UNIVERSITY OF THE WESTERN CAPE

Faculty of Community and Health Sciences

FINAL RESEARCH REPORT

PROJECT TITLE: Assessment of the coverage and quality of HIV diagnosis, prevention and care activities within the TB programme in Livingstone District, Zambia

Student Name: **Cuthbert Kanene**

Student Number: **2816125**

Type of Thesis (choose one): **Mini-thesis**

Degree: **Masters in Public Health**

Department/School: **School of Public Health**

Supervisor: **Dr. Vera Scott**

Co-Supervisor: (if any)

Date: November 10, 2012

10 Keywords: Human Immunodeficiency virus (HIV), Acquired immune deficiency syndrome (AIDS), HIV/TB Integration, Republic of Zambia, Coverage, Quality, Counseling and Testing (CT), Antiretroviral therapy (ART), HIV diagnosis, Implementation models

Declarations

I Cuthbert Kanene do hereby declare that the contents of this report are my own work in consultation with my supervisor. I also declare that all citations and references have been acknowledged as shown in the references section.

Cuthbert Kanene

MPH Student

Acknowledgement

I would like to sincerely thank the organizations and persons that have contributed immensely and made this study a reality. Particular thanks go to my study supervisor Dr. Vera Scott for her technical and unrelenting professional guidance in the development and finalization of this study and the final report. I am also indebted to the University of Western Cape, South Africa -School of Public Health for the study opportunity and to the Ministry of Health in Zambia for providing the study facilities. I also wish to sincerely thank Dr. Alywn Mwinga my employment supervisor for her professional and parental support throughout my studies.

I wish to further acknowledge the following for their support and contributions in one way or another;

- Dr. Lutangu Alisheke, Southern Provincial Medical Officer
- Dr. Cliff Hara, Livingstone District Medical Officer
- Dr. Nancy Zyongwe, Clinical Care Specialist
- Dr. Kebby Musokotwane, Communicable Diseases Control Specialist
- Sister in Charges, Maramba health facility, Dambwa health facility, Libuyu health facility and Linda health facility
- Mr. Emmanuel Sakala, Provincial IT/M&E Officer
- Ms. Maureen Mukelabai, Program Management Specialist
- Mr. Francis Chibinga, Southern Provincial TB Coordinator

I also wish to sincerely thank the research assistants for their hard work in helping collect the data from the study sites. Finally special thanks go to my family for their support during my studies.

ABBREVIATIONS AND ACRONYMS

ART	Antiretroviral Therapy
CPT	Cotrimoxazole Prophylaxis Therapy
CSO	Central Statistics Office
CT	Counseling and Testing
DCT	Diagnostic Counseling and Testing
HCT	HIV Counseling and Testing
HIV	Human Immune Deficiency Virus
HIV CT	Human Immune Deficiency Virus Counseling and Testing
LGH	Livingstone General Hospital
M&E	Monitoring and Evaluation
MOH	Ministry Of Health
PITC	Provide Initiated Testing and Counseling
PLWHA	People Living With HIV/AIDS
PMTCT	Prevention of Mother to Child Transmission
STI	Sexually Transmitted Infection
TB	Tuberculosis
UWC	University Of West Cape
VCT	Voluntary Counseling and Testing
WHO	World Health Organization
ZDHS	Zambia Health and Demographic

ABSTRACT

In recognition of high dual burden of tuberculosis (TB) and Human Immunodeficiency virus (HIV) in Sub-Saharan Africa, the World Health Organization (WHO, 2004) provided guidance for implementing integrated HIV/TB services. This strategy has been implemented using different models ranging from partial to fully integrating, and evaluations of these models have been conducted to determine their effectiveness.

The aim of this study was to describe and contrast the effectiveness of different models of implementation of HIV and TB integration at primary care level within the Tuberculosis (TB) programme in Livingstone District, Zambia

The specific objectives of the study included;

1. To describe the models of integrated HIV and TB services that are currently implemented at four health facilities within the TB programme in Livingstone District at primary health care level.
2. To describe and contrast the coverage and quality of HIV diagnosis in the Tuberculosis (TB) programme achieved in the different facilities representing fully and partially integrated models of service delivery.
3. To describe and contrast the coverage and quality of HIV prevention activities in the Tuberculosis (TB) programme achieved in the different health facilities representing fully and partially integrated models of service delivery.
4. To describe and contrast the coverage and quality of HIV care activities received by co-infected clients in the Tuberculosis (TB) programme in the different facilities representing fully and partially integrated models of service delivery.
5. To describe the quality and outcomes of TB diagnosis and treatment in the different facilities representing fully and partially integrated models of service delivery.

A research design using quantitative methodologies: a cross sectional survey and structured observations or review of patient records (quantitative) were used. The records of 814 TB clients notified in 2010 served as the study population while the sample of 464 (232 from partially and 232 from fully integrated) were randomly selected. Two data collection tools namely: patient record and HIV/TB register review; facility staff interviews (key informant interviews) were used and the results were analyzed using Epi info statistical package. In the study, all respondents gave informed consent and no personal information was collected from the retrospective record review.

The HIV prevention interventions in this study were rated below 30% except for of HIV education (97%). Statistically significant differences (p-value<0.001) existed for condom provision at facility level. Poor performance reported for STI screening (below 2%) and PMTCT information (below 15%). The HIV testing rate was 94% among TB clients which was higher than the counseling coverage of 88%. Statistically significant differences (p value <0.001) at facility level existed for clients who received HIV test results. Sixty three percent (63%) of TB clients were also co- infected with HIV. ART assessment for TB clients was below 40% and statistically significant differences (p value=<0.001) between facilities were identified for this indicator. ART assessment of TB clients at the same facility they tested for HIV was above 50% for all facilities. The continuation of cotrimoxazole was poor at 38% and statistically significant differences (p value=<0.001) were identified for this indicator between facilities. Sputum testing was 85% while the cure rate was poor at 28% average for all facilities. Statistically significant differences (p-<0.001) were noticed at model level for clients cured.

Although HIV prevention and care services were introduced in the TB program in Livingstone, they were not comprehensive enough to respond to the high HIV and TB co-infectivity. For HIV prevention, other than HCT and HIV education, the rest of the critical interventions such as condom provision, STI screening and treatment, and PMTCT intervention were neglected. The HIV care services such as ART assessment and CPT implementation were also poor. There is need to put in place systems to improve these services in the district to improve treatment outcomes.

The differences that were noted in performance for the majority of the indicators were mainly at facility level as being a fully integrated facility did not guarantee effective integration or better performance.

CHAPTER ONE: INTRODUCTION

This section of the report provides the epidemiological information on HIV and TB at global, regional, national and District as well providing the context in which the study was undertaken and the rationale or problem that prompted the research.

Tuberculosis is a global public health problem and the second most frequent cause of mortality from communicable diseases in the world after HIV/AIDS, especially in Sub-Saharan Africa (Mwinga, Mwananyambe, Kanene, Kapata, & Phiri, 2008). The World Health Organization (WHO) reported that in 2007, there were about 33 million persons estimated to be living with HIV infection and 9.2 million persons with newly diagnosed TB worldwide (WHO, 2012).

The WHO (2009) reported that Africa had the highest TB incidence rate of 363 per 100, 000 population with the highest burden of HIV infection. It is estimated that about a third of 40 million people living with HIV (PLWHA) are also co-infected with TB and TB accounts for about a third of all AIDS deaths world-wide (WHO, 2009).

Zambia is one of the countries in the World with high prevalence of HIV estimated at 14% for adults aged between 15-49 years (16% for females and 12% for men (ZDHS, 2007). In Zambia, the TB notification rates increased from approximately 100 per 100,000 to above 580 cases per 100,000 population from 1984 to 2005 (Mwinga *et al*, 2008). The increase in TB burden was largely attributed to high rates of co-infection with HIV, estimated up to 70% or above (MoH, 2007). Kapata , Chanda-Kapata, O'Grady , Schwank , Bates & Mukonka(2011) reported that although the burden of TB remains high in Zambia, the case notification rates have been

declining steadily since 2004 (524 cases per 100 000 population). For example, in 2010, the case notification rate was 365 cases/100 000 population with an estimated cure rate of 82% for all forms of TB and 80% in HIV positive patients (Kapata , Chanda-Kapata, O'Grady , Schwank , Bates & Mukonka, 2011)

In Livingstone District, the study area, different models of integration of HIV and TB services have been implemented in the TB programme since 2005: in some primary health facilities all HIV services are available in the same facility, in others only a limited set of services are available and clients are referred to HIV services. To date there has been no study to evaluate the coverage and the quality of these different models of HIV integration in the TB program in Livingstone district of Zambia.

Study Setting

Livingstone City is the provincial capital of Southern Province. It is entirely urban with an estimated population of 292,000 (ZDHS, 2007). Public health and clinical care services are provided from Livingstone General Hospital (LGH) and 13 urban health facilities. Livingstone has the highest HIV community prevalence rate in Zambia of 31%, twice higher than the National (14.5 %) and Southern Province (14.2%) rates (CSO, 2004; ZDHS, 2007). The TB incidence rate is at 412 cases per 100, 000 with above 70% of TB clients also co-infected with HIV (Chinyonga, 2006). Thus, to address this dual burden of HIV and TB, HIV services were introduced in the TB program in 2005. The initial strategy provided routine HIV counselling and testing (CT) of TB clients at Dambwa health facility health facility, Maramba health facility health facilities and Livingstone General Hospital chest facility. HIV patients were also screened for TB. These services were scaled-up to all 14 health facilities in 2008. Initially HIV counselling and testing (HCT) was used to test TB clients for HIV but at the time of full scale up to all the 14 facilities, Provider Initiated Testing and Counselling (PITC) was introduced where every TB client was provided an opportunity to test for HIV unless they opted out. At this time of the study, HIV positive clients were expected to be assessed using either WHO staging or CD4 counts. Clients in WHO stage III and IV and those whose CD4 count was below 250 were eligible for ART commencement. Of 14 health facilities, only 4 have the capacity to perform the full range of HIV/TB services which include TB diagnosis, TB notification, TB Treatment, Antiretroviral Therapy (ART), HIV counselling and Testing (CT), Provider Initiated Counselling and Testing (PITC), Prevention of Mother to Child Transmission (PMTCT). The remaining ten facilities offer limited range of HIV/TB integrated services consisting of CT, PITC, PMTCT and TB treatment.

These primary and public health services are provided by a range of trained health professionals which includes medical doctors, clinical officers, and nurses and in some cases volunteers. The doctors are trained in advanced clinical medicine and surgery at degree level. In Zambia, they are trained for 7 years. They mainly attend to advanced and complicated cases that cannot be handled by the nurses and clinical officers. They are the ones who perform high level disease investigations and prescribe medication for ART and anti-TB treatment.

The clinical officers are a cadre that was introduced in Zambia at independence in 1964 to avert the problems of shortage of medical doctors. They are trained for 3 years in general clinical medicine at diploma level which equips them with skills to perform curative and preventive health services. In other words they are qualified to diagnose diseases and prescribe medicines in the absence of medical doctors. They work mainly in outpatient departments and in primary health care setting. . The nurses training range from 2 years (certificate level for the Zambia enrolled nurses) to 3 years (diploma levels for registered nurses). Their training content includes surgical, medical, public health nursing, anatomy and physiology. The volunteers are mainly counsellors and community health workers who are trained to provide basic HIV counselling, TB treatment support and health education as task shifting to meet staff shortages.

This study was conducted at four health facilities, two of which offer full range and two which offer partial HIV/TB services.

Problem Statement

The high dual burden of HIV and TB in Livingstone District necessitated the implementation of integrated HIV/TB services. A lack of central government policy on a specific model of HIV/TB integration and the limited capacity at some health facilities has meant that different models of integration have been implemented. In some sites TB sites there is "full integration" of HIV/TB services defined as all components of HIV prevention and care package available to TB clients within the facility. In other TB sites there is a limited set of HIV prevention and care services offered within the facility, so called "partial integration" at facility level. However, there has been no structured evaluation or assessment conducted to determine the extent to which HIV prevention, diagnosis and care is integrated into the TB programme, what the quality of these activities are and how effective the different models of integration implemented in the district have been in delivering integrated services.

CHAPTER TWO: LITERATURE REVIEW

The literature examines the rationale for integrated HIV/TB services, the different models developed, progress made in integration in various settings, challenges encountered, as well as how integration models have been evaluated in other study sites.

2.1 Need for HIV/TB integration

WHO (2008:2012) recommended a closer collaboration between HIV and TB programs for improving diagnosis, care, and prevention of these diseases. This was a reinforcement of the WHO (2004) Interim Policy on Collaborative Activities to emphasize the importance of integrating TB and HIV Services to decrease the burden of disease in populations where HIV is driving the TB epidemic. Some of the broad activities that WHO (2012) recommended included: strengthening the HIV/TB coordinating entities, decreasing the burden of TB in PLWHA, and reducing the burden of HIV in TB clients by providing routine HCT of TB clients. This included the provision of CPT for prevention of secondary in TB clients with HIV; early ART initiation and strengthening HIV/AIDS care and support (WHO, 2012). The new WHO policy (2012), emphasized the need to establish not only the mechanism for delivering integrated TB and HIV services but that these should be provided at the same time and location for better outcomes. In addition, it is recommended that the integrated services should be part of the broader health system which include maternal and child health, harm reduction and prison health services (WHO, 2102).

