

**UNIVERSITY OF THE WESTERN CAPE  
FACULTY OF COMMUNITY AND HEALTH SCIENCES**

**Title: Assessment of an Integrated TB/HIV Programme at Health Facilities in  
Hawassa Town Administration of Ethiopia**

Student name:	Shumet Adnew Lonsako
Student number:	2706856
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Department/school:	School of Public Health, University of the Western Cape
Supervisor:	Dr Gavin Reagon
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## **Declaration**

I declare that “Assessment of an Integrated TB/HIV Programme at Health Facilities in Hawassa Town Administration of Ethiopia” is my own work, that it has not been submitted before for any degree or examination in any other university and that all resources I have used or quoted have been indicated and acknowledged as complete references

Shumet Adnew Lonsako

Signed\_\_\_\_\_

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## Acronyms/Abbreviations

ART	Antiretroviral therapy
CBC	Complete Blood Count
CPT	Co-trimoxazole Preventive Therapy
DOTS	Directly Observed Short Course Treatment
FHAPCO	Federal HIV/AIDS Prevention and Control Office
FMOH	Federal Ministry of Health
HAART	Highly Active Antiretroviral Therapy
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information Systems
ICAP	International Center for AIDS Care and Treatment Programs
IDU	Injection Drug Use
IEC	Information Education Communication
IPT	Isoniazid Preventive Therapy
ISTC	The International Standard of Tuberculosis care
M & E	Monitoring and Evaluation
NTPs	National Tuberculosis Programs
PIHCT	Provider Initiated HIV Counselling and Testing
PR	Prevalence Ratio
POR	Prevalence Odds Ratio
PTB+	Smear Positive Pulmonary Tuberculosis
STD	Sexually Transmitted Diseases

STI	Sexually Transmitted Illness
SNNPRS	Southern Nations and Nationalities People Regional State
TB	Tuberculosis
TBL	Tuberculosis Leprosy
THAC	TB/HIV Advisory Committee
WHO	World Health Organization



## Abstract

Evaluation of health programmes is essential to assist programme managers in decision-making and accountability to the population they serve. Additionally, regular monitoring and evaluation of TB/HIV collaborative activities are used as a means to assess quality, effectiveness and coverage of services; yet little attention has been given to this in most developing countries. In the southern region of Ethiopia, since the inception of the TB/HIV collaborative activities in 2005, there has not been any formal evaluation pertaining to the implementation status of integrated TB/HIV services at routine program level. However, a series of TB/HIV reviews underlined many challenges that have adversely affected the implementation nationally. However, studies conducted on the quality of TB and HIV/AIDS services tend to be broad and not targeted to the integrated TB/HIV program and therefore, it was necessary to assess the implementation status in a more focused way with a vision to determine its adequacy or otherwise and make appropriate recommendations to improve integrated TB/HIV services in the town.

**Aim:** To assess the implementation of integrated TB/HIV activities in the health facilities of Hawassa town administration

**Study design:** Cross sectional study

**Study population:** All health facilities, health managers, and records of TB and HIV patients in Hawassa town administration

**Sample population:** The study population encompassed TB and HIV clinics, managers of each health facility, and sampled records of individual clients/patients enrolled in the HIV/AIDS/TB treatment and care program, from each health facility in the year 2009/10.

**Data collection:** Face-to-face interviews with facility managers, observation of the rooms in which TB/HIV services are rendered and a review of patient records, were undertaken.

**Analysis:** Descriptive statistics with frequencies and percentages were used for analysis of facility based resource inputs, TB case finding and management, and HIV case finding and management practices. Indicator variables extracted from the record review were transformed into scales (0 or 1) and weighted to reflect the levels of TB/HIV service quality, integration and resources input. After weighting, experts' opinion was used to set a cut off level (75%) to categorize the relative service quality received by individuals and the level of integrated care

provided by facilities into “adequate” or “inadequate”. Bivariate analysis was done to assess the effect of independent predictor variables on outcome variables. We used a P value of 0.1 on bivariate analysis as the cut off point for inclusion of variables into the multivariate analysis. Prevalence ratios, adjusted prevalence odds ratios, and 95% confidence intervals were used to present outcomes.

**Results:** Availability of resource inputs for HIV/AIDS care was inadequate in half of the facilities in Hawassa town whereas, laboratory infrastructure for TB/HIV care was adequate in all facilities. Most (91%) HIV/AIDS patients had their CD4 count and weight (96%) measured at baseline. However, the trend declined over time and the practice was better in hospitals than in health centres. HAART status was a strong predictor of CD4 count improvement and improvement in CD4 count was found to be a strong predictor of body weight gain. TB case finding and management practices in HIV/AIDS clinics were found to be adequate in the health facilities in Hawassa town. Ninety five percent and 86% of HIV positive patients were screened for TB at baseline and at the last clinical visit respectively, of which 98%, 93% and 81% of patients co infected with TB and HIV were provided with DOTS, CPT and ART respectively. However, only 11% of HIV positive patients without active TB were provided with IPT. Only HAART status was found to be a strong predictor of TB case finding. Quality of HIV/AIDS care in health facilities in Hawassa town was adequate. Availability of at least a minimum number of staff and being on HAART were found to be strong negative and positive predictors of quality respectively. Overall, 91% of patients on HAART were retained in care at the end of the year (alive and on treatment), 6% were retained and 3% died.

