3 days B. Amodiaquine 10mg/kg body weight bid for 3 days C. S/P 1500mg/75mg start (adult) D. Quinine 10mg/kg (Max 600mg) 8 hourly for 7 days. E. Chloroquin 800mg dly for 2 days, then 400mg on 3 <sup>rd</sup> day. F. Other O. Specify.....	Correct	Not Correct	Divided/whole Tablets		Don't Know Dosage
				correct	Not correct	
		1	2	3	4	8
		1	2	3	4	8
		1	2	3	4	8
		1	2	3	4	8
		1	2	3	4	8
309	How will you rate the effectiveness of the new policy?	very effective.....1				
		effective.....2				
		effective but for the side effects.....3				
		not effective.....4				
		a. other.....8				
		b. specify.....				
310	If given the chance to decide the fate of this new policy, what will that be?	Continue.....1				
		Modify.....2				
		take it out.....3				
		go back to chloroquine.....4				
		a. other .....5				
		o. specify.....				

**INTERVIEWER COMMENTS**

## Facility Audit - Assin North

FACILITY IDENTIFICATION	
Name of Region: <b>CENTRAL</b>	REGION CODE <input type="text" value="3"/>
Name of District: <b>__ASSIN NORTH</b>	DISTRICT CODE <input type="text" value="1"/> <input type="text" value="5"/>
Name of the facility: _____	FACILITY CODE <input type="text"/> <input type="text"/>
Type of Health Facility : (1 = Hospital; 2 = Health Centre; 3=CHPS; 4=Clinic; 5= Maternity home; 6= Other _____)	FACILITY TYPE <input type="text"/>
Operating Authority: 1= Government; 2 = Quasi-government 3 = Non-governmental organization 4= Mission/Religious 5 = Private for profit 6 = Other _____)	OPERATING AUTHORITY <input type="text"/>
Date: _____ DAY /MONTH/YEAR	INTERVIEWER CODE <input type="text"/> <input type="text"/>
Name of the interviewer _____	

### Consent /General Information

FOR OUTPATIENT SERVICES: FIND THE MANAGER OR MOST SENIOR HEALTH WORKER RESPONSIBLE FOR **MANAGING** THE FACILITY. INTRODUCE YOURSELF AND READ THE FOLLOWING:

I am a student of the school of Public Health of the University of Ghana, Legon. In doing my MPH dissertation, I am collecting information on how uncomplicated malaria is managed at health facility level in the district. This information will be useful to the facility and DHMT in planning your health service delivery. This part of the survey will review general management at the facility, staffing levels and practices at the pharmacy in relation to the treatment of uncomplicated malaria. It will take between 20-30 minutes to complete. All information from this survey is confidential. You can refuse to answer any question and no identifying information on respondents will be collected. I am asking for your help to ensure that the information collected is accurate. If there are sections where someone else is the most appropriate person to provide information, I would appreciate your introducing me to that person. If you have any further questions about this survey you can contact the people on this information sheet.

Do you have any questions for me?

Can we begin now ?

100	SIGNATURE OF INTERVIEWER INDICATES PARTICIPANT AGREEMENT TO PARTICIPATE AND THAT THE TIME IS CONVENIENT	
101	Is there a trained health provider present at the facility at all times (24 hours/day)	YES, TRAINED PROVIDER ALWAYS PRESENT .....1 NO,.....2