2.2 Models of integrated HIV/TB services

In Sub-Saharan Africa, different models of integration have being explored and implemented in line with WHO (2004) guidelines to mitigate the dual burden of TB and HIV. A systematic review of TB and HIV programs by Legido-Quigley, Montgomery , Khan , Fakoya, Getahun &, Grant (2010:3) demonstrated that different models of integration had been implemented as follows: "*TB service referring for HIV testing and treatment; TB service testing for HIV and referring for treatment; HIV service referring for TB screening and treatment; HIV service screening for TB and referring for treatment; and the "single facility" where tuberculosis and HIV services were provided in the same facility".* However, the review contends that there is not yet consensus on the best model of delivery. Rather each model has advantages and limitations (Legido-Quigley *et al.,* 2010; Sculier, Getahun, & Lienhardt, 2011). Thus integration ranges from no integration but referral linkages to partial integration to fully integrated (Coker , Balen , Mounier-Jack , Shigayeva , Lazarus , Rudge , Naik & Atun,, 2010; Legido-Quigley et.al, 2010).

Strengthens and weaknesses of the different models have been identified by evaluators of the integrations models. For example, it is argued that models based on referral are easier to implement as they require minimum capacity building and supervision of additional providers where the system is functional. However, these models face challenges in complex referral systems or referral systems with limited communication between facilities (Legido-Quigley *et al.*, 2010) and, if clients are not convinced of the need to undergo additional testing and screening, then they do not follow through on the referral. Additional limitations include poor data systems, limited infrastructure for HIV testing, and unmotivated, untrained and overloaded health workers (Legido-Quigley *et al.,* 2010; Simon, Neel, Wafaa, & Gerald, 2005; Nansera,

Bajunire, Kabakyenga, Asiimwe & Mayanja-Kizza, l 2010; Countinho and Mermin, 2008). Legido-Quigley *et a*l., (2010) established that unlike referral models, those with closer collaboration demand more staff training and infrastructure, whilst the more integrated ones have comparative advantages for the health providers and the clients where HIV is high among TB clients as it avoids referral problems, and fosters improved coordination of patients.

2.3 Progress and challenges of integrated HIV/TB services

In 2007 the TB program introduced HIV CT services within the TB diagnostic health facilities facility Livingstone district of Zambia; a retrospective review showed that of the 4,148 notified TB clients, 2,072 (50%) were tested for HIV; of these, 1,497 (72%) tested positive (Mwinga *et al,* 2008). The study further established that despite success in increasing the proportion of TB clients testing for HIV, the referral system had limitations and that some of the registers were incomplete, making patient follow-ups difficult(Mwinga, *et al* 2008). Malawi integrated HIV and TB services through close collaboration between the TB and HIV program (WHO, 2009; Friedman et.al, 2007). Similar to the Zambia program above, the Malawi model used the TB programme for HIV testing and then referred for HIV treatment. As in Zambia the introduction of 'Opt-out' routine HIV counselling and testing for TB clients resulted in progressive increase in HIV testing among TB clients from 8% in 2002 to 47% in 2005 and more than 90% of HIV positive TB clients put on CPT (WHO, 2009, Friedman et.al, 2007). However, coverage for ART remained as low as 20% or below owing to the policy of delaying ART until the intensive phase of TB treatment was completed to avoid drug interactions and immune reconstitution (Friedman et.al, 2007). This low uptake was also attributed to patients not returning to central level facilities for ART services as they would be feeling much better (Corbett *et.al,* 2006). In addition to

clients being eligible for ART after the intensive phase, the Malawi program had a critical shortage of laboratories to perform CD4-lymphocyte count making it difficult to start eligible HIV positive TB clients, hence only a small proportion were started on ART *(WHO, 2009:01).* The other key challenge was making continued CPT available after completing TB treatment (WHO, 2009). The Tanzania and Kenyan TB program used similar models of integration and successfully introduced routine 'Opt-out' Provider Initiated Counselling and Testing (PITC) for HIV for TB which resulted in HIV testing of 88% and 89% respectively (Wallrauch *et. al* 2008).

Unlike the above examples, Mozambique used models where patients were diagnosed either for TB or HIV at lower facilities but referred to treatment at central level (Mecip, 2005). That is, the TB sites diagnosed TB but referred patients for HIV testing to VCT centres as opposed to testing at the same facility and VCT sites only focused on prevention and HIV testing and referred clients for HIV treatment and TB diagnosis and estimated 47% of these TB patients were found to be co-infected with HIV (Mecip, 2005). In Rwanda (Simon, Neel, Wafaa & Gerald, 2007) a fully integrated model resulted in increased HIV CT among TB clients and improved the diagnosis of TB in HIV patients. However, insufficient structures and human capabilities coupled with rising caseloads driven by either TB or HIV posed challenges to the integration process. This is similar to the Malawi case above where integration problems are also related to the broader health system structural problems.

In South Africa, Khayelitsha sub district had 1283 TB new cases per 100,000 with an HIV co-infection rate of 76% in 2005 prompting integrated services as a one-stop facility which resulted in increased HIV testing of TB clients from 30% to 87% compared to the nearby Gugulethu

facility which reported 8% to 40% as a result of lack of integrated services (Friedman et.al, 2007).

2.4 Evaluation of integrated HIV/TB services

The evaluations of HIV and TB integrated models applied different strategies and methodologies. Coker *et al*. (2010) used a conceptual framework with mixed methodologies of quantitative and qualitative data arranged in six initial domains: context, epidemiological problem, intervention, mechanism, output, and outcome. They then added a domain that included public health function and levels of integration using case studies (Coker, *et al*, 2010). In Uganda, a cross-section study which combined qualitative and quantitative data collection methodologies was used (Nansera *et.al 2011).* The tool assessed the available HIV diagnosis and care services in the TB program, practices and challenges in the in integrated TB/HIV services in lower level health units providing TB treatment (Nansera *et.al, 2011*). In South Africa, a cross-sectional quantitative evaluation instrument was developed and used to determine the level implementation of TB/HIV integrated services by managers and researchers (Scott *et.al*, 2010). This tool was adapted from a UNICEF/WHO tool developed to evaluate PMTCT programmes in low-income countries and is framed by the Conditions of Effectiveness. It looked at the following domains at facility and district level: access, availability of key resources to offer an integrated service, capacity of staff in terms of training, quality of care and continuity of care. In Cameroon, a cross sectional survey was used to evaluate the progress made in TB/HIV collaboration through the review of HIV and TB routine data from the TB registers in line with WHO (2004) recommendations (Yumo, Kaubana & Neuhann, 2011). These evaluations have been very important in identifying the strengths, gaps/barriers of the models as well as helping in pointing to solutions and identifying new areas for future operational research, policy

formulation and performance improvements in TB/HIV integration (Legido-Quigley *et.al*, 2010; Sculier *et al*, 2011).

2.5 Summary

Integrated HIV/TB services have been implemented in several parts of the world following the WHO (2004) policy using different models. This has resulted in increased HIV testing and counselling among TB patient using the different models. Despite this progress a number challenges existed at different levels and will continue to require policy changes and country level implementation to ensure integration of HIV/TB services are successful to improve patient management and improve treatment outcome.

CHAPTER THREE: METHODS

3.1. Aim

The aim of this study was to describe and contrast the effectiveness of different models of implementation of HIV and TB integration at primary care level within the Tuberculosis (TB) programme in Livingstone District, Zambia

3.2 Specific Objectives

The following were the specific objectives of the study;

1. To describe the models of integrated HIV and TB services which are currently implemented at four facilities within the TB programme in Livingstone District at primary health care level.
2. To describe and contrast the coverage and quality of HIV diagnosis in the Tuberculosis (TB) programme achieved in the different facilities representing fully and partially integrated models of service delivery.
3. To describe and contrast the coverage and quality of HIV prevention activities in the Tuberculosis (TB) programme achieved in the different facilities representing fully and partially integrated models of service delivery.
4. To describe and contrast the coverage and quality of HIV care activities received by co-infected clients in the Tuberculosis (TB) programme in the different facilities representing fully and partially integrated models of service delivery.
5. To describe the quality and outcomes of TB diagnosis and treatment in the different facilities representing fully and partially integrated models of service delivery.

3.3 Study design

This study used a quantitative methodology: a cross sectional structured observations of patient records. The cross sectional survey study design was relevant to this type of implementation research as it allowed a comparison of the quality and coverage of integrated services between facilities and to some extent the two models of health services delivery in the TB/HIV program. It was advantageous as it is relatively easy and economical to conduct (Jourbert and Ehrlich, 2007). This methodology permitted the study team to collect data through a retrospective review of patient records (folders, registers and treatment cards) from the four study sites. In order to describe the HIV/TB integrated models and the existing referral systems for services, key informant interviews were held with the Districts Medical Officer, district TB/HIV focal point person, health center in charges/ managers and TB corner nurses in the 4 study sites.

Another study design that could be used would have been a case study using qualitative methods with the different models of integration studied as individual cases to establish experiences, lessons learnt/ best practices, and thus important in reporting on what worked, where, why, and how in the integration of TB/HIV (Coker *et al.* 2010).

3.4 Definitions of key terms

In this study, quality was measured as the degree to which the facilities were adhering to national protocols/guidelines in implementing TB/HIV integrated services. These included HIV prevention services in TB which included counseling and testing, HIV education, the provision and promotion of condoms, PMTCT and STI screening. HIV care activities included provision of Cotrimoxazole (CPT) to HIV positive TB clients, ART eligibility assessment and provision of ART.

Condom provision referred to the act of giving condoms or making patients access condoms during the clinic visit at first visit and follow up visits. This information was collected from the distribution registers or from the integrated HIV counseling and testing registers available in the study sites.

ART assessment according to the Ministry of Health (2010) ART guidelines is determined when a patient's CD4 is measured to ascertain suitability for commencement on anti-Retro viral therapy. In Zambia any patient with less than 350 CD4 count is eligible for ART. ART assessment is also done using the WHO staging where CD4 count facility is not available (MOH, 2010). But in this study CD4 count was the standard measure of ART assessment. This is performed once a patient tests positive for HIV and flow up monitoring at 6 months intervals. This information is collected from the pre- and ART registers.

In this study, the partially integrated services are those facilities which offered limited TB and HIV services. These are the health facilities that are not able to diagnose TB in which case the TB suspects are referred away for TB diagnosis and commencement of treatment; once on

treatment they return to the referring facility for continuation of treatment or resupply of drugs. The limited HIV services include counseling and testing, HIV education, provision of CPT and condom provision and are all provided at the same facility by the same health workers.

On the other hand the fully integrated services were the ones where the full range of the HIV services (such as counseling and testing, HIV education, PMTCT, STI screening, provision of CPT, provision of ART) and TB services (TB notification, TB Diagnosis, TB treatment and TB monitoring) are offered in the same facility (Maramba health facility and Dambwa health facility).

3.5Sampling

Livingstone district has 14 health facilities of which only 3 provided a full range of TB/HIV services in 2010. Two of these 3, Maramba health facility health centre and Dambwa health facility health centre were purposively selected due to their high TB notification rates. This enabled an adequate number of TB clients to be randomly sampled. In addition, these were the two largest facilities under Livingstone District Health Office and were among the first to introduce integrated TB/HIV services in 2005. These two facilities were matched for size and patient load with two health centres which offered partially integrated HIV/TB services: Linda health facility health centre and Libuyu health facility. .

In 2010, the total number of TB clients notified and started on TB treatment in the 4 TB diagnostic centres selected from January to December was 814 with 582 TB clients from the two fully integrated facilities and 232 were from the two partially integrated facilities. These patients served as the study population.

3.6 Sample size

This study set out to describe and contrast the integration in two models of care and a matching sample size for each was calculated for the fully integrated and the partially integrated sites. The sample size for the fully integrated site was calculated using the sample size calculator for population surveys which is found in the StatCalc function of EpiInfo (version 6).

According to the MoH (2007), it is expected that 80% of the TB clients notified would receive counselling and testing for HIV. The worst case scenario in this study is 75%. The study used a margin error or level of precision of 5% and the 95% confidence interval. This meant that of the 582 cases treated in the fully integrated facilities, 173 needed to be in the sample (40% of the notified cases). A further 10% was added manually to compensate for incomplete questionnaires, errors, spoiled and other unexpected problems which took the sample size up to 190 cases.

Assumptions:

True population would be within ± 0.1 of the estimated population

The interval p± 0.05 is a 95% confidence interval

Systematic random sampling would be used

Response Rate of 90% was expected (which in this study was interpreted to be the rate of complete data records)

The total number of notified cases of TB from the partially integrated facilities was 232. Because it was desirable to use an equal number of cases, it was decided to include all cases that were

from the partially integrated site and to increase the number of cases from the fully integrated site to 232 (from 190) to match this. The use of a larger sample size for the fully integrated increased the power of the calculation.

The HIV positive TB clients stood a better chance of being fully assessed for ART at the same facility where they tested at fully integrating facilities as compared to the partially integrated ones where they would be referred to other facilities for assessment.

It was anticipated that a higher proportion of HIV and TB co-infected patients would be commenced timely on ART in the fully integrating facilities as compared to the partially integrated facilities since the services were available in the later without having nurses or clinical officers to refer patients off site.

3.7 Sampling frame

The sampling frame used in the fully integrated facilities was the TB registers which had the details of all TB clients and contained information on their access to HIV services as well. The study therefore, sampled from all the TB clients notified at the selected facilities irrespective of age or gender. This study used a systematic sampling method where the first sampled member was selected randomly (Hedges, 1978). In this case, in each fully integrated site the first patient folder was selected randomly from the TB treatment registers. Thereafter, given the total sample size and the number needed for the sample it was calculated that that the research team sampled every 2.5 folder. Therefore, the team sampled every 2 and then 3rd folder alternatively.

The advantage of this sampling method was that it reduced selection bias which gave each

patient folder an equal chance of being selected. Below is Table 3.1 showing the proportions from the four facilities and their contribution to the sample size.

