PERCEPTIONS AND BARRIERS ON THE FEASIBILITY OF DECENTRALIZING THE COLLECTION OF BLOOD SAMPLES FOR TESTING IN THE COMMUNITY THROUGH THE COMMUNITY ART GROUP MODEL IN LUSAKA, ZAMBIA

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By

Mpanji Siwingwa

A dissertation Submitted to the University of Zambia in partial fulfilment of the requirements of the degree of Master of public health in Health Policy and Management.

THE UNIVERSITY OF ZAMBIA

LUSAKA

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DECLARATION

I, Mpanji Siwingwa declare that this dissertation submitted to the University of Zambia as partial fulfillment of the award of the Degree of Master of Public Health in Health Policy and Management is my own work and has not been submitted either wholly or in part for another degree to this University or any other or Institute for Higher Education.

Signed…… **Date……**

APPROVAL

This dissertation by Mpanji Siwingwa is approved as a partial fulfillment of the requirements for the award of the Degree of Masters in Public Health (MPH) - Health Policy and Management of the University of Zambia.

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Chairperson
Board of Examiners…….…….Signature……Date……

Supervisor……Signature…….Date…….

ABSTRACT

The focus of Community ART Group (CAG) model is on drug refill, adherence and support groups. The laboratory services are completely neglected in implementing this model in Zambia, and stable patients still have to go to the clinic for blood draws after collection of drugs from the community. In addition, phlebotomy delivery system is congested and has challenges with shortage of staff, insufficient funding, shortages of supplies and delivery services. The purpose of this study was to identify the perceptions, barriers and potential resources in decentralizing the collection of blood samples for routine testing into the CAG model.

A qualitative case study design was used. Data was collected through ten Focused group discussions among CAG members, community and health care workers at ART clinics and in-depth interviews with five key informants. Data was analyzed using thematic method and this was done with the help of Nvivo version 10.

Positive perceptions were identified as those which contributed to decongesting phlebotomy rooms, reduced missing appointments for blood draws, work Load, and lost results. Improved quality of phlebotomy service delivery and testing coverage, innovative way of bringing lab services closer to the people and inspire patients to monitor each other's blood draws. The negative perceptions were compromised sample integrity and less contact with clinicians. The study also identified barriers to decentralize phlebotomy services within CAG and these included: long distance and transportation costs, inadequate community sensitization, lack of skills from the community to draw quality samples for testing, lack of privacy and confidentiality, CHWs not recognized by regulatory bodies, low level of literacy, shortage of qualified health workers and lack of remunerations. In summing up, the clinical psychosocial counsellors, volunteers, CHWs and HCWs were identified by all stake holders as prospective community phlebotomist in the decentralization of phlebotomy services.

Decentralizing phlebotomy services into CAG model was perceived as decongesting and reducing work in the phlebotomy room, improved testing coverage and compromised sample integrity. This process incurred challenges due to lack of community sensitization and technical skills in phlebotomy, transportation cost and community health workers not recognition by regulatory bodies. The potential resources needed in community phlebotomy services were identifying prospective phlebotomist, materials for community sensitization, trainers and training materials, experts in quality assurance programs and financial support

Key words: Phlebotomy, CAG, blood collection, ART, Decentralization

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DEDICATION

This study is dedicated to my wife Mwamba Siwingwa for the love, support and understanding when I was away at school and would come home very late. To my dearest parents Mr. J. H Siwingwa and Mrs. M. Siwingwa thank you for encouraging me not to be complacent with my current status in life but to work hard to strive for excellence. And lastly but not the least, to my handsome boys Mayole and Malumbo Siwingwa, thank you for been an inspiration to me.

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ACRONYMYS

ACCA	Association of Chartered Certified Accountants
AED	Automated external Defibrillator
AIDS	Acquired Immune Deficiency Syndrome
ALT	Alanine Aminotransferase
ART	Anti-Retroviral Therapy
ARV	Antiretroviral
AST	Aspartate aminotransferase
CAG	Community Antiretroviral Therapy Group
cART	Combination Antiretroviral therapy
CBART	Community Based ART
GCLP	Good Clinical Laboratory Practice
CD4	T-lymphocyte bearing CD4 receptor
CDC	Centers for Disease Control and Prevention
CHAs	Community health Assistants
CHW	Community Health Workers
CREAT	Creatinine
CP	Community phlebotomy
DBS	Dried Blood Spot
DSD	Differentiated service delivery
EDTA	Ethylene Diamine Tetraacetic Acid
EID	Early Infant Diagnosis
FBC	Full blood count

GRZ	Government of the Republic of Zambia
GNCZ	General Nursing Council of Zambia
Hb	Haemoglobin
HBsAg	Hepatitis B virus surface antigen
HCW	Health Care Workers
HIV	Human Immunodeficiency Virus
HNP	HIV Nurse Practitioner
HPCZ	Health Professional Council of Zambia
HTC	HIV Testing and Counselling
MoH	Ministry of Health
MSF	Médecins Sans Frontières
NGO	Non-Governmental Organization
PLWHA	People Living with HIV and AIDS
PM	Policy Makers
POC	Point of care
POCT	Point of care testing
PSI	Population service international
QA/QC	Quality Assurance / Quality Control
SSA	sub-Saharan Africa
TAT	Turnaround Time
UAG	Urban Adherence Group
UNDP	United Nations Development Program
UNESCO	United Nations Education, Scientific and Cultural Organization

UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNZABREC	University of Zambia Biomedical Research Ethics Committee
HIVVL	HIV-1 Viral Load
WHO	World Health Organization

CHAPTER ONE

1.1. Background information

Services for antiretroviral therapy (ART) in Zambia have expanded rapidly in recent years such that at the end of 2018, it was estimated that more than 900,000 HIV-infected adults and children were currently receiving lifesaving Antiretroviral (ARVs) for HIV treatment (MoH, 2018). This progress has been made in spite of significant shortages of health care workers. This situation has triggered the renewed interest in community health workers and community health Assistants, as they may play an important role in scaling-up antiretroviral treatment for HIV/AIDS by taking over a number of tasks from the health care workers. Currently, a wide variety of community health workers are active in many antiretroviral treatment delivery sites. Community health workers as a community-based extension of health services are essential for antiretroviral treatment scale-up and comprehensive primary health care (Morris et al., 2009). Community ART models are being implemented in Zambia to allow patients to administer the ARV from the community with only one person going to collect the drugs for others (MoH, 2018).

The Community-based ART Model is a delivery model for antiretroviral therapy in which ART care is delivered at a community-based site. CAG model originally started in Mozambique in 2012 and this was so because of the high attrition figures, combined with increasing numbers of patients who were required to travel to a health facility every month to collect drugs and the limited number of clinics still providing ART. This prompted the government with support from Médecins Sans Frontières (MSF) to launch a pilot programme of community-based ART distribution and adherence monitoring in Tete Province (Decroo et al., 2011). It then spread to other countries such as Zambia, Zimbabwe, Malawi Uganda and South Africa and this model has since been piloted and it's been implanted in most countries within the sub-Saharan region. However, the model focus is on drug refill, support groups and at the time of the study there was no literature on studies conducted to include blood collection within the model (Billaud et al., 2013 and Koole et al., 2014).

CAG is an expansion of the home-based model. The Community ART Model has less human resource needs with use of lay persons, increased community participation and most importantly ownership of ART care (Rasschaert et al., 2014). On a monthly visit at a facility, on the day of ART refill, Community Antiretroviral Therapy Group (CAG) members meet in the community. During the meeting, they verify each other's adherence and choose a representative

to collect ART for all members. At the health facility, the group representative has a consultation, any important events that occur in the lives of the other members of the CAG. For each CAG, a group card, containing data about the members and the dates of refill, is updated, and with one copy held at community level and one copy held at clinic level. Then, the group representative goes to the community to distribute the ART to the fellow group members. One month later, another group member is chosen to represent the CAG at the health facility (Rasschaert et al., 2014, Differentiatedcare.org, 2017).

From a patient perspective, the main benefit of a community approach to ART delivery is to reduce the financial and time costs associated with frequent clinic visits, encourage community-based peer support, improved adherence to treatment (Rueda et al., 2006; Ware et al., 2009), and provide an additional accountability mechanism to ensure continuity and quality of care for people living with HIV in service delivery (Monitoring Essential Medicines Consortium, 2013).

Then from a health system perspective, reducing clinic contact required for clinically stable ART populations and refocusing resources towards managing sick patients with complex clinical problems is a key objective, with anticipated reduction of staff workload and improvements in quality of care and programme outcomes (Decroo et al., 2013).

However, in Zambia, studies have shown that CHW programs face additional challenges. These challenges included high turnover, low motivation, inadequate supervision, insufficient compensation or incentives, and low recognition (Furth et al., 2012, MoH, 2010). These challenges may impede the integration of the community phlebotomy into the models if they are not holistically addressed.

According to WHO phlebotomy is the drawing of blood for transfusion, apheresis, diagnostic testing, or experimental procedures (WHO, 2010). In addition, it is a bridge between the laboratory and patient and is becoming a fundamental diagnostic tool (Ialongo et al., 2016). By its nature, phlebotomy has the potential to expose health workers and patients to blood from other people, putting them at risk from bloodborne pathogens. These pathogens include human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and those causing viral haemorrhagic fevers (Crimean Congo haemorrhagic fever, Ebola, Lassa and Marburg) and dengue (Wagner et al., 2004). If a blood sample is poorly collected, the results may be inaccurate and misleading to the clinician, and the patient may have to undergo the

inconvenience of repeat testing. The three major issues resulting from errors in collection are hemolysis, contamination and inaccurate labelling (CDC, 2010, WHO, 2010).

Injuries from sharps (i.e. items such as needles that have corners, edges or projections capable of cutting or piercing the skin) commonly occur between the use and disposal of a needle or similar device (Moor et al., 2000, CDC, 1999). Home-based care is a growing component of health delivery, and current global trends suggest that home-based phlebotomy will become increasingly common. In this situation, stronger protection of community-based health workers and the community is needed. This can be achieved by improving sharps disposal, and by using safety needles with needle covers or retractable needles to minimize the risk of exposure to needles (NIHCE, 2003) and lancets.

Effective prevention of HIV/AIDS requires early diagnosis, initiation of therapy, and regular monitoring of the infected individual. Laboratory tests need to be conducted routinely and as needed. It includes CD4 count, viral load, and toxicity monitoring. The purpose of monitoring includes: evaluation of treatment response and diagnose treatment failure early, evaluation of adherence, screening for pulmonary tuberculosis and detection of toxicity to ARV drugs. In Zambia during cART initiation the following laboratory tests are performed: Creatinine, alanine aminotransferase (ALT), Hemoglobin (Hb) or Full Blood Count (FBC), CD4 count, Urinalysis, hepatitis B surface antigen (HBsAg) (if not vaccinated) and Syphilis test (adolescent or adult). However, according to the HIV consolidated guidelines, the routine laboratory tests include ALT/aspartate aminotransferase (AST), Creatinine, FBC and HIV viral load and these are done every year months if there are no complications and also if results are in the acceptable normal ranges (MoH, 2017).

Dried blood spot (DBS) specimens provide a way to improve the coverage and reach of early infant diagnosis (EID) in children, viral load and HIV genotyping testing, particularly in remote or resource limited and areas where preparation and transport of plasma specimens is limited by cold-chain requirements and lack of staff trained to perform venipuncture and plasma separation. The collection, storage, and transportation of DBS make them an ideal, non-invasive specimen for population screening and field studies in resource-poor settings. DBS have straightforward guidelines for collection, storage, and transportation. DBS may be collected directly from heel stick, finger stick, and other sources of whole uncoagulated blood. National and international transportation regulations consider DBS to be exempt, non-regulated materials that should be transported in a triple packaging system (Monleau et al., 2009, Lofgren et al., 2009).

To improve testing coverage in resource limited areas we planned to determine the perception barriers and resources required in integrating phlebotomy services in the CAG model in Lusaka. We proposed that the community health workers collect patients' blood samples from the community during a monthly meeting and after collecting sends samples for testing to the laboratory. Then only patients whose blood show virological failure, ARV drug toxicity, and intolerance or unresolved and prolonged side effects need to be referred to the facility (Rasschaert et al., 2014, Differentiatedcare.org, 2017).

1.2. Statement of the problem

The testing coverage for HIV-1 viral load in Zambia is very low and it currently stands at 37% and falls short of meeting the global UNAIDS and MoH 90-90-90 goals by deadline 2020. This is however, attributed due to the lack of proper laboratory infrastructure in rural settings (e.g., equipment, transportation, and laboratory human resources) capable of performing these diagnostics. The lack of laboratory capacity in many regions of Zambia, as well as stringent requirements for stabilization of blood plasma (the specimen required for these tests) make it difficult for patients to access laboratory services in rural settings lacking these facilities (Bertagnolio et al., 2010; MoH, 2018).

In addition, the implementation of differentiated service delivery models (DSD) in Zambia is decentralized half way, phlebotomy services are completely neglected in the model of delivery system. The focus of DSD model according to the current Zambia HIV consolidated guidelines is on pharmacy (drug refill, adherence and support groups) and the phlebotomy services are completely neglected, and patients still have to go to the clinic for blood draws after collection of drugs from the community This however, does not help in increasing testing coverage (currently at 37% for HIV-1 viral load) and meeting the 95-95-95 targets by 2020 (Decroo et al., 2011, MoH, 2018).

Opportunity costs for blood draws are too high. On average, patients must travel long distances to the clinic with high transport costs to have blood draws and may lose an entire day of work productivity (arising from long waiting hours at the clinic). In addition, burnt out health care workers, poor relationships with health workers and clinic congestion can make a clinic environment unpalatable for patients (Billaud et al., 2013, Rasschaert et al., 2014).

1.3. Justification

The successful inclusion of community phlebotomy into the CAG model, were stable patients can access laboratory services from the community would greatly improve access to laboratory services, HIV-1 viral load testing coverage and cART treatment monitoring, especially for resource limited places in Zambia.

The introduction of phlebotomy services to compliment the community ART model does not require laboratory infrastructure, intensive training, and cold chain storage units such as freezers. Blood collection once adopted as part of the model only CHWs will have to travel during monthly visits and collect the blood from the community and sends back samples back to the laboratory for testing (Rasschaert et al., 2014, MoH, 2018).

In addition, community phlebotomy would markedly reduce patient transportation burden, and simultaneously reduces phlebotomy volume and congestion, thus allowing providers to focus on the unstable patients who remain in the facility-based model of care. This will decongest the phlebotomy rooms, as only unstable patients with detected viral loads will have to go to the clinic. This study will establish data that the Government of the Republic of Zambia (GRZ) will need to scale up laboratory testing in the community models nationally (Billaud et al., 2013).

Continued scale up of ART using traditional facility-based ART delivery methods is likely to compound human resource and laboratory infrastructure deficiencies. In 2016, the number of patients on ART was about 600,000 and we now have over 900,000 patients on treatment, and it's with such information that MoH feels that there is a high demand for laboratory testing and projects a continued increase in the next five years. Hence innovative strategies are needed in order to improve the current low testing coverage (37%) and build a stronger laboratory capacity in both urban and rural settings. In addition, appropriate strategies and actions are needed urgently to address the huge testing demands for such increase in ART patients (MoH, 2018, UNAIDS, 2012).