➔103

102	Is there a trained health provider available on call at all times after normal working hours? IF YES, ASK TO SEE A CURRENT DUTY ROSTER	YES, DUTY SCHEDULE SEEN ..... 1 YES, NO DUTY SCHEDULE ..... 2 NO..... 3	
103	Now I have some questions about the staff. I want to know the <u>highest technical qualification</u> and the number of staff who are routinely assigned for services. This may include staff who provide both inpatient and outpatient services but <b>NOT</b> staff who function purely administratively. <b>COUNT STAFF IN ONLY ONE CATEGORY. DO NOT INCLUDE STAFF IN TRAINING.</b>		
	<b>QUALIFICATION</b>	<b>TOTAL NUMBER</b>	
	A) Medical Doctors (INCLUDE DOCTORS WITH SPECIALTY TRAINING)	MEDICAL DOCTOR <input type="text"/> <input type="text"/>	
	B) Medical Assistants	MEDICAL ASST <input type="text"/> <input type="text"/>	
	C) Public Health Nurses	PH NURSE <input type="text"/> <input type="text"/>	
	D) Midwives	MIDWIFE <input type="text"/> <input type="text"/>	
	E) Staff Registered Nurse, (INCLUDE NURSES WITH SPECIALITY TRAINING)	SR. NURSE <input type="text"/> <input type="text"/>	
	F) Disease Control Officers	DCO <input type="text"/> <input type="text"/>	
	G) Community Health Nurses/Enrolled Nurses	CHN/EN <input type="text"/> <input type="text"/>	
	H) Pharmacists	PHARMACIST <input type="text"/> <input type="text"/>	
	I) Dispensing Technicians/Technologists	DISPENSING TECH <input type="text"/> <input type="text"/>	
	J) Dispensing Assistants	DISPENSING ASSIST <input type="text"/> <input type="text"/>	
	K) Lab Technicians/technologists	LAB. TECH. <input type="text"/> <input type="text"/>	
	M) Ward Assistants / Ward Maid/ Ward orderly/ Health Aids	WARD ASST <input type="text"/> <input type="text"/>	
	N) Environmental Health Officers	ENVIRONMENT HEALTH OFFICER <input type="text"/> <input type="text"/>	
	O) Biostatistician/ Biostatistician Assistant / Medical Records Assistants	BIOSTATS <input type="text"/> <input type="text"/>	
	P) Labourers /Casuals	LABOURER -----, -----	
	Q) Watchmen	WATCHMAN -----	

R) Others: O) Specify.....	OTHER	<input type="checkbox"/>	<input type="checkbox"/>
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NO.	QUESTIONS	CODE CLASSIFICATION	GO TO
104	Does this facility have formal meetings to review management or administrative issues?	YES..... 1 NO ..... 2 DON'T KNOW ..... 8	→107 →107
105	How often are formal meetings held to discuss management/administrative issues?	Bi-Monthly.....1 Monthly.....2 Quarterly.....3 Semi-Annually.....4 Annually.....5 A.Other.....8 O. Specify.....	
106	Is an official record of meetings maintained? <b>IF YES, ASK TO SEE SOME DOCUMENTATION (MINUTES/NOTES) FROM THE MOST RECENT MEETING</b>	Yes, Document Seen..... 1 Yes, Document NotSeen.....2 No Documentation Maintained..... 3	.
107	Does this facility have any system for determining client opinion about the health facility or services? <b>IF YES, CIRCLE ALL METHODS FOR ELICITING CLIENT OPINIONS THAT ARE USED</b>	Suggestion Box..... 1 Client Survey Form ..... 2 Client Interview ..... 3 Community Durbar.....4 Public Forum.....5 Other ..... 6 (Specify)..... No Client Feedback ..... 7 Don't Know ..... 8	→111 →111
108	In the past 6 months have any changes been made in service delivery as a result of client opinion? <b>IF YES, DESCRIBE THE CHANGES MADE.</b>	YES,..... 1 O) SPECIFY ..... NO ..... 2 DON'T KNOW ..... 8	
109	Does this facility have a Quality Assurance Team?	YES..... 1 NO ..... 2 DON'T KNOW ..... 8	→113 →113
110	Does the team have a Quality Assurance Action Plan? <b>IF YES, ASK TO THE PLAN OR EVIDENCE OF RECENT ACTIVITY</b>	YES, PLAN SEEN ..... 1 YES, NO PLAN SEEN..... 2 NO ..... 3	

111	Are any of the following methods for quality assurance used? IF YES, ASK TO SEE SOME DOCUMENTATION (REPORT/ MINUTES/ ETC). FOR THE METHOD IMPLEMENTATION.			
	METHOD (DON'T PROBE, tick as mentioned)	METHOD USED : WAS FORM OR REPORT SEEN?		
		Mentioned	Not Mentioned	Not Determined
	a) Supervisory checklist for health system components (e.g. service specific equipment, drugs, supplies and records)	1	2	8
	b) Supervisory checklist for health service provision (e.g. Observation Check list)	1	2	8
	c) Mortality meeting	1	2	8
	d) Periodic audit of medical records or service registers	1	2	8
	e) Quality Assurance or Client Oriented Provider Efficient (COPE) committee/team?	1	2	8
	f) Regional/Dist. Health Management Teams Visits' feedback?	1	2	8
	g) Clinical Conferences/Meetings	1	2	8
h) Other	1	2	8	
o) (SPECIFY).....				