Table 3.1: Sample Size Calculations

	Name of Health Centre	Number of cases notified	Calculated sample per facility	Actual sample per facility	Percentage of calculated
Full package of integrated services offered	Maramba health facility	393 (67%)	155	125	81%
	Dambwa health facility	189 (33%)	77	62	81%
	Total	582 (100%)	232	187	
Partial package of integrated services offered	Linda health facility	103	103*	59	57.2%
	Libuyu health facility	129	129*	126	98%
	Total	232	232	185	

* No sampling done of clients attending the facilities offering a partial package of integrated services, entire population included

The challenge with this sampling was incomplete registers, missing folders and inconsistent variables recorded by different people (Jourbert and Ehrlich, 2007) as well as improperly filled in registers. In order to address this problem, the sample size had been calculated to include an adjustment for non-response and errors as explained above. The study had initially included all the 232 notified cases from the partially integrated facilities but during the actual data collection

and cleaning exercise, only 187 cases were finally entered for analysis. It was noted that during the data collection exercise patients records were collectively either missing or incomplete. Precisely 19% of patient folders were missing from TB program records at Maramba health facility and Dambwa health facility health facilities. Libuyu health facility had the lowest folders missing at 2% while Linda health facility had the highest folders of up 43% missing. This could be attributed to the fact that this is a partially integrating facility and refers its patients for TB diagnosis to either Maramba health facility or Dambwa health facility. This thus meant that only 81% of the records were entered and analysed for this study.

Similarly in the fully integrated only 187 cases are entered for analysis.

3.8 Data Collection Methods

There are two data collection tools that were used in this study. The first was the patient record and HIV/TB register review. The patient record review was divided into 4 sections: patient identification, HIV counseling and testing, TB screening and treatment and ART assessment. The second data collection method was the health facility staff interview schedule which looked at the capacity of the facility to integrate HIV and TB services in terms of staffing and availability of drugs, space and support services such as laboratory services. This helped in describing the models in detail. In this study, the documented sources of data that were reviewed included patient records such as folders, treatment cards and HIV/TB registers for all clients notified in the period January to December 2010. The records were reviewed by the research team until the last notified patient had completed TB treatment. The data that was collected from these sources included TB notification details, age groups, sex, TB screening, HIV counseling

data, HIV testing, CPT, CD4 testing, treatment outcomes such as cured, completed or failure and died.

3.10 Reliability

Reliability is the "degree of similarity of the results obtained when the measurement is repeated on the same subject or the same group" (Jourbert and Ehrlich, 2007: 117). Errors can arise from random sampling error or chance. The random sampling error in this study was addressed by increasing the sample size which included a measure of imprecision of 5%. In order to improve and assure reliability, the data collection tools were piloted at Airport facility which has similar characteristics with the partially integrated facilities included in this study. This site was also selected because the researcher was familiar with the facility though it was not a study site. Ten patient folders and three staff interviews were used in the pilot. This assisted to identify ambiguous questions and provide for adjustments the data collection exercise. To strengthen reliability the five research assistants were trained in data collection by the researcher on how to collect the data and understand the key elements of the study. The pilot served as a practical component to the training for the research assistants as it increased their understanding of the tool and allowed the researcher to identify and correct errors they made in interpreting the registers and records. The results of the pilot test were assessed and it was not necessary to make changes to the interviewing approach and/or data collection tools. A data collection supervisor with practical field experience in data collection was engaged and was available all the time to monitor the research assistants in the field and to ensure data quality and accuracy. Furthermore, the data collection supervisor met the research assistants after each day's data collection to identify and address problems early.

3.11 Validity

Validity is considered as how close a study result or measures may be to the truth (Jourbert and Ehrlich, 2007). It determines whether the research method and the tool being used are able to measure what is set out to measure. In this study, the methods and data collection instruments were in line with the proposed study objectives. In order to improve validity in this case, the variables that were measured are in line with the Ministry of Health, Zambia TB and HIV integration guidelines and were those captured in the TB and HIV registers and treatment cards currently used. The variable and data collection instruments are also based on a HIV/TB/STI integration tool which has been tested for face and content validity in Cape Town, South Africa (Scott et al, 2010). To further strengthen content validity in the development of the tools, discussions were held with the Southern Provincial Medical Office TB Officer, the Livingstone District Medical Officer and the health facility in-Charges/managers and TB corner nurses in the 4 study sites. The instrument was also assessed by the health workers at the pilot for face validity though no changes were recommended

3.12 Data Analysis

Initially, all collected data was cleaned and checked for completeness and errors as well as for removing duplicate records. This helped to remove outliers and ensure that the data values were within accepted ranges. A total of 374 records were entered in Epi info, a statistical package. The data was coded using number codes such as 1 for Yes and 2 for No as shown in the data

capture sheets at Appendix 1. The tables, graphs and figures were used to present the study results. In comparing the data from the four facilities statistical test namely the T-test was used. The summary data for the indicators in this study such as means, medians and frequency tables were also used.

3.13. Ethical Considerations

Written permission was obtained from review boards for ethical clearance before the study was implemented. These were the University of Western Cape, the Southern Provincial and Livingstone District Health Offices and the respective managements of the facilities that were studied. In the retrospective record review, it was not be possible to get client consent but no personal information was sought or divulged and there were no risks to the clients in this health system research. The patient names were not collected during the study - only codes were used. TB Patient identification numbers were collected to enable the supervisor to cross check the work of the research assistants. Retired nurses served as research assistants as they were already sensitive to the issue of confidentiality and they received training on the importance of confidentiality before the study started. There were no specific benefits to the clients whose records were reviewed; however there were potential benefits to the future client community in that recommendations were made to the Ministry of Health for policy considerations. In the key informant interviews there was voluntary participation and the respondents retained the right to refuse to take part in the study. The study ensured that there was no recrimination in the system for those who were critical of the status quo. Compensation was not provided to participants as they did not incur any transport costs. This might have set a precedent that might subsequently

make research difficult without compensation. The study team did not encounter any ethical problems in the field as confidentiality was assured

CHAPTER FOUR: RESULTS

This section of the report presents the results of the study with the findings from the individual study sites and the two models of HIV/TB integration (fully and partially).The section describes the two models and provides results in form of tables and graphs for HIV prevention services, HIV care, TB diagnosis and treatment out comes in Livingstone district.

4.1 Human Resources in the Study Sites

Table 5.1. Human resources per facility

	Maramba health facility	***Dambwa health facility***	**Libuyu health facility**	**Linda health facility**
Medical doctor	1	0	0	0
Clinical officer	4	3	1	2
Nurse	31	20	20	17
Volunteer	20	36	3	4

Table 5.1 shows that the HIV and TB services were provided by four different cadres of health professionals described in detail in the study setting section of this report. These are Doctors, clinical Officers, Nurses and Volunteers who are full time employees of the Ministry of Health in Zambia. In this study only Maramba health facility had a medical doctor. The doctor was responsible for providing advanced clinical care services such as adverse drug reactions, treatment failure and detection of other opportunistic infections due to the wider knowledge and understanding of physiology, pharmacology, pathology and microbiology. The doctor was also

responsible for immunological and clinical monitoring of patients through laboratory and general medical checkups and reviews.

Each facility at least had one clinical officer (Maramba health facility (4), Dambwa health facility (3), Libuyu health facility (1) and Linda health facility (2). The clinical officers were also trained to diagnose and commenced patients on either TB or ART treatment and monitored patients on treatment. Once the clinical officers came across a complicated case such as treatment failure or adverse drug reactions, the patients were referred to Maramba health facility or Livingstone general hospital where medical doctors were available for further patient management. The clinical officers were also able to assess TB HIV positive patients for ART eligibility, counsel and test TB clients for HIV, screen clients for STI and provide PMTCT information.

Table 5.1 shows that the main staffing cadre was nurses with Linda health facility having the lowest (17); followed by Dambwa health facility and Libuyu health facility with 20 each and Maramba health facility had the highest with 31 nurses. The nurses provided most of the services in this study such as HIV education, PMCTC information, initial ART assessment, referral of patients, HIV counseling and testing, provision of CPT and also did the documentation of the data in all the facilities.

The table also showed differences in the number volunteers that were available at the four health facilities. For example, Dambwa health facility had the highest number (36); followed by Maramba health facility (20), Linda health facility (4) and the least was Libuyu health facility with (3). The role of the volunteers was to support patients to adhere to TB and HIV treatment,

assist the health workers in the community follow-up of patients. They also helped to refer TB suspects from the community to the health facilities for diagnosis and treatment. The volunteers also helped to provide HIV education, and counseling and testing. This was part of task shifting to enable trained health professionals attend to clinical care specific duties such as diagnosis, treatment and nursing of TB clients.

4.2 Description of Models of TB / HIV Integration in Livingstone District

Figure 5.2.below shows that there are two models of HIV and TB integration in this study. In the first model of '*partially integrated'* services (seen at Linda health facility and Libuyu health facility) both the HIV services and TB services were partially provided at the same facility Linda health facility and Libuyu health facility. In this case, the partial HIV services implemented included HIV education, HIV counseling and testing, PMTCT information and STI screening but not ART assessment or ART commencement.

The HIV education services were mainly provided to TB clients by trained nurses. This education was provided during health education sessions especially when patients reported first at the outpatient department or in some cases in the waiting rooms. In an event that the nurses were not available, trained community lay counselors provided HIV education to TB clients. The HIV education was also provided by the clinical officers as part of Provider Initiated Testing and Counseling (PITC) as they diagnosed and commenced patients on TB or ART medications in the screening rooms or TB corners (usually rooms or any convenient place). The TB corners are spaces or rooms that were designated to attend to TB clients in a given health facility. In partially integrated facilities where space is limited, a TB corner is merely a space with a table where TB

clients receive there drugs and adherence support but in fully integrated sites, this could be a room designated for the TB clients. The TB corners are usually located in the outpatient departments and not in the wards.

As part of HIV prevention services provided, condoms were distributed to TB clients in the TB facilities by either the TB corner nurses or the clinical officers who were on duty at that particular time. The community lay counselors also provided condoms to TB clients as part of HIV prevention package.

STI screening and treatment was an essential component of the provider initiated testing and counseling for HIV for TB clients. The TB clients were thus counseled and screened for STIs by clinical officers or medical doctors in the OPD or consultation rooms. However, the screening of STI in TB clients was not done routinely and the recording was weak as the TB registers did not capture the TB clients screened for STIs but concentrated more on HIV parameters such as HIV testing.

The PMTCT information was another HIV intervention that was packaged in the TB program for pregnant women. This was provided to pregnant women who were diagnosed with TB or those that presented in the TB facilities. This was considered a specialized service that was provided by either trained nurses, clinical officers or doctors in the OPD or TB screening rooms. This service also had challenge in that it was not routinely provided as part of TB case management and that the TB registers did not capture the clients provided with PMTCT information.

HIV counseling and testing was provided to TB clients by trained nurses, clinical officers and HIV lay counselors. With the introduction of Diagnostic Counseling and testing (DCT) currently called Provider Initiated Testing and Counseling (PITC) in the TB facilities, HIV testing was done in the TB corners or rooms. The TB clients were thus, counseled and tested within the same room, given the results on the same day and provided with cotrimoxazole (CPT). It was expected that all the clients should have received their results of the HIV tests for them to make informed decision on either to start treatment if HIV positive or better HIV prevention if negative.

In this model, once patients were tested HIV positive, they were assessed by nurses or clinical officers for ART eligibility (blood was drawn for CD4 counting). The same nurses or clinical officers would then refer the patients with referral slips/letters to the next level of facilities for further HIV management which included enrollment and commencement on ART. The patients would then continue to receive HIV treatment and care services at the same ART site.

At the fully integrating facilities, the laboratory services and CD4 machines were available while the partially integrated facilities had to refer to offsite laboratories.

In the same partially integrated model (Linda health facility and Libuyu health facility), once patients were evaluated or suspected of TB through history taking and examination of symptoms and signs of TB, they were referred with referral a slip by the clinical officers or nurses to the fully integrated facilities (Dambwa health facility and Maramba health facility) for TB diagnosis, notification, and commencement on TB treatment. This was mainly because only certified facilities with the MoH could diagnose and notify TB in Zambia. Once these patients were commenced on TB treatment at the TB diagnostic centre, the patients were given a referral letter

(or slip) with the treatment card, and then referred back to the partially integrated facility namely Linda health facility for continuation of TB treatment and monitoring.

Figure 5.1. further shows that partially integrated facility had limited infrastructure. For example only the TB room and Outpatient Department (OPD) were available for TB services.

In the fully integrating model, HIV education, HIV counseling and testing, PMTCT information and STI screening were also provided by the nurses and clinical officers. These fully integrating facilities further provided ART assessment (CD4 testing and/or WHO staging), and ART which was not provided in the partially integrating facilities. Therefore, in these facilities once a patient was tested for HIV, they received all the HIV services (both prevention and care) at the same facility or in the same building provided by nurses, or clinical officers. Regarding TB services, patients were screened, diagnosed, notified and commenced on the anti-TB drugs by clinical officers at the same facility without being referred to other health facilities.

The figure 5.1. also showed that the fully integrated facility had a comparative advantage in infrastructure (also designed in similar manner and built by the same contractor). These facilities had TB room, OPD, consultation room, ART room, laboratory, data room, conference room, waiting areas for HIV education.

The HIV positive TB clients were provided with cotrimoxazole (CPT) soon after being detected with HIV for prevention of opportunistic infections by nurses or clinical officers working in the TB facility or OPD. To improve the uptake of CPT, the TB program introduced the administering of CPT within the TB rooms as opposed to being referred to the ART departments

for this service. It was anticipated that the co-infected patients would continue on CPT until their CD4 count was sustained at 350 or above for at least six months after TB treatment. This service was provided similarly in both the partially and fully integrated facilities by the similar cadres of health workers.