Resources for the TB program were deficient in our study area. Three out of four facilities had inadequate overall input resources required for good quality TB care and the fourth barely managed to achieve adequate status. However, laboratory infrastructure and availability of forms and registers were adequate in all the facilities. There was a high degree of HIV case finding and a high prevalence (17%) of HIV among TB patients. Despite this, the overall HIV care provided was inadequate, with only 64% and 73% of TB/HIV co-infected patients being provided with HAART and co-trimoxazole respectively and 22% of TB/HIV co-infected patients not enrolled in HIV care. Among sputum positive TB patients good quality TB care was found to be a strong

predictor of successful treatment outcome Our study also showed consistently very high quality TB service provision in the town despite the lack of required resources.

**Conclusion and Recommendations:** The study showed that there was relatively good quality provision of TB and HIV services despite inadequate input resources and that quality of care was positively associated with good outcomes. The study also indicated that HAART benefited patients substantially and hence earlier initiation could be the way forward. We recommend that to further improve quality of care one stop shopping services (availing both anti-TB and HIV care at the same service point within a clinic) be established. In addition, we recommend improved patient monitoring, especially for Pre-ART patients, be established.





## **I. Introduction**

Globally, tuberculosis (TB) was the second highest cause of death amongst adults with only Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS) being higher (WHO, 2005). Globally, 9.2 million new cases and 1.7 million deaths occurred from TB in 2006 (WHO, 2008) and HIV/AIDS accounted for 2.6 million new HIV infections and 1.8 million deaths in 2009 (UNAIDS, 2010). Although the continent of Africa accounts for only 11% of the world's population, more than a quarter of the global TB burden is represented in Africa (WHO, 2005). This was partly the result of the rapidly expanding HIV/AIDS epidemic especially in Sub Saharan Africa which has also been accompanied by an estimated fourfold increase in the number of TB cases in the past decade (WHO, 2003). TB is often the first and most common opportunistic infection in HIV infected individuals (WHO, 2004e). As a result, the World Health Organization (WHO) regional committee for Africa declared tuberculosis as a public health emergency in the African region (WHO, 2005). The close epidemiologic association between TB and HIV has placed the control of both diseases high on the global public health agenda.

In light of this, the WHO interim policy recommended a dual strategy for the control of the two epidemics (WHO, 2004b). However, despite the demonstrated effectiveness of the joint approach in providing comprehensive prevention, care and support services at all levels and improving health services for the benefit of people living with HIV/AIDS and/or TB (WHO, 2004c), TB and HIV/AIDS programmes continue to implement activities independent of each other (Gunneberg, et al. 2008). In an attempt to improve the above situation, resources being allocated for collaborative TB/HIV activities had been increasing, with a national scale-up of TB/HIV activities operative in several countries, but little attention was given to routinely assessing the programme performance (WHO, 2004a). As a result, there is a growing need to monitor these activities and evaluate their impact in order to inform future expansion of the most effective approach. In addition, implementation of TB/HIV activities are widely variable in different settings depending on the prevalence of the diseases and the health system structure, therefore it is necessary to conduct operational research in various settings to contribute to the body of TB/HIV knowledge.

## **II. Background information**

### **2.1. TB/HIV services and health service structures**

#### **2.1.1. Overview of TB/HIV situation in Ethiopia**

Ethiopia, ranked number seven out of the top 22 high TB disease burden countries globally, had an incidence rate of 168 and 379 per 100 000 population for sputum positive pulmonary and all forms of TB respectively, and a prevalence rate of 643 per 100,000 population in 2006 (WHO, 2008). The TB notification rate has also been rising in the past decade, and accounted for 40% of deaths among HIV patients in 2007 (FMOH, 2007d). Hence, TB was a leading cause of morbidity, the third highest cause of hospital admission, and the second cause of mortality. Among other factors, the rapid spread of HIV was believed to be the major cause behind the increase in the TB disease burden. According to a recent estimate, the country had an HIV prevalence of 2.1 percent with approximately one million people living with HIV/AIDS (FMOH, 2007b).

In response, Ethiopia established a TB/HIV Advisory Committee (THAC) in 2002 and launched a TB/HIV collaborative initiative at 9 pilot sites, which expanded nationally to more than 330 health facilities in 2005 (FMOH, 2007a). Activities performed during this period includes: sensitization of policy makers and stakeholders, advocacy communication and social mobilization activities, assessment and selection of sites, training of health workers, provision of supplies, and revision of the TB manual to include TB/HIV activities and development of TB/HIV implementation guidelines (FMOH, 2007a).

A national health facility survey conducted in 2005 in Ethiopia to primarily assess the capacity of health facilities and infrastructure to respond to the burden of the HIV/AIDS epidemic revealed limited coverage of ART services (13%) but better TB treatment services (93%). It also showed wide regional disparities in the distribution of services in decreasing order of Addis Ababa, Amhara, Oromia and Southern Nations and Nationalities People Region (SNNPR) regions, whereas, the overall values for indicators of service for basic HIV testing and clinical services was consistently low (EHFS, 2005).