NO.	QUESTIONS	CODE CLASSIFICATION			GO TO
112	When was the last time a supervisor from <b>OUTSIDE</b> this facility came for a supervisory visit?	Within Prior 6 Months..... 1 More Than 6 Months Ago ..... 2 Never Supervised From Outside Facility ..... 3			→ 114 → 114
113	Within the past 6 months did a supervisor from outside the facility on a visit do any of the following activities?  A) Check some registers or service related books?  B) Discuss problems?  C) Discuss policy/administrative issues?  D) Discuss technical protocols, practices, or service delivery technical issues?  E) Hold an official staff meeting?  F) Observe individual staff providing services?  O) Do anything else G) SPECIFY.....	MENTIONED	NOT MENTIONED	DON'T KNOW	
		1	2	8	
		1	2	8	
		1	2	8	
		1	2	8	
		1	2	8	
		1	2	8	
114	Is there a printed referral form which is sent with referrals from this facility? IF YES, ASK TO SEE THE FORM.	Yes, Form Seen..... 1 Yes, Form Not Seen..... 2 No Form, Use Letterhead..... 3 No Form..... 4 Other (Specify)..... 5 Don't Know..... 8			

NO.	QUESTIONS	CODE CLASSIFICATION			GO TO
115	Does this facility have electricity?	YES.....1	NO.....2		
116	How is water made available for use in examination/consultation areas in the facility today?	Piped.....1	Bucket/Basin.....2	Veronica Bucket.....3	No Water In Service Delivery Areas.....4
117	Is there a waiting area for clients, where they are protected from sun and rain?	YES.....1	NO.....2		
118	Is there a toilet (latrine) in functioning condition which is available for clients' use?	YES.....1	NO.....2		
119	Does this facility have a working phone, cell phone or short-wave radio?	YES.....1	NO.....2		
120	ASSESS GENERAL CLEANLINESS OF FACILITY:  <ul style="list-style-type: none"> <li>■ A FACILITY IS CLEAN IF THE FLOORS ARE SWEEPED; COUNTERS/TABLES ARE WIPED AND FREE FROM OBVIOUS DIRT OR WASTE.</li> <li>■ A FACILITY IS NOT CLEAN IF THERE IS OBVIOUS DIRT/WASTE/BROKEN OBJECTS ON FLOORS OR COUNTERS</li> </ul>	FACILITY CLEAN.....1			FACILITY NOT CLEAN.....2
121	Does this facility have copies of the following: <b>IF YES, ASK TO SEE A COPY.</b>	Reported Available	Not Available	Not Determined	
A.	Standard Treatment Guidelines	1	2	8	
B.	New Anti-malarial Drug Policy	1	2	8	
C.	Treatment Protocols in Consulting Rooms	1	2	8	
D.	IPT Manual	1	2	8	
122	How many staff have been trained in the use of the new antimalarial combination treatment?	<input type="text"/> <input type="text"/>			
		Don't Know = 98			
123	How many staff have copies of the new malaria treatment protocols	<input type="text"/> <input type="text"/>			
		Don't Know = 98			

## PHARMACY

FIND THE MANAGER OR MOST SENIOR HEALTH WORKER RESPONSIBLE FOR **MANAGING** THE PHARMACY. INTRODUCE YOURSELF AND READ THE FOLLOWING:

I am a student of the school of Public Health of the University of Ghana, Legon. In doing my MPH dissertation, I am collecting information on how malaria is managed at health facility level in the district. This information will be useful to the facility and DHMT in planning your health service delivery. This part of the survey will review practices at the pharmacy in relation to the treatment of uncomplicated malaria. It will take between 20-30 minutes to complete. All information from this survey is confidential. You can refuse to answer any question and no identifying information on respondents will be collected. I am asking for your help to ensure that the information collected is accurate. If there are sections where someone else is the most appropriate person to provide information, I would appreciate your introducing me to that person. If you have any further questions about this survey you can contact the people on this information sheet.

Do you have any questions for me?

Can we begin now?