Since the HIV positive TB clients are considered to be in WHO stage 3 and 4, they were recommended to be commenced on ART regardless of CD4 count. It was encouraged that as soon as they could tolerate the Anti-TB drugs they would also be commenced on ART.

Furthermore, to diagnose a TB client, a comprehensive history was obtained by either clinical officer or a medical doctor. This involved developing the symptoms and signs of TB and any other condition that may be associated with TB disease. This was followed by a full systematic physical examination of the patient and then blood was drawn for full blood count and sputum for Acid Fast Bacillus (AFB). In certain conditions, medical doctors requested for chest x-ray. In the case of sputum positive clients, contact tracing to their homes was done by nurses or clinical officer with support from the treatment supporters (volunteers). Upon commencement of treatment, sputum was rechecked at the laboratories at the two month, three months and before discharge. Patients were clinically monitored by clinicians every month including checking for their weight and possibility of other opportunistic infections. This service was available at fully integrated facilities while the partially integrating facilities had to refer patients for this service to the former.

The main strategy that was used for monitoring patients on TB treatment was the Directly Observed Therapy (DOTS) plan. In this plan, the patient was either monitored by a family

member, treatment supporter or health centre staff. This was intended at improving adherence to treatment and reduced the chances of the emergence of resistant strains and assured that the patient was cured. This also helped to reduce defaulter rate. This service was available at both models in this study.

In an event that a TB patient died whilst on treatment, a mortality audit which included a verbal autopsy at community and health facility level was conducted to investigate the possible cause of death so as to improve the case management. This service was also available at both models in this study.

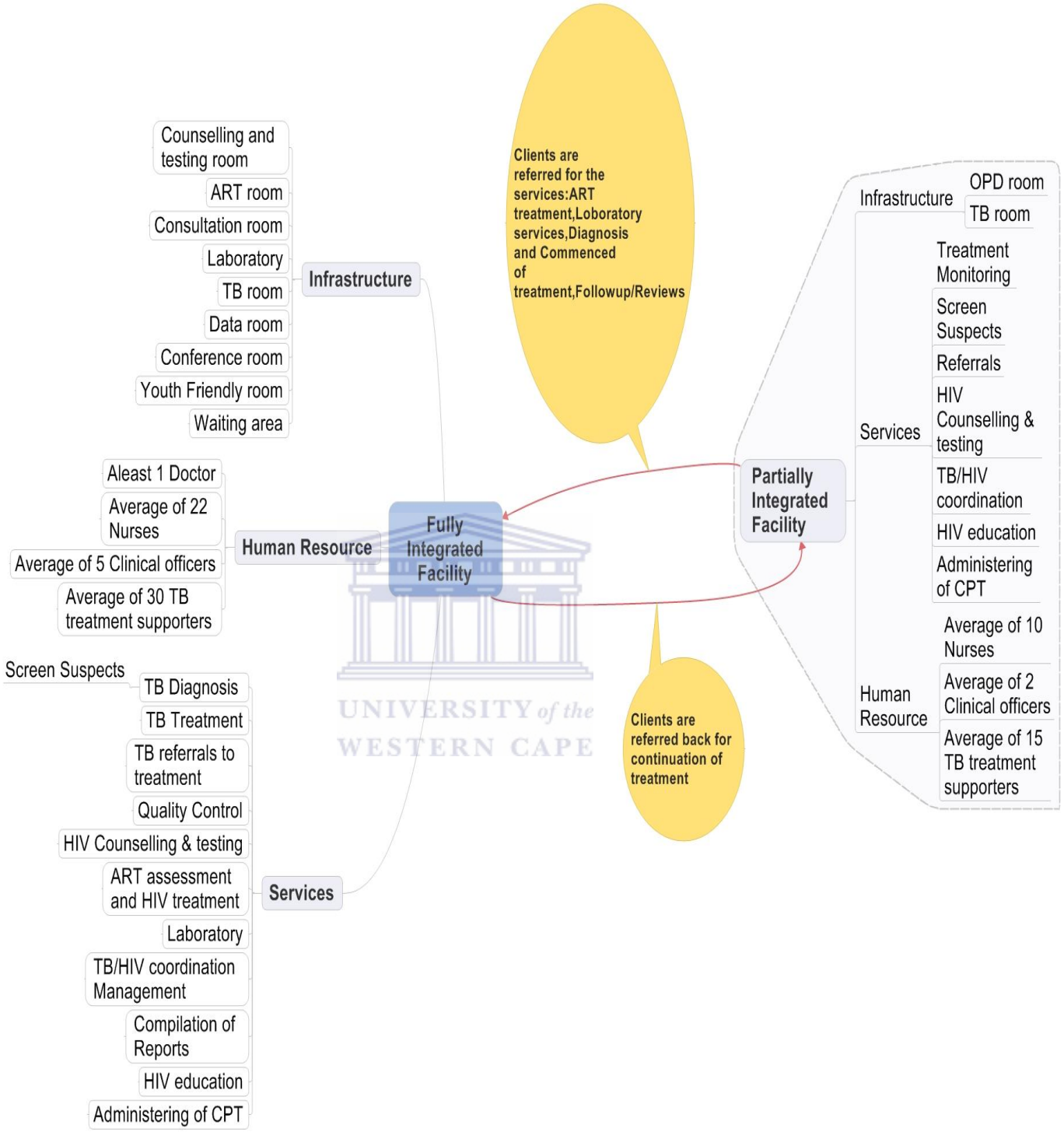
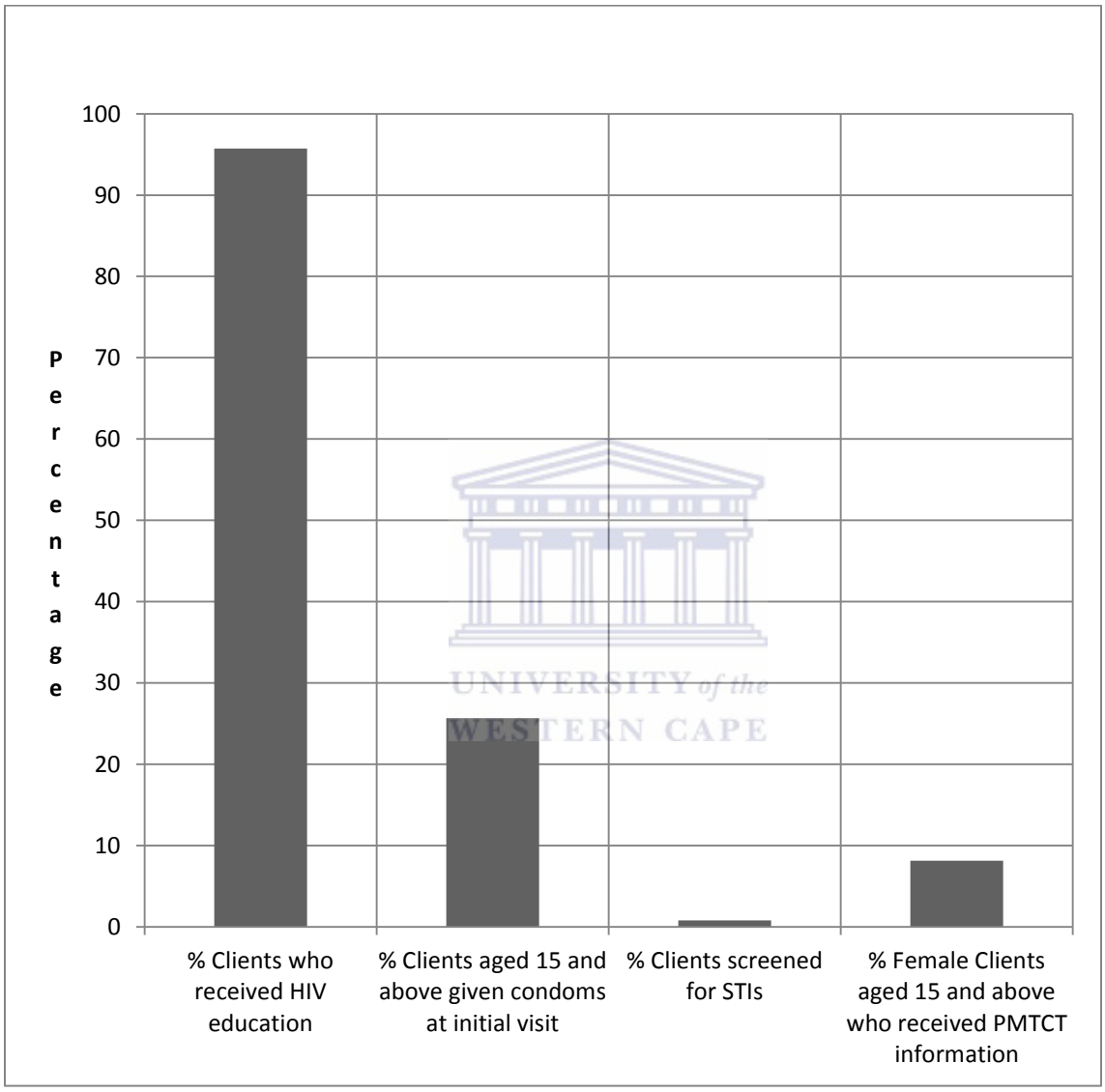


Figure 5.1. Two Models of HIV and TB Integration in Livingstone district

4.3 HIV prevention in the TB programme



Graph 5.1 (HIV prevention activities.

Table 5.2. HIV Prevention activities in the TB programme in Livingstone District.

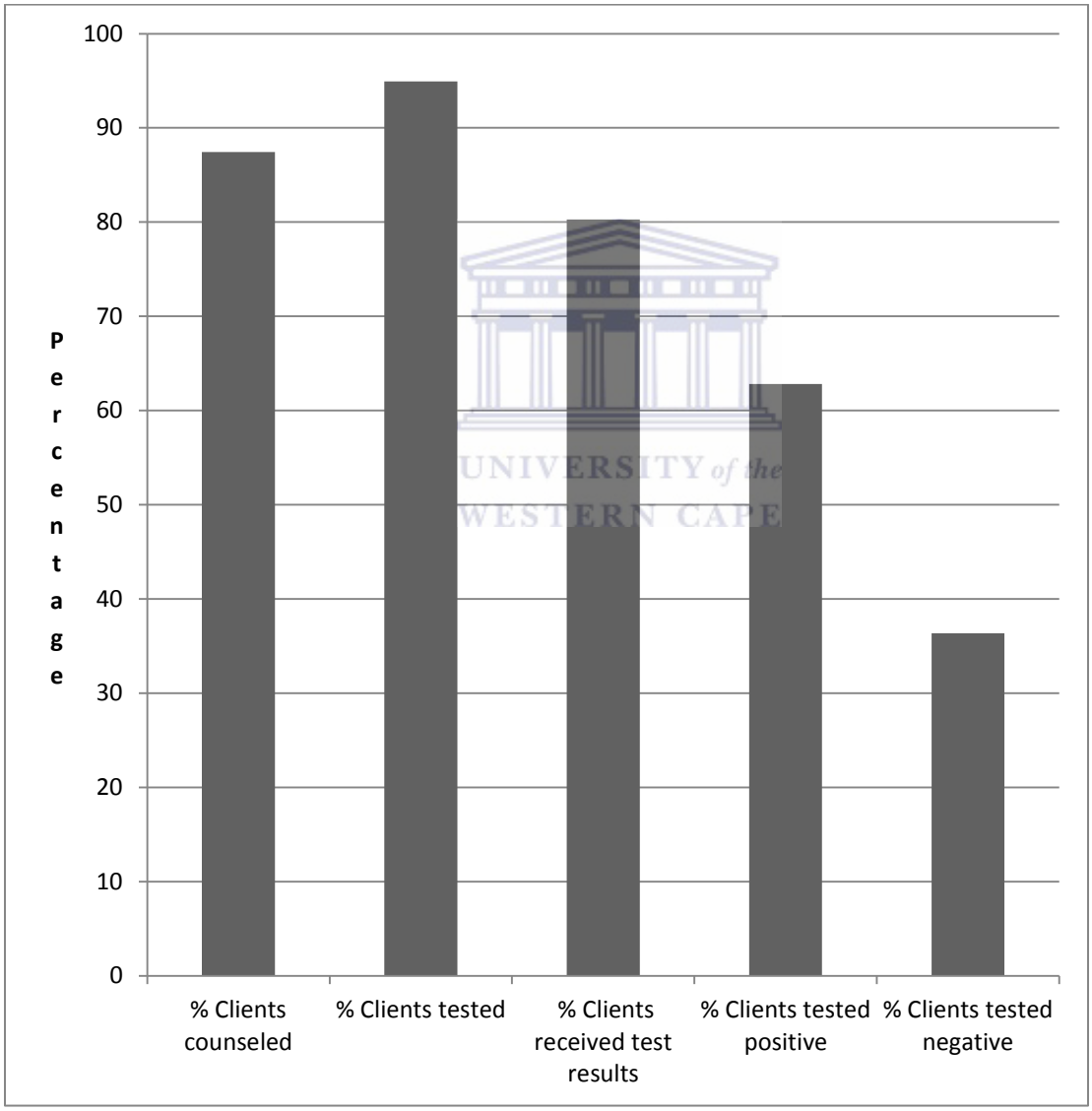
Indicator		Maramba health facility	Dambwa health facility	Libuyu health facility	Linda health facility	P Value
TB clients who received HIV education	%	98	91	96	93	0.92
	N	123	57	122	56	
	D	125	62	127	60	
TB clients aged 15 and above given condoms at initial visit	%	44	50	5	2	<0.001
	N	51	30	5	1	
	D	115	61	110	53	
TB clients screened for STIs	%	2	0	0	0	0.11
	N	3	0	0	0	
	D	125	62	127	60	
TB female clients aged 15 and above who received PMTCT information	%	11	14	7	0	0.27
	N	7	3	5	0	
	D	65	21	73	25	

N=numerator; D=denominator

Table 5.2 and Graph 5.1 presents a summary of results for HIV prevention activities in the TB program in Livingstone district. Overall, the performance of HIV prevention services in the TB program in the four facilities was poor (below 30%) with the exception of HIV education which was reported about 97% as shown in graph 5.1. Condom provision for TB clients aged 15 years and above was also noted to be weak for all the facilities. There is a statistically significant difference (p-value<0.001) which seem to be between Maramba health facility and Dambwa health facility (both fully integrated facilities, scoring 50% and 44% respectively) and Libuyu health facility and Linda health facility (both partially integrated facilities, scoring 5% and 2% respectively), with both the fully integrated facilities achieving higher than the partially integrated facilities. The graph shows that STI screening and PMTCT educations are neglected in the TB program and the table confirms that this is across all the facilities. Screening for STIs

in all the facilities was recorded as below 2%. PMTCT education for all the facilities was below 15% (Maramba health facility-11%, Dambwa health facility-14%, Libuyu health facility-7% and Linda health facility 0%). There was no statistical difference that was noted across the facilities in both screening for STIs and PMTCT education.