Likewise, a more recent study by FMOH in 2009 which assessed the quality of HIV/AIDS services provided in health facilities in the country; showed gaps in all indicators used to assess the quality of services related to HIV services. These gaps were variable across facilities with regards to inputs required, actual care provided and outcome of services. It also recommended that health facilities devise a mechanism to engage in an improvement process (FMOH, 2009). Similarly, another study aimed at assessing quality of Tuberculosis care in public health facilities showed that almost 44% of TB care providers were not trained. In addition, daily TB care services were unavailable in 23% of facilities and a significant proportion of TB patients interrupted treatment (47%) (Mengiste, et al. 2009) Thus, with the increasing case load of both TB and HIV/AIDS, and the diagnostic challenges in an already overstretched health care system with inadequate resources and limited skills, it was necessary to continuously monitor the quality of TB/HIV care as part of the component of the TB/HIV program evaluation on a regular basis.

### **2.1.2. Overview of Southern Nations and Nationalities People Regional State (SNNPRS) region, health service structure and TB/HIV services**

The SNNPRS region is divided into 13 administrative sub regions called zones, eight special districts, and one town administration. Each of the zones are further divided into a total of 133 districts. In 2007, the region had a total of 4910 health facilities, (4615 government, 85 Non-Governmental Organizations (NGOs) and 210 privately owned). Of the total government health facilities, 13 were hospitals, 180 were health centres, and 4425 were health posts and health stations (FMOH, 2007a). The DOTS program was started in the region in 1994 and had 100% coverage. All government and one NGO hospital as well as 30 government and 4 NGO health centres initiated TB/HIV collaborative activities in 2005. According to the single point estimate the region had an adult HIV prevalence of 1.7 % in 2010 (FMOH, 2007b) and the projected HIV prevalence was not expected to decrease soon (FMOH, 2006a). Similarly, the number of registered TB patients had increased from 8,339 in 1997 to 22,692 in 2007 in the southern region (FMOH, 2007c). Data from the regional health office showed that the TB/HIV co infection rate was estimated to be 20% and the estimated TB case detection rate in the region was 40 % (FMOH, 2007c).

### **2.1.3. Overview of Hawassa town administration, health structures and TB/HIV services**

Hawassa town administration, together with the 14 districts form the Sidama Zone in SNNPR of Ethiopia, was a TB/HIV pilot site. Hawassa town is also the capital of SNNPRS. The regional statistics indicates that the local town administration covers an area of 1, 747 square kilometres and had a total population of 53, 737 (SNNPR statistics office). The health facilities serving this area were, Hawassa hospital, Hawassa health centre, 8 private health institutions located in Hawassa town, Bushulo health centre and Tula health centre with 15 health posts located in the rural areas.

The hospital and the three health centres implemented integrated TB/HIV activities. Service provision was structured in a way that there were separate TB clinics, and HIV clinics in each of the health facilities where integrated TB/HIV services were provided. These services include; at the TB clinic: HIV testing and counselling of TB patients, provision of Co-trimoxazole for co-infected patients, anti-tuberculosis directly observed treatment (DOT) provision and referral for highly active antiretroviral treatment (HAART) initiation; and at the antiretroviral therapy (ART) clinic: TB screening of HIV positive patients, provision of isoniazid preventive therapy (IPT), and initiation of HAART to TB/HIV co-infected patients if eligible. TB/HIV collaborative activity was coordinated by one person either a doctor/health officer or a nurse, who is in charge of planning, coordinating implementation of TB/HIV activities, monitoring and evaluation, and strengthening referral linkages among various entry points. The health posts were primarily involved in prevention activities, defaulter tracing and TB suspect referral; while the private clinics were primarily involved in TB diagnosis and referral. Data from the district health office showed that the annual number of TB cases in 2008 was 500 and the number of HIV/AIDS patients enrolled in care in the same year was 1200 for the district (Hawassa Town Administration Health Bureau, 2008).

## **2.2. The problem**

It is known that for programmes to be successful, implementation alone may not be sufficient, but regular monitoring and evaluation (M & E) is needed to identify problems and make corrective actions alongside. However, since the start of TB/HIV collaborative activity in

SNNPRS region there has not been any objective program evaluation conducted. A series of TB/HIV reviews had underlined that a shortage and high turnover of skilled staff; substandard storage facilities; poor inventory system of drug control and a shortage of medical equipment, had seriously affected the implementation of TB/HIV activities (FMOH, 2007a). In addition, the same source noted that TB/HIV data recording and reporting systems nationally was substandard. The situation was likely to be no different in Hawassa town administration. Apart from this, there was limited M & E capacity at all levels in terms of personnel and logistics. The Ethiopian health facility survey tried to provide baseline information on the capacity of the health sector in the country to provide both basic and advanced level HIV/AIDS services, which could be used as a tool to monitor and evaluate the TB/HIV components of the national strategic framework, however, it was not primarily focusing on TB/HIV care and tended to be more general (EHFS, 2005). Similarly, the two local studies provided an overall assessment of the quality of HIV/AIDS and TB services in the country but tended to be more national and not specific to integrated TB/HIV services (FMOH, 2009; Mengiste, et al. 2009). Furthermore, all the studies identified wider geographic disparities and the need for continuous assessment following the improvement process model. In view of this, it was necessary to assess the implementation of TB/HIV collaborative activity in a more focused way within specified geographic locations such as in Hawassa town administration, with a vision to determine its adequacy or otherwise and make appropriate recommendations to develop adapted solutions to improve TB and HIV care in the district

### **2.3. Rationale for the study**

This study attempted to demonstrate to service providers, facility leaders and district TB/HIV coordinators the existing areas of strengths and weaknesses in the implementation of collaborative TB/HIV activities in health facilities, and outline a set of feedbacks and recommendations to address any identified shortcomings, if any, for future programme improvement.