200	SIGNATURE OF INTERVIEWER INDICATES PARTICIPANT AGREEMENT TO PARTICIPATE AND THAT THE TIME IS CONVENIENT			
201	Do you have the following drugs in stock today? Can you please show me a sample of each one? If you have the drug – what is the cost per treatment?	<b>In Stock</b>	<b>Not In Stock</b>	<b>Don't Know</b>
	a. Artesunate / Amodiaquine	1	2	
	b. Amodiaquin	1	2	
	c. Artesunate	1	2	
	d. Quinine	1	2	
	e. Coartem	1	2	
	f. S/P	1	2	
	g. Chloroquin	1	2	
	h. Alaxin	1	2	
	i. other	1	2	
	j. (specify).....			
202	Have you had a stock out of any of the following drugs during the past 6 months?	Yes	No	Don't Know
	a. Artesunate / Amodiaquine	1	2	8
	b. Amodiaquin	1	2	8
	c. Artesunate	1	2	8
	d. Quinine	1	2	8
	e. Artemos	1	2	8
	f. Coartem	1	2	8
	g. S/P	1	2	8
	h. Chloroquin	1	2	8
	i. Alaxin	1	2	8
	o. Other J (specify)			8
203	Where do you usually get your stocks of drug supply from?	Central Medical Stores.....1 Private purchases from companies.....2 Private purchases from town.....3 Other (specify).....4		
204	How often do you do stocking of drugs in the facility	Week.....1 Fortnightly.....2 Monthly.....3 When necessary.....4		

		Don't Know.....5 Other .....6 o. specify.....			
		Yes seen	Yes not seen	No	Don't Know
205	Do pharmacy staffs label drugs appropriately for clients?	1	2	3	8
206	Do pharmacy staffs tell clients how to take malaria drugs correctly?	1	2	3	8
207	What brands of Artesunate and Amodiaquine do you have available in the pharmacy today? (specify).....				
208	What malaria drugs do you most commonly get a prescription for? (position in order of frequency).	a. Artesunate / Amodiaquine.....1 b. Artesunate only.....2 c. Amodiaquine only.....3 d. Quinine.....4 e. S/P.....6 f. Chloroquin.....7 g. Alaxin.....8 h. Artermos.....9 i. Other..... j. (specify).....			
209	Do some of your clients come back complaining of Side effects after taking the medication prescribed to them?	YES.....1 NO.....2 DON'T KNOW.....8			→212 →212
210	What side effects do people most commonly complain of having?  CIRCLE ALL THAT APPLY	p. Weakness.....1 q. Dizziness.....2 r. Palpitation.....3 s. Nausea/vomitting.....4 t. protruded tongue.....5 u. worsening of symptoms.....6 v. fits/confusion/coma.....7 w. others .....8 o. (specify).....			
211	When a client comes to you complaining after having taking an Artesunate-Amodiaquin, what do you do?  CIRCLE ALL THAT APPLY	Fill an adverse reaction form.....1 Recommend another drug.....2 Reassure patient and send home.....3 Refer to prescriber.....4 Refer to a health facility.....5 Other.....7 o. (specify).....			
		Yes	No	Don't Know	
212	Do you have a measuring scale in this pharmacy?	1	2	8	
213	Do you have a measuring container in this pharmacy?	1	2	8	
214	Is there a sufficient waiting area for clients?	1	2	8	
215	Has anyone in this pharmacy had specific training on artesunate-amodiaquine for the national malaria policy?	1	2	8	
216	How do you dispense a specific dose of Artesunate- Amodiaquin	Dose written by the prescriber.....1			

	to a patient from his/her card?	Calculate based on weight of patient.....2 Use treatment charts available.....3 Patients are told at consulting room.....4 Other .....5 o. (specify).....
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**CONSULTATION AREA**

FIND THE MANAGER OR MOST SENIOR HEALTH WORKER RESPONSIBLE FOR CURATIVE CARE SERVICES. INTRODUCE YOURSELF AND READ THE FOLLOWING:

I am a student of the school of Public Health of the University of Ghana, Legon. In doing my MPH dissertation, I am collecting information on how uncomplicated malaria is managed at health facility level in the district. This information will be useful to the facility and DHMT in planning your health service delivery. This part of the survey will review practices at the OPD in relation to the treatment of uncomplicated malaria. It will take between 10-15 minutes to complete. All information from this survey is confidential. You can refuse to answer any question and no identifying information on respondents will be collected. I am asking for your help to ensure that the information collected is accurate. If there are sections where someone else is the most appropriate person to provide information, I would appreciate your introducing me to that person. If you have any further questions about this survey you can contact the people on this information sheet.