4.4 HIV Counseling and Testing services in the TB programme



Graph 5.2 HIV Counseling and Testing services.

Table 5.3 HIV Counseling and testing services in the TB programme in Livingstone District

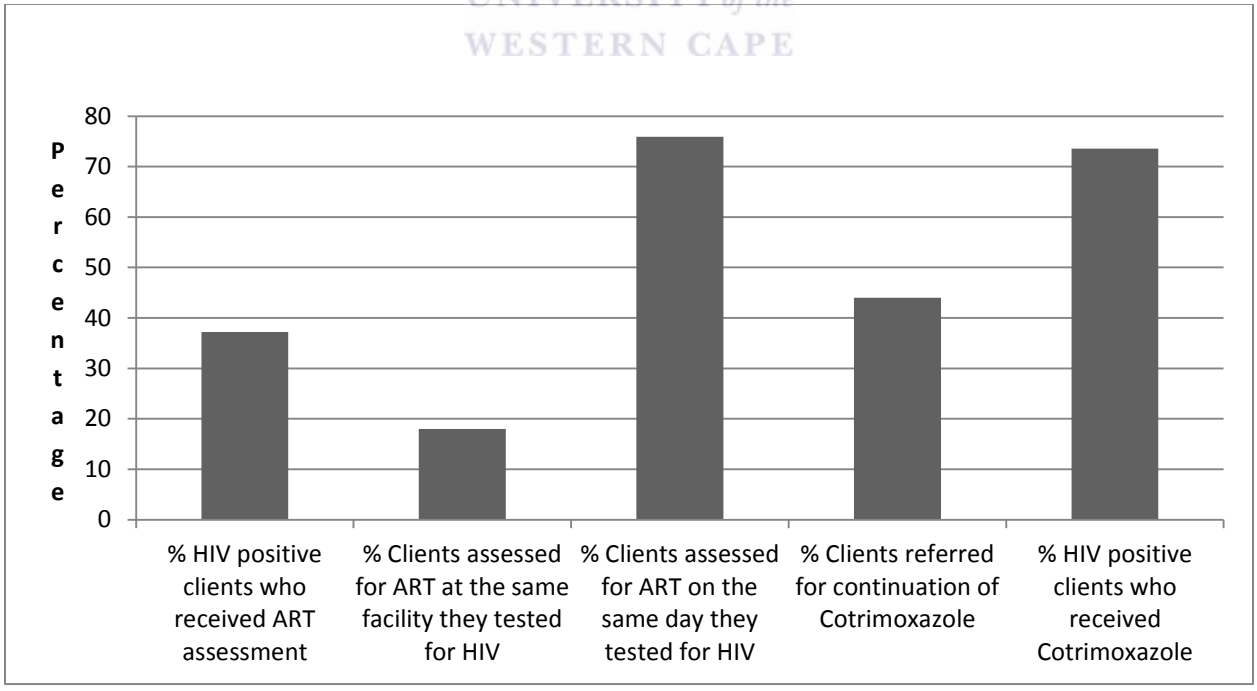
Indicator		Maramba health facility	Dambwa health facility	Libuyu health facility	Linda health facility	p value
TB clients counseled for HIV	%	96	87	93	58	0.06
	N	120	54	118	35	
	D	125	62	127	60	
TB clients tested for HIV	%	97	90	94	97	0.90
	N	122	56	119	58	
	D	125	62	127	60	
TB clients tested for HIV who received the test results	%	93	86	80	48	<0.001
	N	114	48	95	28	
	D	122	56	119	58	
TB clients who tested HIV positive	%	60	63	59	78	0.39
	N	73	35	70	45	
	D	122	56	119	58	
TB clients who tested HIV negative	%	40	36	40	21	0.2
	N	49	20	48	12	
	D	122	56	119	58	

N=numerator; D=denominator

Table 5.3 and graph 5.2 above shows the summary of results for HIV counseling and testing in the TB program in Livingstone district in 2010. The results indicated that generally the coverage of HIV testing in the TB program was good in the district at 94% TB clients tested. Of concern, as shown in Graph 5.2, is that testing coverage is higher than counseling coverage (88%), suggesting that clients are tested for HIV without counseling or there was poor recording of HIV counseling in the TB program. This is the case in all the facilities, with the highest discrepancy being in Linda health facility (97% tested but only 58% counseled). Counseling for HIV is

generally high (Maramba health facility- 96%, Dambwa health facility- 87%, Libuyu health facility-93%) with the exception of Linda health facility. Most clients receive their HIV result back, with Maramba health facility, Dambwa health facility, and Libuyu health facility achieving 80 % and above, while at Linda health facility only 48% of clients got their HIV result back. There is a statistical difference (p value <0.001) in this which seems to be at facility level (Linda health facility performing poorly compared to the other 3 facilities). The HIV prevalence was high among TB clients who tested for HIV at all the facilities with the highest reported at Linda health facility (78%), followed by Dambwa health facility (63%), Maramba health facility (60%) and Libuyu health facility (59%). This high co-infectivity meant that more than 60% of TB clients were HIV positive and below 40% were HIV negative.

4.5 HIV care in the TB programme



Graph 5.3 HIV Care Activities

Table 5.4 HIV Care Activities in the TB Programme in Livingstone district

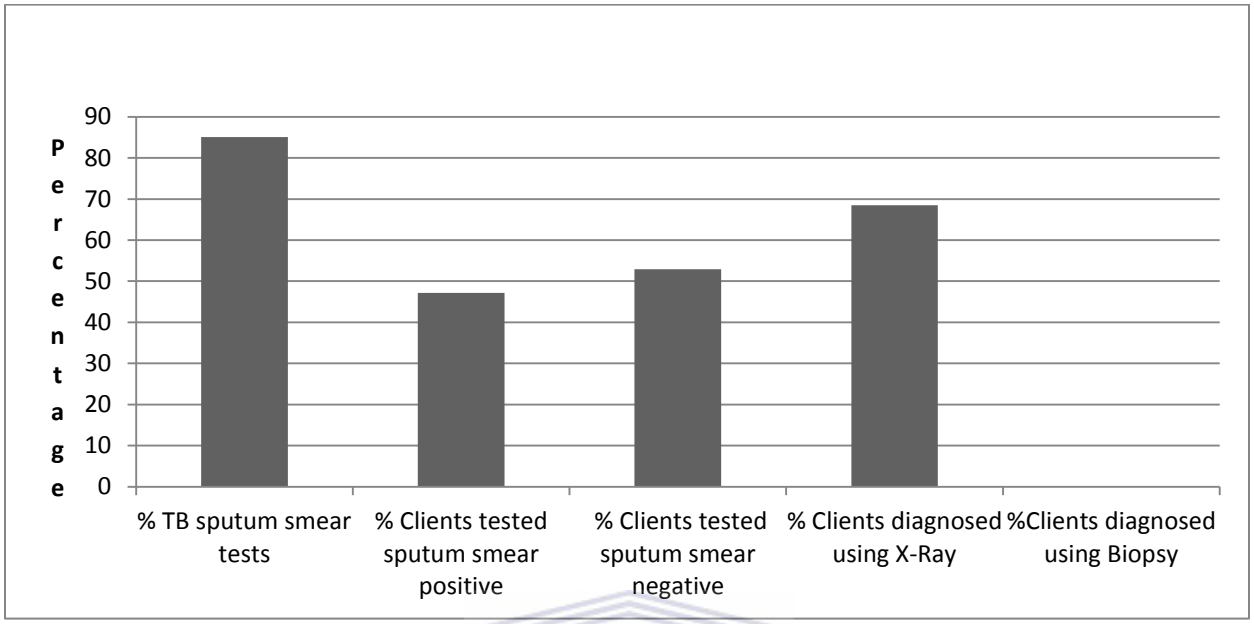
Indicator		Maramba health facility	Dambwa health facility	Libuyu health facility	Linda health facility	P Value
HIV positive TB clients who received ART assessment	%	38	66	25	37	<0.001
	N	28	23	15	17	
	D	73	35	70	45	
HIV positive TB clients assessed for ART at the same facility they tested for HIV	%	60	91	93	65	0.50
	N	17	21	14	11	
	D	28	23	15	17	
HIV positive TB clients assessed for ART on the same day they tested for HIV	%	71	78	80	76	0.98
	N	20	18	12	13	
	D	28	23	15	17	
HIV positive TB clients who received Cotrimoxazole	%	71	97	61	77	0.29
	N	52	34	43	35	
	D	73	35	70	45	
HIV positive TB clients referred for continuation of Cotrimoxazole after completion of TB treatment	%	55	0	57	38	<0.001
	N	40	0	40	17	
	D	73	35	70	45	

N=numerator; D=denominator

Table 5.4 and graph 5.3 presents the summary of results of the HIV/AIDS care activities in selected clinics sampled from folders in Livingstone district. Overall, the HIV/AIDS care services were low. The graph shows that ART assessment was very poor at below 40% for all the facilities. However, Dambwa health facility had better results for this indicator even though only 66% of the clients were assessed for ART as shown in table 5.4. Statistically significant differences (p value=<0.001) between facilities were identified for this indicator which seems to lie at facility level with Dambwa health facility performing better and Libuyu health facility performing worse than Linda health facility and Maramba health facility. The overall

performance on ART assessment of TB clients at the same facility they tested for HIV was above 50% for all facilities. However, there seem to be no statistical difference at facility level with Libuyu health facility reporting highest results of 93%, followed by Dambwa health facility (91%) and Linda health facility (65) with Maramba health facility (60%) recording the lowest. The results further revealed that of all those who received ART assessment, most of them were assessed on the same day they tested for HIV (all facilities achieving above 60%). Most of the co-infected clients were commenced on cotrimoxazole with Dambwa health facility performing particularly well in this intervention (97%) while Libuyu health facility was the weakest (61%). A general weakness was seen for all facilities in the low proportions of clients referred for continuation of cotrimoxazole as reported (38%) (Libuyu health facility-20%, Maramba health facility-19%, Linda health facility-9% and Dambwa health facility-0%). With the change in the threshold for ART from 250 to 350 CD4 count, most of the clients could be on ART hence the low CPT uptake. Statistical significant differences (p value=<0.001) between facilities were also identified for continuation of cotrimoxazole after TB treatment which appeared to be at facility level with Maramba health facility (55%) and Libuyu health facility (57) performing better than Linda health facility (38%) and Dambwa health facility (0%) worst.

4.6 Quality of TB diagnosis



Graph 5.4. Quality of TB Diagnosis in Livingstone District

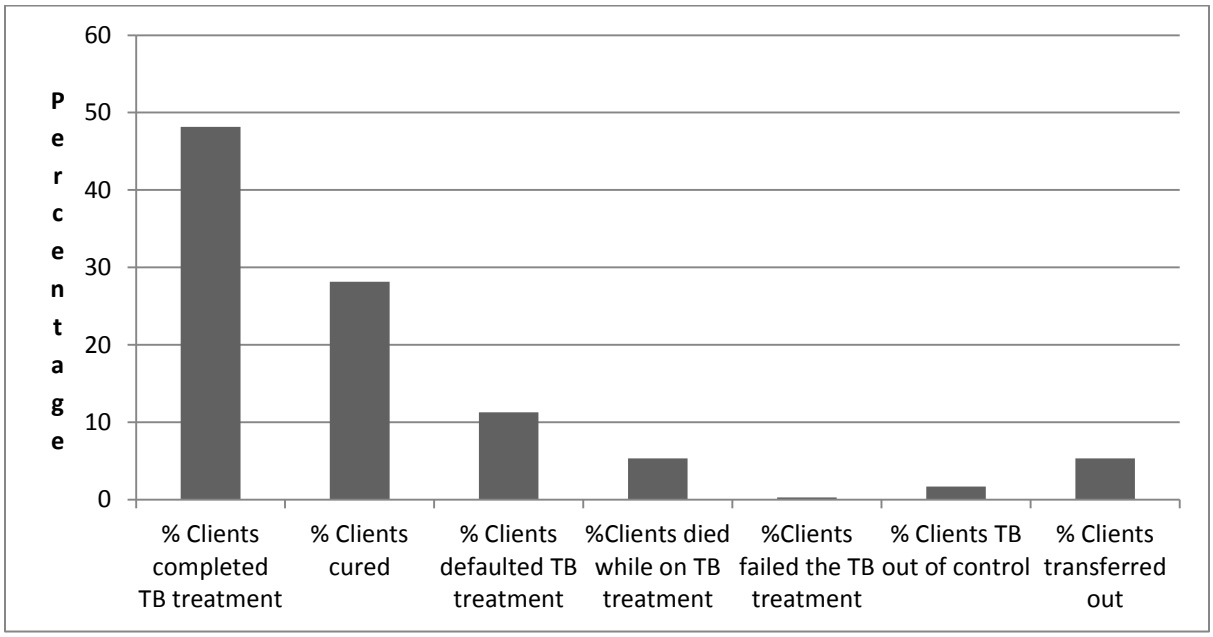
Table 5.5 Quality of TB diagnosis in Livingstone District.