### **III. Literature review**

#### **3.1. Relationship between TB and HIV**

The Human Immunodeficiency Virus increases susceptibility to infection with *Mycobacterium Tuberculosis*, and increases the risk of progression to TB disease, thereby increasing the incidence and prevalence of TB. It also increases the likelihood of re-infection and relapse of TB (FMOH, 2007a), because untreated HIV infection leads to progressive immunodeficiency and increased susceptibility to infections (WHO, 2001). On the other hand the onset of tuberculosis in HIV infected patients causes a marked release of pro-inflammatory cytokines that activates CD4<sup>+</sup> T-lymphocytes and macrophages harbouring latent HIV infection, which leads to increased HIV replication and consequent accelerated disease progression (Badri, et al., 2001). Therefore, the synergy between TB and HIV/AIDS is strong and exacerbates both diseases when HIV is introduced into high TB prevalence populations. In this context, concerted and urgent action would be required against both diseases simultaneously.

#### **3.2. Rationale for integration**

Dual intervention against the two diseases results in decreased incidence of TB; reduced TB case fatality rate and improvement in patient outcomes regarding TB (Abdul Karim et al, 2000; Antonuccia et al., 2000); besides improving the overall care of people infected with HIV (WHO, 2001). Dual intervention also helps to improve general health service delivery through enhanced referral networks, better use of resources, improved staff capacity and improved staff morale. It also contributes to reducing the stigma attached to TB and HIV because of fear of terminal diseases (WHO, 2004c). In addition, integration is considered to be simple and sustainable for initiation and delivery of dual HIV and TB care to large numbers of patients in the context of existing under-developed health care delivery systems (Abdul Karim, et al., 2000) The existing, established infrastructure that was available in many developing countries to provide treatment for patients with TB, provide an existing clinical infrastructure to incorporate general HIV care and antiretroviral therapy by reducing the cost through the efficient and effective use of available health care infrastructure, since the necessary resources for separate care such as new buildings, staff and health care infrastructure were not readily available. Besides, use of already existing



structures and systems would make the new program part of the existing system, subsequently leading to more sustainable implementation regardless of external support.

### **3.3. Resources in integrated TB/HIV program**

Availability of resources is a key factor in the successful implementation of TB/HIV collaborative activities, and in this regard, human resources play a great role because primary care systems would need to provide a more complex intervention than has ever been expected of them. However, resources were often in very short supply in low and middle income countries (Hongoro, and McPake, 2004). The situation was exacerbated by the growing epidemic of HIV which resulted in the loss of lives of many health professionals, increased staff absenteeism, and decreased staff morale because of challenges in diagnosis and increased morbidity and mortality amongst their patients. This was compounded by an insufficient health infrastructure such as limited space and poor laboratory services (Migliori, et al., 2006). For an integrated strategy to work, existing services in the TB clinics such as TB screening, diagnostic and treatment as well as patient monitoring services, would require upgrading and supplementation with additional resources such as additional medical examination equipment, laboratory services such as culture facility and Complete Blood Count (CBC) and cluster of differentiation (CD4) count machines, trained staff in diagnosing complex TB/HIV cases, and renovated rooms to allow more space for counselling. (Abdul Karim et al, 2000). In addition, integration of TB and HIV care may put additional pressure on an already overstretched TB treatment delivery systems (Abdul Karim et al, 2000). Experience from Malawi and South Africa on the implementation of integrated TB/HIV activities at national and local level has also witnessed resources and staffing problems as a challenge (Friedland, et al., 2007). The number of available health workers required given the existing client load was too low in almost all health facilities in Ethiopia, the proportion of staff per population was 1:37,996 for doctors; 1:63,785 for health officers, and 1:4,725 for nurses (FMOH, 2007c). A review of the 2002-2006 Health Sector Development Programme (HSDP) II strategic plan in Ethiopia had also revealed shortages and high turnover of qualified staff at programme and patient management levels, inadequate training on TB/HIV, provider initiated testing and counselling (PITC), inadequate laboratory, pharmacy and finance management, and a lack of efficient diagnostic tools (culture, skin test, X-Ray) as major challenges to an integrated TB/HIV service implementation. Shortage of supplies such as IPT and co-trimoxazole preventive

therapy (CPT) for prophylaxis, poor infrastructural set up, shortage of funding and inefficient absorbing capacity added further challenges (FMOH, 2007a). These emphasized the stronger need to respond to the crisis of health workforce attrition and strengthening of the health systems to improve TB/HIV services besides provision of additional financial resources.