1.4. Research question

I. What are the perceptions and barriers that may affect the feasibility of incorporating the collection of blood samples for routine testing into the CAG model in Lusaka, Zambia?

1.5. General objectives

I. To determine the perceptions and barriers that may affect the feasibility of incorporating the collection of blood samples for routine testing into the CAG model in Lusaka, Zambia.

1.6. Specific objectives

1. To determine stakeholder's perceptions to rolling out the collection of blood samples for routine testing to the community through the CAG model. The stake holders included patients, policy-makers, CHW and HCW (nurses, clinicians and laboratory staff).
2. To determine probable barriers to the feasibility of rolling out the collection of blood samples for routine testing to the community through CAG model.
3. To identify potential community resources to support phlebotomy services in rolling out the collection of blood samples for routine testing within a CAG model for quality assurance.

1.7. Work flow of community art group model

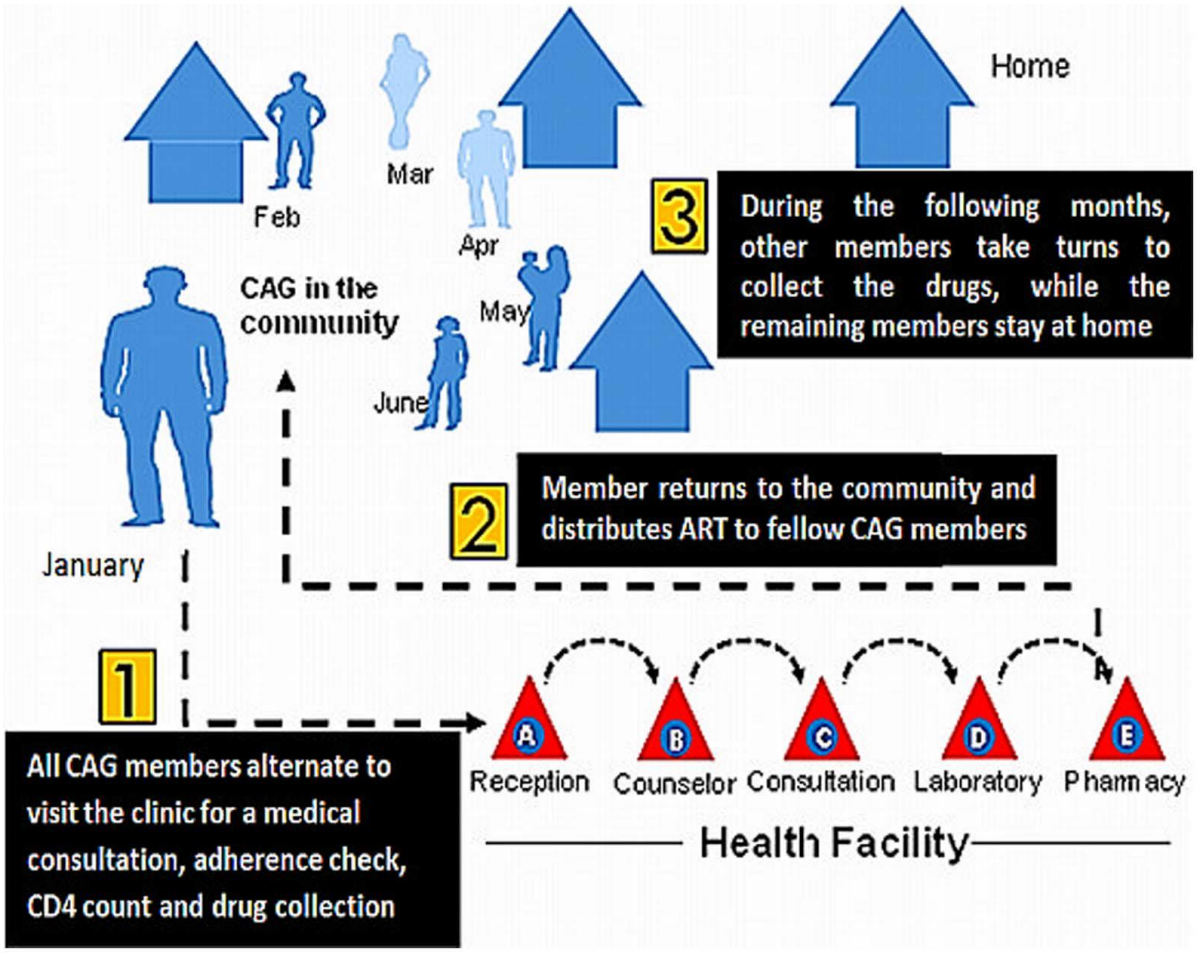

Figure 1. 1 The community ART Group Model

Description of the Model

The CAG model is a community-based ART delivery model. Groups comprise up to six patients on ART. To join a group, patients have to be stable on ART (being at least six months on a first line regimen with a CD4 above 200/mm3 and no current opportunistic infections), and live in the same geographical area. Each group elects a group leader among its members, who coordinates the group activities and functions as a spokesperson of the group. Monthly, a group member is appointed to collect the drugs on behalf of the group.

In the health facility, he/she receives a medical consultation, reports on the health and the adherence status of his/her fellow group members and collects the drugs for the entire group. On return in the community, (s)/he distribute the drugs to the other group members. This team monitors and evaluates the quality of care and coordinate the implementation and roll-out of the CAG model.

1.8. Conceptual framework

This study adopted the health belief model (HBM) stipulated by Rosenstock, (1990) to understand the perception and barriers of decentralizing phlebotomy services within the CAG model in Lusaka. The health belief model was formulated by social Psychologists, Hochbaum, Rosenstock and Kegels in the 1950s. The HBM was developed based on the understanding that a person will take a health-related action if the person feels that a negative health condition can be avoided, has a positive expectation that by taking that action he or she will avoid a negative health condition and believes that he or she can successfully take a recommended health action. According to the HBM, any human behavior or action is guided by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to the action and self –efficacy. As a general rule, the strength of a person's intention to perform a particular behavior is based on the level of key concepts mentioned above, therefore the intent to decentralize blood collection into CAG model will depend on the person's knowledge, attitude and other factors. The conceptual framework assumes that behavior towards blood collection in any population depends on how their demographic factors such as age, knowledge, ethnicity, religion and employment status, influence how susceptible they are from blood draws, the perceived severity of not receiving blood draws, their perceived threat and benefits of blood draws and the factors or cues to action that will influence them to engage in blood collection.

Conceptual Framework

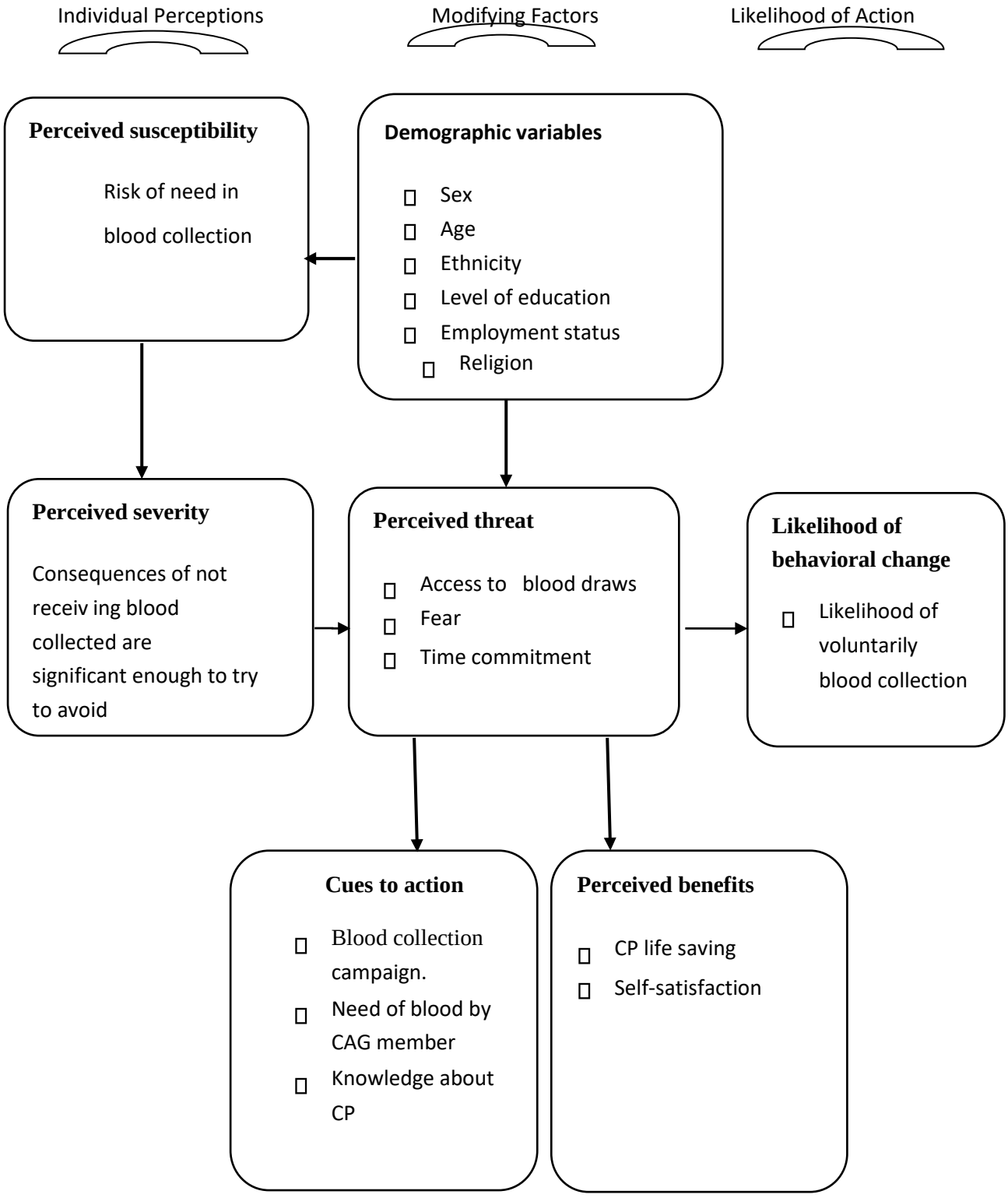

Figure 1. 2 Conceptual framework on perception and barriers of decentralizing phlebotomy services within the CAG model in Lusaka

1.9. Organization of Dissertation

This dissertation is divided into 6 chapters. Chapter one is an introduction of the research topic and discusses the statement of the problem and justification of the study while also outlining the research aim, objectives and questions as well as the organization of the dissertation. Chapter two reviews the literature related to CAG and phlebotomy services and what strategies have been used in the implementation of this model in Africa.

Chapter three is a reflection on the research design and methodology used in the study. It discusses the research strategy and approach to the methods used. The chapter then outlines the actual research methods, sampling methods and data collection tools used as well as the methods of data analysis. Chapter three further discusses ethical concerns and limitations of the study. Chapter four presents the empirical findings of the study using the theoretical framework and discusses implications for policy and practice.

Chapter five discusses the study findings in relation to literature and the conceptual framework. Lastly, but not the least chapter six presents conclusion and recommendations of the study.

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1. Overview

This chapter presents a review of literature related to CAG and phlebotomy services and what strategies have been used in the implementation of this model in Africa. The dearth of information on phlebotomy practice in the CAG model has led to consider exploring the perception and barriers on the decentralization of blood collection within the community models. There was little to no information on perceptions and barriers on decentralizing phlebotomy services into the CAG or DSD models during the study. But in this section opted to highlight the general perspectives on phlebotomy, then perceptions and barriers in donating blood in the community, point of care testing (POC) and HIV testing and counselling (HTC). This is so because the aforementioned subjects were very similar to what is been studied

2.2 General perspectives on phlebotomy

Phlebotomy, the act of drawing blood through venipuncture, is one of the most common medical procedures in healthcare, as well as being a basis for diagnosis and treatment. A review of the available research has highlighted the dearth of information on the phlebotomy practice in Africa. Several studies elsewhere have shown that the pre-analytical phase (patient preparation, specimen collection and identification, transportation, preparation for analysis and storage) is the most error-prone process in laboratory medicine. The validity of any laboratory test result hinges on specimen quality; thus, as the push for laboratory quality improvement in Africa gathers momentum, the practice of phlebotomy should be subjected to critical appraisal. (Mbah et al., 2014).

Historically, the critical role of phlebotomy has been overlooked, having been suggested as the most underestimated procedure in healthcare. For example, although most employers in the United States (US) require valid certification or a license issued by an accredited phlebotomy training programme or a professional body such as the American Society of Phlebotomy Technicians (ASPT), only five US states mandate phlebotomy certification for practice. According to a recent survey on phlebotomy practice in 28 European countries, 21% of the countries do not require specific training for phlebotomy; national phlebotomy guidelines are available in only 25% of the countries; and only 36% have specific training available as a continuous educational resource. In many countries (and most countries in Europe), there are no

professional phlebotomists. Phlebotomy is performed by doctors, nurses, laboratory staff and other healthcare professionals (Southwick et al., 2001, Edwards et al., 2005 and Phlebotek et al., 2014).

The person who performs phlebotomy is called a phlebotomist. Phlebotomists in Africa are also commonly responsible for collecting and properly packaging specimens (blood, sputum, urine, other body fluids, tissues, etc.), accepting incoming specimens and routing specimens to the proper section for analysis. The significant role phlebotomists play in the delivery of essential healthcare services has been described numerous times in existing literature. Phlebotomists are often the only laboratory professional a patient will meet during a hospital stay (Waheed et al., 2013, Plebani et al., 2012 and Balance et al., 2014).

2.3. Perceptions and barriers on blood donation

An area which is very similar and related to what is been studied is on the perceptions and barriers on the collection of blood from the community for the purpose of donating it to those who really need blood. So, in this section we reviewed some publications and studies related to blood donation and below are some of the perceptions and barriers:

A study was conducted in Malaysia on knowledge, perceptions and barriers of blood donation among adults. The reported perceptions on donation of blood from the community were that donation lead to permanent anemia, infertility, death, affected physical strength, risked contracting infection (HIV or Hepatitis B & C) and that it was a painful procedure. Barriers for donating blood from the community were unknown fear, long distances, lack of time to donate blood, patient safety (concerned on sterilization of equipment) and not sure of location for bleeding. The respondents were able to identify the domains with their thought process. Majority of the respondents believed that blood donation was mostly considered as a noble and lifesaving act. It was observed that there were several misconceptions regarding blood donation (Chin, et al., 2018).

In general, in an African context the perceived barriers to community phlebotomy include lack of work space, quality samples, supplies, poor labelling, lack of standard operating procedures, training and complexity in set up (Myhre, 2000, Wondimu, 2013 and Datema, 2011)**.** In addition, a study conducted in Ghana on Community perception and beliefs about blood draw for clinical research among community members. The community perceived blood collected from the

community for research was to diagnose illnesses, determine the HIV status, and prescribe the necessary drugs (Boahen et al., 2013).

A systematically review by Klinkenberg, et al., explored to gain more insight into, and summarize, blood donation determinants among migrants or minorities of Sub-Saharan heritage. Target cohorts varied from Black African Americans and refugees from Sub-Sahara Africa to specific Sub-Saharan migrant groups such as Comorians or Ethiopians. The main recurring barriers for Sub-Saharan Africans were Haemoglobin deferral, fear of needles and pain, social exclusion, lack of awareness, negative attitudes and accessibility problems (Klinkenberg, et al., 2018).