Indicator		Maramba health facility	Dambwa health facility	Libuyu health facility	Linda health facility	P Value
TB clients with TB sputum smear tests	%	87	95	81	72	0.43
	N	109	59	103	43	
	D	125	62	122	60	
TB clients tested sputum smear positive	%	53	56	38	40	0.28
	N	58	33	39	17	
	D	109	59	102	42	
TB clients tested sputum smear negative	%	47	44	62	60	0.3
	N	51	26	63	25	
	D	109	59	102	42	
TB clients diagnosed using X-Ray	%	67	58	76	64	0.75
	N	34	15	48	16	
	D	51	26	63	25	
TB clients diagnosed using Biopsy	%	0	0	0	0	_
	N	0	0	0	0	
	D	51	26	63	25	

N=numerator; D=denominator

Table 5.5 and Graph 5.4 shows the summary of results for TB diagnosis in selected sites in Livingstone district. The results indicate that generally all facilities seemed to have done well in terms of TB sputum smear testing which was reported at 85% as shown in Graph 5.4. The table shows that Maramba health facility-87% and Dambwa health facility-95% performed better than Libuyu health facility-81% and Linda health facility-72%. In terms of smear positive results, no significant difference was observed at facility level, though Maramba health facility (53%) and Dambwa health facility (56%) did better than Libuyu health facility (38%) and Linda health facility (40%). Also no significant difference was noted for proportion of TB clients who tested sputum smear negative, even though Maramba health facility (47%) and Dambwa health facility (44%) reported lower results that Linda health facility (62%) and Libuyu health facility (60%) respectively. Of those who were sputum negative between 58% and 70% were diagnosed using X-Ray. No client was reportedly diagnosed using biopsy as shown in Graph 5.4.

4.7 TB treatment outcomes



Graph 5.5 TB treatment outcomes

Table 5.6 TB Treatment outcomes Clients commenced on Anti-TB drugs.

Indicator		Maramba health facility	Dambwa health facility	Libuyu health facility	Linda health facility	P Value
TB clients who completed treatment	%	46	30	57	55	0.06
	N	56	18	66	31	
	D	123	61	115	56	
TB clients cured	%	34	44	17	21	<0.001
	N	42	27	19	12	
	D	123	61	115	56	
TB clients defaulted on treatment	%	4	20	15	11	0.01
	N	5	12	17	6	
	D	123	61	115	56	
TB clients died while on treatment	%	3	2	9	7	0.21
	N	4	2	9	4	
	D	123	61	115	56	
TB clients failed the treatment	%	0	2	0	0	0.18
	N	0	1	0	0	
	D	123	61	115	56	
TB clients transferred out	%	10	3	3	4	0.22
	N	11	2	4	2	
	D	123	61	115	56	

N=numerator; D=denominator

Table 5.6 and Graph 5.5 highlight the results of treatment outcomes TB for clients who were commenced on TB treatment. The results show that generally more clients complete treatment than are cured and this is true for each individual facility too. However, all facilities reported below 10% death rate. There seemed to be a statistical difference (p-<0.001) noticed across the facilities for clients cured with Libuyu health facility reporting 17% and Linda health facility reporting 21%. Statistical difference for cured is possibly at level of model with more cure taking place in fully integrated facilities and more completion at partially integrated facilities (though the difference for the latter is not statistically significant) .There also seemed to be a difference

noticed on clients defaulting at model level with more clients defaulting in partially integrating than in fully integrating facilities.

CHAPTER FIVE: DISCUSSION

This section of the report discusses the main findings of the study with reference to other studies elsewhere which relates to the issues around TB and HIV integration.

The study established that the HIV prevalence among the TB clients was high in Livingstone district (63% in the four facilities) with one site reporting 78% (Linda health facility). The MOH (2007) and Chinyonga (2006) estimated the HIV prevalence in TB clients in Zambia to be above 70 percent. In Kenya, it was reported that 61% (1327/2192) of the TB clients were also HIV positive (Odhiango *et al*, 2008). In South Africa, 60 to 80% of newly diagnosed TB clients were co-infected with HIV in Kwazulu Natal and 76 % of the TB patients were co-infected with HIV in Khayelitsha (Friedland, Harries & Coetzee,2007).. Another study in Thyolo district in Malawi found similar high (77%) HIVco-infection among TB clients (Zachariah, Paule, Spielman. Chinji, Golmain Arendt, Hargreaves, Salaniponi & Harries, 2003). The Lusaka study of 2007 also showed high HIV co-infection among TB clients (Harris, Randels, Kancheya, Chapula, & Reid, 2009). The high co-infectivity in Livingstone signified the need for more effective integration TB/HIV services in the district to target HIV prevention and cares to improve the treatment outcome of the co-infected clients. Because of the high co-infectivity, it is important that HIV prevention and care strategies are integrated into the TB program (WHO, 2004; Wang, Collins, Vergis, Gerein & Macq *l*, 2007). Integration of TB and HIV prevention, treatment and care are critical to improving diagnosis, treatment and outcomes for patients of both diseases (Friedman et al, 2007).

HIV education services in the TB programme were found to be high (97%) among the TB clients suggesting that managers and front-line staff recognized HIV services as important in the control and management of TB disease. A provider initiated counseling and testing strategy has been

used to achieve this high coverage of TB clients; it compels the health providers to provide HIV counseling and testing to all the TB clients.

Despite the high HIV education, it was observed that other important HIV prevention services were not integrated into TB care. Among the key HIV prevention interventions that were poorly implemented were condom provision at first visit which was found to be very low in all facilities, suggesting that this intervention has not received support as part of a comprehensive HIV prevention strategy in the TB program. However, it was noted that the fully integrated facilities provided condoms at the first visit better than partially integrated which was attributed to higher staffing levels (Doctors, clinical officers and volunteers) in the former.

Another weak area in the HIV prevention was related to screening of TB clients for STIs. It was observed that this intervention was very weak in all the facilities suggesting that HIV prevention was not broad enough to address the high HIV prevalence in the TB program. In three facilities out of the four study sites (Dambwa health facility, Linda health facility and Libuyu health facility), no records of STI service were found to demonstrate that this intervention was being offered in the facilities. Similarly the provision of PMTCT education to women was very low in all the facilities. Although the facilities reported high HIV education, it was noted that this was not comprehensive education as it excluded information about PMTCT.

The low performance on HIV prevention interventions such condom provision, PMTCT information, STI screening suggested that there was weak integration of HIV services in the TB program in Livingstone district. This suggested that health providers did not specifically provide these services though they reported that they provided HIV education to the TB clients. It seems

that most research on how HIV prevention is integrated into TB programmes is focused on HCT. Very little research has been done on how the broader set of HIV prevention interventions are integrated into TB programmes. Where this research has been done, such as in Cape Town in South Africa (Scott *et al*, 2012), the results of integration of HIV prevention into the TB program are found to be similarly poor. For instance, the Scott *et al* study (2012), found that contraception assessment among TB clients was between 27% and 58% for a 4-year review period. In another study in Kwazulu Natal, Loveday, Scott, McLaughlin, Amien & Zweigenthal, 2011) also found poor integration of other HIV prevention interventions in the TB program. For example, this study found out that, of all the TB clients only 18% (34/187) were screened for STIs. Also, only 39% (83/214) of the TB clients had there contraceptive needs assessed for the period of three months that were review (Loveday et al, 2011). Therefore, this indicates that HIV prevention in TB programs in many settings in Africa have not been broad and comprehensive enough to include other HIV interventions which are critical in the control and prevention of HIV prevention.

This study found that HIV testing among TB clients was generally high in the district (94%). Similar high HIV testing results were reported by other studies in sub Saharan Africa. In Kenya, Odhiango *et al, (*2008) found out that HIV testing among TB clients was high (89%) as a result of PITC. In another study in South Africa (Cape Town), HIV testing among TB clients was equally high at 96% where HCT services were offered (Scott *et al*, 2012). In Malawi, similar high (91%) HIV testing rates were reported among TB patient (Zachariah *et al.,* 2003). Another study which was conducted in Rwanda between 2005-2009 reported high (99) HIV testing rates among TB clients **(**Pevsner**,** Vandebriel Lowrance**,** Gasana & Finlay (2011) ‘It is therefore, evident

that where HCT and PITC were introduced in TB program, clients HIV testing rates were generally high that it is feasible to increase HIV testing among TB clients through these interventions.

In this current study, it was concerning that more clients were tested (94%) than those that were counseled (88%) as informed consent is required for HIV testing. It is however likely that this discrepancy is an artifact of data collection. The TB registers, which were the main source of TB/HIV information, did not provide for the recording of clients counseled but only the clients tested. Information on whether clients had been counseled was extracted from the TB treatment cards but these had a number of inaccuracies and it was not easy to reconcile the two reporting documents. Also it was noted that there were too many reporting forms available in the facilities for the same service and, as a result, these were not completed fully by the facility staff. This could be the main reason why there are these reported discrepancies.

It was also found that not all clients who were tested received their HIV test results suggesting that the quality of counseling and testing was comprised. It is worrying to note in a setting with an HIV prevalence of 65% as the potential to prevent mother-to-child and partner transmission is reduced. Other studies also found low coverage of clients returning for their test results. For example, Obermeyer and Osborn (2007), contend that even when high proportions of clients test for HIV in African settings such as in Rwanda, Tanzania and Kenya, about one third of those clients do not return for their HIV test results. They further revealed that in Zambia, even when the HIV testing acceptance was about 50%, only about 20% returned for their results (Obermeyer and Osborn, 2007).

Despite the high prevalence of HIV (65%) among TB clients, it was found that the assessment of HIV positive TB clients for ART was low in three (Maramba health facility, Linda health facility and Libuyu health facility) out of four study sites. It is also worrying to note that even in the fully integrated where ART is provided on-site, the ART assessment for TB clients that are HIV positive was generally low. In a study in Malawi the low ART assessment in the TB program was said to be due the services operating separately and that the health assistant who saw the TB clients lacked skills to conduct assessment (Friedman *et al..,* 2007). In the Uganda, under staffing, lack of capacity to diagnose HIV and TB, lack of protocols for care options for HIV/TB co-infected clients and inadequate knowledge and skills were cited as key barriers to integration (Nansera *et al*, 2010).

Although Harries, Zachariah and lawn (2009) contend that the efficacy and safety of CPT for co-infected patients is well established and that the intervention is an essential component of the HIV care package, this study observed that not all HIV positive clients were commenced on cotrimoxazole. Despite it being a critical intervention in preventing opportunistic infections and contributing to reduction in mortality of HIV positive clients of up to 43% (in Zambia) and 46% (in Uganda)(Harries *et. al*,2009), current study found that there was generally very poor continuation of cotrimoxazole intervention for co-infected TB clients after the anti-TB treatment in all the facilities. Similar to this short coming, the Malawi study found that implementation of the CPT policy remained a challenge as the two programs (TB and HIV) were separate and not integrated fully (Friedman *et al,* 2007).

However, in this current study despite having fully integrated facilities, it was found that there was no difference at model(fully or partially integrated) even though a fully integrated facility(Dambwa health facility) did exceptionally (97%) well in CPT provision. This means that being fully integrated or partially integrated did not grantee better performance in CPT uptake.

The cure and completion rates (less than 40%) for TB were equally poor suggesting that the TB clients were not very well managed. There is thus need to ensure that TB clients are well managed to improve the treatment outcomes.

Although the two models of integration of TB and HIV services have different structures and staffing levels, the study did not find significant differences in the performance of facilities that are fully integrated and partially integrated with the exception of two indicators: clients given condoms at initial visit and the TB clients cured. But in the majority of the indicators in this study, the differences were observed in performance were mainly at the level of facilities and not at the model of integration. This meant that it was not feasible to attribute the performance to the model of integration but the different setting in the individual facilities. Therefore, in this study setting, even where the fully integrated facilities seemed to have a comparative advantage in terms of having better physical structures (more space and rooms), more services such as capacity to conduct on site TB diagnosis, on site ART, and higher staffing levels, these inputs did not result in better results. A lot of work is still required to make them operate more effectively and efficiently. This may include providing onsite supervision, mentoring and monitoring to management and frontline staff facility level to support them in using the

infrastructure and staffing potential and to enhance health workers skills and knowledge on the importance of integration of comprehensive HIV interventions which are not just limited to HIV education and HCT. The HIV interventions should be provided in more comprehensive spectrum to include PMTCT, couple counseling, STI screening, family planning, provision of CPT, ART assessment for all HIV positive TB clients and early initiation on ART for HIV positive TB clients especially that the HIV prevalence is high to prevent morbidity and mortality. To improve CPT uptake, there need to consider having the drugs within the TB corners as opposed to having them in the ART corners. As opposed to the unclear reasons for poor performance in the fully integrated facilities in Livingstone study, Loveday *et al*, (2011) observed that poor performance of services at primary health care was as results poor managerial skills and inadequate infrastructure, staff attrition and delays in hiring managers and facility clinical officers (doctors) staff. To improve health service delivery in TB and HIV integration, it was advisable to restructure service delivery and establish quality improvement systems for HIV and TB co-infected clients (Loveday et al, 2011). For improving the quality of services, regular onsite supportive supervision was recommended especially in settings where the disease burden was high (Loveday *et al*, 2011). Other innovative strategies such as use of audit tools like the one that was used in Cape Town study, which engaged managers and facility staff in reviewing problems and addressing them as well as strengthening leadership and management are critical in improving performance Scott *et al*, 2012).