### **3.4. TB/HIV management information systems**

Information systems are important for measuring and improving health care quality (Joyner, and Rogers, Undated), because good quality information is needed on which to base policy and management decisions, particularly where resources are limited. However, health service delivery related information systems were weak in many developing countries (Kumalo, 2006). Even in countries with encouraging progress on health information systems such as South Africa, the problem of retaining managers at the various level of the health system needed to optimally use the available information for informed decision making persisted (Kumalo, 2006). In general, health information systems were at the very early stage in Ethiopia, particularly for the integrated TB/HIV programme as it was a new initiative. Consequently, TB/HIV data recording and reporting systems were not up to the expected standard in terms of completeness, accuracy, availability and timing. Nationally, it was consistently observed that TB/HIV data was of poor quality (incomplete, inaccurate, delayed and or absent), and not analysed at the site of collection (FMOH, 2007a). The same source mentioned lack of computerized recording and reporting, weak feedback mechanisms, inadequate supportive supervision and review meetings at all levels. The lack of external evaluation of the programme, and absence of monitoring and evaluation tools were also listed as challenges for the TB/HIV programme in Ethiopia. In addition, health workers were being overburdened with excessive data and reporting demands due to multiple, poorly coordinated systems which often duplicate data collection efforts and fail to deliver timely, accurate and complete data (Kumalo, 2006). Abouzahr and Boerma (2005) attribute international donors' information demands as a reason for this primarily because they prioritise the urgent need for data over long term development of information system capacity within the country. This is because of the high demand for data for accountability purposes that donors require. In order to obtain this, they implement their own data collection system which is easy and less costly, but is parallel to government structures and does not respond to the government's needs. On the other hand, supporting the host government health information system, which



often requires more technical and financial investment, would result in a strong one-channel reporting system that can yield reliable information which responds optimally to both donors' and governments' needs. This requires designing standard tool for monitoring and evaluating collaborative TB and HIV activities (WHO, 2004c).

### **3.5. TB/HIV Quality of Care**

A recent study on quality of TB care and its association with patient adherence to treatment in eight districts of Ethiopia revealed an association of untrained providers (44%) and TB service unavailability (23%) with treatment interruption by TB patients (47%). It was noted that in facilities where daily TB care was unavailable, patients were more likely to have missed daily doses of TB medications [AOR 4.2; 95% CI (1.6, 10)] (Mengiste, et al. 2009).

Prompt and accurate diagnosis and effective treatment are essential for good patient care and tuberculosis control (Hopewell, et al., 2006; Migliori et al., 2006). It is also shown that improving the national TB programme quality is essential to mitigate the resurgence of TB in the era of HIV; however the overall global efforts to ensure people living with HIV/AIDS have adequate access to high-quality TB prevention, diagnostic and treatment services were insufficient (WHO, 2008). Despite this, the perception of sufficient quality differs between countries and sectors because of different value systems. For example, in health care, the perception of the needs of a client or community varies with the different views and perspectives of the patient, service provider and society, and the social, political and economic environment of the country which leads to differences in perception of quality (WHO, 2004f). It also differs between facilities and care providers which is explained by distinct differences in structural and process aspects of tuberculosis management. Structural factors include basic infrastructure to provide services such as examination room, medical equipment, supplies, drugs and health care providers; whereas process factors are entirely patient specific such as hospital and clinical practice including nursing care, patient and environmental hygiene, (Hongoro, et al. 2005; Chang, et al., 2007). In view of this, the International Standard of Tuberculosis care (ISTC) was developed to help improve the quality of care of all TB cases regardless of age or sex, addressing all types of TB patients including those co-infected with HIV. The purpose of standardized care is to describe a widely accepted level of service that all practitioners should seek to achieve in managing patients and to facilitate the effective engagement of all providers in delivering high

quality care. The basic principles of care are the same worldwide, a diagnosis should be established promptly and accurately; standardized treatment regimens of proven efficacy should be used, together with appropriate treatment support and supervision; the response to treatment should be monitored; and the essential public health responsibilities must be carried out (Hopewell et al., 2006; Migliori et al., 2006). Equally important as a standard of care is access to appropriate care for patients who are co-infected with TB and HIV including access to ART (Colin, et al., 2006).

### **3.6. TB case finding and management in HIV patients**

Before the advent of HAART and Isoniazid Preventive Therapy (IPT) for HIV infected people, efforts to control tuberculosis among HIV-infected people had mainly focused on implementing the DOTS strategy for tuberculosis control (WHO, 2001). However, HIV/AIDS has greatly complicated TB case detection and disease control; (Lawn, and Wood, 2005). Therefore, the conventional approach of passively waiting for patients with advanced symptomatic disease to make their way to microscopy centres for diagnosis had minimal positive outcome (Cunningham, and Perkins, 2007). Instead, the expanded scope of the new strategy for tuberculosis control for countries with either an overlapping TB and HIV epidemic or where there is an increasing HIV rate which may fuel the TB epidemic, comprises interventions against tuberculosis (intensified case-finding and cure and tuberculosis preventive treatment) and interventions against HIV (and therefore indirectly against tuberculosis) which includes providing condoms, STI treatment, safe injecting drug use (IDU) and highly active antiretroviral treatment (HAART) (WHO, 2003).

Assessment of wide scale routine implementation in South Africa on TB/HIV activity in 2005 revealed that only 16% of HIV-positive patients were screened for TB, of which 44% were found to have active TB, and only 4% of HIV-positive patients were started on isoniazid preventive therapy (IPT) (Colin et al., 2006). Another study in Rwanda had shown that between June and July of 2006, 377 patients attending HIV clinics were screened for TB at their initial or follow up visits, of which 80 patients were TB suspects and of these nine (11%) were diagnosed to have active TB (ICAP, 2007). Likewise, a preliminary review of pilot sites in Ethiopia showed that of

the 2760 TB suspects, 852 (30%) were diagnosed with active TB, but no figure was found on TB screening and IPT provision as the recording system was immature (FMOH, 2006b). However, the Ethiopian national TB/HIV strategic plan had decided to screen all people infected with HIV for active TB (FMOH, 2007a).