Do you have any questions for me?

Can we begin now ?

300	SIGNATURE OF INTERVIEWER INDICATES PARTICIPANT AGREEMENT TO PARTICIPATE AND THAT THE TIME IS CONVENIENT			
301	Is there a <b>ROUTINE</b> system where patients are seen <u>prior</u> to the consultation for the illness?	YES.....1 NO.....2 DON'T KNOW8	→ If no, go to next section	
302	ASSESS WHICH ITEMS ARE ROUTINELY DONE AT THE FACILITY	<b>ROUTINE DONE(1)</b>	<b>NOT ROUTINELY DONE(2)</b>	<b>DON'T KNOW (8)</b>
	a. take weight			
	b. record weight			
	c. take temperature			
	d. assess immunization status			
	e. sponge febrile children			
	f. give first aid medication eg p'mol			
	g. Check Blood Pressure			
	h. other			
	o. specify.....			
303	Are records kept for all malaria patients?	YES.....1 NO.....2 DON'T KNOW.....8		
304	Are separate records kept for all malaria patients?	YES.....1 NO.....2 DON'T KNOW.....8		
		Yes(1)	No(2)	Don't Know(8)
305	Do you have the following pieces of equipment in the OPD?			
	a. Adult weighing scale?			
	b). Child weighing scale (hanging Salter scale)?			
	c). Infant weighing scale?			

**MONTHLY OUTPATIENT MORBIDITY (SERVICE STATISTICS)**

	May 2007	Apr 2007	Mar 2007	Feb 2007	Jan 2007	Dec 2006
Malaria cases children<1yr						
Malaria cases children 1-4yrs						
Malaria cases children<5yrs						
Malaria cases Pregnant women						
Total Malaria cases						
Total OPD Attendance						
<b>FACILITIES WITH ADMISSION CAPACITY ONLY</b>						
Average Bed Occupancy						
Average Daily Admissions(all)						
Average daily Admissions (malaria)						

## Patient's Records Review Checklist – Assin North

### Consent / General Information

FOR OUTPATIENT SERVICES: FIND THE MANAGER OR MOST SENIOR HEALTH WORKER RESPONSIBLE FOR **OUTPATIENT SERVICES** WHO IS PRESENT AT THE FACILITY. INTRODUCE YOURSELF AND READ THE FOLLOWING:

I am a student of the school of Public Health of the University of Ghana, Legon. In doing my MPH dissertation, I am collecting information on how uncomplicated malaria is managed at health facility level in the district. This information will be useful to the facility and DHMT in planning your health service delivery. This part of the survey will review records of patients seen and managed as uncomplicated malaria. It will take between 1-2 hours to complete. All information from this survey is confidential and using any records for this survey is voluntary. No names of patients will be collected. You can refuse to let me use any record. I am asking for your help to ensure that the information collected is accurate. If there are sections where someone else is the most appropriate person to provide information, I would appreciate your introducing me to that person. If you need more information about this study you can contact the people on this card.

Do you have any questions for me?

Can we begin now?

100 \_\_\_\_\_

SIGNATURE OF INTERVIEWER INDICATES PARTICIPANT AGREEMENT TO PARTICIPATE AND THAT THE TIME IS CONVENIENT

## Patient's Records Review Checklist – Assin North

FACILITY IDENTIFICATION	
Name of Region: <b>CENTRAL</b>	REGION CODE <input type="text" value="3"/>
Name of District: <b>ASSIN NORTH</b>	DISTRICT CODE <input type="text" value="1"/> <input type="text" value="5"/>
Name of the facility _____	FACILITY CODE <input type="text"/>
Type of Health Facility : (1= Hospital; 2 = Health Centre;;3=CHPS; 4= clinic; 5= Maternity home; 6= Other _____)	FACILITY TYPE <input type="text"/>
Operating Authority: 1= Government; 2 = Quasi-government 3 = Non-governmental organization 4= Mission/Religious 5 = Private for profit 6 = Other _____)	OPERATING AUTHORITY <input type="text"/>