Limitations

The limitations of this study include the following;

- Although the sample size was designed to detect differences in TB and HIV performance indicators between two models of integration, the preliminary analysis revealed that the main differences in performance were at facility. This means that the sample was not powered enough to meet the original intention.
- During the review of folders and treatment cards, it was observed that there was poor recording by facility. This included incomplete recording or no records at all for certain indicators.
- The study did not explore the client perspective of on the success of integration but focused on the service output.
- The study did not explore the patient staff ratio to determine workloads of health staff as a key factor in performance.

Recommendations

In order to improve HIV/TB integration in the TB program in the district the following are the recommendations;

- In settings like Livingstone, it would be useful for the Ministry of Health to strengthen services at facility level where most of the differences existed through regular TB/HIV review meetings and mentoring /supervision of health workers whilst building the

capacity of integrated facilities to be more effective taking advantage of their infrastructure and available human resources.

- The Ministry of Health should invest in improving recording and data management skills to ensure that documentation is up to date and that the data is used for quality improvement. This should include the harmonization of reporting tools for data collection.
- Future studies be conducted should consider exploring the perspectives of the TB clients and the community in improving TB/HIV integration.
- The MoH should devise systems for ensuring that all HIV positive clients were commenced on CPT and that this intervention is continued even after completion of TB treatment for effective prevention of OIs. Where feasible CPT drugs should be made available in the TB diagnostic and treatment facilities.
- HIV prevention in the TB program should not limited to HCT and education but made broad enough to include other key HIV prevention strategies such as couple counseling and testing, PMTCT, condom provision, STI screening and early initiation of HIV confected TB clients on ART services.
- HIV care services in the TB program such as ART assessment, provision of CPT and initiation of HIV co-infected TB clients should be strengthened through onsite mentoring, supervision and monitoring as well as making readily available the ARV and CPT commodities. Therefore, services should be designed in such a way that eligible patient for ART should be put on ART, if possible and where resource are available patients should be commenced on ART once tested positive for HIV.

- TB case finding and patient monitoring should be strengthened to improve treatment outcomes especially the cure rates.

Conclusion

In spite of the introduction of HIV interventions in the TB program in Livingstone district, the integration of HIV prevention and care services has not been comprehensive enough to respond to the high HIV prevalence among TB clients. This meant that HIV prevention was mainly limited to education and HCT as opposed to being more comprehensive to include other interventions such as PMTCT (including family planning), STI screening and treatment, condom provision, and couple counseling and testing. Further, the HIV care services in the TB program were also not effective enough to ensure that co-infected clients are enrolled in care and treatment services as demonstrated by low CPT provision and weak ART assessment. These key HIV prevention and care services may need to be addressed by introducing innovative strategies for quality improvement highlighted above such as onsite mentoring, supervision and strengthening leadership and management at district and facility level. With regards to STI screening there is need to develop data capturing tools which are adequate in terms of capturing data needed for programme planning and improvement.

Although, the study established that there was generally poor performance of HIV prevention and care services in key indicators in the district, the differences in achievements were mainly at facility level and not necessarily at model level as being fully did not grantee effective or better performance.

The study has also established a platform for future evaluations which will attempt to address the limitations of this current study and help expand the scope of HIV and TB integration that is inclusive of all parameters.

Reference List

1. Central Statistics Office. (2002). *Zambia Demographic and Health Survey*. Calverton, Maryland: Central Statistics Office and Macro International Inc.
2. Chinyonga, J. (2006). *District HIV/TB Collaborative Activities*: *An Assessment*. Livingstone: Unpublished District Health Report.
3. Coetzee D., Hildebrand K., Goemaere E., Matthys F., & Bloelaert M (2004). *Integrating tuberculosis and HIV care in primary care setting in South Africa.* Blackwell Publishing. 9(6) A11-A15. Tropical Medicine and International Health. [online], Available: http://onlinelibrary.wiley.com/doi/10.1111.1365-3156.2004 [Downloaded: 27/11/2012, 15:53PM]
4. Coker R., Balen J., Mounier-Jack S., Shigayeva A., Lazarus V J, Rudge W J, Naik N & Atun, R. (2010). *A Conceptual and Analytical Approach to Comparative Analysis of Country Case Studies: HIV/TB Control program and Health Systems integration.* Oxford University Press. Health Policy and planning 25:121-131
5. Coutinho, A. and Mermin, J. (2008). *Integrating Tuberculosis and HIV in Africa*. INT. J TUBERC LUNG DIS 12 (7):702: The Union. [Online], Available: http://www.ingentaconnect.com/connect/iuatld/ijtld/2008 [Downloaded: 04/03/09, 12:20 PM]. Department of Health, Western Cape, City Health, Cape Town: School of Public Health.
6. Department of Health, University of Western Cape. (2008). *Integrated HIV/TB/STI Program Evaluation: Manual,* June 2008. Cape Town: School of Public Health, University of Western Cape.

7. Friedland G. Harries A., & Coetzee D. (2007). *Implementation Issues in Tuberculosis/HIV Program, Collaboration and Integration: 3 Case Studies.* The Journal of Infection Diseases.196:S114-23. In factious Disease Society of America. [Online] Available: http;//www.medres.med.ecla.edu/education/syllabus/.[Downloaded:09/08/2011, 13:30PM]
8. Harries A., Maher, D. & Graham, S. (2004). *HIV/TB Clinical Manual, Second Edition*. Geneva: WHO
9. Harris J.,Randels K., Kancheya N., Chapula TC & Reid(2009). *Integration of TB and HIV Care in Large, Urban Primary Health Centers: Lessons Learned from Lusaka, Zambia*. [Online] Available: http://ftguonline.org. [Downloaded: 2/12/2012, 14.34PM].
10. Hedges, B. (1978). Ch 4-Sampling. In Hinville, G. & Jowell, R. (Eds). *Survey Research Practice.* London: Heinemann: 55-89.
11. Micep K. (2005). *Integrating TB and HIV Care in Mozambique: Lessons from an HIV Facility in Beira.* Core group/Health Alliance International. [Online], Available: http://www.coregroup.org/working_groups/HAI_Mozambique_TB-HIV_case_study.pdf [Downloaded: 03/06/2009; 17:44 PM].
12. Jensen, P. (2007). *Achieving Impact Through Scale Up of TB-HIV Activities*. Washington DC: RESULTS Education Fund.
13. Jourbert, G. & Ehrlich, R. (2007). Epidemiology: A Research Manual for South Africa. Cape Town: Oxford Sothern Africa.
14. Kapata N,. Chanda-Kapata P, .O'Grady J,. Schwank S,. Bates M, & Mukonka V. (2011) *Trends of Zambia's tuberculosis burden over the past two decades*. Tropical Medicine & International Health ;16(11):1404-1409.
15.

16. Katzenellenbogen, J.M., Jourbert, G. & AbdoolKarim, S.S. (1997). Ch.8-Sampling. in *Epidemiology: A Manual for South Africa*. Cape Town: Oxford University Press: 74-82

17. Legido-Quigley H., Montgomery CM., Khan P., Fakoya A., Getahun H.&, Grant AD.(2010), *Integrating tuberculosis and HIV services in Low-and Middle-income countries:a systems review*. Global symposium on health systems research, Montreux, Switzerland. Available: http://www.dfid.gov.uk/r4d/pdf/HIV_A. [Downloaded: 09/08/2011; 14:56PM]

18. Loveday M., Scott V., Mcloughlin J., Amien F & Zweigenthal J (2011). *Accessing Care for patients with TB/HIV/STI infections in a rural District in KwaZulu-Natal.* South African Medical Journal. 10(12); 887-890.

19. Loveday M, Zweigenthal V. TB and HIV integration: obstacles and possible solutions to implementation in South Africa. Trop Med Int Health 2011;16:431-438.

20. Harries D., Zachariah R., & Lawns D (2009). *Providing HIV care for co-infected tuberculosis patients: a perspective of Sub-Saharan Africa.* The Union. International Journal of Tuberculosis and Lung Diseases. 13(1): 6-16. Available: http://docstore.ingenta.com/cgi-bin/ds_deliver/1/u/d/ISIS/71836145.1/iuatld/ijtld/2009/00000013/00000001/art00004/8C8F99345405EAF6135470390351C14A89DC359910.pdf?link=http://www.ingentaconnect.com/error/delivery&format=pdf. [Downloaded: 04/12/2012; 13:30PM].

21. Ministry of Health, Zambia (MoH). (2005). *National HIV/AIDS/STI/TB Policy*. Lusaka: Ministry of Health.

22. Ministry of Health, Zambia. (2007). *Tuberculosis and HIV/TB Manual.* Lusaka: Ministry of Health.

23. Ministry of Health. (2010). *Antiretroviral Therapy Protocol 2010.* Lusaka: Ministry of Health.

24. Mwinga, A., Mwananyambe, N., Kanene, C., Kapata, N. & Phiri, C. (2008). *Provider Initiated HIV Testing and Counseling of TB clients in Livingstone District, Zambia, September 2004-December 2006 Atlanta: CDC.* [Online], Available: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5711a3.htm?s_cid=mm5711a3_e [Downloaded: 04/03/09, 11:29AM].

25. Nansera D, Bajunire F, Kabakyenga J, Asiimwe PK & Mayanja-Kizza H.(2010). *Opportunities and barriers for implementation of integrated TB and HIV care in lower level health units: Experiences from a rural Western Uganda District.* African Health Sciences 2010; 10(4):312-319.Uganda. Makerere Medical School. [Online] Available: http://www.ukpmc.ac.uk/ukpmc/ncbi/articles/pmc3052807/ [Downloaded: 09/08/2011, 11:30PM]

26. National HIV/AIDS/STI/TB Council. (2004). The *HIV/AIDS Epidemic in Zambia: Where are We Now?, Where are We Going?*. Lusaka: DAPEG.

27. National HIV/AIDS/STI/TB Council. (2006). *National HIV/AIDS Strategic Framework 2006-2010.* Lusaka: Printeck.

28. Pevsner ES., Vandebriel G., Lowrance DW. Gasana M & Finlay A(2011**) .** *Evaluation of the Rapid Scale-up of Collaborative TB/HIV Activities in TB Facilities in Rwanda, 2005-2009.*BiMed Central. **11**:550 doi:10.1186/1471-2458-11-550. [Online] Available: http://www.biomedcentral.com/1471-2458/11/550. [Downloaded: 11/12/2012., 16.20PM].

29. Sculier D., Getahun H., & Lienhardt C (2011). *Improving Prevention, Diagnosis and Treatment of TB among People Living with HIV: the Role of Operational Research.*

BioMed Central: Journal of the International AIDS Society. [Online], Available: http://www.jiasociety.org/content/pdf/1758-265..[Downloaded: 09/08/2011; 14:43PM].

30. Scott V., Chopra M., Azevedo V., Caldwell J., Naidoo P & Smuts B (2010). *Scaling up integration: development and results of a participartory assessment of HIV/TB services, South Africa.* Heath Research Policy, 8:23. [Online], Available: http://www.health-policy-systems.com/content/8/1/23. [Downloaded: 10/08/2011, 12:26PM]

31. Scott V., Azevedo V., & Caldwell J (2012). *Improving access and quality of care in a TB program.,* South Africa medical journal 2012:102(11): 837-840.DO1:10.7196/SAMJ.5469

32. Simon, J. T., Neel R. G., Wafaa, M. E. & Gerald, F. (2007). *Tuberculosis and HIV--Needed: A New Paradigm for the Control and Management of Linked Epidemics.* Medscape General Medicine: Journal of the International AIDS Society. [Online], Available: http://www.medscape.com/viewarticle/561367_print/. [Downloaded: 03/06/2009; 17:15 PM].

33. Obermeyer MC. & Osborn M (2007). *The utilization of testing and counseling for HIV: a review of the social and behavioral evidence.* American Journal of Public Health. 97(10). [Online], Available: http://ajph.aphapublications.org/201/pdf/10.2105/AJPH2006.099265. [Downloaded: 27/11/2012; 17:57 PM].

34. Odhiambo J., Kizito W., Njoroge A., Wambua N., Nganga L., Mburu M., Mansoer J., Marum L., Phillips E., Chakaya J & De Cock MK(2008). *Provider-initiated HIV testing and counseling for TB clients and suspects in Nairobi, Kenya.* The Union. International Journal of TB and Lung Diseases. 12(3):S63–S68

35. Wallrauch, C., Barnighausen, T., Heller, T., Houulihan, C., & Newell, M.L. (2008) *The White and the three-letter plague: integration of TB and HIV care in Sub-Saharan Africa.* Future Medicine ltd.2 (5), 437-451. [Online], Available: http://www.ucl.ac.uk/paedricl_epidemiology/p... [Downloaded: 09/08/2011; 15:10PM]

36. Wang Y., Collins C., Vergis M., Gerein N & Macq J (2007). *HIV/AIDS and TB: contextual issues and policy choice on programme relationships.* Blackwell publishing ltd. Tropical medicine and International Health. 12(2); 183-194.

37. WHO. (2004). *Interim policy on Collaborative HIV/TB Activities.* Geneva: WHO. [Online], Available: http://whqlibdoc.who.int/hq/2004/who_HTM_TB-2004.330pdf [Downloaded: 04/03/09, 17:54 PM].

38. WHO. (2005). *HIV/TB Research Priorities in Resource Limited Settings.* Geneva: WHO. [Online], Available: http://whqlibdoc.who.int/hq/2005/ [Downloaded: 04/03/09, 18:08 PM].

39. WHO. (2009). *Joint HIV/Tuberculosis Interventions.* Geneva: WHO. [Online], Available: http://who.int/hiv/topics/tb/tuberculosis/en/ [Downloaded: 04/03/09, 15:52 PM].

40. WHO. (2009). *WHO Report 2008: Global TB Control –Surveillance, Planning, Financing.* Geneva: WHO. [Online], Available: http://who.int/hiv//tb/publications/global _ report/2008/key_points/en/ [Downloaded: 14/04/09, 10:52 AM].

41. WHO. (2009). *Joint HIV/TB Services in Malawi: Progress, Challenges and the Wayforwad.* [Online], Available: http://www.who.int/bulletin/volumes/85/5/06-036665/en/index.html. [Downloaded: 03/06/2009, 20: 16 PM].

42. WHO. (2012). *Global Tuberculosis Control*.: WHO Report 2011.

43. WHO. (2012). *WHO policy on Collaborative TB/HIV activities: Guidelines for National Programmes and other stakeholders.* Geneva: WHO Press. WHO. [online]. Available:

http://whqlibdoc.who.int/publications/2012/9789241503006_eng.pdf.[Downloaded:27/02/2013, 14:30PM].

44. Yumo AH., Kaubana C., & Neuhann F (2011). *WHO recommended collaborative TB/HIV activities: evaluation of implementation and performance in a rural district hospital in Cameroon.* The Pan African Medical Journal. 10(30). [Online] Available: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3240931/. [Downloaded: 4/12/2012, 17:25PM.

45. Zachariah R., Paule M., Spielman L., Chinji C, Golmain P., Arendt V, Hargreaves N J, Salaniponi & Harries AD (2003). Voluntary Counseling, HIV testing and adjunctive cotrimoxazole reduces mortality in tuberculosis patients in Thyolo, Malawi. Lippncott & Wilkins. Journal of International AIDS Society. 17(7); 1053-1061. Available: http://journals.lww.com/aidsonline/Abstract/2003/05020/Voluntary_counselling,_HIV_testing_and_adjunctive.15.aspx. [Downloaded: 03.12.2012, 11:12 AM].

Appendix i: Data collection tool : Patient Treatment Record Review Data Capture Sheet

This data capture sheet will be used by the trained research assistants to record the results from the treatment cards, patient folders and HIV/TB registers. This will mainly be done in the TB facility and the missing data will be pulled from the PITC, CT, PMTCT and ART corners.

IDENTIFICATION DETAILS		
No	**Questions and filters**	**Code categories**
Q00	Name of Health Facility Maramba health facility Dambwa health facility Libuyu health facility Linda health facility	 1 2 3 4
Q01	TB Identification Number_____	

Q02	Date of visit to facility_____	
Q03	Research Assistant code and signature_____	
Q04	Research Team Leader code and signature_____	
Q05	Data entry Clerk Code_____	
Q06	Date of Birth: _____	
Q07	Sex of client Male Female	 1 2
Q08	Date Client notified_____	
	TB SCREENING/TREATMENT	
Q09	Was the TB sputum smear test done? Yes No	 1 2
Q 10	What was the sputum smear result? Positive	 1

	Negative	2
Q 11	What was the client's type of TB diagnosed? Pulmonary Extra-pulmonary	
Q 11	If negative to Q09, what method of TB diagnosis was used? X-ray Biopsy Other (specify)	 1 2
Q12	Was the client commenced on TB treatment? Yes No	 1 2
Q13	If yes to Q16, indicate date treatment started_____	
Q 14	What was the patient type? New smear positive Smear negative Extra pulmonary Relapse Treatment after failure Treat after default Others …….(specify)	 1 2 3 4 5 6 7
Q19	What regime was the client put on? 6 months	 1

	8 months	2
	12 months	3
Q20	What is the client treatment outcome?	
	Cured	1
	Completed	2
	Died	3
	Failed	4
	Transferred out	5
	Defaulted	6
	HIV SERVICES PROVIDED IN THE TB CORNER/FACILITY	
Q21	Was the client provided with HIV education?	
	Yes	1
	No	2
Q22	If yes, at what point of service delivery was HIV education provided?	
	Initial visit	1
	Follow-up visits	2
Q23	What areas were covered during HIV education?	
	HIV prevention	1
	Relationship between TB and HIV	2
	Stigma reduction	3
	ART services	4
	Positive living	5

	Others (specify)	
Q24	Was the Client counseled for HIV? Yes No	 1 2
Q25	Was the Client Tested for HIV? Yes No	 1 2
Q26	What was the client's HIV test result? Negative Positive	 1 2
Q27	Did the client receive the HIV result? Yes No	 1 2
Q28	If HIV positive, was the client given Cotrimoxazole? Yes No No record	 1 2 3
Q29	If yes, calculate how many weeks Cotrimoxazole was dispensed to the client while on TB treatment	
Q30	Was client referred to ART facility for continuation of	

	Cotrimoxazole after TB treatment was completed? Yes No	 1 2
Q31	Was the client screened for STIs? Yes No	 1 2
Q32	If yes, at point of service delivery was STI screening done? Initial assessment Follow-up visits Other ----------(specify)	 1 2 3
Q 33	Was their partners referred for screening? YES NO	
Q34	Was the client treated for STIs at the same facility? Yes No	 1 2
Q35	Was their partners referred for treatment? Yes No	 1 2

Q36	Did client receive condoms at the facility? Yes No	 1 2
Q37	If yes, at what point service delivery was the client given condoms? Initial visit Follow-up visits	 1 2
Q38	Was the client referred for condoms? Yes No	 1 2
Q39	What other elements of care are there for clients who are HIV positive in your setting? Weighing Nutritional support Multivitamins- Other specify …….	 1 2 3 4
Q40	If female, was the client provided with PMTCT information? Yes No	 1 2
Q41	Was the client asked about their last menstrual period? Yes No	 1 2

Q42	Was the client planning to have another child? Yes No	 1 2
Q43	Did client receive any contraception? Yes No	 1 2
Q44	Was the client referred for contraceptive services? Yes No	 1 2
	ART ASSESSMENT	
Q45	If client HIV positive, was ART assessment done? Yes No	 1 2
Q46	If yes, was the assessment done the same day of the HIV test? Yes No	 1 2
Q47	If yes to Q 45, what was the CD4 result Below 350 Above 350 CD4 not done (please indicate date of CD4 test)----------	 1 2 3
Q48	What other tests were done during ART assessment?	

	FBC LFT Creatinin Others specify	1 2 3 4
	REFERRAL TO OTHER SERVICES ESPECIALLY ART	
Q49	Was the client assessed for ART at the same facility they tested for HIV? Yes No	 1 2
Q50	Was the client referred to ART assessment after testing HIV positive? If no proceed to Q29 Yes No	 1 2
Q51	If yes, is there record of referral on the patient records? Yes No	 1 2
Q52	Is there record of feedback from the centre where the client was referred to? Yes No	 1 2
Q53	Was the client started on ART?	

	Yes No	1 2
Q54	If yes, indicate date treatment started _____	

Appendix ii: Data collection tool : Interview schedule to describe HIV/TB Integration Models

This health facility capacity assessment data sheet will be used by the research team who will interview health centre managers or TB corner nurses to establish the capacity of centres to provide HIV/TB integrated services in Livingstone district.

No	Questions and filters	Code categories
Q00	Name of Health Facility Maramba health facility Dambwa health facility Libuyu health facility Linda health facility	 1 2 3 4
Q01	Facility Code number_____	
Q02	Date of visit to facility_____	

Q03	Research Assistant code and signature_____	
Q04	Research Team Leader code and signature_____	
Q06	Data clerk code_____	
Q07	What HIV a services are being offered in the TB facility/corner at this facility? HIV CT Provision of Cotrimoxazole STI screening Condom education and provision HIV education and stigma reduction Assessment for ART ART initiation ART continuation PMTCT Adherence counseling	 1 2 3 4 5 6 7 8 9 10

Q 08	How many staff does the facility have? Doctors Clinical Officers Nurses Volunteers Other specify_____	 1 2 3 4 5
Q09	Does the facility have staff trained in providing HIV Counseling and testing in TB setting? Yes No	 1 2
Q10	If yes, indicate how many are trained? Doctors Clinical Officers Nurses Volunteers Other specify_____	
Q11	Does the facility have staff trained in STI screening and management in TB setting? Yes No	 1 2
Q12	If yes, indicate how many are trained? Doctors Clinical Officers	

	Nurses Volunteers Other specify_____	
Q13	Does the facility have staff trained in Condom education and provision Yes No	 1 2
Q14	If yes, indicate how many are trained? Doctors Clinical Officers Nurses Volunteers Other specify_____	
Q15	Does the facility have staff trained in providing HIV education and stigma reduction? Yes No	 1 2
Q16	Does the facility have staff trained in providing ART services? Yes No	 1 2
Q17	If yes, indicate how many are trained? Doctors	

	Clinical Officers Nurses Volunteers Other specify_____	
Q18	Does the facility have staff trained in providing HIV PMTCT? Yes No	 1 2
Q19	If yes, indicate how many are trained Doctors Clinical Officers Nurses Volunteers Other specify_____	
Q20	Did the centre stock the following drugs at all times in the period under review? Indicate number of months if out of stock: -TB drugs- Yes No How many months out of stock……	 1 2

	-ARVs- Yes No How many months out of stock…… -Cotrimoxazole- Yes No How many months out of stock…….	 1 2 1 2
Q21	Does the centre have enough space for the following services? -counseling and testing Yes No -TB services Yes No -ART Yes	 1 2 1 2 1 2

	No -PMTCT Yes No -Laboratory Yes No	 1 2 1 2
Q22	Does the facility offer the following Laboratory services -Sputum microscopy Yes No -CD4 count Yes No -Full Blood Count Yes No -Liver Function Test Yes	 1 2 1 2 1 2 1

	No	2
Q23	How can we sustain HIV/TB integration at the facility?	
Q24	What are the main strengths of the current model of HIV/TB integration?	
Q25	What are the main weaknesses of the current model of HIV/TB integration?	
Q 26	Are there any comments or suggestions for improving integration at this facility?	

Appendix iii: Participant information sheet

UNIVERSITY OF THE WESTERN CAPE
School of Public Health

Private Bag X17 ● **BELLVILLE** ● 7535 ● South Africa
Tel: 021- 959 2809, Fax: 021- 959 2872

PARTICIPANT INFORMATION SHEET

An assessment of the coverage and quality of HIV diagnosis, prevention and care activities within the TB programme in Livingstone District, Zambia

Dear Study Participant_____

I am Cuthbert Kanene, a student at the University of the Western Cape. I am gathering information related to the integration of tuberculosis (TB) and HIV/AIDS services in Livingstone District

Why am I doing this?

I am required to undertake a research project and submit a mini-thesis in partial fulfilment of the requirements for the degree Masters in Public Health in the School of Public Health (SOPH), University of the Western Cape. I will be carrying out interviews, doing observations and a

review of documents. I am accountable to Dr Vera Scott (Supervisor, SOPH) who is contactable on +27 21 959 2630 or c/o SOPH Fax: +27 21 959 2809 or by email at verascott@mweb.co.za

Who are the participants?

The participants in this study will include the Livingstone District Medical Officer, district TB/HIV focal point person, health centre in charges/ managers, TB corner nurses and HIV focal persons in the health facilities of Libuyu health facility, Maramba health facility, Dambwa health facility and Linda health facility.

What is expected from the participants in the study?

I will ask you some questions concerning the integration of HIV services in the TB program in Livingstone district since 2005. It is expected that each interview will last approximately between 25 to 30 minutes. All the information collected will be treated confidentially, and only the researcher and supervisor will have access to it.

What can participants expect?

Once the research project is completed, feedback will be provided to all participants in the form of summarised and detailed reports.

Can you withdraw from the study?

Certainly, you may withdraw from the study at any time, without having to give a reason. You are free to ask questions during the interviews. You do not have to talk about anything you do not want to, and you may end the interview at any time. The study is voluntary and if you refuse to participate this will not influence your employment in any way.

Any further questions?

Are there any questions about what I have just explained? More information may be obtained from (your name and contact details). If you are willing to participate in the study, please read and sign the consent form below.

Appendix iv: Consent form

UNIVERSITY OF THE WESTERN CAPE
School of Public Health

Private Bag X17 ● **BELLVILLE** ● 7535 ● South Africa
Tel: 021- 959 2809, Fax: 021- 959 2872

CONSENT FORM

An assessment of the coverage and quality of HIV diagnosis, prevention and care activities within the TB programme in Livingstone District, Zambia

Participant's agreement

I have been informed about the purpose of the study, and what my participation involves. I also understand that I can withdraw from the study at any time, without having to give a reason and that the study is voluntary. I also understand that confidentiality will be maintained and that the findings of the study will be used for research purposes and service development.

Researcher's agreement

I shall keep all the information collected during the research confidential and use a pseudonym of your choice in all documents. The contents will be used for the purposes referred to above, but may be used for published or unpublished research at a later stage without further consent. Any change from this agreement will be renegotiated with you.

Participant's Signature: _____ Date: _____

Interviewer's Signature: _____ Date: _____