### **3.7. HIV case finding and management in TB patients**

In countries where TB is a common presentation of AIDS, the existing TB program provides an efficient opportunity for identifying those patients who are HIV-infected and those eligible for HAART (Abdul Karim et al, 2000). However, data suggests that the total coverage of HIV testing and counselling for TB patients was still very low with 12% of TB cases globally and 22% in African regions being tested for HIV (WHO, 2008). However, the same source noted that among 11 African countries with over 50% of the world's HIV-positive TB cases that reported data for all years 2002–2006, the percentage of notified cases that were tested quadrupled, from 8% to 35% over the five-year period. Rwanda (76%), Malawi (64%) and Kenya (60%) achieved the highest testing rates, which were also ahead of the 51% target set for the African Region in the Global Plan to stop TB, 2006 -2015.

In this regard, though Ethiopia started to implement TB/HIV collaborative activities at a wider scale since 2005, only 2.6% of notified TB cases were tested for HIV (WHO, 2008). This represents a major missed opportunity as the above patients were already in the health care system and extrapolating from the high global (40%) TB/HIV co-infection rate, it is likely that many of them would have HIV (WHO, 2008). To our knowledge, except for one hospital based study that showed a low rate of HIV testing (35%) among TB patients in the southern region in 2005 (Jerene, et al., 2007), there has not been subsequent wide scale assessment of this in Ethiopia. In view of this and because the national TB/HIV strategic plan targeted to offer HIV counselling and testing service to 100% of newly diagnosed TB patients; to test 80% of newly diagnosed TB patients for HIV; and to provide co-trimoxazole preventive therapy (CPT) for all HIV-infected TB patients (FMOH, 2007a), it was important to assess the performance of the facilities nationally.

### **3.8. Evaluation of health programs**

Program evaluation is a systematic gathering, analysis and reporting of data to assist in decision-making (Joyner, and Rogers, date accessed). It also helps program managers to be accountable to the population they serve and often to donors, senior managers and political office bearers (WHO, 2004a). In addition, programmes, countries and donors also need to demonstrate progress towards global targets such as the Millennium Development Goals (MDGs) (TB incidence should be falling by 2015) and the Stop TB Partnership targets (to halve rates of prevalence and mortality by 2015 compared with their levels in 1990) (WHO, 2006a). To respond to these, programme evaluations need to use standard indicators to ensure comparability across countries and over time (Global Fund, 2004). This helps to direct resources to regions or sub-populations with greater needs and to identify areas for intensification or reduction of effort. In the context of the TB/HIV programme, monitoring and evaluation provides the means to assess delivery, coverage, access, comprehensiveness, integration, efficiency, effectiveness and quality of collaborative TB/HIV activities (WHO, 2010). Of particular interest to our setting was process evaluation which is designed to assess the content, scope and quality of the TB/HIV programme which had already been implemented and was being scaled up nationally (Global Fund, 2004). In addition process evaluation would give us information about client satisfaction and perception, anticipated needs and services (WHO, 2010). Monitoring and evaluation is generally planned and performed by staff in the TB and HIV programs or by general health service staff, but in some instances, particularly for detailed program evaluation or review, external consultants or experts are recruited to help (WHO, 2004a).

In this aspect, data suggests steadily increasing collaborative TB/HIV activity in many high burden countries over time. For instance, 7% of all TB patients were tested for HIV in 2005, representing a three-fold increase since 2004 and 184 000 people living with HIV were screened for TB in 2005, twice the number than in 2003; however, the level of activity was still far from the global milestones (Gunneberg, et al., 2008). This was due to a combination of slow implementation and lack of necessary tools and systems for capturing activity data. In addition, conflicting demands for different information from external agencies placed an unnecessary burden on programmes already burdened by a poor monitoring and evaluation capacity (WHO,

2004a). While there has been progress in scaling up of TB/HIV activities in Ethiopia, a lack of monitoring information has resulted in an inability to show the exact level of the implementation status and whether the collaborative TB/HIV activity has contributed to the control of the two epidemics. Experience from Cambodia showed that integrated TB/HIV activity can lead to increased TB screening and HIV testing rates (Kanara, et al., 2008). It was therefore imperative to assess the TB/HIV program in Ethiopia.



#### **IV. Aim**

To assess the implementation of an integrated TB/HIV programme in the health facilities of Hawassa town administration

#### **V. Objectives**

- To assess the availability of adequate input in terms of personnel/staffing, infrastructure, equipments, drugs and supplies, health systems procedures and information systems for TB/HIV in the health facilities in Hawassa town administration.
- To assess the HIV case finding and management practices in TB clinics of health facilities in Hawassa town administration in 2009/10.
- To assess the TB case finding and management practices at HIV clinics of health facilities in Hawassa town administration in 2009/10.
- To assess the quality of care within the HIV/AIDS and TB services and factors associated with good quality of care both at individual patient and facility level in Hawassa town administration.
- To assess the extent to which TB and HIV case detection, treatment and care are integrated, and factors affecting the level of integration of HIV and TB services at the facility and individual patient level in Hawassa town administration.

## **VI. Methodology**

### **6.1. Study design**

A cross sectional study design based on quantitative methods using a retrospective review of records, facility observations and interviews of facility managers using a structured questionnaire was used.

We chose a quantitative approach because, the quantitative approach gives an objective measure of the programme implementation status and allows comparability of findings across time and regions, which was very pertinent to our study, as the purpose was to foster programme performance improvement through ongoing monitoring and evaluation across time by district health authorities. In addition, the study intended to use routine health service data plus a simple structured questionnaire to interview people to get information about the services. The cross sectional study design is an appropriate study design to describe health service delivery status as well as health care needs of the population using routinely available data or using data obtained in special surveys (Beaglehole, Bonita and Kjellstrom, 2002). It's also an appropriate design to get a snapshot of the health and service delivery status of a programme (Raj, 2002), which is in line with what our study intended to conduct for the time being. Above all, periodic cross sectional studies are recommended by health authorities to measure changes and to evaluate interventions by repeating the same survey in different time periods (Raj, 2002) which also coincides with the purpose of this study as it aimed to demonstrate that district health authorities can regularly assess/audit and monitor progress of their programmes as well as compare them with national and international milestones. Moreover, as we were measuring the status of program implementation including programme input, process and outcome variables at the same time, a cross sectional study design is the most appropriate method. The cross-sectional study is simple, economical and can (Beaglehole, Bonita and Kjellstrom, 2002) be regularly carried out by the district health officers themselves, allowing them to assess their programme performances after the study is complete and to also track improvement measures they have taken, based on the identified gaps and lessons learnt. Hence if this study had sufficient validity, it could be replicated at regular intervals by district health officers in all areas of Ethiopia.

## **6.2. Study Area**

The study was conducted in Hawassa town administration in Southern Nations Nationalities and Peoples Region of Ethiopia, because the researcher was interested in implementing the results in his home town.

## **6.3. Study population**

The study population included all TB and HIV clinics of all health facilities in Hawassa town administration; managers of each health facility; and records of individual clients/patients enrolled in HIV/AIDS treatment and care, and the TB program in the year 2009/10.

## **6.4. Sample size and Sampling procedures**

All four government health facilities (which included one hospital and three health centres) were chosen for the study and a facility manager from each of the facilities were selected for interviewing.

The sample size for the review of records of clients/patients in HIV and TB clinics was calculated using the “statcalc” tool of Epi-Info version 3.5.1, statistical package for estimating sample size using single population proportion. In estimating the likely level of the outcome measurement we used the proportion of patients who received a quality level above the mean/median as a factor. Thus a population proportion of 50% is taken assuming that 50% and above of the patients would receive a high quality service for both HIV and TB services, with an accepted error of 5% and a confidence level of 95%. In estimating the study population, we used the total number of patients seen over the last one year at all of the clinics: thus for HIV clinics we used the total number of HIV patients enrolled in HIV care in the year of 2009/10 in HIV clinics of all selected facilities in the town administration - which amounted to 1000 patients. Similarly, the total number of TB patients enrolled in DOTS program in all the selected health facilities in the town in the year of 2009/10 - which amounted to about 500 patient charts, were taken as our study population. In addition, we added 10% to the calculated sample size in anticipation of unavailability of patients’ charts in the clinics. Based on the above assumptions, the sample size was 306 patients’ records from the HIV clinics and 240 patients’ records from the TB clinics. The above numbers were shared among the four health facilities proportionate to their HIV and TB patient loads respectively



From a sampling frame of all newly enrolled HIV/AIDS and TB patients in HIV and TB clinics in the year of 2009/10, the respective numbers of sampled patients' records were randomly selected from a list of patients' records. This was carried out by inserting lists of all patients from HIV and TB registers that were enrolled in the given year (2009/10) into the Excel sheet and assigning numbers to each, afterwards the estimated sample charts were selected randomly. If the patient's record was not available at the time of selection or if it did not fulfil the inclusion criteria the next chart would be chosen, and if the next chart was unable to fulfil similar criteria as noted below, it would be considered as unavailable and the next chart would be selected.

Inclusion criteria: TB clinic: Patients registered for DOTS between Sep, 2009 – Aug, 2010 and treated with first line therapy

HIV clinic: Newly enrolled patients between Sep, 2009 – August, 2010. This group was chosen because inclusion of newly enrolled patients would give the latest picture of TB/HIV care and taking a full one year period would avoid any difference in seasonal practice and would give a comprehensive picture of the TB/HIV care at any given period within the year. In addition it would give patients enrolled around the end of the data collection period (Aug, 2010) a full one year course of observation/follow up which allowed assessment of the one year treatment outcome for HIV care and was sufficient time to assess the final TB treatment outcome

Exclusion criteria: pregnant women on PMTCT. This is because, pregnant women have varying managements (some may take full course of HAART while others may take combination drugs (AZT and NVP) or single dose nevirapine) which would require different follow up schedules and they have additional care components such as pregnancy follow ups, delivery and postnatal services which needed to be included in the comprehensive service package.

Transferred out patients in both TB and HIV clinics were not considered as it was difficult to get the treatment follow up measures and their treatment outcomes.

In addition patients aged less than 18 years in both TB and HIV clinics was not considered as they required varying treatment regimens and follow ups with continued dose adjustments which makes their management different from those of adults.