Another study was conducted to determine perceptions and views on supportive service of hospital staff about blood donation. A volunteer group of 23 non-medical hospital staff were studied using the 'Free listing' technique. Of these 7 most expressive participants were selected for 'Pile Sorting' exercise. The perception in this study for donation blood in the community were that it saved lives, noble work, lacked awareness, must be encouraged, had a lot of misconceptions, blood was donated every 3 or 4 months, should accompany a nominal amount, donors must get rewarded, and available for free (Dhara, et al., 2012).

2.4. Perceptions and barriers on point of care testing (POC)

Another similar subject related to what is been studied is the collection of blood from either the community or near the site of patient care or at the bedside and use that blood for POC testing. In addition, it also reviews the different cadres that they used from different countries to collect blood and what are the perception and barriers surrounding the collection and POC testing.

Point-of-care testing (POCT) is defined as medical testing at or near the site of patient care by specially trained healthcare providers. These are tests which can be performed at the bedside and typically involve blood and urine testing. The goal of POCT is to collect the specimen and obtain accurate results in a very short period of time at or near the location of the patient. POCT is often accomplished through the use of transportable, portable, and handheld instruments (e.g., blood glucose meter, INR meter). POCT is carried out in a wide range of settings, in primary care, the community and secondary care, supporting the delivery of the right care in the right place at the right time testing in communities, home settings, and primary healthcare centers is believed to have tremendous potential in reducing delays in diagnosing and initiating treatment for diseases such as HIV, tuberculosis, syphilis, and malaria (Price et al., 2001; Pathology POC, 2018).

A qualitative research project on barriers to POC testing in India and South Africa was conducted between 2012 and 2013. The project used semi-structured interviews and focus group discussions to examine diagnostic practices across major diseases and actors in homes, clinics, communities, hospitals, and laboratories in South Africa and India. The barriers to POC testing in South Africa and India were transport challenges, lost results, delayed results, high work load, poor sample quality, clerical errors, and stock outs and frequent change in testing kits (Yellappa, et al., 2016).

A systematic review was also conducted in the United States of America on barriers to Implementation of Rapid and Point-of-Care Tests for Human Immunodeficiency Virus Infection. Five databases were searched, 16,672 citations were retrieved, and data were abstracted on 132 studies by 2 reviewers. The barriers were categorized into test devices, patient level, provider level and health stem. At the patient levels, main barriers were identified as lack of awareness and misconceptions, patient time constraints, counsel, and receive results and linkages; privacy and fear associated with receiving results. At the provider level, barriers were predominantly related to challenges in integrating them in their clinical workflow, costs, and attitudes and reluctance of staff to conduct POCTs. The main levels of the health care system, implementation barriers were in integrating tests within clinical workflows, health systems, lack of quality in implementation, turnaround time taken to offer rapid tests, difficult protocols, and complications in execution impeded delivery and staff reluctance in offering rapid testing. At the device level, reported barriers were primarily related to diagnostic accuracy, difficulties in test conduct, and complicated testing (Nitika, et al., 2015).

In 2014, a qualitative study was conducted in Mbarara district, southwestern Uganda on health care workers' perceptions of point-of-care testing in a low-income country. They wanted to explore perceptions of POC test end-users in a low-income setting, aiming to support the development of novel POC tests for low-income countries. So, fifty health care workers were included in seven focus groups, comprising midwives, laboratory technicians, clinical and medical officers, junior and senior nurses, and medical doctors. The perception on utilization of POC tests were that POCTs were practical in the local context, improved patient management, distrust in results, improper use of test, and imperfection of POC tests in the local context (Rasti, et al., 2017).

Other studies explored cadres who were involved in collection and testing of the samples collected. One of these studies from Dar es Salaam in Tanzania, were three different specimen

collection methods evaluated compatibility using the Alere Pima CD4 assay at five HIV/AIDS healthcare sites. At each site, whole blood specimens were collected from enrolled patients by venipuncture and fingerstick. In this study specimen collection was done by HCW (after demonstrating competency in specimen collection they later conducted the actual testing. Then Pima CD4 testing was performed at site of collection on venipuncture specimens (Venous) and fingerstick blood directly applied to a Pima CD4 cartridge (Capillary-Direct) and collected into an EDTA microtube (Capillary-Microtube). Venous blood was also tested at the laboratory by the reference CD4 method and Pima for comparison analysis. The samples collected by either venipuncture and fingerstick were concordance with the one freshly collected from the health facility and it also showed that the collection of blood by the HCW was of good quality (Kohatsu, et al., 2018).

Studies have been conducted in southern Africa using the POC platform to improve access to testing and especially in CD4 testing using different testing Platforms. Countries where such studies have been conducted include South Africa, Malawi, Zambia, Zimbabwe, Botswana and Uganda with the hope of decentralizing HIV testing services with limited resource settings. In Zambia collection of blood for POC testing is done by the Medical Officers, Lay Counsellors, Nurses, Clinicians and Laboratory staffs and they use the blood collected to test. The POC test in Zambia include GeneXpert for TB, CD4 count, EID, and HIV-1 viral load. This also shows that different cadres are capable of collecting bloods from either the community or bedside and guarantee a quality sample provided the cadre of interest is properly trained and certified. For instance, MoH Zambia has mandated the community health workers to collection specimens for EID tests and prepare the samples and store it for collection. In other rural setting CHW prepare malaria slides for analysis and perform RDT tests (MoH, 2018, Chilikwazi et al., 2018 CIDRZ, 2015).

2.5 Perceptions and barriers on HIV testing and counselling

Lastly but not the least, another very important subject that was very closely related to what is been studied is in the decentralization of HIV testing and counselling using the lay health workers in resource limited places. In this section we have used studies and publications that have explored the perception and barriers related to collection of blood through finger print and what cadres were recommended to perform these tasks. Below are some of the findings from the studies around the globe.

In May 2007, WHO and UNAIDS released Guidance on Provider-Initiated HIV Testing and Counselling in Health Facilities. The Guidance provided a useful framework and contained important principle and recommendations that guided the approach to expand access to HIV testing and counseling. In particular, the Guidance: *(a)* strongly support efforts to scale up testing and counselling services through diverse methods, including client-initiated and provider-initiated testing and counselling; *(b)* unequivocally opposed mandatory testing and counselling; *(c)* emphasizes voluntary testing *(e)* acknowledged the scaling up of testing and counselling accompanied by (i) access to HIV prevention, treatment and care services; and (ii) a supportive environment for people living with HIV and those most at risk for acquiring HIV infection (WHO/UNAIDS, 2007).

The South African Department of Health launched an HCT campaign in April 2010, in line with WHO and had reached 13,269,746 people by June 2011, of which 16% tested HIV positive and 400,000 of those were initiated into antiretroviral treatment. The overall objective of this project was to gain insight into the general perceptions about HIV testing in the different South African communities. The general perceptions about HIV testing from the communities were the inaccurate perception of low risk to HIV infection, fear of testing HIV positive, stigma, common practice in the community (because people donate blood), skepticism and discrimination (Ntsepe et al., 2014).

Another study conducted in South Africa on clients' perceptions and satisfaction with HIV counselling and testing. The aim of this study was to assess clients' satisfaction with HCT as well as describe perceived barriers to and facilitators of HIV testing by HCT clients in South Africa. The most cited perceived barrier to HIV testing from within the community was lack of awareness about the HCT service (98%), while staff attitudes (37%), confidentiality (29.6%) and privacy (23.6%) were perceived facilitators (Matseke et al., 2016).

Various studies advocate greater use of lay health care workers in response to the human resource demands of HIV care and treatment (Philips et al., 2008). In Uganda, lay health workers have been trained to perform simple patient assessment and deliver antiretroviral medications to patients in their homes (Weidle et al., 2006). And in addition, finger prick is now the common practice among health care giver in south African region and it includes lay counselors, community health workers as cadres who can perform the rapid tests and prepare samples such as microscopic slides (ready to be sent to the laboratory for testing). The decentralization of rapid testing from the traditional way of testing to other well designated places and use of lay person to

conduct such test is mean to improve access to laboratory diagnostics and improve the attrition rates for HIV (Waheed et al., 2013, Plebani et al., 2012 and Balance et al., 2014).

In 2008, Eswatini in collaboration with the MOH and PSI helped establish mini-laboratories to equip 12 health facilities that served more than 100 clients/day and that offered pre-antiretroviral therapy (ART) and ART services. Phlebotomists were attached at the mini-laboratories provide simple hematology tests including RPR, Hb, HIV test, Urinalysis, pregnancy test, glucose and malaria test. The phlebotomists were high school graduates with a science and math's subject credit in their certification. They were recruited and trained for five days in phlebotomy and CT by American Society for Clinical Pathology (ASCP) and the National Reference Laboratory (NRL). A four-week practical attachment to the laboratories was part of post-training mentoring, and one phlebotomist was placed in each facility. The results showed an increased uptake of HIV testing and counselling (HTC) by clients in rural health facilities by 75% (from 300 to 1200 on average a month). The MoH from that country has since adopted the rapid HIV testing curriculum for the training of phlebotomists and are using finger prick for blood collection. In addition, the phlebotomist who were used in this study were not allowed to perform venipuncture phlebotomy because of the level of education and in the process the routine testing such as ALT, AST, CD4 count and HIV-1 viral load was not accessed in this study. But the phlebotomists used in this study were adopted by MoH of Eswatini (PSI, 2010).

CHAPTER THREE: METHODOLOGY

3.1. Study site

The study was conducted in Lusaka province at both rural and urban ART clinics and these provided an ideal and conducive environment for assessing the perceptions, barriers and health system support and requirements to decentralizing specimen blood collection from the community in the CAG model.

3.2. Study design

A qualitative methodological case study approach was used to identify perceptions, barriers and community resources to decentralizing the blood sample collection in the CAG model and this qualitative study used FGDs and IDIs. This method allowed the respondents to express themselves and used any language they were comfortable with without any restriction.

3.3. Study population

The study recruited adults aged 18 years and above accessing ARVs from both rural and urban ART facilities in Lusaka province. In addition, the study population was adult patients who were already utilizing the CAG model in rural and urban ART facilities in Lusaka.

Patient inclusion criteria:

- Those who were 18 years of age and above
- Those who were not acutely ill
- Those who were already utilizing CAGs models and were on ART for at least three months.

Health Worker eligibility criteria:

- Those who had worked in the rolling out of CAG model in the ART facilities
- Those who had worked in the phlebotomy department before

Patient exclusion criteria:

- Those who had inability to participate in the group activities due to cognition deficits or mental illness.
- Those who had inability to provide consent or unwilling to participate in study

3.4. Participants sampling procedures

This study used purposive sampling to determine the number of participants. Interviews and focus groups were conducted and below is how the study was conducted;

1. Policy-makers: IDIs were conducted until thematic saturation was attained.

2. Professional HCW: two FGDs were conducted (one in an urban clinic and another in a rural clinic) in Lusaka province.

3. Community Health Workers: four FGDs were conducted (two in an urban clinic and two in a rural clinic) in Lusaka Province.

5. ART patients: four FGDs were conducted (two in urban clinic and two in a rural clinic) in Lusaka province.

Hence a total 10 FGDs for CAG members, CHWs, and HCWs were conducted and five IDIs for policy-makers.

3.5. Data collection

We assessed perspectives from three key groups: (1) individual patients, (2) health facilities professional and community health workers, (3) government and local leaders. Two types of data collection methods were utilized: IDIs and FGDs.

IDIs: IDIs utilized semi-structured question guides. On average participants were interviewed for approximately 45 minutes and the interviews were conducted in English. Where permission was granted, interviews were audio-recorded for later transcription and analysis. All IDIs were done for policy-makers at Ministry of Health.

FGDs: FGDs utilized semi-structured question guides and on average FGDs lasted for about 1 hour and were conducted in English for HCW and local language (Nyanja or Bemba) for CHWs based on participant preference. All discussions were facilitated by a Research Assistant fluent in the local language and in English and, after permission was granted, discussions were audio-recorded for later translation, transcription, and analysis. The discussants were provided with the ground rules for the discussion before beginning and Research Assistant/Investigator was responsible for re-directing the conversation if it went off topic.

All FGDs and IDIs were conducted in a quiet and isolated space for an average duration of 45 minutes and when permitted were digitally audio-recorded. In addition, notes were taken hand-written and reported relevant observations.

3.6. Data management and storage

The Government of the Republic of Zambia owns the data from this study. All data collected was used for stated objectives in the protocol. This data will be shared, using secure transfer methods with all co-investigators and data-related study staff members based in Zambia. In cases where export will be needed, databases will be de-identified and will include only those necessary fields for quality assurance (QA), data management, and analysis. These procedures were facilitated by the monitoring of data quality and provide opportunities for local capacity building. For the future, we will seek additional, and separate ethical review for any analyses falling outside the objectives of our current protocol.

3.7. Data analysis

A digital audio-recorder was used to record the interviews and handwritten notes for those who did not consent to be recorded. Recorded files and hand-written notes were downloaded on the computer to prepare for transcribing. All transcripts were imported into Nvivo 10 for data organization and transcribed the information verbatim and later reviewed. As data was being coded the themes, memos were continually being written. Memos of key statements, ideas and attitudes were noted down using as much as possible from the words in the text. Quotes of participants' actual words on each theme were linked to appropriate memos. Similar codes were grouped together to create nodes.

Thematic analysis was performed through the process of coding in six phases in order to create recognized, meaningful patterns. These phases are: familiarization with data, generating initial codes, searching for themes among codes, reviewing themes, defining and naming themes, and finally producing the final report.

Data was familiarized by reading and re-reading the same data while paying attention to emerging patterns and frequency at this point, the Researcher focused on data that addressed the research question. This marked coding processes. Generation of initial codes was done by documenting information on perceptions, barriers and health system requirements included patterns occurred in the various categories. This involved listing of items from the data set that had reoccurring pattern. Meaningful parts of data related to the research question were organized and examined. The lists of themes were combined to the coded data with proposed themes. Some themes emerged from the data in cases where the identified issues occurred; repeated ideas, indigenous terms, metaphors, analogies as well as similarities of the participants' linguistic

expression. The missing information from the data was addressed at this point. If the analysis seemed incomplete, the previous phase was reviewed to identify the gap. The major themes and sub-themes which were considered within the data were identified. The Researcher wrote the whole analysis process to identify the story of each theme and its significance. It is at this stage that the Researcher came up with the names of the themes.

Finally, the revealed final themes and the report was written according to the themes that made meaningful contributions to answering research objectives. The Researcher presented the dialogue connection with each theme in support of increasing constancy of the results.

3.8. Data validity and reliability

Validity was attained by member checking, where the interviewees were given the interpretation and drafted report in order to check the authenticity, accuracy, credibility, and validity of the study. In addition, the Researcher also allowed the Research Assistants to read the transcript for participants to consent whether what had been written reflected what they had said, commented and gave some clarifications. The Researcher also ensured validity by not fabricating responses. Concerning reliability, the Researcher compared the findings with those of other Researchers (Decroo et al., 2014; Rasschaert et al., 2014; Billaud et al., 2013). This study was reliable because the factors taken into consideration where the confidence of the researcher regarding the truth of the findings based on the research design informants and context.