101	A) Record identification/Card No. <input type="text"/>	C) ID Code <input type="text"/> <input type="text"/> <input type="text"/>
	B) INTERVIEWER CODE <input type="text"/> <input type="text"/>	

102	Date of Consultation _____ DAY / MONTH / YEAR
-----	--

103	Does the record note the following symptoms? (underline as appropriate & tick)	YES(1)	NO(2)
	a. fever	1	2
	b. headache	1	2
	c. body pains/general malaise	1	2
	d. vomiting/abdominal pain/diarrhea	1	2
	e. feeling cold/sweating/rigors/chills	1	2
	f. poor appetite/bitter taste	1	2
	g. fits/unconsciousness	1	2
	o. other .....	1	2
	h. specify .....		
104	Does the record have the following signs of malaria?	Yes(1)	No(2)
	a. warm to touch	1	2
	b. pallor	1	2
	c. drowsiness/coma/confusion	1	2
	d. jaundice	1	2
	e. dark coloured urine	1	2
	o. other	1	2
	f. (specify) .....	1	2
105	Does the record show duration of symptoms?	1	2
106	What is the duration of symptoms (specify)		

107	Does the record have the following laboratory investigations?	YES	NO
	a. Blood film for malaria parasites	1	2
	b. Full blood count or haemoglobin	1	2
	c. Rapid Diagnostic test	1	2
	o. Other	1	2
	d. (specify).....		
108	Does the record have any of the following drug treatment?	YES	NO
	<b>ANTI-MALARIA</b>		
	a. Amodiaquine (alone)	1	2
	b. Artesunate (alone)	1	2
	c. artesunate/amodiaquine combined	1	2
	d. Alaxin	1	2
	e. Artemos	1	2
	f. Chloroquine	1	2
	g. S/P	1	2
	h. Quinine	1	2
	p. missing		
	<b>OTHER DRUGS</b>		
	i. Analgesic e.g. Paracetamol, Brufen, Asprin etc.	1	2
	j. Haematinic/ Multivitamin	1	2
	o. Other	1	2
	k. (specify) .....		
109	What is the sex of the record owner (patient)? Male=1; Female=2 Missing=9	Male .....1 Female.....2 Missing.....9	

110	What is the age of the record owner in years?	Infant (<1) .....1 Under 5.....2 Older Child (5-17).....3 Adult (>17).....4 Missing.....9					
111	What is the weight of the record owner (to the nearest whole number)	_____ KG (99=Missing)					
112	What dose of anti-malarial has been prescribed?	Correct	Not Correct	Divided/Whole Tablets		Don't Know	Actual Prescription
				Correct	Not Correct		
	A. Artesunate 4mg/kg body weight bid for 3 days (Max 200mg/dose)	1	2	3	4	8	
	B. Amodiaquine 10mg/kg body weight bid for 3 days (Max 600mg/dose)	1	2	3	4	8	
	C. S/P 1500mg/75mg (3 tablets) stat for Adults. 2-11mths—1/4 tablet stat 1-3yrs ----1/2 tablet stat 4-8yrs ---- 1 tablet stat 9-14yrs-----2 tablets stat 14+ -----3 tablets stat	1	2	3	4	8	
	D. Children: Quinine 10mg/kg 8 hourly for 3-7 days Adults 600mg 8hrly for 7 days.	1	2	3	4	8	
	E. Chloroquin Adults: 800mg (4 tablets) daily for 2 days then 400mg (2 tablets) on 3 <sup>rd</sup> day Children: 10mg/kg bw stat, 5mg/kg bw 6hrs later, then 5mg/kg daily for 2 days.	1	2	3	4	8	
O. Other F.specify.....							
113	What is the diagnosis on the record?	malaria.....1 clinical malaria.....2 malaria (uncomplicated).....3 malaria (severe).....4 malaria+ anaemia.....5 malaria + URTI.....6 malaria+Other(specify).....7 MISSING .....99					
114	What is the temperature on the record	Less than 35 <sup>0</sup> c.....1 35.0-37.5 <sup>0</sup> c.....2 More than 37.5 <sup>0</sup> c.....3 MISSING.....99					
115	If severe malaria was patient referred?	YES (1) NO(2) N/A(99)					

COMMENTS: