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EVALUATING THE QUALITY OF LYMPHATIC FILARIASIS SURVEILLANCE DATA REPORTED IN SELECTED COMMUNITIES IN WESTERN REGION OF GHANA

BY

ERIC ADJEI YIRENKYI

(10444947)

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DECLARATION

I hereby declare that this submission is my own work, with the exception of the references made to other people, and work which have been duly acknowledged. It contains no material which has neither in whole nor in part been presented to the University. The thesis was done under supervision by a supervisor.

Signature ……

ERIC ADJEI YIRENKYI (STUDENT)

Date……

Signature……

DR. SAMUEL O. SACKEY (SUPERVISOR)

Date …….

DEDICATION

This work is dedicated to my children Kezia, Basil and Bervelyn for their support in the entire period of my study. I also dedicate it to my mother Mrs Juliana Adjei for her love and support.

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LIST OF ABBREVIATIONS

ADL	Adeno-Lymphangitis
ADLA	Acute-Dermato-Lymphangio-Adenitis
AFL	Acute Filarial-Lymphangitis
CDC	Communicable Disease surveillance
DHMT	District Health Management Team
DCO	Disease Control Officers
DD	Drug Distributor
DEC	Diethylcarbamazine Citrate
DQA	Data Quality Assessment
DHIS	District Health Information System
GPELF	Global Programme for Elimination of Lymphatic Filariasis
HIO	Health Information Officer
HIV	Human Immunodeficiency Virus
LF	Lymphatic Filariasis
L3	3^{RD} Stage Larva
MDA	Mass Drug Administration
M&E	Monitoring and Evaluation
NTD	Neglected Tropical Disease
PC	Preventive Chemotherapy
SDP	Service delivery Point
STMA	Secondi Takoradi Metropolitan Area
TB	Tuberculosis
WHO	World Health Organization

OPERATIONAL DEFINITIONS

Data quality dimensions

A data quality dimension is a measure of the quality of data. Is a recognised term used by data management professionals, to describe a feature of data that can be measured or assessed, against defined standards in order to determine the quality of data.

Validity: It is also known as accuracy. Accurate data are considered correct: the data measure what they are intended to measure. Accurate data minimize error (e.g., recording or interviewer bias, transcription error, sampling error) to a point of being negligible.

Reliability: Data is said to be reliable if the data generated by a program's information system are based on protocols and procedures that do not change according to who is using them and when or how often they are used. The data are reliable because they are measured and collected consistently.

Precision: This means that the data have sufficient detail. For example, an indicator requ ires the number of individuals who received HIV counselling & testing and received their test results by sex of the individual. An information system lacks precision if it is not designed to record the sex of the individual who received counselling and testing.

Completeness: Completeness means that an information system from which the results are derived is appropriately inclusive: it represents the complete list of eligible persons or units and not just a fraction of the list.

Timeliness: Data are timely when they are up-to-date (current), and when the information is available on time. Timeliness is affected by: (1) the rate at which the program's information system is updated; (2) the rate of change of actual program activities; and (3) when the information is actually used or required.

Integrity: Data have integrity when the system used to generate them are protected from deliberate bias or manipulation for political or personal reasons.

Confidentiality: Confidentiality means that clients are assured that their data will be maintained according to national and/or international standards for data. This means that personal data are not disclosed inappropriately, and that data in hard copy and electronic form are treated with appropriate levels of security (e.g. kept in locked cabinets and in password protected files.

ABSTRACT

Introduction

Lymphatic filariasis (LF), usually called elephantiasis, is a neglected tropical disease caused by thread –like parasitic worms called filarial worms (*Wucheria bancrofti, Brugia malayi and Brugia timori). Wuchereria bancrofti* is the most prevalent specie. It is transmitted by mosquitoes belonging to the genera *Aedes, Anopheles, Culex, and Mansonia.* Majority of infected people are asymptomatic, but 40% have kidney damage, with proteinuria and haematuria. LF is a public health problem in Africa, Asia, part of the Americas and Western Pacific. Worldwide it is estimated that about 1.3-billion people are at risk, with 120-million people worldwide infected, in 81 countries in the tropics and subtropics. One third of these people live in Africa.

Method

A cross sectional study involving review of data registers and interview of drug distributors, disease control officers and health information officers using the DQA tool was done. Data registers for service delivery points were obtained from district health office, for assessment. The assessment verified reported results in comparison with recounted values for 5 indicators. Sources of data for the 5 indicators were recounted to determine the percentages.

Results

The most accurately reported indicator was number or tablets received. The strongest functional area was indicator definition and reporting guidelines and data collection and reporting forms and tools. The best reporting performance was reliability and integrity.

Conclusion

There was under reporting and over reporting of indicators at service delivery points. Data management processes and M&E structure, functions and capabilities must be improved. Confidentiality and timeliness must also be improved

CHAPTER ONE

INTRODUCTION

1.1 Background

Lymphatic filariasis, (LF) usually called elephantiasis, is a neglected tropical disease (NTD) (CDC, 2015), caused by thread –like parasitic worms called filarial worms (*Wucheria bancrofti, Brugia malayi and Brugia timori). Wuchereria bancrofti* is the most prevalent specie (WHO, 2015).

It is transmitted by mosquitoes belonging to the genera *Aedes, Anopheles, Culex, and Mansonia* (WHO, 2015). These genera, alongside *Coquilletidia* and *Ochlerotatus* have been reported to be carriers of the LF parasites (de Souza *et al*., 2010). An infected mosquito deposits the worm in the blood through their bites (WHO, 2015)). *Wuchereria bancrofti*, *Brugia malayi* and *Brugia timori* are transmitted by vectors in tropical and subtropical areas of Africa, Asia, Western Pacific, the Caribbean and parts of the Americas (Rebollo *et al*., 2015). In Ghana *An. gambiae* s.l and *An. funestus* are the main vectors (Ughasi *et al.*, 2012)

Lymphatic filariasis is a debilitating disease that causes lymphedema, elephantiasis, and hydrocele (Oscar *et al.*, 2014). The adult filarial worm which is about 4-12cm lives in the lymphatic system, causing blockage to the return of fluid to the circulatory system. Due to the lymphatic blockage, fluid is deposited in the tissues especially the legs and genitalia causing outrageous swellings to these organs, with associated intermittent fevers, following attacks of minor bacterial infections (CDC, 2015). The huge majority of infected people are asymptomatic, but virtually all of them have subclinical lymphatic damage and as many as 40% have kidney damage, with proteinuria and haematuria (WHO, 2015).

Lymphatic filariasis is a public health problem in Africa, Asia, part of the Americas and Western Pacific, because apart from morbidity, it also causes social stigma, considerable economic loss and sexual incapacitation (Gordon *et al*., 2011). Worldwide it is estimated that about 1.3 billion people are at risk, with 120 million people worldwide infected, in 72 countries (Global Alliance, 2015; WHO, 2015) in the tropics and subtropics. One third of these people live in Africa. Over 40 million people are incapacitated by the disease and also stigmatized. 15 million have lymphoedema (elephantiasis) and 25 million men have urogenital swelling mainly scrotal hydrocele. Globally, 40 million people live with the chronic effects of lymphatic filariasis (LF), making it the second leading cause of disability in the world (Omudu and Ochoga 2011).

Lymphatic filariasis can be treated, controlled and if possible eliminated (Ottesen, 2006). Preventive chemotherapy though a single dose of Albendazole (400 mg) together with Ivermectin (150-200 mcg/kg) or with Diethylcarbamazine Citrate (DEC) (6 mg/kg) is given once, or twice a year, to wide segments of the population, in disease endemic-areas, through MDA (Ottesen *et al*., 1997), with a goal of reaching 80% population coverage yearly, for at least 5 years (Gyapong *et al*., 2005). This strategy was pioneered in China in 2000 (Hotez *et al.*, 2007), and later in the same year in Ghana. (Goldman *et al*., 2007)

Disease control and elimination programs, depends on prompt reporting of data from SDPs to monitor progress, treatment coverage to facilitate decision making for public health. It is therefore important for public health programs to have reliable data. In order to ensure a control strategy to be more effective and appropriate, the collection and compilation of data needs to be of a high standard followed by proper approach for data analysis and diseases management (Youngblut, loveland-Cherry, and Horam Mary 2013)

Timely and accurate health data are important for impartial decision making and policy formulation. But, little evidence exists to explain why poor quality routine health data persist (Baaba da-Costa Vroom *et al*., 2015)

In 2000, The Global Programme for the Elimination of Lymphatic Filariasis (GPELF) was established. This followed the World Health Assembly Resolution 50.29 (WHA 50.29) in 1997 calling on the member states of the World Health Organisation (WHO) to eliminate the disease as a public health problem by the year 2020 (Molyneux, 2003), (Cano *et al*., 2014). The (GPELF) strategy is based on mass drug administration to entire endemic communities. Republic of Korea (Cheun *et al*., 2009) and China (De-jian *et al*.,2013) have been officially recognised as having eliminated LF as a problem of public health. Togo has also been recognized as having eliminated LF as a public Health problem (Sodahlon *et al*., 2013).

In spite of significant successes, achieving the goal of elimination as a public-health problem, by interrupting transmission remains challenging in the many endemic areas (NTD Road Map, 2012). Current challenges includes technical, logistic and financial with unresolved issues such as optimal frequency, duration and end point of treatment, tools for monitoring successful therapy, and means for detecting the potential development of resistance to any of the three anti filarial drugs, on which the GPELF depends (Gyapong *et al*., 2005). In addressing the challenges, stake-holders are required to maintain focus on eliminating transmission. Also spreading the benefits of the (GPELF) to those who presently suffer from LF-related disease, will need national LF elimination programs that are compact, and integrated, and that involve different sectors of the health care system.

In Ghana, the control and elimination of LF has been in progress since 2000. In order to know whether there has been a success, in eliminating LF, quality data would have to be analysed.

1.2 Rationale of the study.

In Ghana, MDA started in the year 2000 in five districts. By the year 2006, the MDA has been extended to all endemic districts in the country. Thus, endemic districts have had between 8 and 14 rounds of MDA. The interruption of transmission in endemic districts was supposed to have ended after 5 to 6 rounds of MDA. Ghana has achieved considerable success in the control of LF. However many endemic districts remain, that despite the required number of treatment, continue to be highly endemic. There is still evidence of residual prevalence of the disease in some districts (Ughasi *et al*., 2012).

In all endemic districts, various information are collected during MDAs, including number of treatments given, number of people treated, number of tablets used, reasons for non-treatment, place of treatment, individual identification (name and address), name of drug used, age, sex etc. Public Health data can be useful for decision making, effective service delivery, and evaluating prevailing programs in order to maintain high quality of healthcare. Poor data quality not only contributes to poor decisions and loss of confidence in the systems, but also intimidates the validity of impact evaluation studies (Mavimbe *et al*., 2005). Studies have shown variability in data quality, from national health management information systems in sub-Saharan Africa which threatens utility of these data as a tool to improve health systems (Nisingizwe *et al*., 2014). Collecting accurate data will aid appropriate intervention for elimination.

1.3 Conceptual Framework

Figure 1 below present the conceptual framework of data quality and factors affecting it.

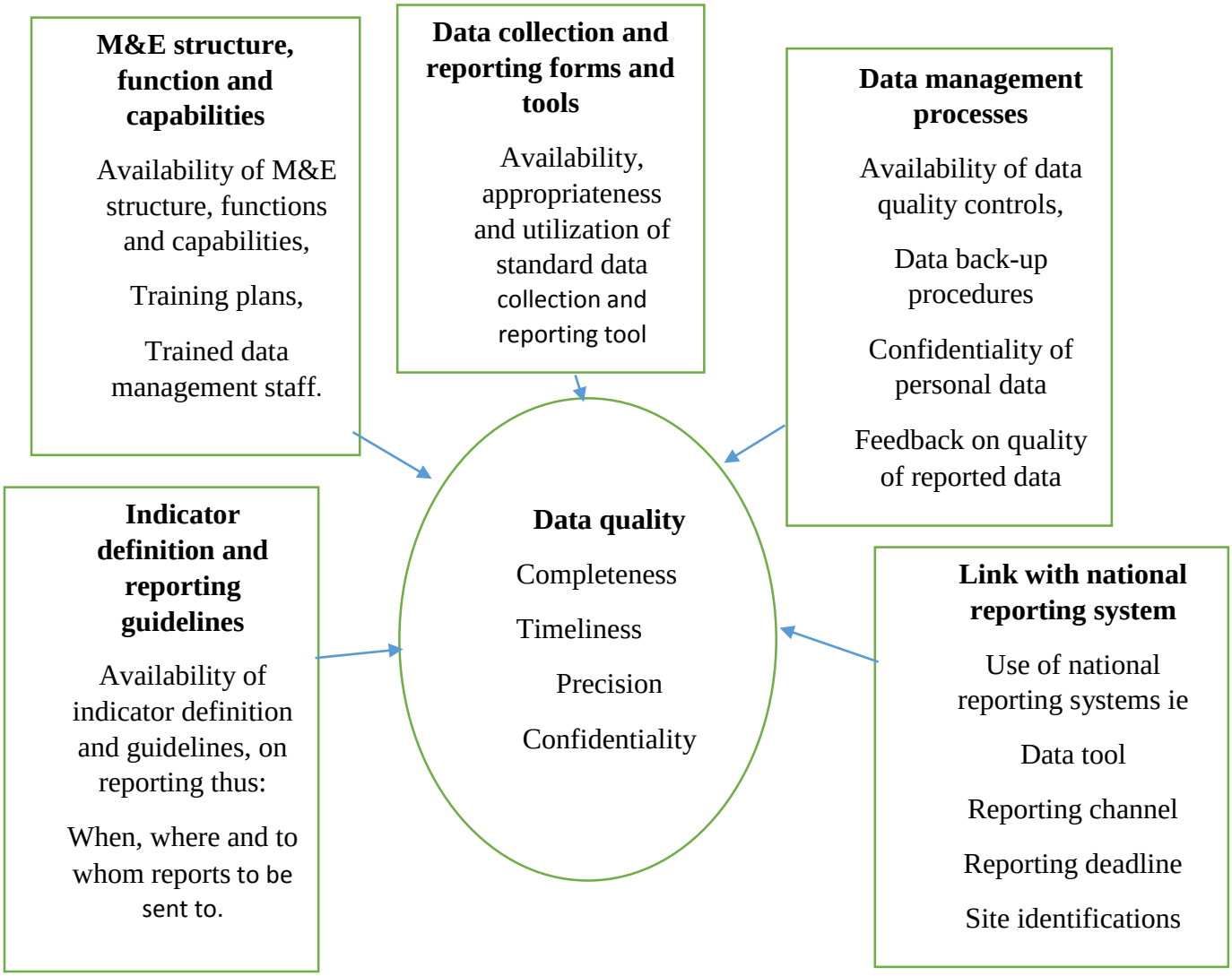

Figure 1: Conceptual Framework

1.4 General Objective.

The objective of this study is to evaluate the quality of LF data reported in districts with transmission of lymphatic filariasis in Ghana.

1.4.1 Specific Objectives

- To assess the validity of data reported in LF surveillance system.
- To assess functional areas of LF surveillance system.
- To assess data quality dimensions in LF surveillance system.

CHAPTER TWO

2.0 LITERATURE REVIEW

Lymphatic filariasis is a parasitic disease caused by the filarial worms (*Wuchereria bancrofti, Brugia malayi and Brugia timori)*. *Wuchereria bancrofti* is the most prevalent specie (WHO, 2015). It is a painful and disfiguring disease that causes extensive disabilities to people in endemic areas ((Simonsen and Mwakitalu, 2013). Presently, more than 120 million people are infected and about 40 million disfigured and incapacitated by the disease. Also 1.4 billion people are risk in roughly 72 countries (Global Alliance, 2015; WHO, 2015) The World Health Organization 50th WHA session launched the GPELF to help to regulate the burden of LF and also eliminate the disease by 2020 (Molyneux, 2003).

2.1 Disease manifestation and symptoms

Lymphatic filariasis (LF) is a mosquito-borne disease which in its advanced forms can manifest as lymphoedema, hydrocele and elephantiasis. Globally, 40 million people live with the chronic effects of LF, making it the second leading cause of disability in the world (Omudu and Ochoga 2011). The visible manifestations of the disease are severe and disfiguring. It has been reported that one third of infected individuals present with overt clinical manifestations including: lymphoedema and elephantiasis of the limbs, hydrocoele, chyluria, or recurrent infections associated with damaged lymphatic (Sherchand *et al*., 2003). The symptoms are predominantly the result of adult worms in the lymphatic system (Richards *et al*., 2011). The swelling and the decreased function of the lymph system make it difficult for the body to fight germs and infections (CDC, 2015). There are three broad types of clinical scenarios: asymptomatic infection, acute infection, and chronic infection (Chu *et al*., 2010).

2.1.1 Acute Disease Conditions

These are Acute Adeno-Lymphagitis (ADL) and Acute Dermato-Lymphangio-Adenitis (ADLA). ADL which occurs in both early and late stages of infection is usually the 1st manifestation of LF (USAID, 2015).

The draining lymph nodes swell and can become quite sore, possibly with redness and warm skin at the affected area due to presence of adult worm (Richards *et al*., 2011). Depending on the level of infection and the degree of lymphedema associated with the acute episode, lymphangitis, lymphadenitis and cellulitis are possible sequelae in ADLA. Excitingly, ADLA attacks are largely due to secondary bacterial infections. Fungal infections can also aggravate the situation and progress the disease to elephantiasis. Invading bacterial pathogens take advantage of the compromised skin integrity and cause secondary infections, ultimately leading to persistent cycles of ADLA (Walsh, 2015). Lymphedema management programs have been shown to decrease episodes of ADLA. Current lymphoedema management strategies are based on the central role of ADLA as a trigger for lymphoedema progression (Addiss and Brady 2007).

Acute Filarial-Lymphangitis (AFL), a rare form of the disease, occurs due to death of the adult filarial worm. In the scrotum and along the lymphatics, the dead worm forms small tender nodules in lymph nodes causing blockade and lymphatic dysfunction. This episode neither present with fever or bacterial infections (Walsh, 2015).

2.1.2 Chronic disease conditions

Chronic disease manifestations of lymphatic filariasis includes Elephantiasis, lymphoedema, hydrocele, genito-urinary lesions, chylocele, chyluria, chylous ascites, adenopathy, microhaematuria and macrohaematuria (Dreyer *et al*., 1999). The World

Health Organization and its partners have established strategies and activities both for managing lymphoedema, through community home-based care, and for increasing access to surgery for hydrocele (Lee *et al*., 2011).

2.1.2.1 Hydrocele

This is a common chronic manifestation of lymphatic filariasis caused by *W. bancrofti* (Figure 2). It occurs in only males. The condition manifests following accumulation of fluid in the sac surrounding testes (tunica vaginalis) (Thomas *et al*., 2009). The scrotal sac may gradually swell to bigger sizes over a long period of time. Microfilariae may be found in scrotum of some individuals with this condition. Over 27-million men are thought to suffer from filarial hydrocele (Thomas *et al*., 2009). The economic, physical, and psychosocial impact of this disease can be devastating for individual, family and community (Gyapong *et al*., 2000). Among the clinical manifestations targeted by the Global Programme for the Elimination of Lymphatic Filariasis, hydrocele is the one that has receive the least attention (Addiss and Brady, 2007), though, many surgeries have been taken place all over the world (Thomas *et al*., 2009; Ceylan *et al*., 2006; Okorie, *et al*., 2011; Booth, 1987). Hydrocele can be corrected by surgery (Ceylan *et al*., 2006). Lymphatic filariasis programs therefore are recommended to include disability alleviation services, and for men with hydrocele, hydrocelectomy surgical programs are encouraged.

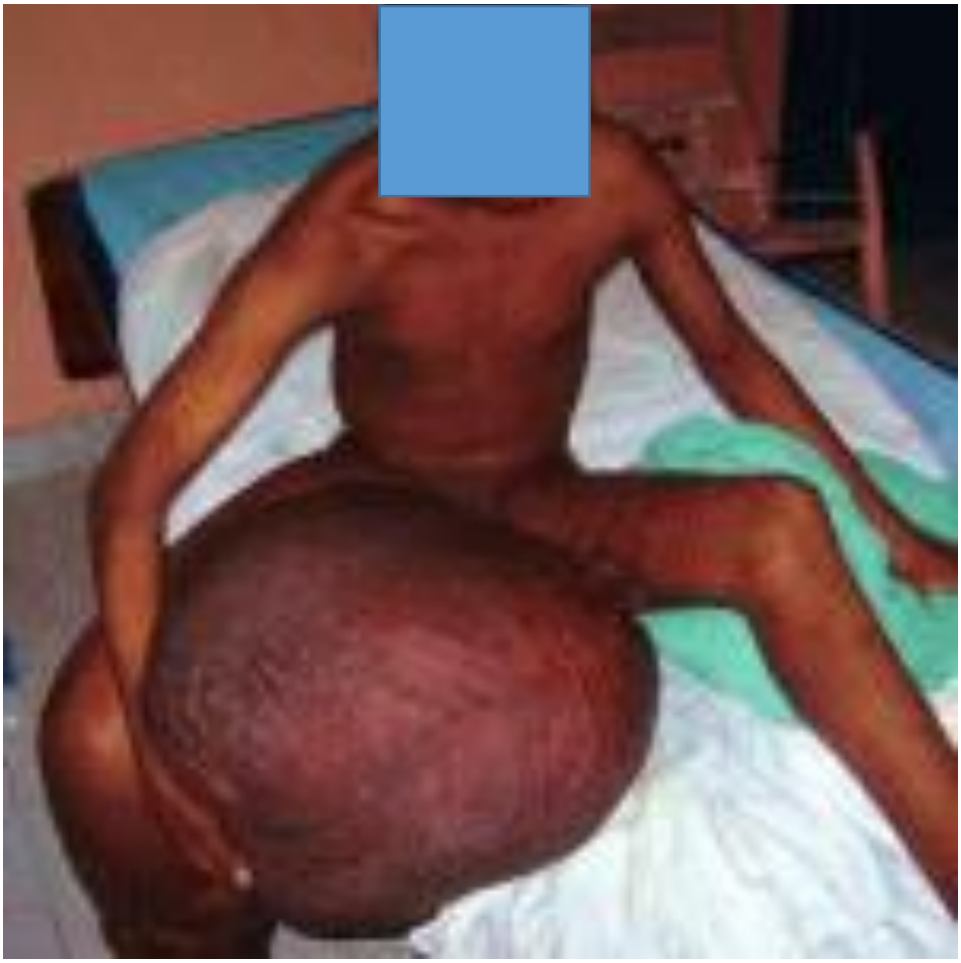

Figure 2: Hydrocele in men (Admin, 2015).

2.1.2.2 Lymphoedema and elephantiasis

Lymphoedema is swelling due to accumulation of lymph in the tissues at the affected area(s).

It has the potential of progressing to Elephantiasis (Figure 3), a chronic form of filariasis, due to obstruction of the lymphatic drainage. The progression of lymphoedema to elephantiasis, associated with great incidence of episodic Adeno-Lymphangitis (ADL) is of great concern, as it causes physical suffering, permanent disability and economic loss to lymphatic filariasis patients (Kerketta *et al*., 2005). The affected body part may have the skin looking warty and thickened. LF affects 120-million people in over 80 countries, of

which, about 14-million suffer from lymphoedema or elephantiasis of legs (Walsh, 2015). This clinical manifestation is responsible for extraordinary disfigurement and disability.

Figure 3: Elephantiasis of the limbs (Walsh, 2015).

2.2 Distribution of LF

A vital component of national elimination programmes, is a detailed understanding of the geographical distribution of LF, so that all endemic areas can be targeted. Approximately 80% of people infected with LF are living in the following 10 countries: Bangladesh, Democratic Republic of Congo, Ethiopia, India, Indonesia, Myanmar, Nigeria, Nepal, Philippines and the United Republic of Tanzania (WHO, 2015). One third of people infected with LF live in India, a third live in Africa and the remainder live in Papua New Guinea, Southeast Asia, the Pacific Islands and the Americas. In Africa, the prevalence of lymphatic filariasis is especially striking, affecting over 40 million people in the sub-

Saharan region alone. It has been well established that lymphatic filariasis is endemic in rural areas of Ghana (Simonsen and Mwakitalu, 2013;Gbakima *et al*., 2005). In Ghana, Lymphatic filariasis is prevalent in 61 out of 128 districts, in 9 out of 10 regions. Antigen prevalence is between 20%-40% in the northern region and 10%-20% in the south (MOH, 2015). In Ghana LF is distributed along the coastal belt and the northern region (Gyapong *et al*., 2014;de Souza *et al.*, 2010)

2.3 Transmission and Life Cycle

The incidence of arthropod-borne disease is on the rise, and mosquito-borne diseases in particular, constitute a world-wide threat (Decoure *et al*., 2012). Lymphatic filariasis, is transmitted by mosquitoes belonging to the genera *Aedes*, *Anopheles*, *Culex*, *Mansonia*, *Coquilletidia* and *Ochlerotatus* (de Souza *et al*., 2012) A person needs many mosquito bites over several months to years to get lymphatic filariasis (WHO, 2015). An important determinant of transmission of *W. bancrofti* is the ability of the mosquito to ingest and support the development of microfilariae (Kwansa-Bentum *et al*., 2014). *Culex* mosquito transmission, is widespread across urban and semi-urban areas; Anopheles mainly in rural areas, and Aedes, mainly in endemic islands in the Pacific (USAID, 2015). Members of the *Anopheles gambiae* complex are important vectors of lymphatic filariasis (LF) in sub-Saharan Africa (Lenhart *et al*., 2007), An infected mosquito deposits the worm in the blood through their bites (WHO, 2014). The adult filarial worm which is about 4-12cm lives in the lymphatic system, causing blockage to the return of fluid to the circulatory system. Due to the lymphatic blockage, fluid is deposited in the tissue most commonly, the legs and genitalia causing swellings to these organs, with associated intermittent fevers, following attacks of minor bacterial infections (CDC, 2013). The worm is estimated to have an active reproductive life span of 4-6 years and produce millions of

small immature microfilaria larvae which circulates in the blood after 3-6 months for, *Brugia malayi*, 6-12months for *Wuchereria bancrofti* often with nocturnal periodicity (WHO, 2015). When a mosquito bites an infected person, the microfilariae are picked up and the infection may be transmitted to others after about 2weeks. After the microfilariae are ingested by the mosquito, the sheath is lost and they migrate out of the mosquito stomach and into the flight muscle tissues of the thorax. At this location, the microfilariae moult three times, developing into the infectious 3rd stage larvae (L3) after approximately 10 to 20 days. Infectious L3 larvae migrate to the proboscis of the mosquito. The larvae are not directly injected into the human host by the mosquito, but rather are deposited on the skin and migrate into the bite wound. The L3 larvae then migrate through subcutaneous tissues to gain the lymphatic system, where they will develop into adults over the course of approximately 1 year. Male and female adults mate after reaching maturity and gravid females subsequently release their motile microfilariae (Walsh, 2015). Figure 4 below describes the life cycle of the parasite in the human host and the vector

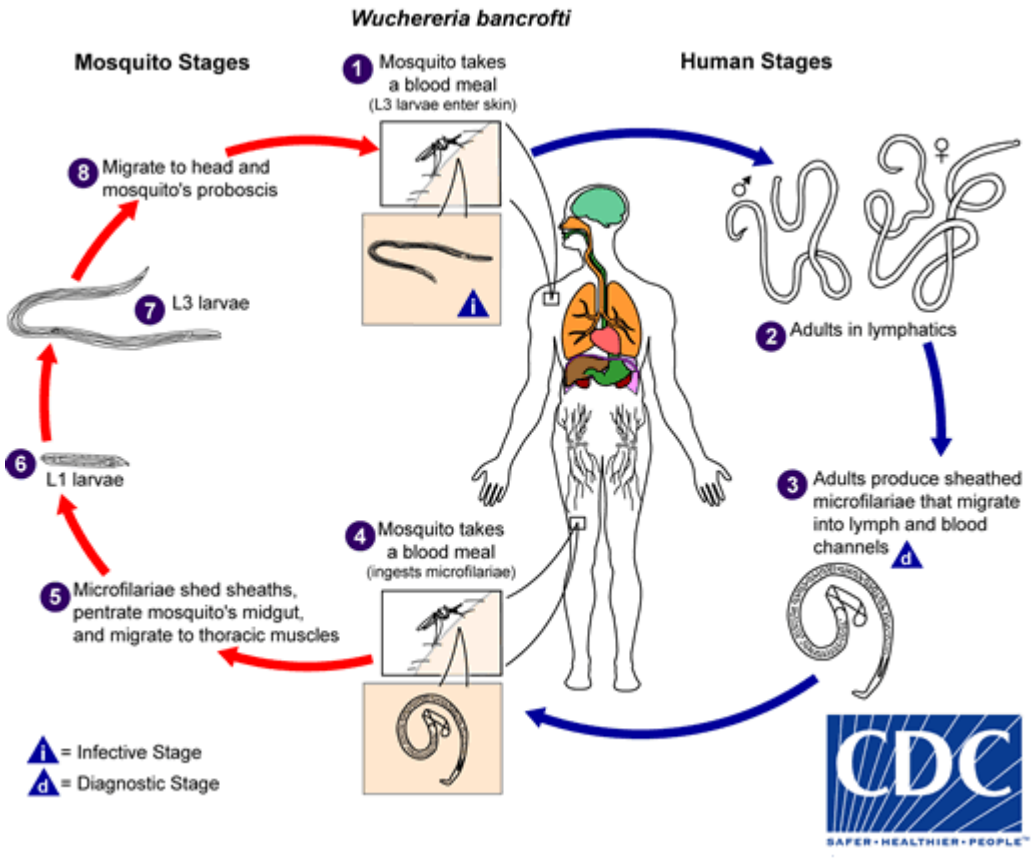

Figure 4: The Life cycle of Wuchereria bancrofti (USAID, 2015; CDC, 2013).

2.4 Control strategy and drug used

The Global Program to Eliminate Lymphatic Filariasis (GPELF) was launched in 2000 with the principal objective of breaking the cycles of transmission of *Wuchereria bancrofti* and *Brugia spp*. through the application of annual mass drug administrations (MDAs), to entire at-risk populations. WHO's strategy is based on 2 key components: stopping transmission through large-scale annual treatment of all eligible people, in an area or region where infection is present and alleviating the suffering caused by lymphatic filariasis through increased morbidity management and disability prevention activities (Ottesen *et al.*, 1997). Prevention of lymphatic filariasis is possible by stopping the spread of the infection. Large-scale treatment involves a single dose of 2 medicines given

annually to an entire at-risk population in the following way: albendazole (400 mg) together with ivermectin (150-200 mg/kg) or with diethylcarbamazine citrate (DEC) (6 mg/kg). Albendazole inhibits the polymerization of worm beta-tubulin and microtubule formation. Diethylcarbamazine's mode of action is still not completely understood, but it effects in the sequestration of MF and their concluding destruction by the immune system, and is dependent on inducible nitric oxide synthase and cyclooxygenase (McGarry, Plant and Taylor 2005). Ivermectin acts by hyperpolarization of glutamate-sensitive channel (Sharmeen *et al*., 2010). These preventive chemotherapy (PC) medicines have a limited effect on adult parasite but effectively clear the microfilaria from the blood stream and prevent the spread of parasite to mosquitoes (Slatko *et al*., 2010). By 2012, 56 countries had started implementing large-scale treatment through mass drug administration (MDA). Of the 56 countries that had implemented MDA, 13 countries have moved to the post-MDA surveillance phase (WHO, 2012). During the last half century, several countries have successfully eliminated LF, including Japan, China (De-jian *et al*., 2013), South Korea (Cheun et al., 2009), the Solomon Islands, Egypt (Ramzy *et al*., 2005), and Togo (Sodahlon *et al*., 2013). Although significant progress in initiating MDA programs in endemic countries has been made, emerging challenges to this approach have raised questions regarding the effectiveness of using MDA alone, to eliminate LF, without the inclusion of supplementary vector control to reduce exposure to mosquitoes (Bockarie *et al*., 2009), and morbidity management to alleviate suffering and prevent disability of those affected by the disease (WHO, 2014;WHO, 2012)

2.5 Challenges to control of LF

Apart from technical, logistic and financial challenges, challenges associated with vectors, coverage rates, compliance and initial prevalence levels cannot be ignored. The global

elimination of LF as a public health problem has been operationally interpreted as the reduction in the prevalence of infection with *Wuchereria bancrofti*, *Brugia malayi*, or *Brugia timori* in all endemic countries, to target thresholds below which transmission of the infection cannot be sustained. These thresholds were earlier empirically observed to be less than 1.7% microfilaria (mf) prevalence for Bancroftian filariasis and less than 1.5% mf prevalence for Brugian filariasis though current targets for GPELF are considerably more conservative (Ichimori *et al*., 2014). In Bancoftian filariasis where Aedes is the primary vector, the target threshold is <1%.

Achieving the elimination of LF through MDA alone would be difficult if culicines are involved in the transmission cycle, in that culicines can transmit LF even at microfilaria rate less than 1%. Recent studies in Ghana have shown that *Anopheles melas* and species of *Mansonia* (Ughasi *et al*., 2012 ; Amuzu *et al*., 2010) are capable of transmitting at low microfilaria levels thus keeping a residual transmission of the disease even after more than seven rounds of LF MDA.

The national programme in Ghana is based on (MDA) of an annual dose of a combination of 2 drugs (Ivemectin and albendazole) to all endemic villages. Though MDA for LF elimination is comparatively inexpensive in relation to most other public health program (Goldman *et al*., 2007), the total cost of treatment drug is relatively high and may affect coverage for treatment (Ramzy *et al*., 2005). Compliance being far behind the required coverage, the cause of non-compliance was mostly due to fear of side effects, lack of awareness of the benefits of MDA, and non-attendance of health staff in villages (Hussain *et al*., 2014). The long intervals between MDAs, and a lower than optimal treatment coverage, including the significance of treatment intervals and compliance must be researched into, in order to optimize efforts to control LF in sub-Saharan Africa (Simonsen *et al*., 2010). Challenges associated with the quality of data reported such as

uncompleted data, poor writing, and lack of confidentiality of data lead to inaccurate data. Inaccurate data does not tell the real state of disease and this may retard elimination.

2.6 African Programme for Onchocerchiasis Control (APOC)

APOC was launched 1995 to combat the rest of Africa river blindness. It also aims to set up sustainable national control programs against onchocerciasis in 16 countries in sub-Saharan Africa, with community directed treatment of ivemectin as the delivery strategy ,covering over 100 million people who are at risk for infection.. APOC has had a huge impact on population health in sub-Saharan Africa, preventing 8.2 million years' worth of healthy life from being lost due to disease and mortality, at a cost of about US$257 million (Coffeng *et al*. 2013). APOC also includes effective active involvement of MOHs and its affected communities, several international and local Non-Governmental Development Organisation (NGDOs), private sectors, donor countries and UN agencies. World Bank is the fiscal agent of APOC and WHO is the executive Agent. In Ghana, onchocerciasis is endemic in 9 out of 10 regions with a total at-risk population of approximately 3.2 million. Responsibility for ivermectin distribution which occurs in 73 districts was devolved from the Onchocerchiasis Control Programme (OCP) to Ghana in 2002 under the supervision of APOC.

2.7 Mass Drug Administration of Ivermectin in Ghana

MDA started in Ghana in Five endemic districts (Sissala, Kassena-Nankana, Awutu-Efutu Senya, Ahanta-West, Builsa). MDA for onchocerciasis started in 1999, with lapses in both geographic and therapeutic coverage. By 2006, MDA has been extended to all endemic districts. MDAs were conducted in 40 districts and at least 494,697 people (partial results) were treated for onchocerciasis in the first half of FY 2013, with support from Sightsavers, the Government of Ghana, CNTD Liverpool and the African Program for Onchocerciasis

Control (APOC). In addition, MDA was given to at least 2.7 million people (partial results) in 126 districts for schistosomiasis with USAID funds; and at least 1,823 people (partial results) out of the 6,053 who were targeted, received MDA for trachoma using funding from Sightsavers. In 2001, 121 districts with 8 million people were treated with a programmes coverage of 56.5-92.9%. Between October 2012 and March 2013, 494,697 tablets of Ivermectin has been provided to the programme.

2.8 Data Quality Assessment (DQA) Tool

Studies have confirmed data quality as a multi-dimensional concept (Madnick, 2012). Most data quality measures are developed on an ad hoc basis to solve specific problems, and fundamental principles, necessary for developing usable metrics are lacking. Disease control programs usually deal with both the subjective perceptions of the individuals involved with the data, and the objective measurements based on the data set in question (Lee Wang, 2015). The expanded drug donations and the programme goals presented in the NTD roadmap for implementation (WHO, 2012), highlights the importance of a robust monitoring and reporting system, from the point of treatment by a drug distributor to the national and international level.

In 2002, a Data Quality Audit tool was developed for the Global Alliance for vaccines and immunization (GAVI) to verify reported immunization coverage data and to build capacity to improve monitoring and reporting activities. In addition, a Data Quality Assessment (DQA) tool, was developed as a standard method to verify reported data and assess data management and reporting system for tuberculosis, malaria, and HIV/AIDS programs. This document adapt these existing methodologies to develop a tool for assessing the quality of data for NTDs. The DQA Tool focuses exclusively on verifying the quality of

reported data quantitatively and assessing the underlying data management and reporting systems qualitatively for standard program-level output indicators. The tool measures accuracy, reliability, completeness and timeliness through the data verification component. The DQA tool assesses the quality of data at the Service Delivery Point, Intermediate Aggregation Level Site and National M&E Unit sheets. Each assessment contains two parts for data collection: Part 1: Data Verifications Part and 2: Systems Assessment.

Data verifications: Part 1 of the Tool enables a quantitative comparison of recounted to reported data and a review of the timeliness, completeness and availability of reports. The purpose of this part of the tool is to assess if service delivery and intermediate aggregation sites are collecting and reporting data accurately, completely and on time, and whether the data agrees with reported results from other data sources. The Data Verification protocol has three sub-components including, Documentation Review, Re-counting Reported Results, Cross-checking reported results with other data sources.

Data management and reporting system assessment: Part 2 of the Tool enables qualitative assessment of the relative strengths and weaknesses of functional areas of a data management and reporting system. The purpose of assessing the data management and reporting system is to identify potential threats to data quality posed by the design and implementation of data management and reporting systems. The five functional areas of a data management and reporting system are as follows: M&E capabilities roles and responsibilities, Indicator definitions, Data collection and reporting forms and tools, Data management processes and data quality controls, Links with national reporting system. Little work has been done on DQA for LF. However data quality assessment has been done for other diseases like HIV/AIDS (Mbondo *et al*., 2013; Nair *et al*., 2011; Kawonga *et al*.,2012; Lidikwe *et al*., 2014), TB (Qader, 2013), Malaria (Chilundo *et al*., 2004) as well as on vaccination (WHO, 2015)

A qualitative assessment of data management and reporting system was done in Botswana to improve the quality of health information. Interviews were conducted at national, district and community level to assess M&E structures, functions, and capabilities; indicator definitions and reporting guidelines; data collection forms and tools; data management processes; and links with the national reporting system. Health programs generally had standardized data collection and reporting tools and defined personnel for M&E responsibilities at the national and district levels. Best practices included a variety of relatively low-resource initiatives such as attention to staffing patterns, making health data more accessible for evidence-based decision-making, developing a single source of information related to indicator definitions, data collection tools, and management processes, and utilization of supportive supervision visits to districts and facilities. Weakness included limited ownership of M&E-related duties within facilities, a lack of tertiary training programs to build M&E skills, few standard practices related to confidentiality and document storage, limited dissemination of indicator definitions, and limited functionality of electronic data management systems (Ledikwe *et al*., 2014)

Also in HIV monitoring and evaluation capacity rapid needs assessment (RNA), in Kenya, 16 facilities in 8 districts across 2 regions were selected based on the general quality of the reported HIV data and the number of partners supporting the regions. There were also significant gaps, including lack of M&E guidelines, parallel reporting systems, feedback given to subnational levels, and data use and general data management and use capacity at subnational levels (Mbondo *et al*., 2013).

CHAPTER THREE

3.0 METHODS

3.1 Study design

A cross sectional study involving review of data registers and interview of drug distributors, disease control officers and health information officers was done. Data registers at the service delivery point, capture data during MDA for compilation by health workers. Information contained in these registers include age, sex, height, number of households, population, drug used, number of tablet used, and number of tablets received.

To evaluate the quality of data reported in areas with transmission of lymphatic filariasis, data registers for (50%), 14 out of 29 service delivery points (SDPs) for 2010 were obtained from district health office, for assessment. The assessment verified reported results in comparison with recounted values for 5 indicators, i.e. number of tablets received, number of tablets used, number of tablets remaining, mass drug administration coverage, population treated. Moreover, Drug distributors, Disease control officers and Health information officers were interviewed using the data quality assessment (DQA) tool, to determine the M&E structure, functions and capabilities; indicator definitions; links with national reporting system; data management processes and data collection and reporting forms and tools. Sources of data for the 5 indicators were recounted to determine the percentage of reports available, on-time, completed, collected and measured consistently, protected from deliberate bias, maintained according to national or international standard of data.

Percentages collected and measured consistently, protected from deliberate bias and maintained according to national or international standards was obtained from functional areas whiles percentage of reports available, on-time, completed was obtained from data register through verification component.

3.2 Study area

The study was conducted in Ahanta West District and Nzema East District in Western Region of Ghana. The two districts were selected out of the 22 districts in the region because of the high prevalence of LF in the two districts. Prevalence rate of microfilaria among males and females are 20.9% and 5.8% respectively whiles antigenaemia among males and females are 44.4% and 29.7% respectively (Ayisi-Boateng, 2013).

3.2.1 Ahanta West District

Ahanta West district in the Western Region has 19 SDPs in 4 sub-districts. It is located at the southernmost point of the country, and the entire West African Sub-Region, with its capital Agona Nkwanta also called Agona Ahanta. The Ahanta West District has a total land area of 591 square kilometers and it is occupied by 95,140 people according to the 2000 Population and Housing Census report. The District is bounded on the East by the Sekondi Takoradi Metropolitan Assembly (STMA), on the West by the Nzema East Minicipal, and the North by Mpohor Wassa East and Tarkwa Nsuaem Municipal and the Gulf of Guinea to the South as shown below in the district map indicated by figure 5. The District is about 15 minutes' drive from the commercial capital of Western Region, Takoradi and about 25 minutes' drive from the administrative capital, Sekondi. In terms of distance, it is approximately 25 kilometres from the central business district of Takoradi. 15.6% of inhabitants are positive for mf whilst 39.2% are positive for antigenaemia (Ayisi-Boateng, 2013). Prevalence rates of mf and antigenaemia among the males are 20.9% and 44.4% respectively, higher than in females who have mf and antigenaemia prevalence of 5.8% and 29.7% respectively (Ayisi-Boateng, 2013). The district lies within two broad vegetation belt; land bordering a body of water, and the extremely productive ecosystems that provide numerous good and services both to the marine environment and

rainforest and the Rainforest. The northern part of the district falls largely within the High Rain Forest Vegetation Zone, and therefore supports the cultivation of rubber and oil palm with the part closer to the sea lying within the Strand and Mangrove, which also supports coconut growth. This proximity to the central business district of Takoradi enhances business and trade in particular. The District lies between latitude 4°.45"N and longitude 1°.58"W.

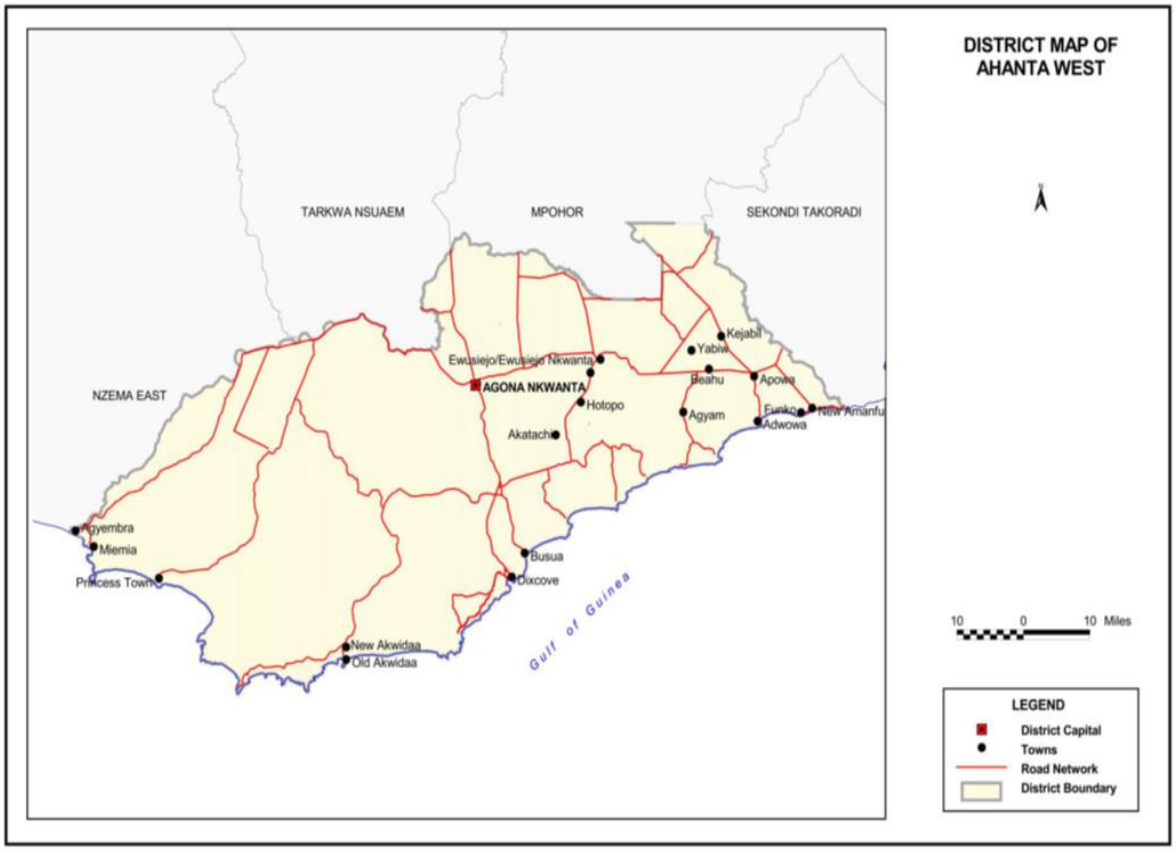

Figure 5: District Map of Ahanta West

Figure 5 is the District Map of Ahanta West showing some of the communities under study. (Ahanta West district Analytical Report, 2010 Population and Housing Census)

3.2.2 Nzema East District

Nzema East district in the Western Region has 10 service delivery points in 5 sub-districts. Nzema East Municipal forms part of twenty two (22) Metropolitan, Municipalities and Districts in the Western Region of Ghana. The Administrative capital of the Municipality is Axim. The Municipality shares boundaries with Jomoro to the west, Wassa Amenfi Central to the north, to the east with Ahanta West District and Tarkwa Nsuaem respectively. The Municipality is bounded to the south by the Gulf of Guinea as shown in figure 6 below. The Nzema East Municipal covers an area of about 2194 square kilometres (9.8 percent of the total area of the Western Region). The population of Nzema East Municipality, according to the 2010 Population and Housing Census, is 60,828 representing 2.6 percent of the region's total population. The vegetation of the Municipality is made up of the moist semi-deciduous rain forest mainly in the northern part, followed by secondary forest southwards mainly due to human activities like tree felling and farming and coastal savannah mainly in the south along the 30km coastal belt. All these comprise of large areas of forest resources which include various timber species and other non-timber forest products like rattan, bamboo, game and wildlife all of which offer opportunities to generate resources for development. 15.6% of inhabitants are positive for mf whilst 39.2% are positive for antigenaemia. Prevalence rates of mf and antigenaemia among the males are 20.9% and 44.4% respectively, higher than in females who have mf and antigenaemia prevalence of 5.8% and 29.7% respectively (Ayisi-Boateng, 2013)

Figure 6: District map of Nzema East

Figure is the District Map of Nzema East showing some of the communities under study (Nzema East District Analytical report. 2010 Population and Housing Census)

3.3 Sampling

Simple random sampling was used to select 14 SDPs (50%) from a total of 29 SDPs in the district. All Disease Control Officers, Health Information Officers and Drug Distributors present at the time of study were included.

3.4 Data processing and analysis

The DQA tool exist in Microsoft Excel format. Using the Microsoft Excel DQA tool, scores are generated for each functional area. The scores are an average for all responses to the qualitative questions in each functional area, with each question coded 3 for ‘’yes, completely’’, 2 for ‘’partly’’, and 1 for ‘’no, not at all. The scores are intended to be compared across functional areas to guide on which systems strengthening activities to prioritize.

The checklists was printed and completed by hand and entered into the spreadsheets on a computer. A number of dashboards were generated to show graphics of summary statistics for each site. The dashboard displays two graphs for each site visited: The spider-graph displays qualitative data generated from the assessment of the data management and reporting system and can be used to prioritize areas for improvement. Decisions on where to invest resources for system strengthening should be based on the relative strengths and weakness of the different functional areas of the reporting system identified via the DQA. The bar-chart shows the quantitative data generated from the data verifications (recounted/reported) which can be used to plan for data quality improvement.

The 5 indicators namely number of tablets received, number of tablets used, number of tablets remaining, mass drug administration coverage, population treated were calculated using data verification. The verification Factor (VF) is calculated as the ratio of recounted

value of the indicator to the reported value, expressed as a percentage. For example if for indicator 1, recounted value from data register is (p), and reported value by district is (q), then Verification (VF) = **(p) / (q)*100.**

A value of 100% indicates a high level of accuracy. Values above 100% indicate under reporting, whiles values below 100 suggest over reporting. In interpreting the results, indicator values between 95-105% across multiple sites were considered as high quality reporting. Indicator values less than 90% and greater than 110% were considered poor quality reporting.

In terms of the Data Management Assessment, functional areas with scores >2.5 indicate high quality whiles score <2.0 reflect low quality. Score =2.8 across sites, indicate well performance and score =1.5 across sites indicates that functional area needs work.

3.5 Ethical consideration

Ethical clearance for this study was sought from Noguchi Memorial Institute of Medical Research. The aims and principles of the study were explained in detail to participants, and informed consent was obtained by signature. Permission and subsequent approval was sought and approved from the Central Regional Health Administration. All study results and completed questionnaires were kept confidential and only accessible to the research team. The study was conducted in the participants own environment. There were no direct risk to participants and no compensation.

CHAPTER FOUR

4.0 RESULTS

Of the 14 SDPs, 8 (57%) were from Ahanta West district and 6 (43%) were from Nzema East district. A total of 8 participants were interviewed. Of this, 4 were disease control officers, 3 were drug distributors and 1 was health information officer. Results of the interviews and recounting are represented in tables and graphs as follows:

4.1 Validity of data in LF surveillance system

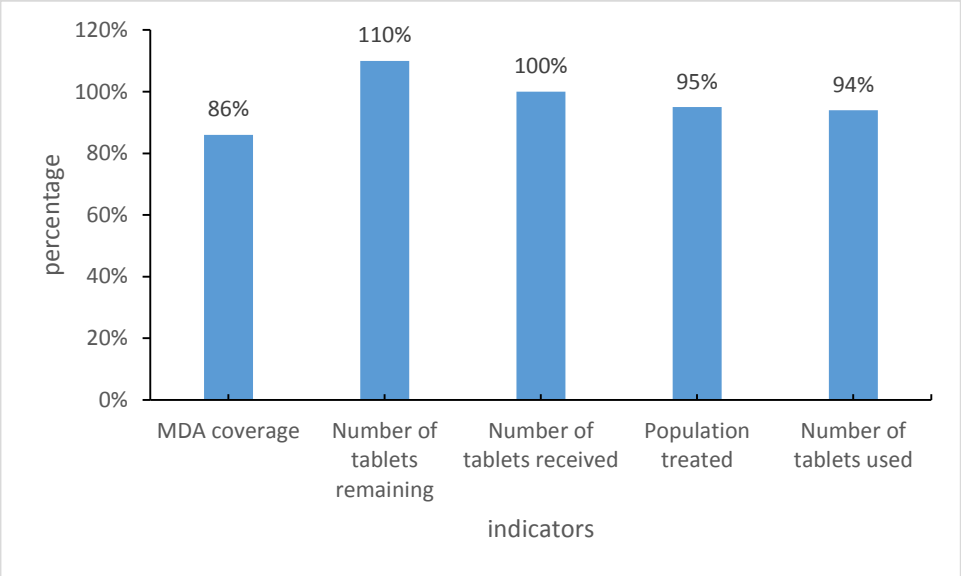

Figure 7: Data and reporting verification, Asuboi, Ahanta West, 2010.

In Asuboi (figure 7), population treated was 95%, the number of tablets remaining was 110%. The number of tablets used was over estimated by 6%. The most accurately reported indicator is number of tablets received, followed by population treated. However, MDA coverage was over reported by14%.

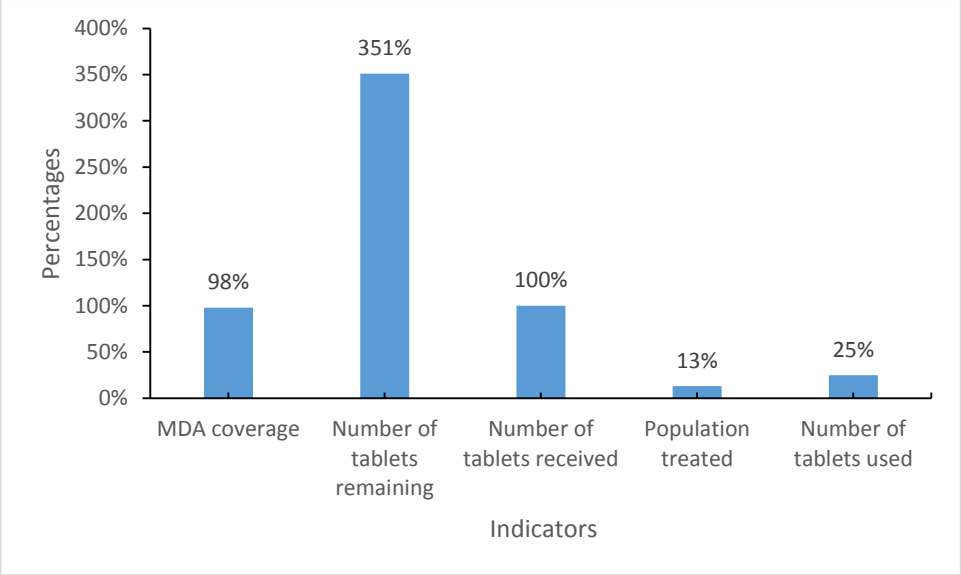

Figure 8: Data and reporting verification, Tumentu, Ahanta West, 2010

In Tumentu (figure 8), population treated was 13% and number of tablets remaining was 351%. The number of tablets used was over estimated by 75%, and the most accurately reported indicator is number of tablets received, followed by MDA coverage.

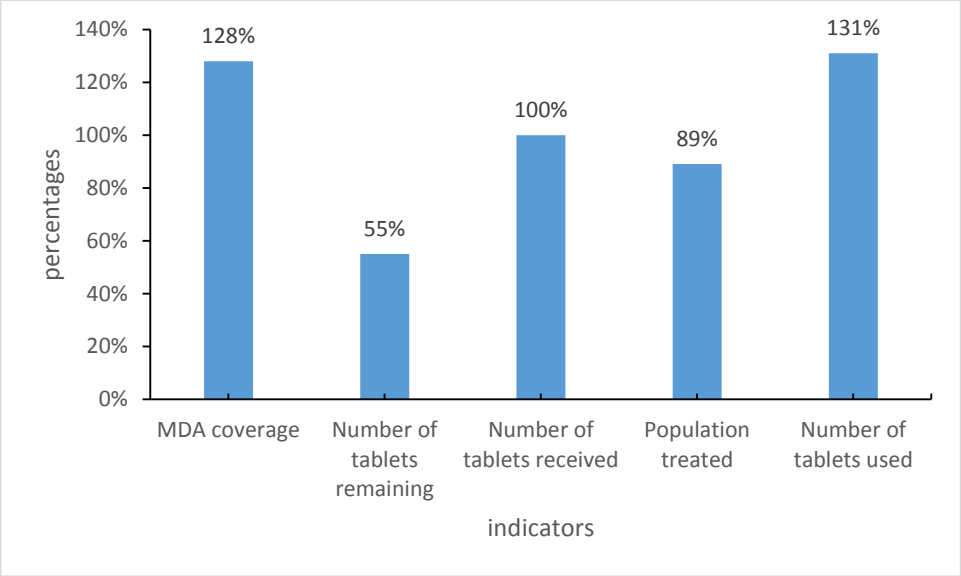

Figure 9: Data and reporting verification, Adalazo, Ahanta West, 2010

In Adalazo (figure 9), population treated was 89%, number of tablets remaining was 55%. The number of tablets used was under estimated by 31%, the most accurately reported indicator is number of tablets received, whiles MDA coverage was under reported by 28%.

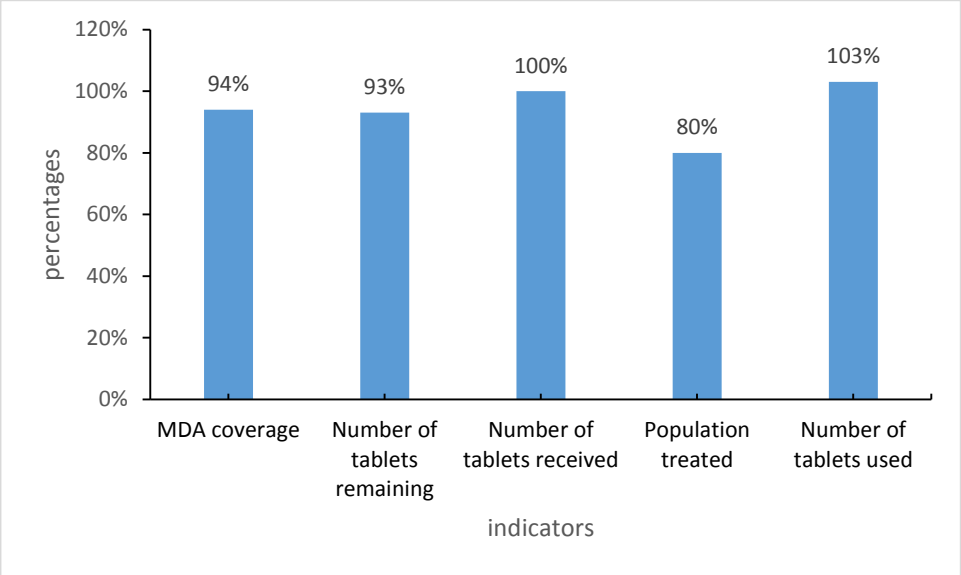

Figure 10: Data and reporting verification, Silimowu, Ahanta West, 2010

In Silimowu (figure 10), population treated was 80% and number of tablets remaining was 93%. The number of tablets used over estimate by 3%. The most accurately reported indicator was number of tablets received and MDA coverage was over reported by 6%.

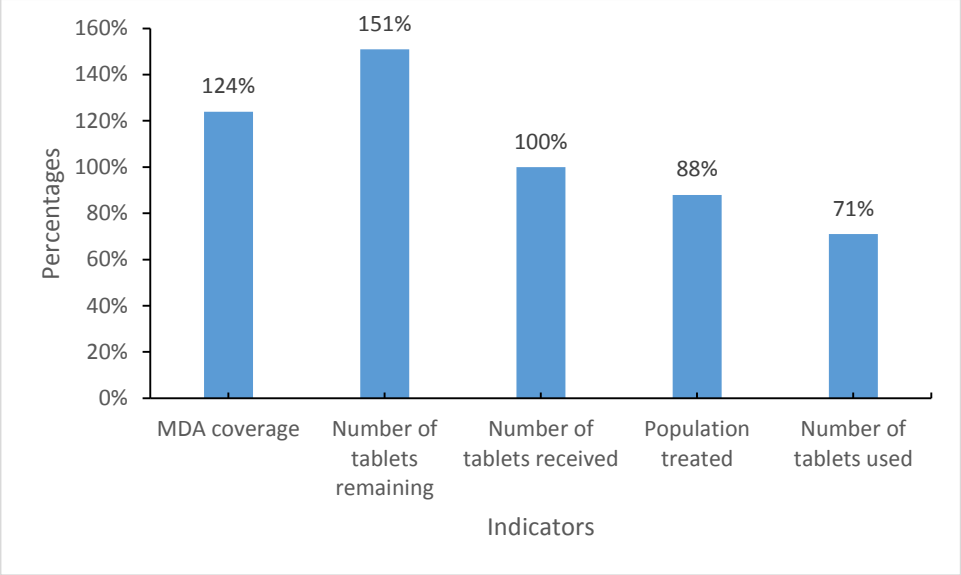

Figure 11: Data and reporting verification, Anwana beach, Ahanta West, 2010

In Anwana beach (figure 11), population treated was 88%, number of tablets remaining was 151%. The number of tablets used was over reported by 29% and MDA coverage was under reported by 24%. However, the most accurately reported indicator was number of tablets received.

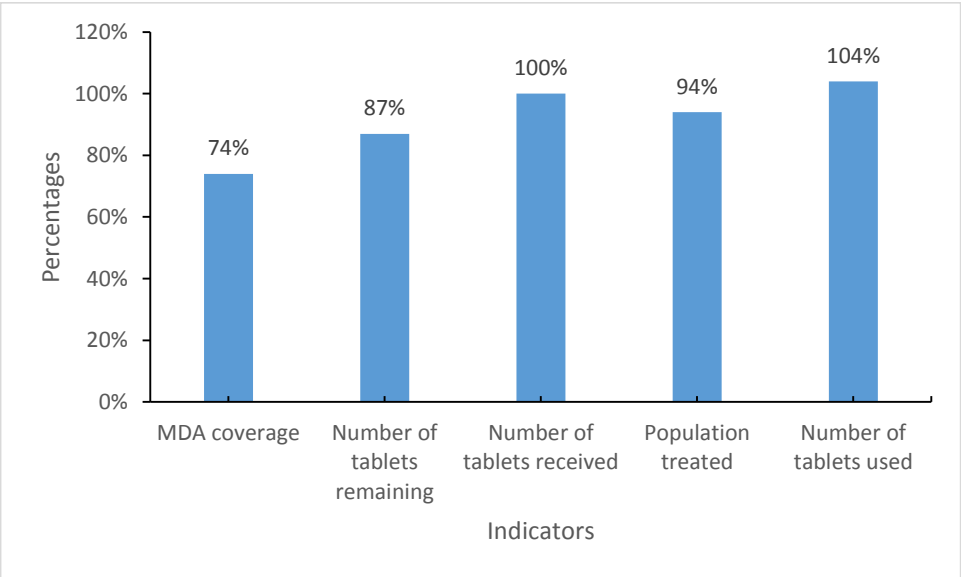

Figure 12: Data and reporting verification, Nkwantanan, Ahanta West, 2010

In Nkwantanan (figure 12) population treated was 94%, number of tablets remaining was 87%. The number of tablets used was under reported by 4%. The most accurately reported indicator was number of tablets received and MDA coverage was over reported by 26%.

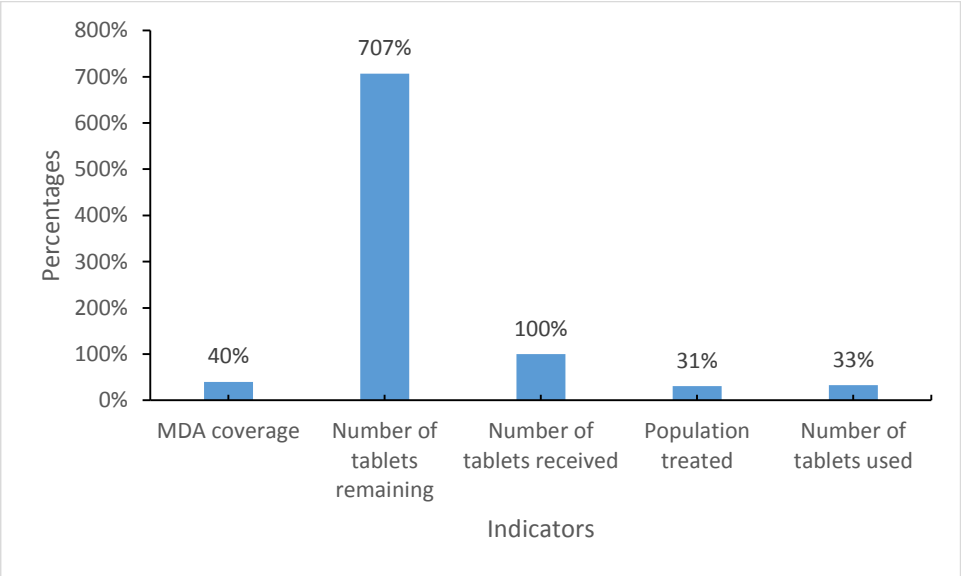

Figure 13: Data and reporting verification, Aketekyi, Ahanta West, 2010

In Aketekyi (figure 13), population treated was 31%, number of tablets remaining was 707%. The number of tablets used was over reported by 67%. MDA coverage was over reported by 60% and the most accurately reported indicator was number of tablets received.

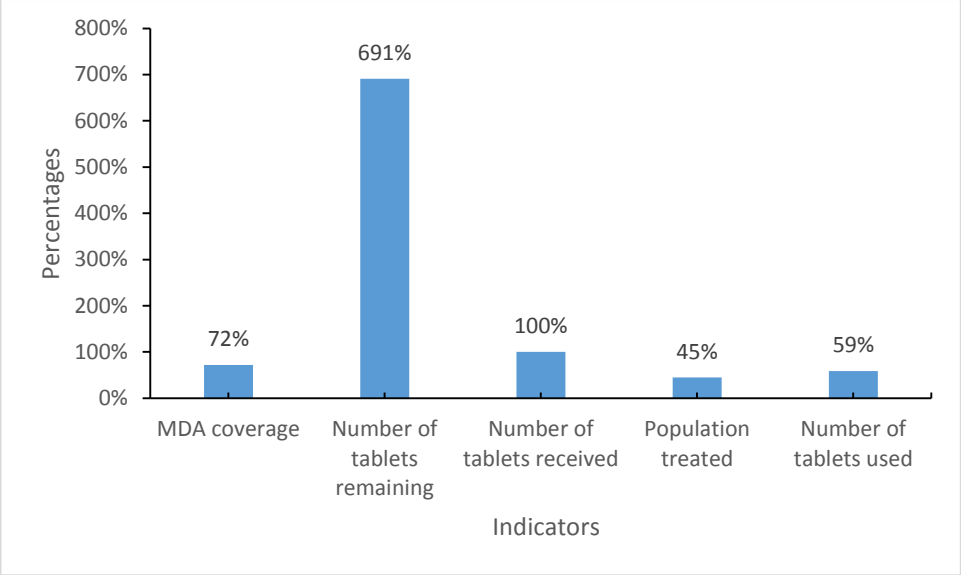

Figure 14: Data and reporting verification, Princess town, Ahanta West, 2010

In Princess town (figure 14), population treated was 45%, number of tablets remaining was 691%. The number of tablets used was over reported by 41%. The most accurately reported indicator was number of tablets received and MDA coverage was over reported by 28%.

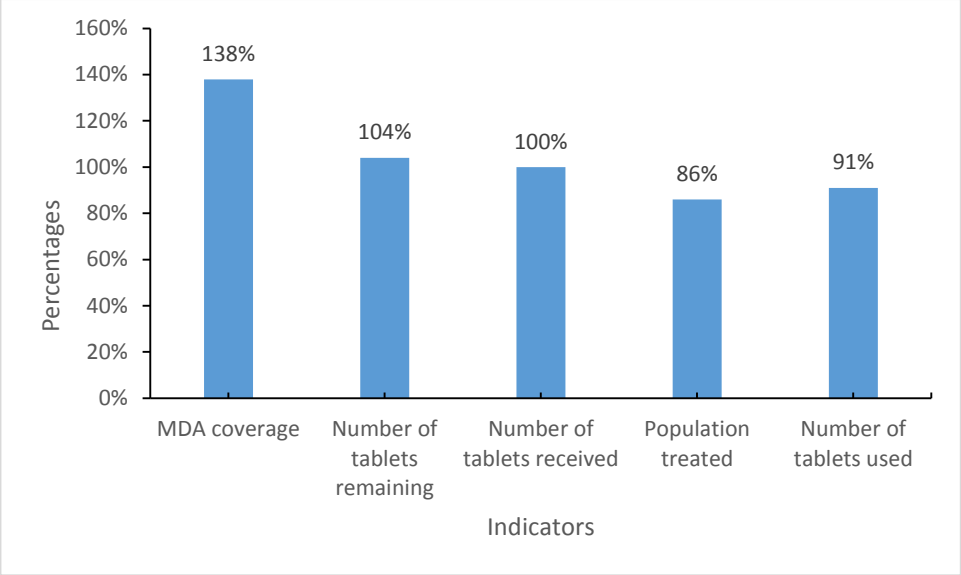

Figure 15: Data and reporting verification, Akonu, Nzema East, 2010

In Akonu (figure 15), population treated was 86%, number of tablets remaining was 104%. The number of tablets used was over reported by 9%. The most accurately reported indicator was number of tablets received. MDA coverage was under reported by 38%.

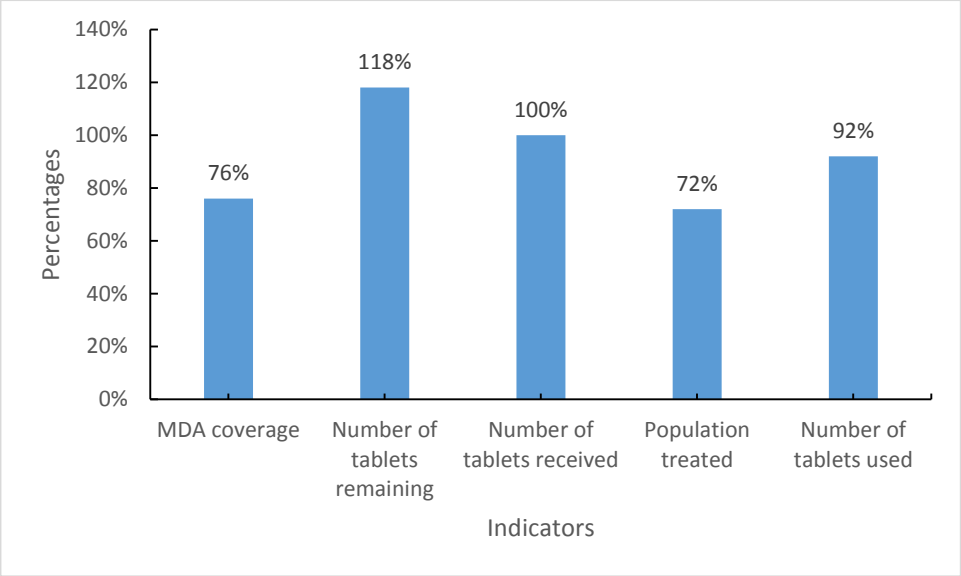

Figure 16: Data and reporting verification, Dumunli, Nzema East, 2010

In Dumunli (figure 16), population treated was 72%, number of tablets remaining was 118%, the number of tablets used was over reported by 8%. The most accurately reported indicator was number of tablets received, MDA coverage was over reported by 24%.

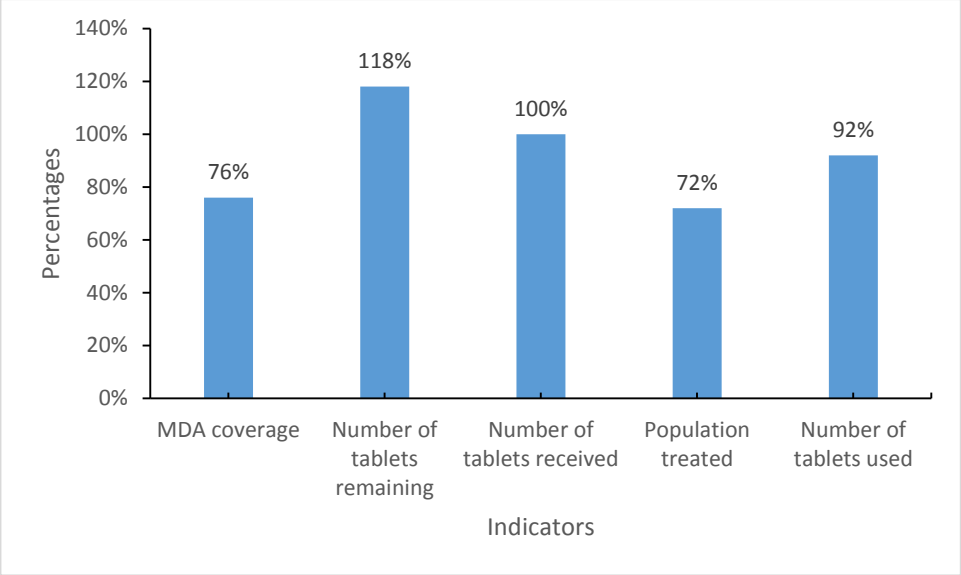

Figure 17: Data and reporting verification, Agyan, Nzema East, 2010

In Agyan (figure 17), population treated was 47%, number of tablets remaining was 180%. The number of tablets used was over reported by 49% and MDA coverage was over reported by 14%. The most accurately reported indicator was number of tablets received.

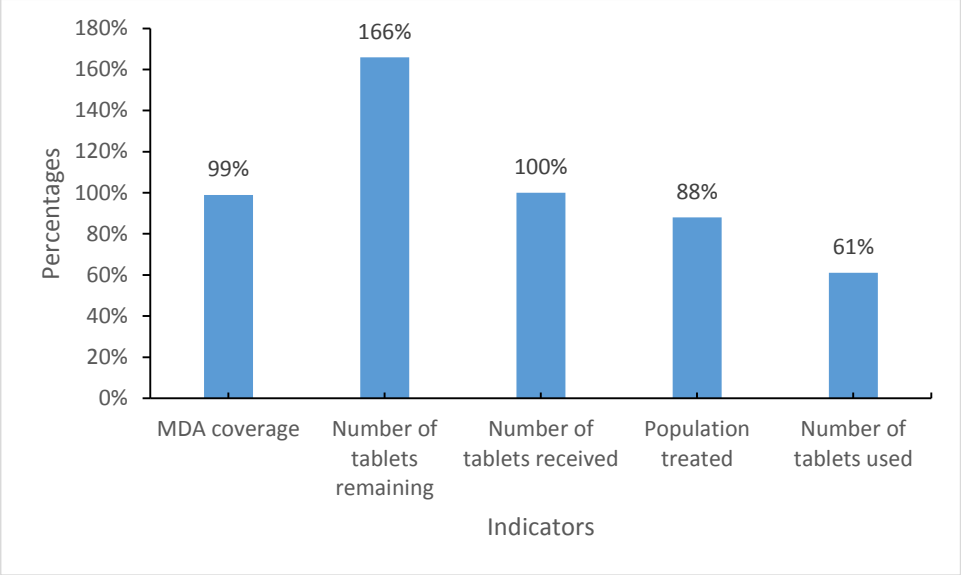

Figure 18: Data and reporting verification, Ewuku, Nzema East, 2010

In Ewuku (figure 18), population treated was 88%, number of tablets remaining was 166%. The number of tablets used was over reported by 39%. MDA coverage and number of tablets received was accurately reported at 99%and 100% respectively.

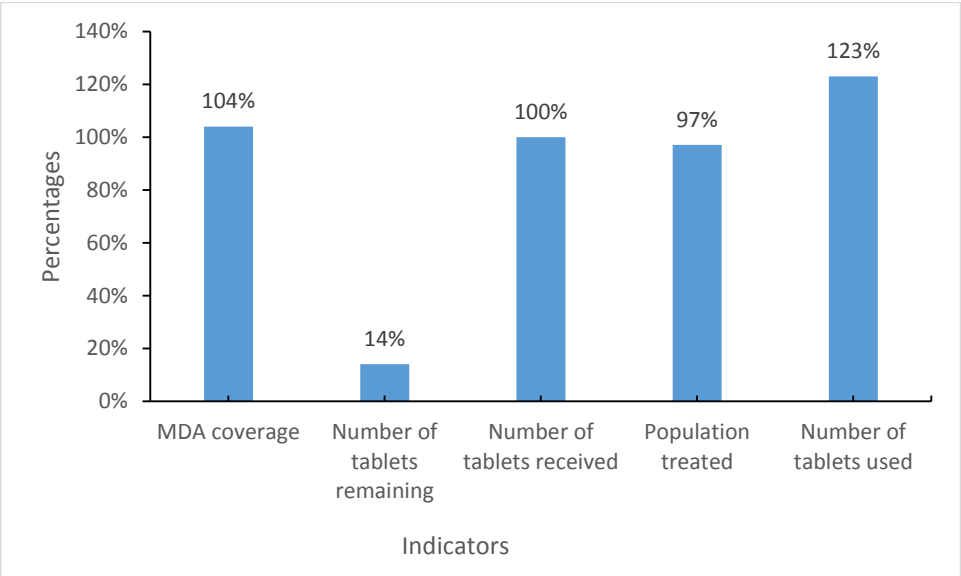

Figure 19: Data and reporting verification, Agona, Nzema East, 2010

In Agona (figure 19), population treated was 97%, number of tablets remaining was 14%. The number of tablets used was under reported by 23%. MDA coverage was 104% and the most accurately reported indicator was number of tablets received.

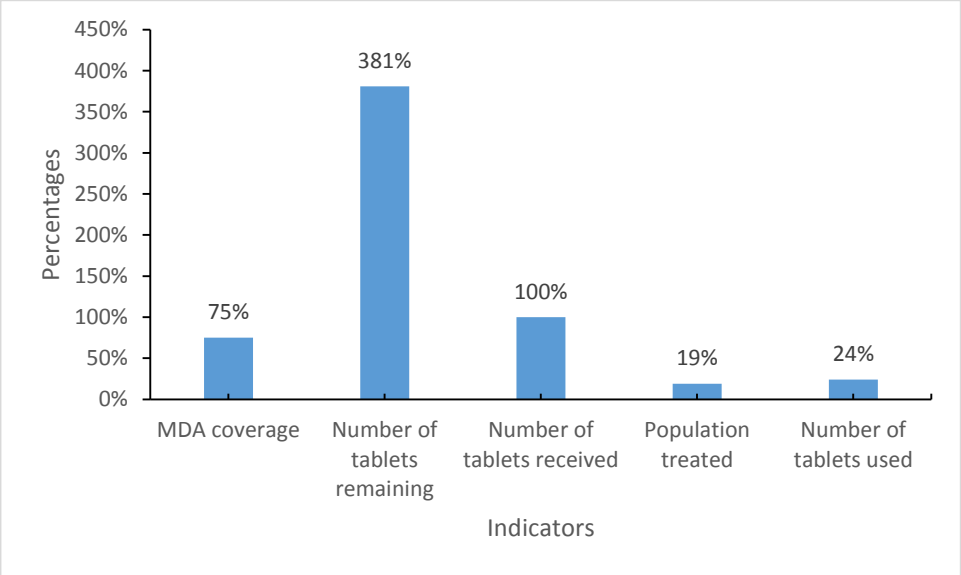

Figure 20: Data and reporting verification, Aguafo, Nzema East, 2010

In Aguafo (figure 20), population treated was 19%, number of tablets remaining was 381%. The number of tablets used was over reported by 76%. MDA coverage was 75% and number of tablets received was the most accurately reported indicator.

4.2 Functional Areas in LF surveillance system

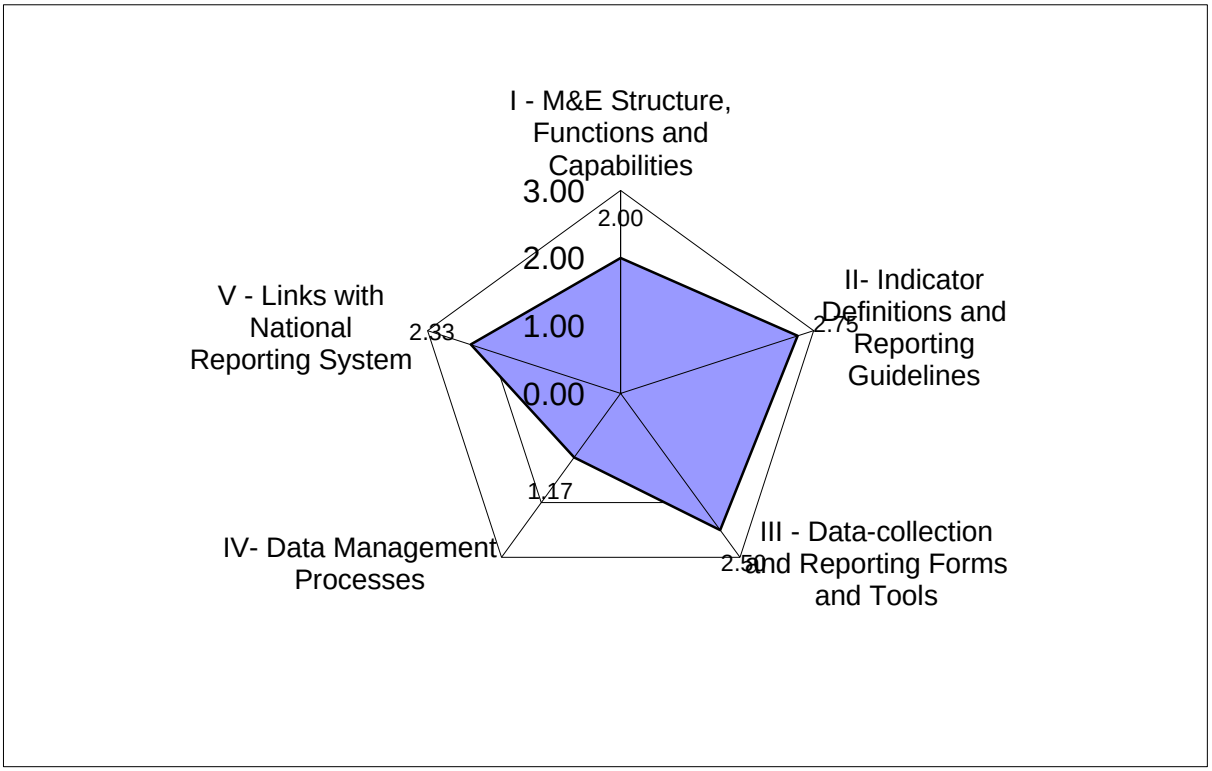

Figure 21: Data Management Assessment, Agona Nkwanta DHMT, Ahanta West, 2010

In Agona Nkwanta Health post (figure 23), indicator definitions and reporting guidelines was the strongest functional area (2.8) followed by data collection and reporting forms and tools (2.5). Data management processes was the weakest functional area (1.17), followed by M&E Structure, Function and Capabilities (2.0).

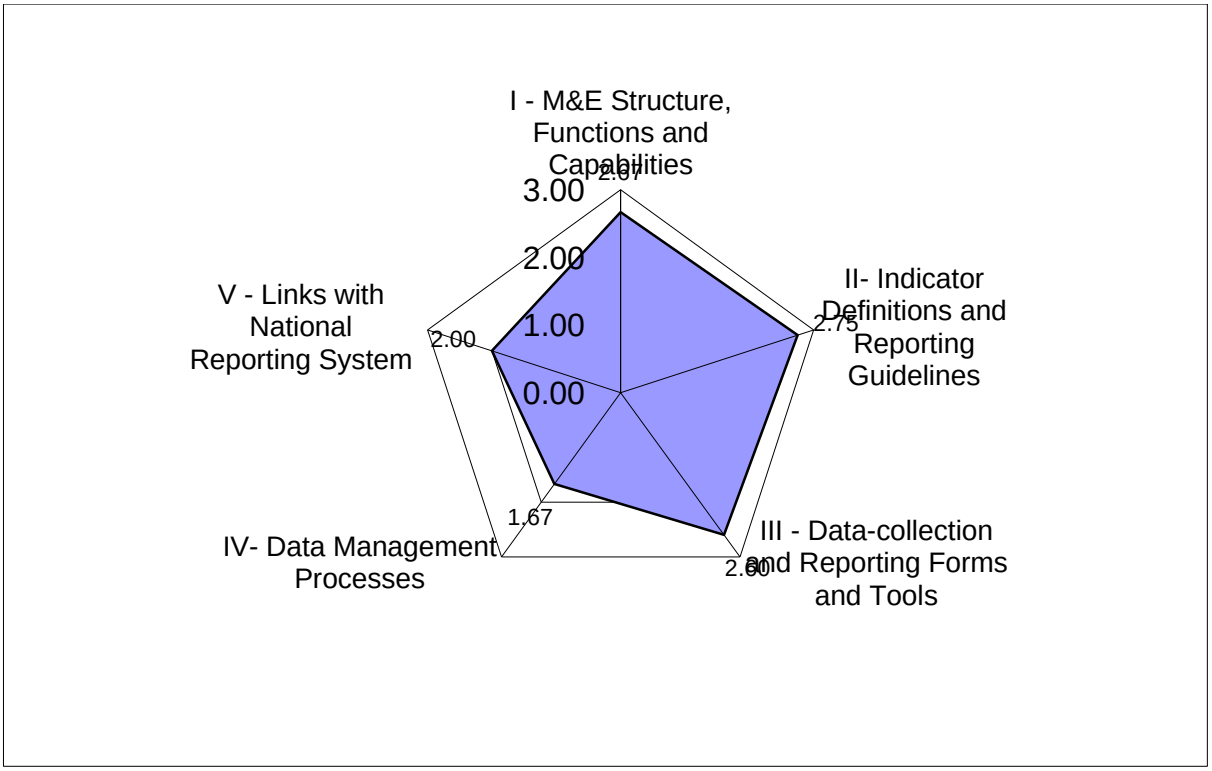

Figure 22: Data Management Assessment, Axim DHMT, Nzema East, 2010

In Axim DHMT (figure 24), the strongest functional area was indicator definitions and reporting guidelines (2.8), followed by M&E structure, functions and capabilities (2.67) then data-collection and reporting forms and tools (2.5).

4.3 Data quality dimensions in LF surveillance system

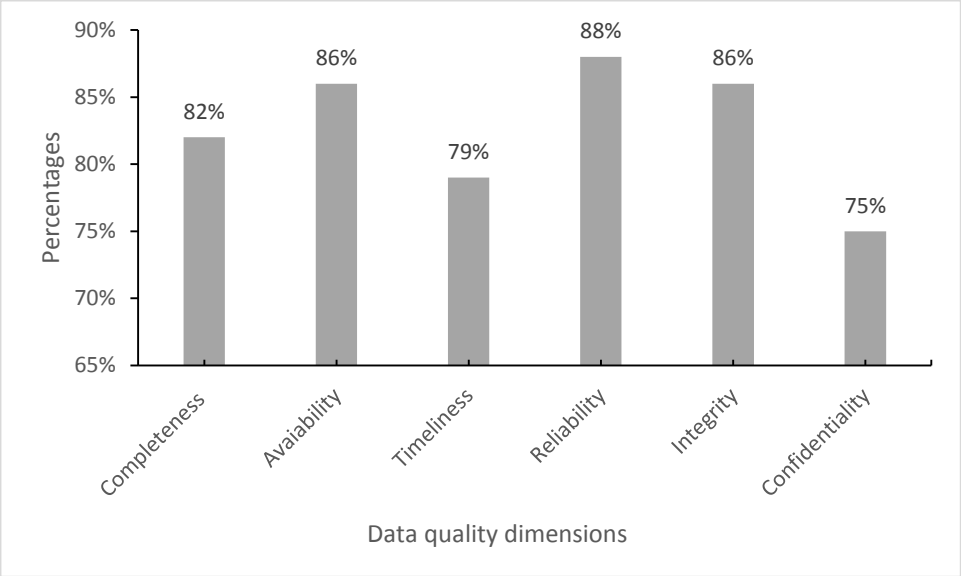

Figure 23: Dimensions of data quality, Ahanta West District, 2010

In Ahanta West district (figure 21), the lowest reporting performance was confidentiality (75%) followed by timeliness (79%). However, the best reporting performance was reliability (88%) followed by availability (86%) and integrity (86%).

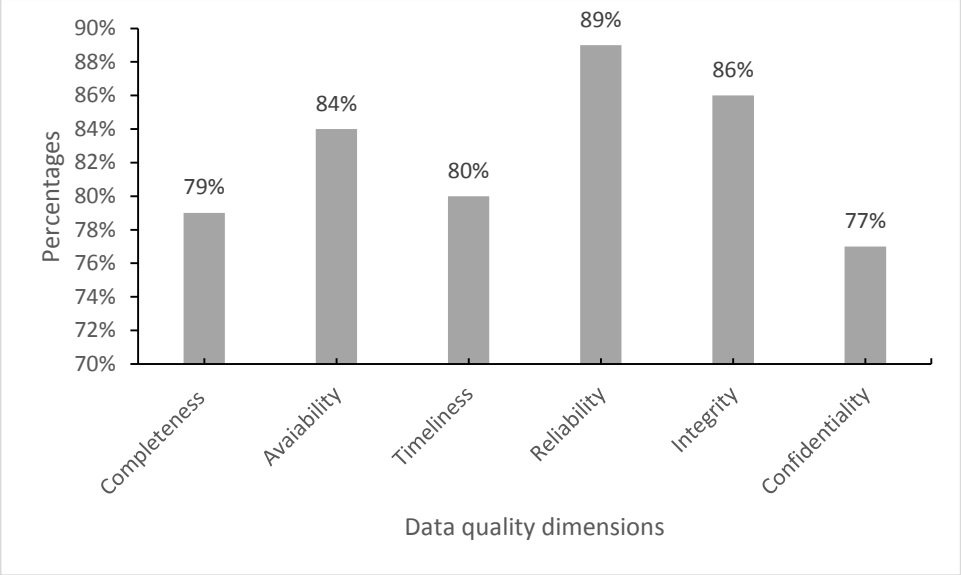

Figure 24: Dimensions of data quality, Nzema East District, 2010

In Nzema East district (figure 22), the lowest reporting performance was confidentiality (77%) followed by completeness (79%). On the other hand, the best reporting performance was reliability (89%), followed by integrity (86%).

CHAPTER FIVE

5.0 DISCUSSION

Data are vital to public health, since, they signify and reflect public health practice. The extensive application of data, for the evaluation of public health responsibility and performance, highlights the importance of data quality and how to evaluate it. In evaluating the quality of LF surveillance data in communities with transmission of lymphatic filariasis, in the Western region of Ghana, Validity of data reported in LF surveillance system varies with the various indicators, and the most accurately reported indicator was number of tablets received. There was high quality reporting for number of tablets received across multiple sites because, verification factor is always between (95%-105%). The level of accuracy in reporting MDA coverage in Awuku, Agona and Tumentu was high. In Akonu there was high level of accuracy in reporting population treated as well. Number of tablets used was reported with high level of accuracy in silimowu and Nkwantanan. This is because their verification factors are closed to 100%. There was no indicator that has consistent over reporting or under reporting across multiple sites because, no indicator has a verification factor which is always greater than 110% across sites. None of the sites had high quality reporting across multiple indicators, because, no site had verification factor for all indicators between (95%-105%). Similarly, there was no site that had poor quality reporting across multiple indicators because, no site had verification factors for all indicators to be less than 90% or greater than 110%. There was massive under reporting in number of tablets remaining in Aguafo (281%), Princess Town (591%), Aketekyi (607%) and Tumentu (251%). This may be due to an overestimating the populations of communities. Similarly, there was over reporting in population treated and number of tablets used in Aguafo (81%, 76%), Aketekyi (69%, 67%) and Tumentu (87%, 75%). It was observed that, the data capture in communities was not properly done. These

findings suggest both under reporting and over reporting of indicators at some SDPs or communities, and agrees with the findings following immunization in Tunisia (WHO, 2015). However there was high level of accuracy in reporting some indicator such as number of tablets received at service delivery points or communities. The supply of drugs to the communities was strictly supervised by the districts. The indicator with the worst verification factor was number of tablets remaining because, it has been severely under reported.

No site demonstrated a high quality data reporting system, because, no site scored (>2.5) for all functional areas (M&E structure, Indicator definitions, Data collection and reporting forms and tools, Data management processes and Link with national reporting system). Similarly, none of the sites demonstrated a poor quality data reporting system because no site scored (<2.0) for all functional areas (M&E structure, Indicator definitions, Data collection and reporting forms and tools, Data management processes and Link with national reporting system).

Indicator definition had an average score of approximately 2.8 in Agona Nkwanta District Health Management Team (DHMT), as well as Axim DHMT, reflecting good performance. This is because, for a particular functional area to perform well, average score across sites must be =2.8. No functional area need work because average score across sites should be =1.5 before it can be categorised under areas that need work.

In Agona Nkwanta, availability of indicator definition and reporting guidelines was the strongest functional area (2.8) followed by data collection and reporting forms and tools (2.5). This is because strict guidelines were received defining the indicator to report on. Also community Drug distributors used standard data capture tool from the national level

all the time to capture data since the tools were available. The weakest functional area was data management processes (1.17) followed by M&E structure, function and capabilities (2.0), because, data quality controls, data back-up procedures, confidentiality of personal data and feedback on data quality were not available. Moreover, trained data management staff, training plans were not sufficient as well as non-availability of M&E organisational structure.

In Axim DHMT, the strongest functional area was availability of indicator definition and reporting guidelines (2.8), followed by M&E structure, function and capabilities (2.67) then data collection and reporting forms and tools (2.5) because where to send report, when to send report and whom to send report has been vividly stated and followed. There were also training plans, and trained data management staff who manage data effectively and also utilization of standard data collection and reporting tools. The weakest functional area was data management processes followed by links with national reporting systems, because, relevant personal data are not strictly maintained according to national or international confidentiality guidelines. Again, there were no sites identification such as specific identity number.

Results suggest data management processes as the weakest functional area which needs to be improved most. Also links with the national reporting system and M&E structure, function and capabilities are weak and must be improved. However the strongest functional area was availability of indicator definition and reporting guidelines, followed by data collection and reporting forms and tools.

In the findings of Mbondo *et al* (2013), from Kenya in an HIV monitoring and evaluation capacity rapid needs assessment (RNA), significant gaps identified included lack of M&E

guidelines, parallel reporting systems, poor feedback given to subnational levels, poor data use and general data management capacity at subnational levels. Though in a different disease, these findings concurs with the results from this study. Also in studies in Botswana, to improve the quality of health information in HIV, weaknesses determined included limited ownership of M&E-related duties within facilities, a lack of tertiary training programs to build M&E skills, few standard practices related to confidentiality and document storage, limited dissemination of indicator definitions, and limited functionality of electronic data management systems (Lidikwe *et al*., 2014). Similar gaps were observed in the findings from this study, except for the limited dissemination of indicator definition which was not observed in this study.

The areas which need the most improvement in terms of reporting performance was confidentiality and timeliness in Ahanta West district, because data was not managed according to protection and use standard and most data were not reported on time. In addition to this, the completeness of data must be improved in the Nzema East district because the data was not inclusive and with omissions. However, availability, reliability and integrity of data were high in both districts because, most data was available for assessment, most data were collected through consistent procedures and protocols, and most data were managed according to protection and use standard. In Ahanta West district, data quality dimensions were 88% reliability, 86% integrity, 79% timeliness, 86% availability, 82% completeness and 75% confidentiality. In Nzema East district, data quality dimensions were 89% reliability, 86% integrity, 80% timeliness, 84% availability, 79% completeness and 77% confidentiality. In studies on TB data to assess data quality dimension, Qader (2013), estimated 80% reliability, 89.8% integrity, 73.7% timeliness. The findings from this study are similar to those from Qader (2013).

In Ahanta West and Nzema East Districts, confidentiality was the least among all the data quality dimensions, with 75% for Ahanta West and 77% for Nzema East districts, because, data were not managed according to protection and standard use. These findings concur with those of Chilungu *et al* (2004) on malaria in Mozambique, which revealed routine primary data to be of poor quality and evidence of ‘'invention" of data in health facilities, and a lack of confidentiality of data in health facilities. Likewise, Kawonga *et al* (2012), in South Africa, reported mistrust of some DHIS capacity. The completeness of the data was also a major issue that was identified. This is because the degree to which most information received on an eligible person was not complete. In Nzema East, completeness was 77% and in Ahanta West, completeness was 82%. In evaluating HIV surveillance system in New York, Nair *et al* (2011) suggested lack of completeness

Challenges in undertaking this studies was that, data was compiled in one data register for multiple communities so it was difficult to verify data from some individual communities. Data must not be combined in a single register for multiple communities but must be captured on community bases. Also, the DQA tool allow for only 5 indicators to be inputted at a time, so in improving the DQA tool, it must be designed to take more than 5 indicators. This will enhance assessing more indicator other than 5 at a time.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Conclusion: This study is the first of its kind on lymphatic filariasis. No site demonstrated a high quality data reporting system. Also, none of the sites demonstrated a poor quality data reporting system. Indicator definition is the functional area which is performing well. There is high quality reporting for number of tablets received across multiple sites. However there was high level of accuracy in reporting some indicator. There was no indicator that had consistent over reporting or under reporting across multiple sites. None of the sites had high quality reporting across multiple indicators. There is inaccurate reporting of data at SDPs or communities in Ahanta West and Nzema East Districts. Also data management processes are the weakest functional area and need to be improved most. M&E structure, function and capabilities and links with national reporting system are also weak and must be improved. The strongest functional area is indicator definition and reporting guidelines, followed by data collection and reporting forms and tools. Timeliness and confidentiality are the lowest reporting performance, though the best reporting performances were integrity, availability and reliability of data.

6.2 Recommendations

The regional lymphatic filariasis control team:

- Those responsible for data capturing must be proactive since most reports are not being captured. This may lead to inaccurate reporting of data as such, data capturing must be strictly supervised and enforced.

- Data for some communities were combined at the district level so it was difficult to verify data from some individual communities. Data must not be combined but it must be captured on community bases.
- Data managers must be given refresher courses very often so as to polish their managerial skills.

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APPENDICES

NEGLECTED TROPICAL DISEASES CONTROL PROGRAMME

MDA/CDTI REPORTING FORMAT

REI WESTERN DISTRIC AHANTA WEST SUB-DISTRICT..... PRINCESS PERIOD (Month/Year) December 2010

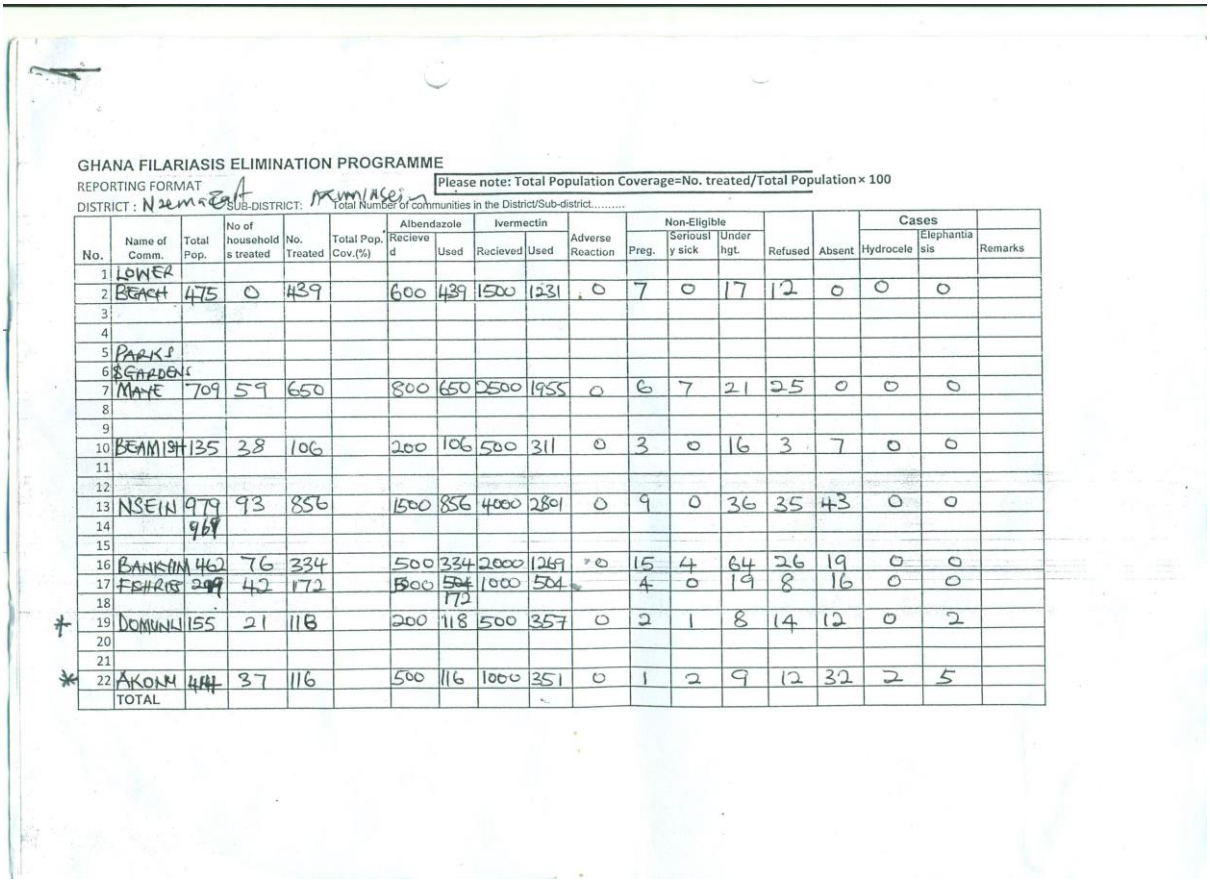
NO.	Name of community	Total population	Number treated	Total pop. Coverage	Albendazole		Ivermectin		Adverse Reaction	Non-Eligible				Refused	Absent	Clin	
					Received	Used	Received	Used		pregnant mother	lactating < 1 week	Seriously Sick	Under Hieight			Hydroceole	Elephantiasis
1	Abuse	370	350	94.6	900	410	2000	1542	0	3	5	0	15	0	0	0	0
2	Tumentu	316	287	90.8	500	350	2000	1053	0	3	2	0	8	2	14	0	0
3	Asoboi	298	212	71.1	300	215	1000	615	0	5	0	0	9	2	70	1	0
4	Anwana beach	106	81	76.4	100	81	500	299	0	2	0	0	3	2	18	0	0
5	Nkwantoan	319	275	86.2	300	280	1000	701	5	4	0	1	7	12	20	2	0
6	Adalaza	155	104	67.1	200	105	500	310	0	1	0	0	3	1	46	0	0
7	Silmawu	210	132	62.9	200	135	500	373	1	2	0	1	3	9	62	0	0
8	Alebira	468	435	92.9	500	435	1500	1331	2	4	3	1	17	3	5	0	0
9	Enlaukoan	314	206	65.6	300	210	1000	612	4	4	0	0	10	9	81	0	0
10	Princess Town	2335	2198	94.1	2500	2265	6000	5500	3	12	3	7	14	10	91	3	3
11	Akenkyi	2151	2018	93.8	2200	2020	6000	5684	0	22	5	2	7	15	82	2	0
12	Enyano	418	370	88.5	400	370	1500	1349	0	4	2	1	14	9	18	0	0
13	Abongekrom	108	95	88.0	100	100	500	320	0	1	0	0	4	5	7	0	0
14	Gwakro	950	869	91.5	1200	910	3500	3265	0	17	6	3	14	20	26	2	2
15	Kake	287	235	81.9	400	240	1600	812	0	6	0	0	13	2	35	0	0
16	Fekpoli	159	157	98.7	200	160	1000	520	0	2	0	0	0	0	0	0	0
17	Egyambra	1161	1057	96.0	1500	1203	4500	3048	4	8	7	2	11	5	11	0	0
18	Mensia	892	797	88.9	1200	870	4000	4049	7	6	3	4	58	10	15	1	1
19	Enkye Villa	53	41	77.4	100	45	500	135	1	2	0	1	9	0	0	0	0
	TOTAL	9457	9155	105.3	12900	10372	49500	31618	27	96	30	23	221	116	601	12	10

Total no. of communities (c) = 19

Total no. of communities treated (t) = 19

Appendix 1: Reported results from Ahanta West and Nzema East

No.	Name of Comm.	Total Pop.	No of households treated	No. Treated	Total Pop. Cov.(%)	Albendazole		Ivermectin	
						Recieved	Used	Recieved	Used
1	Amavukumanu	383	127	336	1.8	400	336	2798	935
2	Kokoado	451	122	399	2.1	400	399	3000	1118
3	Aguafo/Agona	465	132	424	2.2	500	424	2000	1575
4	Brawire	881	167	853	4.5	1000	853	5200	2445
5	Akyinim	973	117	933	4.9	1000	933	3800	2581
6	Bolazo	607	140	540	2.9	600	540	2000	1302
7	Apewosika	448	80	393	2.1	500	393	2000	1020
8	Botokule	603	164	570	3.0	600	570	2000	1484
9	Bankyim	616	130	554	2.9	800	554	1800	1524
10	Nsein	1173	110	1117	5.9	1500	1117	4000	3984
11	Anto Apewosika	1108	105	1078	5.7	1400	1078	3000	2904
12	Tolanu	266	59	248	1.3	400	248	2000	783
13	Ottupy	354	68	326	1.7	432	300	2000	1008
14	Grant Hill	645	179	610	3.2	625	610	3000	1793
15	Fitikolonu	411	92	385	2.0	400	385	2000	1015
16	Ayisakro	320	73	304	1.6	372	304	1500	837
17	Ndatiem	342	80	293	1.5	300	293	1500	874
18	Bokazo	457	135	425	2.2	450	425	3000	1425
19	Ewuku	257	84	240	1.3	300	160	2000	1224
20	Dadwen	833	168	799	4.2	400	300	2000	1045
21	Kegyina	863	167	830	4.4	600	530	3000	2358
22	Fofle/Anagye	415	98	350	1.8	600	350	3030	1322
23	Fantikrom	242	69	227	1.2	300	227	1000	675
24	Averebo/Ahunyame	466	119	432	2.3	600	432	2000	1277
25	Adekelezo	245	60	220	1.2	300	220	1000	649
26	Nyamebekyere(32)	259	77	220	1.2	300	220	1500	635
27	Nuabesa	202	60	153	0.8	300	153	1000	722
28	Yedeyesele	333	135	310	1.6	500	310	1500	1237
29	Ankyerenyin/Awuky	430	135	400	2.1	400	400	1500	1170
30	Apataim	414	121	386	2.0	500	386	1000	880
31	Adukolonu	221	58	208	1.1	300	208	1000	586
32	Akonu	378	123	352	1.9	400	352	1000	867
33	Agyan	242	71	222	1.2	300	222	1000	585
34	Subri 1& 2	443	74	407	2.1	500	407	1500	1283
35	Suffer to gain	152	53	122	0.6	200	122	500	432
36	Lower Beach	653	123	537	2.8	600	537	2000	1623
37	Police Quarters	436	86	382	2.0	400	382	1500	1059
38	Bokakole	360	67	346	1.8	350	346	1000	988
39	Nkakem	420	130	382	2.0	400	382	1500	1019
40	Nyarke	165	85	150	0.8	180	150	500	438



GHANA FILARIASIS ELIMINATION PROGRAMME

REPORTING FORMAT

DISTRICT : Nzema East SUB-DISTRICT: Kumlasein Total Number of communities in the District/Sub-district.....

Please note: Total Population Coverage=No. treated/Total Population × 100

No.	Name of Comm.	Total Pop.	No of household s treated	No. Treated	Total Pop. Cov.(%)	Albendazole		Ivermectin		Adverse Reaction	Non-Eligible			Refused	Absent	Cases		Remarks
						Recieved	Used	Recieved	Used		Preg.	Seriously sick	Under hgt.			Hydrocele	Elephantiasis	
1	LOWER																	
2	BEACH	475	0	439		600	439	1500	1231	0	7	0	17	12	0	0	0	
3																		
4																		
5	PARKS																	
6	&GARDEN																	
7	MAYE	709	59	650		800	650	2500	1955	0	6	7	21	25	0	0	0	
8																		
9																		
10	BEAMISH	135	38	106		200	106	500	311	0	3	0	16	3	7	0	0	
11																		
12																		
13	NSEIN	979 969	93	856		1500	856	4000	2801	0	9	0	36	35	43	0	0	
14																		
15																		
16	BANKYIM	462	76	334		500	334	2000	1269	0	15	4	64	26	19	0	0	
17	~~FEHRIE~~	~~299~~	42	172		500	~~504~~ 172	1000	504		4	0	19	8	16	0	0	
18																		
* 19	DOMUNLI	155	21	118		200	118	500	357	0	2	1	8	14	12	0	2	
20																		
21																		
* 22	AKONU	~~444~~	37	116		500	116	1000	351	0	1	2	9	12	32	2	5	
	TOTAL																	

Data Verification and System Assessment Sheet - Service Del

Name of Site (Service Delivery Point)	K
Data aggregation site 1 / Data aggregation site 2 / District	
Indicator(s) Assessed	
Date of Assessment	
Time period of the Preventive Chemotherapy (PC) Round	

Part 1: Data Verifications

A - Documentation Review:						
	Review availability and completeness of all indicator source documents for the selected time period of PC round.	**Guiding Questions / Comments**	**Number of tablet used**	**population treated**	**Number of tablets received**	**Number of tablets**
1	Indicate the source documents for each indicator (Write N/A for indicators that are not applicable to the site being assessed, e.g. an indicator on schistosomiasis in an area that is not endemic for schistosomiasis)	Guiding Question (for each indicator): What was the source of data used to prepare a summary report on the PC exercise (conducted during the period under review)? Comment: Write the source for each indicator. It is important to mention the reference period for the assessment.	Drug distribution register	Drug distribution register	Drug distribution register	Dru distrib regis

2	Review available source documents for the reporting period being verified. Is there any indication that source documents are missing?	Guiding question (for each indicator): How many Community Drug Distributors (or teachers) were involved in PC activities in this village (or school)? Did each of them use a separate document (register or tally sheet) to record the persons served? Where are those documents stored? How many of those documents are available? Comment: In some cases each CDD keeps his/her source documents after compiling the reports. Efforts should be made to access documents from all the CDDs. It is possible to encounter a site where source documents are completely missing. The team should nevertheless go ahead with the assessment.	No	No	No	N
	If yes, determine how this might have affected reported numbers.	(no relevant guiding question or comment)				
3	Are all available source documents complete?	(no relevant guiding question or comment)	No	No	No	N
	If no, determine how this might have affected reported numbers.	(no relevant guiding question or comment)				
4	Review the dates on the source documents. Do all dates fall within the time period of the PC round being assessed?	(no relevant guiding question or comment)	Yes	Yes	Yes	Ye

	If no, determine how this might have affected reported numbers.	(no relevant guiding question or comment)				
B - Recounting reported Results:						
	Recount results from source documents, compare the verified numbers to the site reported numbers and explain discrepancies (if any).					
5	Recount the number of people, cases or events recorded during the time period of the PC round by reviewing the *source documents*. **[A]**	(no relevant guiding question or comment)	973	160	700	(27
6	Copy the number of people, cases or events reported by the site during the PC round under assessment from the site *summary report*. **[B]**	(no relevant guiding question or comment)	610	190	700	
7	Calculate the ratio of recounted to reported numbers. **[A/B]**	(no relevant guiding question or comment)	160%	84%	100%	-303
8	What are the reasons for the discrepancy (if any) observed (i.e., data entry errors, arithmetic errors, missing source documents, other)?	(no relevant guiding question or comment)				

C - Cross-check reported results with other data sources:					
Cross-checks can be performed by comparing other information sources such as examining residents' register or separate inventory records documenting the quantities of treatment drugs,					
9	List the documents used for performing the cross-checks.	(no relevant guiding question or comment)	MDA reporting format	MDA reporting format	
10	Describe the cross-checks performed.	(no relevant guiding question or comment)	compare quanity of treatment drug to see if it tallys with reported results		
11	What are the reasons for the discrepancy (if any) observed?	(no relevant guiding question or comment)			
Part 2. Systems Assessment			**Answer Codes: Yes - completelyPartlyNo - not atallN/A**		**(Please provide responses will**
I - M&E Structure, Functions and Capabilities					

1	The responsibility for recording the delivery of services on source documents is clearly assigned to the relevant staff.	Guiding Question: Is there someone who was assigned the responsibility of recording the services provided during Preventive Chemotherapy (PC) at this unit (village or school)? If yes, who was assigned the responsibility and by who? Were the responsibilities for recording clearly spelled out (ask what the responsibilities are)? How was the assignment effected (i.e. whether in writing or verbally)? Comment: Probe to find out if there is staff responsible for data management and if an authority such as District NTD Focal Person, Sub-district supervisor, or MoH Central authority assigned the responsibility.	Yes - completely	
2	All relevant staff have received training on the data management processes and tools.	Guiding Question: How many persons are responsible for recording data at this service delivery point (village or school – where applicable)? How many of these were trained on data recording, summarization or preparing a report on PC activities? What aspects of data recording and reporting did the training cover? Comment: Probe to establish if the training included areas such as data recording / reporting tools, how to complete the tools, timelines for reporting, where to send reports, quality control, confidentiality etc.	Partly	About twenty perso recording
3	There are designated staff responsible for reviewing aggregated numbers prior to submission to the next level	Guiding Question: Other than the person(s) responsible for summarizing data or preparing the reports, is there any other person who checks the summarized data / report before it is submitted to the next level? If yes, who is this person? Comment: This person is expected to be different from the one who prepares the report. In some cases the response would be that the same person who prepares the report also reviews it. In this case there is no designated staff responsible for reviewing the aggregated data.	Partly	sometimes commu
II- Indicator Definitions and Reporting Guidelines				
The M&E Unit at the national level has provided guidance (verbal, written, pictorial, job aides, etc) on …				

4	,,, *what* they are supposed to report on.	Guiding Question: Has the site (village or school) received any instructions from the national level (whether written or verbal) on what is supposed to be reported on after the PC exercise? Comment: This seeks to know if guidelines were received defining the indicators to be reported on.	Partly	Instruction came fro
5	… *how* (e.g., in what specific format) reports are to be submitted.	Guiding Question: Has the site (village or school) received any instructions from the national level regarding the format the reports should be submitted? If yes, in what format should the reports be submitted?	No - not at all	Please Provide a C
6	… *to whom* the reports should be submitted.	Guiding Question: Has the site (village or school) received any instructions from the national level regarding whom the reports should be sent to? If yes, whom should the reports be sent to?	Partly	Mr Biney the drug c (disease control offi
7	… *when* the reports are due.	Guiding Question: Has the site (village or school) received any instructions from the national level on when the reports should be ready and sent to the next level? If yes, ask to find out the timelines for preparing the reports and submitting them to the next level and compare with national timelines (where available)	Yes - completely	Two weeks ofter the
III - Data-collection and Reporting Forms and Tools				
8	The M&E Unit has identified standard data recording and reporting forms/tools to be used by the service delivery points	Comment: This may not be asked to the persons at the SDP level as the information is available at the central M&E unit level. You may only need to establish whether the unit is using the tools.	Yes - completely	
9	….If yes, the standard forms/tools are consistently used by the Service Delivery Point.	Guiding Question: Do all the community medicine distributors in this village / school use the standard data capture tools from the national level all the time? Do they use the standard reporting forms / tools from the national level all the time? Are there other data tools other than the standard tools that the CDDs in this village / school use?	Yes - completely	

10	Clear instructions have been provided by the M&E Unit on how to complete the data collection and reporting forms/tools.	Guiding Question: Has the unit (village or school) received instructions from the national level on how to fill the data collection and reporting forms / tools? In what form were the instructions provided (probe to find out if they were in form of written guidelines, job aides, verbal, etc)? How clear were the instructions? Comment: In case instructions were not clear probe to find out what was not clear.	Yes - completely	
11	All *source documents* and *reporting forms* relevant for measuring the indicator(s) are available for auditing purposes (including dated print-outs in case of computerized system).	Guiding Question: How many source documents (e.g. registers) were used by all the drug distributors within the site (village or school) during PC round under assessment? Did the unit prepare a report / summary data after the PC exercise? Can I have a look at all the source documents used and summary reports (tally sheets) prepared by this site? Comment: Ask to see all the source documents and compare numbers available with what is expected. If a report was prepared, ask to see the report for the unit (village / school). Should site be using a computerized system, ask for print-outs.	Yes - completely	
12	The data collected on the source document has sufficient precision to measure the indicator(s) (i.e., relevant data are collected by sex, age, etc. if the indicator specifies desegregation by these characteristics).	Comment: Check the source document whether it provides for collecting data with sufficient precision. The team should as well check the data recorded on the source document to assess its precision. Comments should be provided in case of insufficient precision, which could be a result of the tools not providing for enough information or poor documentation by the persons recording data.	Partly	Column for age and
IV- Data Management Processes				
13	There are quality controls in place for compiling data for the summary reports to ensure the accuracy (e.g. detection of transcription errors).	Guiding Question: Are there any steps you take while compiling data to make sure that the summary reports are of good quality? If yes, what are those measures? Comment: Some examples could include 2 different persons counting numbers served and comparing their results, comparing aggregated against disaggregated values.	No - not at all	They just use tallied
14	If applicable, there are quality controls in place for when data from paper-based forms are entered into a computer to ensure the accuracy of data entry (e.g. edit and/or logic checks, post-data entry verification, etc).	Guiding Question: What steps does the unit take to make sure that the data entered from paper-based forms / tools into a computer are of good quality? Comment: Question should only be asked where there is a computerized system.	No - not at all	They use tallied figu

15	If applicable, there is a written back-up procedure for when data entry or data processing is computerized.	Comment: Only applicable where the unit has a computerized system.	Partly	sometimes
16	….if yes, the latest date of back-up is appropriate given the frequency of update of the computerized system (e.g., back-ups are weekly or monthly).	Comment: Only applicable where the unit has a computerized system.	No - not at all	Please Provide a C
17	Relevant personal data are maintained according to national or international confidentiality guidelines.	Guiding Question: Are there any steps taken to restrict unauthorized access to source documents (e.g. registers) that contain personal data? If yes, what are the steps (steps may include locking up the documents)? How are the documents containing people's personal data kept while not in use? How do you guard against theft or loss of the documents?	Yes - completely	They lock up regist
18	The recording and reporting system avoids double counting people within and across Service Delivery Points (e.g., a person receiving the same service twice in a reporting period, a person registered as receiving the same service in two different locations, etc).	Guiding Question: Are there any measures taken to detect and avoid situations of recording and reporting cases where a person may receive the service more than once within this unit (village or school) or may receive the same service from this unit and some other unit? If yes, what are the measures?	Yes - completely	
V - Links with National Reporting System				
19	When available, the relevant national forms/tools are used for data-collection and reporting.	Comment: This is only applicable in countries that have national forms / tools. The national tools are normally issued by the Ministry of Health. One may need not ask any question but rather examine the available recording and reporting forms / tools (this should have already been done under "Data Collection and Reporting Tools and Forms" section above, to establish whether they are the national forms / tools.	Yes - completely	
20	When applicable, data are reported through a single channel of the national information systems.	Guiding Question: Where and how do you send your report? Comment: Should be asked only where a national information system for NTDs exists. May need to probe to establish if the national system is followed.	Yes - completely	

21	Reporting deadlines are harmonized with the relevant timelines of the National NTD Program (e.g., cut-off dates for reporting).	Guiding Question: Were you given by the national level, deadlines within which to prepare your reports and submit them after the most recent PC round? If yes, what are the deadlines? (NOTE: It is possible that this information could have already been obtained while discussing question 7 above. In this case you need not ask the question again). Comment: Should be asked only where a national information system for NTDs exists. The field team needs to be conversant with the national program's timelines. Compare deadlines with the national NTD program deadlines.	Yes - completely	
22	The service sites are identified using ID numbers that follow a national system.	Comment: This is relevant to countries whose national information system uses IDs for service delivery points (villages and schools).	No - not at all	Please Provide a C

Part 3: DASHBOARD: Service Delivery Point