3.9. Ethical issues

There were no anticipated physical risks. But there were possible risks of involuntary disclosure of opinions or statements. Some participants were embarrassed, worried, anxious, or uncomfortable when discussing sensitive topics. These risks were minimized by maintaining confidentiality and being sensitive to these areas.

3.10. Ethical approval

The needs of the participants were the priority of this study. In order to ensure the safety and rights of the participants, approval and clearance was sought from the University of Zambia Biomedical Research Ethics Committee (UNZABREC) reference number 016-06-17. Written permission was sought from MoH, at both Provincial and District Medical Officer to carry out the study in the ART clinics. Verbal permission was also obtained from the Heads of the ART clinics where data was collected. Informed consent was obtained from each participant after explaining the purpose, benefits and risks, and how the information would be used while

assuring them that the information would be held in confidence. The signing of consent forms was only done after all questions and possible doubts from participants had been cleared. In addition, those that had agreed to participate signed the forms were still free to withdraw from the study without any penalties.

Respect for participants' autonomy and confidentiality

Anonymity of participants was assured since the participants' names were not to be written or mentioned in the study. Participants had privacy during the interviews. Data was not availed to any unauthorized persons. No name was used and the participants were assured that information would be used only for the improvement of CAG models at facilities. The benefits and likely risks were communicated being that the research findings though may not have benefited the participants immediately but was to be used to inform policy-makers in order to improve the well-being of patients and health workers. The participants were also assured that no physical harm was anticipated in the course of the study.

Autonomy

Participants were informed that they had a right to decline participation in the study from the onset or to withdraw from participation at any time during the study without giving a reason. All research materials that contained participants' responses would be destroyed after seven years in line with ethical approval standards. All voice recordings were deleted immediately after completion of the transcription.

3.11. Limitations

Some of the limitations of this study were that it focused on only the CAG model. But the current HIV guideline (MoH, 2017) prescribes the usage of four community models to improve service delivery. The prescribed models include urban adherence group (UAG), out of facility managed individual, and in facility managed models and CAG. However, this study only focused on CAG and this was a weakness for this study. We hope future studies would look at all the four community models and provide further information to inform policy and add to the body of knowledge. In addition, all the four-model including CAG, only focus on the stable patients and neglect unstable patients and would like to see other studies explore the use of unstable patients in the community models.

The study only interviewed the community health worker/volunteers because they were the only ones used when piloting the CAG model in Zambia and at the time of the study we did not find any of CHAs working or deployed at all the facilities visited.

CHAPTER FOUR: PRESENTATION OF RESULTS

4.1. Overview

This chapter presents a qualitative perspective of the study and it explores the perceptions, barriers and feasibility of decentralizing the collection of blood samples for testing to the community through the community ART group model in Lusaka. A brief description of the participants is shown below and is followed by the presentation of major themes which included: perceptions, barriers, eligibility of community phlebotomy, and health system support and requirements for community phlebotomy. Verbatim quotations have been used to illustrate sub-themes which stood out. To ensure anonymity and confidentiality of the participants, relevant locations, and facilities characteristics were de-identified.

Characteristics of participants for focused group discussions and in-depth interviews

Table 4.1 below shows the participants characteristics for FGDs and IDIs and summary numbers of participants. The study was conducted in Lusaka province at both rural and urban ART clinics

Table 4. 1 Participants of the focus group discussions and in-depth interviews

Stakeholder groups	**Number of FGDs**	**Number of IDIs**
	Province	
CAG members/patients	4	0
Community Health workers	4	0
Professional Health workers	2	0
Policy makers	0	5
TOTAL	**10**	**5**

Table 4.2 below shows the major themes and sub-themes that emerged from the data. These themes were the basis for the presentation of the data.

Table 4. 2 Major and sub-themes identified based on the content of the interviews and FGDs

Major themes	Sub- themes/categories
Perceptions to decentralize phlebotomy	**Positive perceptions to decentralize phlebotomy** • Decongested phlebotomy rooms • Reduced missing appointments for blood draws • Reduced work load • Reduced lost results • Improved quality of phlebotomy service delivery • Improved testing coverage and TAT • Innovative way of bringing lab services closer to the people • Improve current model and patient life • Reduced waiting time and frequency of visits • Inspired patients to monitor each other's blood draws • Increased productivity in the community **Negative perceptions decentralize phlebotomy** • Compromise sample integrity • Limited contact with Clinicians
Barriers for decentralizing community phlebotomy	• Distance and transportation cost (s) • Inadequate community sensitization • Lack of skills to draw quality samples for testing

	• Lack of privacy and confidentiality • Volunteers not recognized by regulatory bodies • Low levels of literacy • Lack of remunerations
Potential resources to support phlebotomy services	• Community phlebotomist • Financing • Technical and supervisory visits • Incentivized phlebotomy work force • Adequate training • Community sensitization •

4.2. Perceptions to decentralizing phlebotomy into cag model

Perceptions of decentralizing phlebotomy services into the community through CAG model, was identified by collecting views from the patients, (CHW), (HCW) and (PM). The perceptions were identified from interviews and were categorized as being either positive or negative perceptions. Positive perceptions were identified as those which contributed to decongesting bleeding room, reduction in missing appointments for blood draws, work load, and lost results improving testing coverage, quality of service delivery, reduction of waiting time and blood draw visits, increased productivity within the community and innovative way of bringing laboratory services to the people. Lastly but not the least the negative perceptions were identified as those compromising sample integrity and limited contact with patients

Decongesting phlebotomy rooms

Despite patients using the current CAG model, most of the participants felt that it took a long period of time to have blood drawn from the patients. Patients still had to stand in long queues and wait for blood to be drawn. Most patients came as early at 05.00 hours in the morning and had bloods drawn after and finished after 13.00 hours, and they wasted the whole day waiting for blood to be drawn. Most of the time the phlebotomy room became so congested with patients waiting for blood draws and this made the work environment unpalatable for both patients and

health workers. Most participants said that including phlebotomy into the CAG model would greatly improve in decongesting the phlebotomy room and reduce the traffic of patients at the clinic. Ultimately, both the health workers and patients would be accorded ample time to focus on the other most important activities. This however they said would work well if blood is collected from the community and then referred to the laboratory for testing.

"I think with the inclusion of lab services in CAG model it will definitely go a long way to reduce congestion at the health facility …" **(CHW, FGD, Hospital, 24/01/2018).**

*"……is a good ideal, community phlebotomy will help to reduced congestion and work load at the clinic……" (***CAG members, FGD, Clinic, 01/02/2018).**

*"It's a great model and it will greatly decongest the bleeding area and room and patients will spend less time at the clinic" (***HCW, FGD, Clinic, 01/02/2018).**

Reduce work Load in the Phlebotomy room

Inclusion of community phlebotomy into the community model was perceived as a good thing because it would help in reducing work load in the phlebotomy room. Since bloods would be collected from the community, most CAG member felt that the traffic of patients at the facility would reduce, then health workers would then have less work and stress and would focus more on patients who really needed their services. Here is what the CAG members had to say;

*"Yes of course if the labs would be included in the model, they will make a big difference because work load will reduce for health personnel..…" (***CAG members, FGD, Clinic, 23/01/2018).**

*"Yes, if lab services are included in CAG, will make a huge difference, because it will mean less people to be attended at the facility, less work load for the profession health workers……" (***CAG members, FGD, Clinic, 31/01/2018).**

Innovative way of bringing lab services to the people

Decentralizing Community phlebotomy into the current model was perceived as a brilliant ideal.

This was so because it brings laboratory services closer to the people and it was in line with the current ART policies in Zambia. In addition, they said that the current HIV guidelines promoted and encouraged the decentralization of health services and bringing the services as close as possible to the people. Some of the participants especially the policy makers, perceived this as a creative way of bringing laboratory services as close to people as possible so long as all the bottles necks that came with it were addressed in the implementation process. Here is what they had to say;

*"Integrating community phlebotomy into the CAG model is an innovative way of bringing laboratory services closer to the people" (***Policy-maker, IDI, MoH, 14/03/2018).**

*"Once in a while a health profession can come to draw blood for tests at a centrally located place within the community hence bringing health services closer to people……" (***CAG members, FGD, Clinic, 01/02/2018).**

Improve the quality of phlebotomy service delivery

Majority of CAG members said including community phlebotomy into the CAG would improve the quality of service delivery for phlebotomy services. Usually at the time the bloods are collected from the patients, the phlebotomy room is congested and health workers are stressed and overloaded with work and the quality of service they got was unpalatable. So, they said including phlebotomy into the CAG model, would be a great thing, because they expected better and quality phlebotomy services rendered (such as attendance and quality of services) to them by health workers. Below was what the CAG members had to say;

*"Yes, the inclusion of lab tests in the CAG model will improve the quality of service delivery in the community or the way health personnel attend to us" (***CAG members, FGD, Clinic, 23/01/2018).**

*"If labs are included in the CAG model it will improve the quality of health service in the community. In fact, no one will be missing labs and everything will be available as it will be done in the community closer to people so you should quicken the commissioning, the sooner it is rolled out the better" (***CAG members, FGD, Clinic, 31/01/2018).**

*"The inclusion of laboratory tests in this model will greatly improve the quality of service delivery in the community or the way health personnel attend to us in that this service will be happening once every six months for each group and the patient will have no excuse but to do the labs since they will be brought on their door step" (***CAG member, FGD, Clinic, 01/02/2018).**

Improvement of the current model

Majority of the policy makers felt that inclusion of the phlebotomy into the CAG model would greatly improve the current model and the life of the patient. The standard of care demanded that each patient had the viral load test done by six months and used it to determine whether a patient was stable or unstable. However, most of the patients did not have this test done and it was difficult for Clinicians to ascertain whether a patient was doing well or not without the viral load being done. The participants felt that this would ensure that viral loads were done and doctors/clinician used that to determine whether a patient was stable or not. In addition, inclusion of phlebotomy services would enhance in the monitoring of the patient drug regimens for toxicities and efficacy.

*"Phlebotomy will probably make the most difference than anything else especially when you look at what our standard of care is, our standard of care is every patient should have a viral load by 6 months. It's as close as you can get knowing how the patient is doing without lab services its next to impossible to implement DST model because that's the basis of saying you are stable..." (***Policy-maker, IDI, MoH, 24/03/2018).**

*"Inclusion of the phlebotomy services is a plus or good thing because it will improve and enhance the current community models" (***Policy-maker, IDI, MoH, 17/05/2018).**

"We as community workers support the idea, I think it is a great idea which if implemented will go a long way to improve the model and life of people" **(CHW, FGD, Clinic, 23/01/2018).**

Reduced loss of laboratory results

The loss of results was a common problem in all the facilities visited during this study. According to the patients and health care workers, the bloods were collected and they somehow went missing/lost and the patient was requested to recollect the blood draws. This usually was

discouraging for the patients because they went through pain to have the bloods repeated and waited for the results. Most participants felt that including blood draws into the CAG model would greatly help in reducing on the number of results lost or misplaced for the patient and would minimize the frequency of blood draws collected. This was so because they said they already have a system for CAG members and they only needed to enforce it once the blood draws were part of the model.

"Yes, I think that will be good because we will have hope and assurance that they will be finding our results and this has led to people taking a year without doing labs but if it is going to be done that way that they are followed in the community I think even the labs will be up to date" **(CAG Member, FGD, Hospital, 24/01/2018)..**

"Now with the CAG model we have introduced a system that all CAG patients need to be identified. Whenever blood is drawn by way of indication of the words "CAG" on the Lab request slip so that the samples are quickly worked on" **(HCW, FGD, Hospital, 24/01/2018).**

Inspire patients to monitor each other's blood draws and tests

The other perception was on encouraging patients to take keen interest on what the laboratory tests entails and why they are important. In addition, patients would be interested to know who was doing well using the laboratory tests and who wasn't and also patients would be encouraged to monitor each other's blood draws. In the process would improve adherence to phlebotomy appointments and majority of patients would be consistence in drawing blood. When it came to viral load, patients liked to have a suppressed viral load (as sign that they were done well) and they encouraged fellow members to have such results. Here is what was said;

"The way we can notice that our friend does not do the labs is by way of his or her status, you will notice that he or she is not improving the way he or she used to look has changed then you will be able to conclude that this person does not do labs to check there status or CD4 and the person's appearance will change then you will be able to know that they are not doing their labs …" **(CAG Member, FGD, Hospital, 24/01/2018).**

"It also makes it easy for the patients to understand some of the lab tests because in some instances patients who are not in CAG as you are going through their files you will notice that

they have labs results and when you ask them whether they know about these results and why they tested they will not give accurate answer. They will say I was just told to do the labs. Now if these lab services are included in CAG model the CAG members do understand these labs and the model will be the best" **(HCW, FGD, Clinic, 01/02/2018).**

"This system has really helped suppress the high viral loads in the patients with high viral loads. This situation will encourage them, such that those that are virologically suppressed will be an inspiration to others" **(HCW, FGD, Hospital, 24/01/2018)**

Reduced missing blood draws

The majority of participants revealed that including phlebotomy into this model would improve the missing of appointments for blood draws. That now patients did not have to shy away from going to phlebotomy because it was congested, but that patient's blood would be collected in the community where it was less congested. This would in a big way enhance and encourage CAG members from missing appointments for blood draws.

"Labs should be included in the model so that we do the labs as a group to reduce on queuing up, loss of results and workload" (**CAG member, FGD, Clinic, 23/01/2018).**

"Encourage the patients to remind each in the group not to miss blood draws and be consistent in drawing bloods and in the process will reduce missing blood draws" (**HCW, FGD, Clinic, 02/02/2018).**

Improved testing coverage and TAT

The inclusion of phlebotomy in the CAG model would help in fighting suppression of the virus in patients. Most participants said that once phlebotomy was included the testing coverage and results turn-around time (TAT) would improve. In addition, most policy-makers and HCW also mentioned that this would improve testing coverage in both rural and urban facilities in Zambia. At the moment the testing coverage for viral load stood at 37% (MoH, 2018) and most of the tests were done in the urban areas and very few are done in rural areas. So, most policy-makers felt that to meet the 95-95-95 goals, especially for the last 95% for viral suppression what needed

to be done was to include the phlebotomy services in the community to enhance testing coverage for HIV viral load and compliment the current tested mechanism.

"It all depends on the viral load, even to analyze them because in the next five years if the viral load coverage remains at 33% it means 33 % of people will be eligible to go into some form of model. Nevertheless, if your coverage is at 33% how many of this 33% will be suppressed? I don't have statistics. So, imagine 90% to mean only 90% of that 33% will be able to go into a model. So, it is dependent on viral loads and it is crucial" **(Policy-maker, IDI, MoH, 24/03/2018).**

Reduced waiting time, and duration of blood draw visit

The majority of participants mentioned that this inclusion meant that CAG members spent less time waiting for blood draws in the community and ultimately reduced the number of blood draw visits. Most patients would only be required to go to the clinic when the results were very bad and expected to be seen by the doctor at the facility.

"*CAG members have a lot of benefits here at the facility, they will be given VIP treatment, and they don't stay long at the facility"* (**CHW, FGD, Hospital, 24/01/2018).**

……. "*as a health care worker, myself I'm very passionate about that I don't want to see 100 patients in a day, by the time I'm reaching number 85 I'm extremely exhausted and patients start walking the room" (***Policy-maker, IDI, MoH, 24/03/2018).**

The increased economic involvement

The inclusion of phlebotomy services into the current model would definitely make patients spend less time at the bleeding room and the more they became productive and engaged in economic activities. For those who ran business meant they had enough time to concentrate on their businesses. For those who had formal employment at least they had to get some time to have blood drawn and later went for work and others had ample time to attend to their families and other matters. Here is what they had to say;

… "*They are applicable to decongest the facilities and also to give our clients time to do other productive things"* (**Policy-maker, IDI, MoH, 20/02/2018).**

…. "*You don't stay long on the queue, you leave the facility early you are assured of early exit then you have more time to go and do other productive things you also save finances if you come from a distant place" ...* (**CAG Member, FGD, Hospital, 24/01/2018).**

"*More time for the patients and they will be more productive there by providing for their families. Healthy communities and much economic development and prosperous communities"* (**CAG Member, FGD, Clinic, 31/01/2018).**

Negative perception to decentralizing phlebotomy into CAG model

The negative perceptions were classified into various categories, namely, compromised sample integrity and patients limited contact with clinicians.

Compromised sample integrity

Some health workers and policy makers perceived the inclusion of phlebotomy into this model as compromised sample integrity. This was attributed to intricates within the pre-analytical processes (patient preparation, specimen collection and identification, transportation, preparation for analysis and storage). The obvious problems were that clerical errors would raise and samples collected for specific test came in wrong tubes. For example, green bottles were for chemistries, read was for serology and blue was for hematology and virology samples only. Some samples would be exposed to high temperatures and sunlight and this may negatively affect the result of the patient. Some samples required that they be processed within a stipulated period of time and they felt that samples might come after the required time and the laboratory might reject those samples. For example, samples for FBC, viral load and chemistries were supposed be processed within 24 hours and 48 hours for CD4 and if samples came after the required time the laboratory considered unstable times and were rejected.

"Integrity of quality of the specimens to some degree will be negatively affected since there is no one to monitor and ensure that the results are of good quality" (**Policy-maker, IDI, MoH, 17/05/2018).**

Patients less contact with clinicians

Some of the health care workers viewed the inclusion of phlebotomy services into GAG model as limiting contacts with the Clinicians and they were concerned that this took time for them to

know when the patient was failing treatment and intervention was usually done late when the patient was ill and needed urgent attention. Here is what they had to say about it:

"*There is now less contact with the patients and it takes time to know when the patient started failing on treatment and it takes long time for clinicians to intervene"* ***(HCW, FGD, 01/02/2018).***

4.3. Barriers to decentralize phlebotomy into cag model

Several barriers to decentralizing phlebotomy within the community CAG model were identified and were highlighted as long distances and transportation costs, inadequate community sensitization, lack of technical skills for phlebotomy, lack of privacy/confidentiality, volunteers not recognized by regulatory bodies, low level of literacy in the community, shortage of qualified health care workers, lack of remunerations and stigmatization.

Inadequate community sensitization

Implementation of community phlebotomy would come under fire if the community was not educated or sensitized on drawing blood in the community. Most of the participants from the patients to policy-makers, all agreed that the community needed to know what would be happening in the community and how they should help in ensuring that these interventions were done to meet the needs of the patients. At the time of the study, majority of the respondents felt that the community is not sensitized enough about this subject and that the incorporation of phlebotomy within the community may be misconstrued. In addition, the majority of participants said that in the Zambian culture drawing blood was viewed as rite and it might be misconstrued as offering to some spirits for appeasement (Osaro et al., 2011):

…… "*Suspicions of being involved in Satanism could draw this model backwards as the community will look down upon this group*" **(CHW, FGD, Clinic, 23/01/2018).**

"Myths, such as suspicions of Satanism, stigma and lack of sensitization are barriers to entering CAG laboratory services" **(CHW, FGD, Clinic, 01/02/2018).**

"Collection of blood within the community may be misconstrued as ritual practice and it is not customary for people to witness blood drawn from people within the community" (**Policy-maker, IDI, Lusaka, 17/05/2018).**

Long distance and transportation costs

Transportation for CHW and samples collected were among the major barriers that came out during data collection. In this study, participants brought out the transportation costs associated with inclusion of community phlebotomy into the CAG model. This cost included transportation of CHW, collection materials (cooler boxes, gloves, collection containers, vacutainer needles and holder and disinfectants etc.) and specimens, and this exercise required transportation. They said the heath workers required transport when going to collect bloods from the community when sending back samples to the laboratory. They also mentioned that during transportation, it was of paramount importance that environment is ambient for the samples until it reaches the testing site. Here was what some of the participants said regarding long distances and transportation costs;

"The challenges are that sometimes we cycle 10 km from home to the clinic and again another 10 km to where the groups are meeting and you are using an old bicycle. The transport to take the samples to the lab for viral load which is not done here (sent to nearest facility for testing) is another challenge because the viral load samples are not supposed to be kept for a long time" **(CHW, FGD, 31/01/2018).**

"The barrier of decentralizing community phlebotomy within this model would be a lack of specimen transportation" **(HCW, FGD, 01/02/2018).**

*"The other barrier of incorporating phlebotomy within the community model is Sustainable Support in transportation" (**Policy-maker, IDI, MoH, 14/03/2018).***

Lack of skills to draw quality samples for testing

In the study, the majority of HCW and policy-makers expressed concerns about the lack of skills by people who would provide community phlebotomy services within the community model. The skill to ensure that the sample collected was of high quality and had not hemolyzed, clotted and lipemic in nature. In addition, the skill to know what sample type bottles to use for a particular test was also crucial in the pre-analytical stages. This they said was key in ensuring that the result was a true reflection of the patient condition and was identified as a barrier. So, some of the concerns that came out were expressed below:

*"Integrity of quality of the specimens to some degree will be negatively affected since there is no one technical to monitor and ensure that the bloods collected are of good quality" (**Policy-maker, IDI, MoH, 17/05/2018).***

Lack of assured safety standards for patient and phlebotomist

The other barrier was on ability to maintain and provide continuous safety of patient, phlebotomist and the environment. The lack of assurance that the patients were safe and that there were less accidents at the collection site was a grave concern from majority of participants. To ensure that the phlebotomists were not infected whilst drawing blood they said was equally risky and concerned about it. There was a high risk that both the patients and phlebotomist could get infected whilst drawing blood with infectious disease such as HIV, Hepatitis B virus (HBV), hepatitis C virus (HCV), and those causing viral haemorrhagic fevers (Crimean Congo haemorrhagic fever, Ebola, Lassa and Marburg) and dengue. Some participants lacked confidence in the community phlebotomy to be able to perform infection prevention all the time and ensured a safe working environment for everybody. The aforementioned skills were lacking and posed as a major barrier of decentralizing phlebotomy services in the community models.

…."Skill, safety to the patient. It is just the level of technique the labor aspect of it, how intensive the hygiene is, will somebody be able to do infection prevention out there in the community? The facilities to draw blood from patients can be done at someone's home but how do we ensure that there is no contamination and pricks. So, those issues have to be addressed" **(Policy-maker, IDI, MoH, 20/02/2018).**

Lack of confidence among peer volunteers

The lack of confidence among peer volunteers came out as one of the barriers to decentralizing phlebotomy within the community model. This was so, because it was observed during the time of the study, how some volunteers are not confident in themselves to provide a service even when they have been trained. And vice-versa the lack of confidence by some patients and HCW who only believed that only trained HCW were the ones who can do phlebotomy services.

"*Some of the barriers mighty be a lack of confidence amongst the volunteers themselves. Let it be put it this way, already there are some of the community members who complain that they don't know how knowledgeable their fellow community volunteers are to even stand and talk*

about HIV. So, some of the barriers might be that some of the clients might not have confidence in their peers to do the right thing. So, that one is expected. So, some might say no I will go to the clinic so that I have the blood collected by people who I think they know what they are doing" **(Policy-maker, IDI, 20/02/2018).**

"*I think someone professional should come and draw blood not CAG members you can be trained quite alright but if you have not acquired that skill you may end up pricking your colleague wrongly and also may be within the group there is someone a professional yes, they can do it, not individual members veins are tricky"* (**CHW, FGD, Hospital, 24/01/2018)**

"*I think the professional health worker probably is the right and qualified persons to do the collection of blood in the community because it is part of their training* (**HCW, FGD, Hospital, 24/01/2018)**

Low literacy levels

HCW in rural areas felt that the literacy levels were so low, that finding people who were able to read, write and spoke local languages proved to be a difficult venture. Majority of the population in the rural areas did not know how to read and write and hence finding phlebotomist in these places, who were capable of reading and writing was a daunting task. And yet people who were supposed to perform community phlebotomy at least needed to know how to read and write. It was a requirement, because that is what they did, for each patient they had to write the patient demographics and laboratory tests requested for on the requisition form.
This is what they had to say:

"I think in places like ours here the barriers would be the levels of literacy which are so low. So, even if you would like to find someone to help you need to find someone who is able to read and write" **(HCW, FGD, Clinic, 31/01/2018)**

Lack of privacy and confidentiality

Some participants felt that it would be difficult for some CHW to maintain privacy and confidentiality, as they would be seen by their peers. Some CAG members even feared that health workers could breach confidentiality if they were told about such sensitive matters.

"Then of course issues of privacy, not everyone would want their fellow community member to know they are HIV positive so they want to keep it private" **(Policy-maker, IDI, MoH, 20/02/2018).**

Volunteers not registered and recognized by regulatory bodies

Some health care workers and policy-makers felt that since the proposed community phlebotomist (s) were not registered or recognized regulatory bodies such as MoH, HPCZ and GNC then this would be very difficult to hold them accountable, and to enforce punitive measures should something go wrong. In addition, there were no authority structures to show who they report to in the MoH and they were basically non-existent in the GRZ system.

"CHW also need to be registered by HPCZ and also, they need to belong to some body or association as a profession (certificate for protection)" **(HCW, FGD, clinic, 01/02/2018).**

"But we need to put in place precautionary measure and recommendations from either HPCZ or GNCZ (General Nursing Council of Zambia)" **(Policy-maker, IDI, MoH, 14/03/2018).**

Lack of remunerations

During the time of the study, all the volunteers (CHW) were not on payroll. They did the work on a voluntary basis and no incentive or transport allowances were given. This in the long term was going to lead to high levels of CHWs turn overs and most facilities would not have any staff to provide phlebotomy services. This they said led to some volunteers being demotivated and quit work without any notice. If this continues then, it would pose as a serious barrier to the success of decentralization process of phlebotomy. Here is what some participants said:

"The other challenge is the issue of pay; most of us are not on a salary. Previously I was paid a stipend but things have changed because the stipend was reduced. They did not think of bringing an extra pair of hands to help me with work. So, this demotivates." **(CHW, FGD, Clinic, 31/01/2018).**

"The issues of wanting some monetary gain. If you engage volunteers sometimes you have to plan to give them something because they have to find time and resources to move from their homes; stopping whatever economic activities they are doing or other things." **(Policy-maker, IDI, 20/02/2018).**

4.4. Resources to support phlebotomy services

During the study it was crucial that potential resources (including pool of cadres for phlebotomy services) were identified before rolling out the collecting of bloods from the community. The potential resources identified included identifying potential cadres for community phlebotomist, community sensitization, adequate training, sustainable funding mechanisms and technical supervisory visits.

Community phlebotomists

One of the obvious resources needed in phlebotomy services within the community was human resource and this included community phlebotomists. In light of this, all the study participants were consulted on what qualities that prospective community phlebotomist must possess. Identifying potential cadres phlebotomist who were able to collect blood from the community and send back samples correctly to the laboratory for testing was crucial and of outmost importance and these were essential resource for the proposed intervention

The majority of the participants felt that CHW were better placed as community phlebotomist. This was so because in all the facilities visited the CHWs were the front liners for community ART program and were spear heading the programs. In addition, they said they were reliable and were familiar with current happenings of the clinics. Whilst some policymakers insisted that the CHAs should be the ones involved as phlebotomist in the proposed model, because they had undergone a formalized one-year training, and were capable to handle all phlebotomy related issues. Other participants felt that the volunteers and Clinical Psychosocial Counselors were capable, if proper training and supervision is consistently done. Lastly but not the least, some patients and HCW still insisted that the health care workers must continue and were trained to handle and perform phlebotomy. Below are some of the views from different stakeholders:

"I think the health care worker is probably the right and qualified persons to do the collection of blood in the community because it is part of their training" **(HCW, FGD, Hospital, 24/01/2018).**

….. *If counselors or community workers are given adequate training and properly funded the model can work perfectly."* **(CHW, FGD, Clinic, 23/01/2018).**

….. *"also have volunteers who are trained to collect the same dry spot specimens from babies they prick the sole of babies and collect some blood for early infant diagnosis for HIV so it's a*

similar thing and we have a number of volunteers who are doing that" **(Policy-marker, IDI, MoH, 20/02/2018).**

Community sensitization

Community sensitization was very key to the successful rolling out and implementation of this program. Majority of our participants felt that drawing blood from the community was a sensitive matter and hence they emphasized the need to sensitize the community, health care workers and policy makers. In addition, the participants felt that sensitization through health promotion activities would greatly help in demystifying the notion that blood collected in the community was been offered to appease spirits. Resources would be needed in health promotion activities such as radio and television adverts, community outreach programs and education just to mention but a few. So, there was a great need for MoH to come up with health promotion activities that would be used to sensitize the community, health care workers, patients and policymakers on why this activity is important and benefits of doing this. In addition, the needed to buy into this idea and help out in information patients about this intervention and what the benefits are. Here were what participants said:

"There is need to sensitize. To sensitize the communities, we may have to start working with the groups which are already organized and experienced with working with the health personnel and knowledgeable in HIV and have been trained in HIV programming or even adherence counselling and also involved in collecting blood in children or in adults." **(Policy-marker, IDI, MoH, 20/02/2018).**

"I think we need to reach out in terms of sensitization in the community so that the community is equally aware of the program and also understand what it is all about" **(CAG member, FGD, Hospital, 24/01/2018).**

Trainers and training materials

The need to train more staff cannot be over emphasized. Resources such as experts in phlebotomy such as laboratory scientists, nurses, clinical officers and medical doctors are needed to conducted such trainings. The training supplies needed to demonstration the collection of blood from real patients such a vacutainer needles and holders, collection bottles and disinfectants are equally important. All the participants in the study agreed that whoever will be identified to offer community phlebotomy services needed to be trained adequately in blood

collection techniques and other training packages such as AID and AED need to be seriously considered. This was so, so that capacity would be built within the community and support and enhance the delivery service within the health system. Policy-makers in this study recommended that for the smooth incorporation of the community phlebotomy into the current model, the government and its implementers need to work with already existing human resource and build capacity by training more CHW into phlebotomy and anything related to it. Examples are first AID and AED trainings and make mandatory refresher training in the same

"Provide first (1st) AID and AED training for those who are phlebotomist, so that they should know what to do in case patient collapse or faints" **(Policy-marker, IDI, MoH, 17/05/2018).**

Incentivized phlebotomy work force

The other resources were on mobilizing and recruiting of community phlebotomist for collection of blood within the community was crucial in this study. The majority of participants were recommending an increase in incentivized phlebotomy work force and use these cadres in phlebotomy services. This they said was to motivate this work force and make earns meet in doing this exercise. This was what was said:

"The other challenge is the issue of pay; most of us are not on a salary so it may motivate the people working if they considered putting us on a salary because at the moment, we are doing it voluntarily……." **(CHW, FGD, Clinic, 31/01/2018).**

……. *"the issues of wanting some monetary gain if you engage volunteers. Sometimes you have to plan to give them something because they have to find time and resources to move from their homes stopping whatever economic activities they are doing and other things."* **(Policy-marker, IDI, MoH, 20/02/2018).**

Experts in quality assurance

The other thing that came out of the study from some participants was the need for professional workers to provide technical and supervisory frequent visits to the community phlebotomists. This is to ensure that services provided on a daily basis are of high quality and good for patient health care. Resources would such as clinical officer, medical doctors, nurses and laboratory personnel be needed to facilitate this activity and this included transportation costs, allowances for technical staff and enrolments for quality assurances programs

"We hope to see more professionals involved in training and supervision visit as a way of monitoring the quality of service delivery being offered by CHW, and secondly to provide technical support." **(Nurse, FGD, Clinic, 01/02/2018).**

Sustainable financial support

For this program to thrive and be sustainable, the government and its partners need to plan and budget for this activity. The majority of participants in the study emphasized the need to have readily available funding to finance the operations of this intervention and to plan for its sustainability. Some of the suggested items and supplies needed to support and supplement this intervention included specimen collection bottles, vacutainer needles and holders, cooler boxes, ice parks, cotton wool and motor bikes. Here is what some of our participant said:

……"*Secure sustainable sources of funding for sustaining the intervention and service delivery system".....* **(Policy-marker, IDI, MoH, 14/03/2018).**

SUMMARY

This chapter has presented the findings on perceptions, barriers and community phlebotomist on feasibility of decentralizing the collection of blood samples for testing to the community through the community art group model in Lusaka, Zambia. In addition, the main stakeholders for this study were CAG members, CHW, HCW and policy-makers and collected pertinent views regarding decentralizing phlebotomy services using the CAG model. The positive perception regarding decentralizing phlebotomy services within GAG model were decongested phlebotomy rooms, reduced missing appointments for blood draws, reduced work Load, reduced lost results, improved quality of phlebotomy service delivery, improved testing coverage and TAT, innovative way of bringing lab services closer to the people, improve current model and patient life, reduced waiting time and frequent visits, inspire patients to monitor each other's blood draws and increased productivity in the community. the negative perceptions were on compromised quality of samples and limited contact with clinicians.

The main barriers to incorporating community phlebotomy services into the CAG model included distance and transportation cost (s), inadequate community sensitization, lack of skills to draw quality samples for testing, lack of privacy and confidentiality, volunteers not recognized by regulatory bodies, low level of literacy, shortage of qualified health workers and lack of remunerations

This study went to establish the right cadres and who were better placed to handle and manage community phlebotomy into the CAG model. The following were the prospective community phlebotomist for decentralizing the proposed model and these were volunteers, community health workers, clinical psychosocial counselor, community health assistant and health care workers (included doctors, clinical officers, nurses and laboratory scientist/technologists). In addition, other resources such as trainers and training materials, financial support, experts in quality assurance programs, and materials for community sensitization are needed to support the collection of blood in the community

CHAPTER FIVE: DISCUSSION OF FINDINGS

Successful implementation and integration intervention depend on the acceptability of both intervention deliverers (e.g. Researchers or healthcare professionals) and recipients (e.g. patients and communities) (Diepeveen et al., 2013; Stok et al., 2016). From the patient's perspective, the content, context and quality of care received may all have implications for acceptability. If an intervention is considered acceptable, patients are more likely to adhere to treatment recommendations and to benefit from improved clinical outcomes (Fisher et al., 2006; Hommel et al., 2013). From the perspective of healthcare professionals, if the delivery of a particular intervention to patients is considered to have low acceptability, the intervention may not be delivered as intended (by intervention designers), which may have an impact on the overall effectiveness of the intervention (Borrelli et al., 2005, Proctor et al., 2009). All the cadres who were interviewed felt that decentralizing the phlebotomy services within the community model was good and innovative way of bringing services to the people.

However, the disagreements were on the modalities, such us where (designated localities within the communities) such interventions can be done and how do we ensure the safety of the patient and quality of the specimens collected. Generally speaking, there was consensus amongst the patients, CHW, HCW and policy-makers that this was a great idea and must be piloted.

The findings on perception of decentralizing community phlebotomy within the CAG model were similar to what other studies did in Mozambique (Rasschaert et al., 2014) even though in those studies the focus was on drug refill. Decongesting the phlebotomy rooms (clinics) was the most talked about perception by almost all the participants; this was because it had benefits at individual, clinic and community levels. At individual level the patients would spend less time during blood draws, less on transport money and in the process concentrate on other things such as working and improving on businesses. At the clinic level, the work load reduces such that now the clinicians would have enough time to focus on patients who were really sick (unstable). At the community level it helped in reducing stigma. These, however, were expected to continue happening when phlebotomy services were incorporated into the CAG model.

The other perception was about improving the testing coverage, especially for HIV viral load. Zambia's overall HIV-1 viral load testing coverage stands at 37% and most policy-makers felt that this would help in increasing the testing coverage and that this would help in reaching the UNAIDS goal, where 95% of HIV patients were tested and virologically suppressed (MoH,

2017). And in addition, with such intervention this may imply that more stable patients in both urban and rural areas would be reached and consequently would have their laboratory tests and results done. This is a plus or bonus for the ART programs and will help in meeting the viral suppression rate for ART patients.

However, negative perceptions were highlighted in this study. Some of the negative perception included the compromise on the quality of samples collected by community health workers. Most laboratory personnel were concerned on maintaining the sample integrity and ensure that the blood drawn was of good quality and that it should reach the laboratory within the recommended time frame. The other issues that was of great concern was avoiding clerical errors and usage of correct tubes for the correct tests. However, they mentioned that if the sample went beyond the stability time, had a lot of clerical errors and came into a wrong bottle, then that sample would be rejected and patient would be requested to submit a fresh sample.

The study had barriers to incorporating community phlebotomy within the CAG model and this is consistent with a study done in Zambia (Mutale et al., 2013). The barriers included lack of remunerations, lack of qualified healthcare workers, incapacity to do community phlebotomy, the fact that CHWs were not recognized by HPCZ, and inadequate sensitizations. This however, tied in with health system support and requirements, which were found in the same study.

The study findings showed that majority of stakeholders felt that community health workers (CHW) were better suited to handle and perform community phlebotomy if this was to be successfully incorporated into the current CAG model. However, studies have shown that, CHW programs face additional challenges and Zambia was not exempted. These challenges included high turnover, low motivation, inadequate supervision, insufficient compensation or incentives, and low recognition (Furth et al., 2012, MoH, 2010). This was also observed during the time of the study and it was among the barriers of incorporating phlebotomy services into the current community models.

To try and address some of the challenges that CHWs face in health service delivery, the Zambian Ministry of Health (MoH) developed the National Community Health Assistant Strategy (MoH, 2010). The purpose of this strategy was to formalize and standardize the role of CHWs in the health system by creating a new group of workers called Community Heath Assistants (CHAs). Compared to CHWs, whose training is short and not standardized, CHAs are expected to undergo a year's standardized training programme. Furthermore, in contrast to

CHWs who work as volunteers, CHAs would be put on the government payroll and registered with a regulatory body. The CHAs are expected to work under nurses, and deliver health services on a task-shifting basis (i.e., from Nurses to CHAs). Their tasks and mode of supervision are clearly specified in the strategy.

The CHAs are thus better suited and capable of handling the community phlebotomy because they have more intense training, are recognized by MoH, are enumerated, better supervised and additional training will be easier to put in place and will be shorter than that for CHWs. It is for the above reasons that it has been recommended for the use of CHAs for community phlebotomy and according to the national community health worker strategy of 2010, the Ministry plans to train about 5,000 CHAs by 2020. In addition, the CHAs would have to undergo thorough annual refresher short courses such as First AID, AED and phlebotomy related courses as part of their continuous improvement.

Despite asserting that the CHAs are the best community phlebotomists in incorporating the phlebotomy services in the community models, there is need to also consider examining the success of this intervention through the lens of health systems. Studies in Zambia have shown that the building block's specific weaknesses have a cross cutting effect in other health system building blocks which is an essential element of systems thinking. These linkages emphasis the need to use system wide approaches in assessing the performance of health system interventions (Mutale et al., 2013). Especially that other studies suggest that if health systems are lacking capabilities in key areas such as the health workforce, drug supply, health financing, and information systems (which was the case for the current study), they may not be able to respond adequately even if there was an increase in human resource, funding and technical support (Jha et al., 2009, Larsson et al., 2009). Hence, it would be prudent for Government through the MoH policy-makers, and its partners to seriously look at the incorporation of phlebotomy services through the lens of system thinking approach. Health systems thinking approach will mitigate the perceived barriers and challenges that came out of this study (Mutale et al., 2013).

The use of CHAs is realistic and feasible because this might be a financial relief for the Government as it is over committed with other projects and is financially constrained. They have already made plans, and strategies in place and very committed in meeting their goals and have finances channeled towards other programs. The use of CHWs would prove to be futile considering that the government is over committed with other plans and financially constrained

(MoH, 2018). The use of CHWs would require more funding and training; this in the process would not encourage the government to buy into the idea.

In addition, the CHWs would require or need to be recognized in the health systems as the way things stand, they are not really recognized as work force but instead they are left to work as volunteers and they are inadequately trained. But CHAs are now registered under the GNCZ and they would be supervised and report to a nurse and this is according to the latest community health assistant strategic plan (MoH, 2018). According to the national health strategic plan the GRZ intend to have trained over 5,000 CHAs by 2020, who are adequately trained and motivated community-based health workforce in providing the basic health care needed. This training implies that the government has already committed their financial efforts and resources. The use of CHAs as community phlebotomists would be easier for the government to integrate in the health system and it would not require much as this has already been planned for and it's just waiting for smooth implementation.

Community sensitization and health education campaigns are key in the success of the implementation or integration of the phlebotomy services with the community ART programs. A lot needs to be done to educate the community leaders, community and ensure that there is consensus and awareness of this program. The government through MoH needs to come with health promotion programs that would ensure that the community is adequately sensitized and reach levels where they also buy into the idea. Community-based studies have shown that lack of community sensitization, engagements and health education from the starting point leads to low outcomes of health implementation programs and in the process leads to low uptake of health care services (Chamie et al., 2014 and Bhatia et al., 2007).

Government leaders and organizations need to broaden the way they see their responsibilities to include roles as facilitator, supporter, collaborator, and empower of citizens and stakeholders. Stakeholder engagement is key and plays a meaningful role in the deliberations, discussions, decision-making and/or implementation of projects or programs affecting them. In addition, several key opportunities are commonly identified and are important to MoH. Among these are:

- Increase the likelihood that projects or solutions will be widely accepted. Stakeholders who participate in these processes show significant commitment to help make the projects happen.

- Create more effective solutions. Drawing on local knowledge from a diverse group creates solutions that are practical and effective.
- Improve citizens' knowledge and skills in problem solving. Participants learn about the issues in-depth. Greater knowledge allows them to see multiple sides of the problem. Citizens can practice communication and decision-making skills.
- Empower and integrate people from different backgrounds. Groups that feel ignored can gain greater control over their lives and their community. When people from different areas of the community work together, they often find that they have much in common.
- Create local networks of community members. The more people who know what is going on and who are willing to work toward a goal, the more likely a community is to be successful in reaching its goals.
- Create several opportunities for discussing concerns. Regular and on-going discussions allow people to express concerns before problems become too big or get out of control.
- Increased trust in community organizations and governance. Working together improves communication and understanding. Knowing what government, community citizens and leaders, and organizations can and cannot do may reduce future conflict (adapted from Bassler et al, 2008)

The other issue that was of serious concern bordered on sample integrity and patient safety concerns. All these specific concerns need to be addressed and thought of very carefully and to ensure that they meet HPCZ and Good Clinical Laboratory Practice (GCLP) requirements.

From the testing point of view all the specimens must meet the laboratory testing requirements and must be of high quality. Phlebotomy services would require that all the materials such as gloves, cooler boxes, collection bottles (red, green and purple bottles), vacutainer holders and needles are readily available at any given time. Such materials are essential to the success of this program. Hence the community phlebotomist must know exactly what testing bottles are needed for what test and the volume required for each test. For instance, purple is only for CD4 count, FBC and HIV viral load, green is for biochemistry and red is for RPR and hepatitis. The integrity of the specimen is key and of outmost importance. Failure to maintain the sample integrity would lead to wrong diagnosis and patient mismanagement (MoH, 2017). However, CHAs supervision would be needed from both from the nurses, clinical offices and laboratory staff for the purpose of quality assurance and quality control. This supervision would be needed and must be done very often to give confidence to the patients, health care workers and policy-makers.

According to the national health strategy for CHA, it is very clear that nurses would provide daily supervision and it is our hope that this would be consistently be followed up for the sake of maintaining sample integrity and also ensuring that patients are receiving the best possible health care. In addition, the laboratory personnel would be key in supplementing efforts and ensure quality assurance are met (MoH, 2018).

From the provider point of view the community phlebotomist must be registered and recognized by the regulatory body and MoH and must have undergone some basic training in a health-related field. In addition, the CHAs must be professional, equal to the task and ensure that the issue of confidentiality is maintained, and assure the CAG members. Most of the CAG members and CHWs feel that they don't need a prescribed and designated place where phlebotomy would take place; they feel that the Government should leave it open for the CAG group members to decide where that would take place. However, health care workers feel that they should have designated places, because blood collection is sensitive and they don't have to alarm the community and bring about suspicions. Hence, they proposed that this issue has to be decided upon and ensure that where the collection takes place should meet the basic requirement of HPCZ. In this regard, the MoH and co-operating partners need to devise a mechanism and budget for the aforementioned materials and supplied for the purpose of smooth running of the operations. In addition, the devised mechanism must be transparent and accessible for HPCZ or GNCZ or indeed any other interested party to come and verify what is happening in the process.

The CHAs would be very mobile as they would facilitate in collection of blood within the community and this would require that they have transport costs met from clinic to the community and back. So again, the Government through MoH should consider the use of either motor bikes or bicycles for CHAs and specimens for transportation. The mode of transportation must be cost-effective and time sensitive so that it should preserve the sample integrity and must therefore, be reliable.

Among some benefits mentioned in the study on inclusion of the phlebotomy services is that of improving the testing coverage for HIV viral load. Most of the participants especially the heath care workers and policy-makers feel that this would greatly improve in meeting the UN goals of 95% virologically suppressed patients. Most of the remote setting have little to no access to viral load and the inclusion of the lab services would imply that these services would be done elsewhere and improve patient treatment management. And if most patient are virologically

suppressed the community would also benefit, in that the rate of transmission would also reduce and eventually reduce the rate of new infection (MoH, 2017).

The pilot of CAG model with inclusion of the phlebotomy services would provide valuable information for the policy-makers. The pilot studies would answer questions such as how relevant CHAs or CHWs/volunteers would be to this model? What sort of gaps would they have in terms of their technical skills? The level of uptake of laboratory services would be determined? Such question demand answers and would be relevant especially for budgeting purposes and in informing policy-makers.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

Decentralizing phlebotomy services within the CAG model is perceived as either being a positive or negative. Positive perceptions were identified as those which contributed to decongesting phlebotomy rooms, reduced missing appointments for blood draws, reduced work load and lost results, improved quality of phlebotomy service delivery, improved testing coverage and TAT, bringing lab services closer to the people, improved current model and patient life, inspired patients to monitor each other's blood draws and increased productivity in the community. The negative perceptions were on compromised sample integrity and limited contact with Clinicians.

Some of the concerns that may impede the inclusion of phlebotomy service and compromise patient safety within the community model were long distance and transportation cost (s), inadequate community sensitization, lack of skills to draw quality samples for testing, lack of privacy and confidentiality, volunteers not recognized by regulatory bodies, low level of literacy, shortage of qualified health workers and lack of remunerations

The study identified a potential resource needed to support the decentralizing of phlebotomy services within the community. The resources included identifying a pool of community phlebotomist, Financial support, trainers and training materials, community sensitization materials, and experts in quality assurance.

6.2. Recommendations

i. Advocating for pilot studies that would include phlebotomy services in the new DST models. The Government of the day should seriously consider piloting new DST models (CAG) with phlebotomy services integrated in it and assess the feasibility and acceptability.

ii. In the 2018-2021 latest community health assistant strategy the MoH has recognized CHAs as key partners in health and are mandated to provide the basic health care services (including diagnostics and phlebotomy) and that they are being regulated by the GNCZ.

We strongly recommend that MoH should consider them to play a role as community phlebotomist when piloting the new DST models.

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APPENDICES

Appendix I: participant information sheet

My names are Mpanji Siwingwa and I am pursuing a Master's degree in Public Health at the University of Zambia under the School of Public Health. You are invited to take part in a study on feasibility and barriers to decentralizing the collection of blood in the community antiretroviral model. This Participant Information Sheet will help you decide if you'd like to take part. It sets out why we are doing the study, what your participation would involve, what the benefits and risks to you might be, and what would happen after the study ends. We will go through this information with you and answer any questions you may have. You do not have to decide today whether or not you will participate in this study. Before you decide you may want to talk about the study with other people, such as family, friends, or healthcare providers. Feel free to do this.

The Community based ART Model is a delivery model for antiretroviral therapy in which ART care is delivered at a community-based site. The Community ART Model has less human resource needs with use of lay persons, increased community participation and most importantly ownership of ART care. The community ART groups (CAG), peer support groups members, who are clinically stable patients. On a monthly visit at a facility, on the day of ART refill, CAG members meet in the community. During the meeting, they verify each other's adherence and choose a representative to collect ART for all members. At the health facility, the group representative has a consultation, any important events that occur in the lives of the other members of the CAG. For each CAG, a group card, containing data about the members and the dates of refill, is updated, and with one copy held at community level and one copy held at clinic level. Then, the group representatives to the community to distribute the ART to the fellow group members. One month later, another group member is chosen to represent the CAG at the health facility

Why am I doing the project?

The project is part of my research proposal submitted to the University of Zambia in partial fulfillment of the degree of Masters of Public Health in Health Policy and Health Systems Management at the University of Zambia. It is hoped that the project could provide useful information for healthcare professionals about advice and recommendations given to people utilizing the Community Antiretroviral Model.

What is the project's purpose?

To explore the perceptions and barriers on the feasibility of decentralizing the collection of blood samples to test within a community ART delivery model (CAG).

Specific objectives

1. To explore stakeholders' perspectives on decentralizing blood sample tests to community level

   The stake holders include Policy-makers, health workers (Nurses, clinicians and laboratory staff) and patients.

2. To explore patients' perspectives on using blood samples within the CAG models
3. To identify community phlebotomists and barriers to decentralizing of within a CAG model

Why have you been chosen?

You have been chosen because mostly likely you are a stable client utilizing ART services in Lusaka district for at least three months. You will have knowledge about community ART programme. On top of this, you will also have general knowledge about the routine tests and how they can be implemented in the community.

Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do decide to take part you will be able to keep a copy of this information sheet and you should indicate your agreement to the consent form attached to this form. You can still withdraw at any time. You do not have to give a reason.

What will happen to me if I take part?

If you agree to take part in this study, you will be asked to sign the cconsent form on the last page of this document. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep. This document is 2 pages long, including g the Consent Form. Please make sure you have read and understood all the pages. We will also arrange a time to meet, for either an in-depth Interview or Focus Group interviews, which will be convenient for you at a

place convenient for you or the group members in case of a focus group interview. Lastly but not the least, when I have completed the study I will produce a summary of the findings which I will be more than happy to send you if you are interested. You may also wish to agree to a follow-up interview to confirm some answers or accuracy of your answers.

Can I be withdrawn?

Yes. The study staff, or people responsible for the study, can take you or anybody else out of the study, without consent, they feel it is in your best interest.

What are the possible benefits of taking part?

The main benefit of a community approach to ART delivery is to reduce the financial and time costs associated with frequent clinic visits, encourage community-based peer support, improved adherence to treatment, and provide an additional accountability mechanism to ensure continuity and quality of care for people living with HIV in service delivery. In addition, from a health system perspective, reducing clinic contact required for clinically stable ART populations and refocusing resources towards managing sick patients with complex clinical problems is a key objective, with anticipated reduction of staff workload and improvements in quality of care and programme outcomes. Lastly but not the least to improve testing coverage in resource limited areas in Zambia

What are the possible disadvantages and risks of taking part?

There are no anticipated physical risks. But possible risk of involuntary disclosure of opinions or statements. Participants may become embarrassed, worried, anxious, or uncomfortable when discussing sensitive topics. The research team has been trained to handle all the possible anticipated risks and you will not have to worry

What happens if the research study stops earlier than expected?

Should the research stop earlier than planned and you are affected in any way we will tell you and explain why.

What if something goes wrong?

If you have any complaints about the project in the first instance you can contact:

The Chairperson

UNZABREC
Ridgeway Campus
P.O BOX 50110
Lusaka
Tel:260211-256067
Fax: 260211-250753

The Dean
University of Zambia
School of Public Health
P.O BOX 50110
Telephone: 260211-252641
Fax: +260211-252681

Name: Mpanji Siwingwa

Mobile number: +260977383092

Email: mpanjisiwingwa@gmail.com

Appendix II : Consent form

If you need an INTERPRETER, please tell us.

Please tick to indicate you consent to the following *(Tick as appropriate)*

I have read, or have had read to me in my first language, and I understand the Participant Information Sheet.	Yes ☐	No ☐
I have been given sufficient time to consider whether or not to participate in this study.	Yes ☐	No ☐
I have had the opportunity to use a legal representative, family support or a friend to help me ask questions and understand the study.	Yes ☐	No ☐
I am satisfied with the answers I have been given regarding the study and I have a copy of this consent form and information sheet.	Yes ☐	No ☐
I understand that taking part in this study is voluntary (my choice) and that I may withdraw from the study at any time without this affecting my medical care/profession.	Yes ☐	No ☐
I consent to the research staff collecting and processing my information, including information about my health or work.	Yes ☐	No ☐
If I decide to withdraw from the study, I agree that the information collected about the group up to the point when I withdraw may	Yes ☐	No ☐

continue to be processed.		
5I understand that there may be risks associated with participation in either In depth Interviews or Focused Group Discussion	Yes ☐	No ☐
I understand that my participation in this study is confidential and that no material, which could identify me personally, will be used in any reports on this study.	Yes ☐	No ☐
I understand the compensation provisions in case of injury during the study.	Yes ☐	No ☐
I know who to contact if I have any questions about the study in general.	Yes ☐	No ☐
I understand my responsibilities as a study participant.	Yes ☐	No ☐
I wish to receive a summary of the results from the study.	Yes ☐	No ☐

Declaration by participant:

I have read the foregoing information and I understand completely what the research is about, or it has been read and explained to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I therefore, consent voluntarily to participate as a participant in this study.

I hereby consent to take part in this study.

Participant's name:

Signature:	Date:

Appendix III : Key informant in-depth interview question guide (English)

ID No.……Interviewer…….……Date of interview…….

Profession of interviewee……..Average Duration of ART service ……

EFFECTIVENESS

1. How do the CAGs form and function?
2. What is the role of the different CAG members and other stakeholders?
3. How are the individual relations and social interactions between the group members?
4. What are the inter-variabilities between the different groups according to the health centre/location they are related to, as well as between the individuals within a same group?
5. What is the quality and impact of CAG at clinic, community, and individual levels?
6. What is your perception, impression of the CAG model?

APPROPRIATENESS

7. How would you consider the quality of CAG laboratory service delivery: at clinic and community levels?

ELIGIBILITY

8. What are the characteristics of people, who should do and do not access CAG laboratory services?
9. What are the main barriers to entering CAG laboratory services? Who should be eligible for CAG laboratory services?

EQUITY

10. How is the relationship between patients in CAG laboratory services and in individual HIV care?

RELEVANCE

11. What are the benefits of CAG laboratory services in the current model?
12. How could CAG model better meet the needs of patients, population and health system?
13. How do you see the future of the CAG model?

If there are no questions or concerns, we have now come to the end of our interview. Thank you very much for your time and your participation.

Appendix IV: Guiding question topics for focus group discussions

FGD No.……Interviewer…….……Date of interview…….

Age of interviewees……..Average Duration of ART service……..

Sex Composition……..Group Number……..

INTRODUCTION

1. Mention some of the tests that you know that has been conducted on you (or somebody else and would you?
2. Would you know why the doctor/nurse /clinical officer requested for such tests?
3. What do you understand by viral load tests and Why is it Important to you?
4. What is GAG model and Why is it Important to you?
5. How long have you been utilizing/ working with the CAG model?

EFFECTIVENESS

6. How do the CAGs form and function?
7. What is the role of the different CAG members and other stakeholders?
8. How are the individual relations and social interactions between the group members?
9. What are the inter-variabilities between the different groups according to the health centre/location they are related to, as well as between the individuals within a same group?
10. What is the quality and impact of CAG at clinic, community, and individual levels?
11. What is your perception, impression of the CAG model?

APPROPRIATENESS

12. How would you consider the quality of CAG laboratory service delivery: at clinic and community levels?
13. Would the Inclusion of laboratory tests in this model improve the quality of service delivery in the community or the way health personnel attend to you?
14. Do you think the laboratory would make any difference when they are included in the model?

ELIGIBILITY

15. What are the characteristics of people, who should do and do not access CAG laboratory services?
16. What are the main barriers to entering CAG laboratory services? Who should be eligible for CAG laboratory services?

EQUITY

17. How is the relationship between patients in CAG laboratory services and in individual HIV care?

RELEVANCE

18. What are the benefits of CAG laboratory services in the current model?
19. How could CAG model better meet the needs of patients, population and health system?
20. How do you see the future of the CAG model?

If there are no questions or concerns, we have now come to the end of our interview. Thank you very much for your time and your participation.

Appendix V: Umukankala uwakumwafwilisha uwakwasuka amepusho (Bemba version)

Inambala iyacitupa……Kepusha……..Ubushiku bwamepusho…….

Incinto iyakasuuka wamepusho…….Inshita iyakwikatilamo imilimo iya ART

UBUNONSHI

1. Bushe ama CAGs ya pangwa noku bomba shani?
2. Bushe ninchito nshi ishapusana pakati pa mamembala ba CAG nentungulushi ishatubungwe utwapusanapusana?
3. Bushe ubumfwano pakati pamembala naabashaala bwabashani?
4. Bupusanonshi bwabapo pakati pamabuumba ukulingana notubungwe twabumi okotusangwa,kabili napakati pamamembala mukabungo kamokene.
5. Busuma na malipilonshi ya CAG pa cipatala, munchende, na membala? #
6. Bushe mumona nunkunfwashani pamipangile Iya CAG?

UBUSUMA

7. Muimona shani imibombee iya CAG laboratory mukufilisha ishancito pa chipatala na munchende ishalekanalekana?

IFIFWAIKWA

8. Finshi fifwaikwa kubantu, abafwile na bashifwile ukusendamo ulubali mu CAG laboratory?
9. Finshi filenga abantu beingila mu CAG laboratory mukundapwa? Bantushi bafwile ukusenda ulubali mu mibombele ya CAG laboratory?

UKULIGANYA

10. Bushe abalwele bomfwana shani mu mibombele iya CAG laboratory na mumyundapile iya HIV?

UBUKANKALA

11. Ubusumanshi bwabamo mumibombele yaba CAG laboratory pali ndaakayi?
12. Bushi nimunshilanshi CAG inga kwanishishamo ubufwayo wabalwele, icintu bwingi na ubumi?
13. Bushe mumona shani ubuyantanshi bwami pangile iya CAG?

Nga tapali amepusho, iyi empela ya mepusho. Twatotela sana panshita na mukusendamo ulubali.

Appendix VI: Ukutugilila kwamepusho (Bemba version)

Nambala ya FGD ……..Kepusha…….Ubushiku bwamepusho……..

Imyaka ya kasuka wamepusho…….. Inshita iyakwikatilamo imilimo iya ART

Imibele yamuntu……..inambala ya kabungwe……..

INTENDEKELO

1. Lumbuleni imipiminwe mwaisha eyo bacita paliimwe ?
2. Kutimwaishiba icalengele bashing'anga bafwaye imipiminwe iyi?
3. Finshi mwaishibapo pa mipiminwe ya viral load elyo bushe cikankala nshi kuliimwe?
4. Imipangile ya GAG ninshi elyo bushe cikankala nshi kuliimwe?
5. Bushe imipangile ya CAG mwaibomfya kufuma lilali?

UBUNOSHI

6. Bushe ama CAGs ya pangwa noku bomba shani?
7. Bushe ninchito nshi ishapusana pakati pa mamembala ba CAG nentungulushi ishatubungwe utwapusanapusana?
8. Bushe ubumfwano pakati pamembala naabashaala bwabashani?
9. Bupusanonshi bwabapo pakati pamabuumba ukulingana notubungwe twabumi okotusangwa,kabili napakati pamamembala mukabungo kamokene.
10. Busuma na malipilonshi ya CAG pa cipatala, munchende, na membala?
11. Bushe mumona nunkunfwashani pamipangile Iya CAG?

UBUSUMA

12. Muimona shani imibombee iya CAG laboratory mukufilisha ishancito pa chipatala na munchende ishalekanalekana?
13. Bushe ukubikamo kwa imipimine iya mu laboratory kuti yatwala pantanshi mukufikilisha kwamibombe mu ncended nangu mumibombele bashing'anga bamyundapilamo?
14. Bushe ama laboratorys kuti yapanga ubupusano ngabayabika mumipangile iyi?

IFIFWAIKWA

15. Finshi fifwaikwa kubantu, abafwile na bashifwile ukusendamo ulubali mu CAG?

16. Finshi filenga abantu beingila mu CAG laboratory mukundapwa?

UBULIGANYA

17. Bushe abalwele bomfwana shani mu mibombele iya CAG laboratory na mumyundapile iya HIV?

UBUKANKALA

18. Ubusumanshi bwabamo mumibombele yaba CAG laboratory pali ndaakayi?

19. Bushi nimunshilanshi CAG inga kwanishishamo ubufwayo wabalwele, icintu bwingi na ubumi?

20. Bushe mumona shani ubuyantanshi bwami pangile iya CAG?

Nga tapali amepusho, iyi empela ya mepusho. Twatotela sana panshita na mukusendamo ulubali.

Appendix VII: Fungulo lotsongolera pa mafunso a zokambilana mozama (Nyanja)

Nambala ya chitupa……ofunsa…….tsiku lofunsira……..

Nchito ya ofunsidwa…… Pindi yo landililamo citetezo ca ART …….

UBWINO /UYENERALA

1. kodi ma CAG ya pangidwa bwanji ndipo yasewenza bwanji?
2. Kodi pali mugwilizano wotani pakati pa mamembala a gulu ili?
3. Kodi ndizokoma zotani ndiponso ndizo cocuka motani za CAG pa chipatala, ndi mzinda, ndi pa anthu omwe?
4. Kodi ndi zinthu zabwanji zosiyana pakati pamagulu wosiyana-siyana kulingana ndi malo azaumoyo amene apezekako,ndi pakati pa anthu wopezeka mugulu limozi?
5. kodi lingo lanu ndi lotani pa zandondomeko ya CAG?)
6. Kodi muwona ndi kumva motani pa za CAG modelo?

KUYENELEZA

7. Kodi mukutenga bwanji kukoma kwa nchito za mulaboratoryu zopelekedwa ndi CAG: pa chipatala ndi malo wonkhalamo?

KUYENELERA

8. Kodi ndi anthu azochitika zabwanji amene afunikila ndi amene safunikila kutengako mbali pa nchito za mulaboratoryu ya CAG?
9. Kodi ndi zipsyinjo/ zopinga zotani zimene zingaletse kulowa nchito yaku laboratoryu ya CAG? Ndani woyenela kugwira nchito ya kulaboratoryu ya CAG?

KULINGANIZA

10. Kodi pali mugwirizano bwanji pakati pa odwala amene agwira nchito mulaboratoryu ya CAG ndi munthu Wozisamalira ku kalombo ka HIV?

ZOFUNIKILA/(ZOPEDZEKAMO)

11. Kodi nizabwino zotani zimene zipezeka mu zi nchito za kulaboratoryu ya CAG mu modelo ya tsopano?

12. Kodi CAG modelo inga kwanilitse bwanji kukumanitsa bwino zofunikila za wodwala, muzinda wa anthu ndi za umoyo?

13. Kodi muwonapo bwanji zatsogolo la CAG modelo?

Kapena palibe mafunso kapena zokhuza zina, tafika kumapeto kwazokambilana zathu. Zikomo kwambili panthawi yanu ndi potenga mbali.

Appendix VIII: Pothela pa chiwiri: mafunsi yotisogolera m'zokambilana (Nyanja).

Nambala ya FGD……. . wofunsa…… tsiku lofunsila……

Zaka za wofunsidwa……..muyeso wa nthawi yogwira nchito ya zopanga-panga……...

Mukazi kapena mwamuna……..nambala ya gulu……..

CHIYAMBI

1. Chulani mayeso yamene mudziwa yomwe yanachitidwa pa inu ndi yomwe mungafune?
2. Kodi mungadziwe chifukwa ndichiyani adotolo/ anasi ndi mukulu wa pachipatala anfusira mayeso wotele?
3. Kodi mumvetsa motani pa za mayeso ya unyinji wa kalombo ndipo ndichifukwa nichani ndiyofunikira kwa inu?
4. Kodi CAG modelo ndichiyani ndipo ndichifukwa nichani ndiyofunikira kwa inu?
5. Kodi mwakhala kwa nthawi yotani mukusewenzetsa CAG modelo?

UBWINO /UYENERALA

6. kodi ma CAG yapangidwa bwanji ndipo yasewenza bwanji?
7. Kodi ndi nchito bwanji zosiyana-siyana zimene zigwilidwa ndi mamembala ndi ena wofunika kutengakombali?
8. Kodi pali mugwilizano wotani pakati pa mamembala a gulu ili?
9. Kodi ndi zinthu zotani zosiyana pakati pamagulu wosiyana-siyana kulingana ndi malo azaumoyo amene apezekako,ndiponso pakati pa anthu wopezeka mugulu limozi?
10. Kodi ndikukoma kwabwanji ndiponso zotulukamo zabwanji za CAG pa chipatala, malo wokalamo, ndi muyeso wa munthu?
11. Kodi muwona ndi kumva motani pa za CAG modelo?

KUYENELEZA

12. Kodi mukutenga bwanji kukoma kwa nchito za mulaboratoryu zopelekedwa ndi CAG: pa chipatala ndi malo wonkhalamo?

13. Kodi kuikamo kwa mayeso yamu laboratoryolitali mu modelo ili kungabweletse kupita patsogolo mu ubwino upeleka nchito mumalo wokhalamo kapena njira yopelekela za umoyo kwa inu?

14. Kodi muganiza kuti ma laboratoryu yangabweletse kusintha kuli-konse ngati yaikidwamo mu modelo ?

KUYENELERA

15. Kodi ndi anthu azochitika zabwanji amene afunikila ndi amene safunikila kutengako mbali pa nchito za mulaboratoryu ya CAG? Kodi ndi anthu otani amene afunikila ndi amene safunikila kutengako mbali pa uwongolelo wa CAG laboratoryu?

16. Kodi ndi zipsyinjo/ zopinga zotani zimene zingaletse kulowa nchito yaku laboratoryu ya CAG? Ndani woyenela kugwira nchito ya kulaboratoryu ya CAG?

KULINGANIZA

17. Kodi pali mugwirizano bwanji pakati pa odwala amene agwira nchito mulaboratoryu ya CAG ndi munthu Wodzisamalira ku kalombo ka HIV?

ZOFUNIKILA

18. Kodi nizabwino zotani zimene zipezeka mu zi nchito za kulaboratoryu ya CAG mu modelo ya tsopano?

19. Kodi CAG modelo inga kwanilitse bwanji kukumanitsa bwino zofunikila za wodwala, muzinda wa anthu ndi za umoyo?

20. Kodi muwonapo bwanji za tsogolo la CAG modelo?

Kapena palibe mafunso, ndizokhudza zina, tafika kumapeto yazokambilana zathu. Zikomo kwambili pamupata ndi potengako mbali

Appendix IX: UNZABREC Ethical approval

THE UNIVERSITY OF ZAMBIA

BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: 260-1-256067
Telegrams: UNZA, LUSAKA
Telex: UNZALU ZA 44370
Fax: + 260-1-250753
E-mail: unzarec@unza.zm
Assurance No. FWA00000338
IRB00001131 of IORG0000774

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia

10th October, 2017.

Your Ref: 016-06-17.

Mr. Mpanji Siwingwa,
C/O University of Zambia,
School of Public Health,
P.O Box 50110,
Lusaka.

Dear Mr. Siwingwa,

RE: RESUBMITTED RESEARCH PROPOSAL: "PERCEPTIONS, BARRIERS AND FEASIBILITY OF DECENTRALIZING THE COLLECTION OF BLOOD SAMPLES FOR TESTING TO THE COMMUNITY THROUGH THE COMMUNITY ANTIRETROVIRAL GROUP MODEL IN LUSAKA, ZAMBIA" (REF. No.016-06-17)

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee on 6th October, 2017. The proposal is approved.

CONDITIONS:

- This approval is based strictly on your submitted proposal. Should there be need for you to modify or change the study design or methodology, you will need to seek clearance from the Research Ethics Committee.
- If you have need for further clarification please consult this office. Please note that it is mandatory that you submit a detailed progress report of your study to this Committee every six months and a final copy of your report at the end of the study.
- Any serious adverse events must be reported at once to this Committee.
- Please note that when your approval expires you may need to request for renewal. The request should be accompanied by a Progress Report (Progress Report Forms can be obtained from the Secretariat).
- Where appropriate apply in writing to National Health Research Authority for permission before you embark on the study.
- **Ensure that a final copy of the results is submitted to this Committee.**

Yours sincerely,

Prof. M.C Maimbolwa PhD
CHAIRPERSON

Date of approval: 10th October, 2017. **Date of expiry**: 9th October, 2018.

Appendix X: National Health Research Authority approval

THE NATIONAL HEALTH RESEARCH AUTHORITY
C/O Ministry of Health
Haile Selaisse Avenue,
Ndeke House
P.O. Box 30205
LUSAKA

MH/101/23/10/1

17 October 2017

Mpanji Siwingwa

UNZA School of Medicine

P.O. Box 50110

Lusaka

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled **"Perceptions, barriers, and feasibility of decentralizing the collection of blood samples for testing to the community through the community art group model in Lusaka, Zambia."**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA quarterly from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

Dr. Godfrey Biemba
Director/CEO
National Health Research Authority

Appendix XI: Lusaka Provincial Medical Office approval

All Correspondence should be addressed to the
Provincial Medical Officer
Telephone: +260 211 256815
Telefax: +260 211 256814

PMOLSK/101/1 In reply please quote:

File No. .....

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

PROVINCIAL MEDICAL OFFICE
P. O. BOX 32573
LUSAKA

18th January, 2018

Mpanji Siwinga
Principal Investigator
School of Medecine, Ridgeway Campus
University of Zambia (UNZA)
Lusaka, Zambia

Dear Sir,

RE: AUTHORITY TO CONDUCT RESEARCH

Reference is made to the above subject matter.

Lusaka Provincial Health Office is in receipt of your letter in which you are requesting for permission to collect Primary Research Data on **"Perceptions, Barriers and Feasibility of Decentralizing the collection of blood samples for testing to the community through the community ART group model at Chilenje, Kamwala, Mwembeshi and Lwiimba ART Clinics in Lusaka Province"**.

My office is happy to inform you that we have no objection to your request for you to conduct research in Lusaka District. Besides, the final report of your research it must also be shared with this office and the targeted District where the research will be done.

18 JAN 2018

Dr. Kakungu Simpungwe
Provincial Health Director
LUSAKA PROVINCE

cc. Lusaka District Health Office

Appendix XII: Lusaka District Medical Office approval

P. O. Box 50827
Lusaka
Tel: +260-211-235554
Fax: +260-211- 236429

In reply please quote:
No:.....

REPUBLIC OF ZAMBIA

MINISTRY OF HEALTH
LUSAKA DISTRICT HEALTH OFFICE

12th January, 2018

Mpanji Siwingwa (Mr)
The University of Zambia
School of Medicine
Department of Public Health
P. O. Box 50110
LUSAKA

Dear Mr. Siwingwa,

RE: AUTHORITY TO CONDUCTRESEARCH IN LUSAKA DISTRICT

We are in receipt of your letter over the above subject.

Please be informed that Lusaka District Health Office has no objection for you to conduct research entitled **"Perceptions, barriers and feasibility of decentralizing the collection of blood samples for testing to the community through the community art group model in Lusaka, Zambia".**

Kindly ensure that your findings are shared with the health facility and District Health Office and that the normal operations of the facility are not disrupted.

By copy of this letter, the Medical Superintendent/In-Charge for Chilenje and Kamwala Health Facilities are kindly requested to facilitate accordingly.

Yours faithfully

Dr. C. Mbwili-Muleya
Principal Clinical Care Officer
For/DISTRICT HEALTH DIRECTOR

C.C: The Medical Superintendent/In-Charge: Chilenje and Kamwala Health Facilities
C.C: Supervisors: Dr. W. Mutale and Dr. SH Nzala - UNZA

Appendix XIII: Key Informants approval

All Correspondence should be addressed to the
Permanent Secretary
Telephone: +260 1 253040/5
Fax: +260 1 253344

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

In reply please quote
MH/101/9/6
No.....

NDEKE HOUSE
P. O. BOX 30205
LUSAKA

9 February, 2018

The University of Zambia
School of Medicine, Ridgeway Campus
Department of Public Health
LUSAKA.

Dear Mpanji Siwingwa,

RE: PERMISSION TO CONDUCT RESEARCH INTERVIEW ON KEY INFORMANTS

Ministry of Health is in receipt of your letter dated 5th February, 2018,

Kindly be advised that you have been granted permission to proceed as requested.

By copy of this letter, the Directors Clinical Care and diagnoistics, Director of Policy and Planning, National Lab Coordinator/HOD Pathology and Microbiology, and National HIV Treatment Program Coordinator are duly notified.

Yours sincerely,

Dr. Jabbin Mulwanda
Permanent Secretary - Health Services
MINISTRY OF HEALTH

Cc: Directors Clinical Care and diagnoise – MOH
Cc: Director of Policy and Planning – MOH
Cc: National Lab Coordinator/Hod Pathology Microbiology
Cc: National HIV Treatment Program Coordinator

Appendix XIV: Chilanga District Medical Office approval

All correspondences
Should be addressed
To the District Medical Officer

In reply please quote

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH
CHILANGA DISTRICT HEALTH OFFICE
P.O BOX 350097, CHILANGA

26th January, 2018

Mr Mpanji Siwingwa
The University of Zambia
School of Medicine, Ridgeway Campus
Department of Public Health
P.O. Box 50110,
Lusaka.

Dear Mr Siwingwa,

RE: AUTHORITY TO CONDUCT RESEARCH IN CHILANGA DISTRICT

We are in receipt of your letter over the above subject.

Please be informed that Chilanga district health office has no objection for you to conduct research entitled **"Perceptions, barriers and feasibility of decentralizing the collection of blood samples for testing to the community through the community art group model in Lusaka, Zambia".**

Kindly ensure that your findings are shared with the health facility and the district health office and that normal operations of the facility are not disrupted.

By copy of this letter, the In-Charge for Mwembeshi health facility is kindly requested to facilitate accordingly.

Dr Leah Namonje
District Health Director

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH
CHILANGA DISTRICT MEDICAL OFFICE
29 JAN 2018
DISTRICT MEDICAL OFFICER
(D.M.O)
P O BOX 350097, CHILANGA, LUSAKA

Appendix XV: Pediatrics Center of Excellence approval

MINISTRY OF HEALTH
PAEDIATRIC HIV/AIDS CENTRE OF EXCELLENCE
UNIVERSITY TEACHING HOSPITAL
DEPARTMENT OF PAEDIATRICS AND CHILD HEALTH
P.O BOX 50440
LUSAKA

IMITI IKULA
E MPANGA

01st February, 2018

Mr. Mpanji Siwingwa
Principal Investigator
University of Zambia
School of Medicine
Department of Public Health
Ridgeway Campus
Lusaka

Dear Mr. Siwingwa,

RE: AUTHORITY TO CONDUCT RESEARCH AT MWEMBESHI ART CLINIC

We are in receipt of your letter requesting for permission to conduct research at Mwembeshi ART Clinics. The program has no objection using program data to conduct your study.

Hence permission has been granted to you to conduct your research on "Perceptions, Barriers and Feasibility of Decentralizing the Collection of Blood Samples for Testing to the Community through the Community ART Group Model in Lusaka, Zambia".

Sincerely,

Dr. Chipepo Kankasa
DIRECTOR/PI, UTH-HAP

Paediatrics HIV/AIDS Center of Excellence
University Teaching Hospital, Department of Paediatrics and Child Health, Nationalist Road,
PO Box 50440, Ridgeway, Lusaka, Zambia
Tel. +260-1-257535-6 Fax:+260-1-257534

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