## 6.5. Data collection method

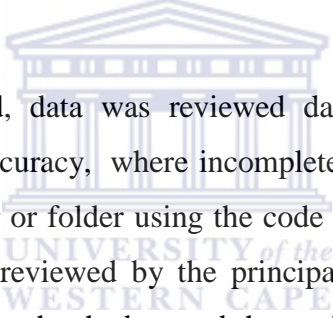
Data was collected after September 2011. This would give at least a one year follow up period for the cohort of patients that were enrolled at the last month of the sampling period. The data collection was made through the use of an adapted TB/HIV audit tool

The methods were:

- Face-to-face interviews with facility managers in each facility on issues such as staffing and health service provision. A structured questionnaire with close ended questions prepared in English and translated into Amharic was used. To check the correctness of the translation, it was then back translated by another person. Prior to use in the study it was also pre-tested and revised wherever necessary.
- Observation of the rooms for availability of furniture, equipment, drugs and supplies, and materials for TB/HIV information systems
- Record reviews was conducted using a structured data extraction form prepared in English.
  - **Patients initially receiving HIV care:** Data extracted from patients' folders to assess quality of HIV care included completeness of patients details, identification and of care giver's contact details, basic investigations done, staging of patient, provision of medicines such as ARTs, follow up appointment and other outcome measures such as weight, CD4 count and functional status. In order to assess the integration of TB/HIV services within the general HIV clinical services and the extent to which TB case detection and management are integrated into the HIV service the following were measured: IPT and Co-trimoxazole provision
  - **Patients initially receiving TB care:** Data extracted from TB registers, to assess quality of TB care included completeness of client details, identification and completeness of care giver's contact details, patient category, completeness of patient drug regimen, sputum smear result registration and treatment outcome. Provision of HIV test, as well as enrolment into HIV care, ART initiation and CPT provision was measured to assess the integration of TB/HIV services within the TB clinics and the extent to which HIV care was integrated into the TB service

The researcher administered the facility manager interviews and conducted the required observation of the health facilities. Data from patient records was collected by trained research

assistants. The researcher conducted a two days training session for four research assistants. A data collection guideline was prepared to assist research assistants to have a standardized definition and understanding of the data they would be collecting and this was complemented with a training manual used to train them. These helped standardize the data collected by the research assistants. They were recruited based on their experience on data collection/research and their background in public health with a minimum education level of diploma in respective fields. Next, they were trained by the investigator on the use of the data collection tools and guidelines including methodology to be employed in the process of data collection and the observance of ethical issues. The first day of the training course was held in the class room, while on the second day the training included practice under field conditions at a health centre at another district where the tool was piloted. This occurred under close supervision and feedback from the researcher. The training was conducted after the questioner was pretested and finalized.



During the data collection period, data was reviewed daily by the research assistants for completeness, consistency and accuracy, where incomplete, incorrect and missing data was checked back to the source/register or folder using the code label to identify the source of data. Prior to data entry, the data was reviewed by the principal investigator to help identify any residual incomplete or incorrect data that had passed the onsite review and if there was any that specific data would be discarded from entering analysis. To assist this, all the data collection questionnaires and logs included dates, codes and signature of the research assistant who completed the form. In addition, logs were kept on site for tracking data to be collected, completed and submitted for data entry (here also logs at data entry was kept for receipt, data entry, returned for cleaning and duplicate data entry).

During data entry, checks were made into the database that restricted the entry of data that was not present in the subset of values reducing the chance of adding error. Sample duplicate data entry was used to assure data quality and data exploration was done to identify and correct any fraudulent data. Following all the quality control checks and identification of certain poor quality data, data cleaning was done through correction of incomplete, missing and inconsistent data at

the site of data collection or removal of poor quality data from analysis if was not possible to correct it. The completed data was analysed using SPSS version 21.

## 6.6. Variables

### 1. *Dependent variables*

TB/HIV integration (individual level/facility level)

TB/HIV quality of care (individual level/facility level)

HIV treatment outcomes

Improvement in CD4 count

Improvement in body weight

TB treatment outcomes

HIV case finding and management practice

### 2. *Independent variables:*

Facility level:

Service inputs: personnel

Infrastructure,

Supplies and supply management system,

Health system procedures

Information education & communication materials

Job aids

Overall facility input

Type of facility: health centre

Hospital

Individual level:

Age

Sex

Education

Marital status

Residence

Employment

HAART treatment status

TB status  
CD4 count  
TB type  
HIV status

## **6.7. Data management and Data analysis**

Variables were grouped and descriptive statistics with frequencies and proportions, were used for analysis of facility based input factors such as staffing patterns; health systems; availability of infrastructure, drugs and supplies and materials on TB/HIV information systems in the facilities, as well as for the individual patients' treatment outcomes. In the HIV/AIDS clinics, treatment outcomes were measured by the CD4count, functional status and survival across time periods (at six months and one year) while in TB clinics, treatment outcomes were measured by standard outcome measures of tuberculosis treatment (cure rate, treatment success rate, defaulter rate, death rate and failure rates)

Data from the record review of patients in the HIV and TB clinics was used to perform descriptive statistics with frequencies and proportions for TB case finding and management among HIV patients and HIV case finding and management among TB patients.

The quality of TB/HIV services was calculated from indicator variables extracted from the record review of services in the HIV and TB clinics (Tables 13 and 25). In this calculation, facility level input factors were not included as direct quality measurement indicator variables because the presence of these facility levels input factors were assumed to contribute to service delivery indicators that would ultimately result in the direct estimate. The quality grading was done by a method of coding whereby the facilities and services received at individual level were categorized into two groups based on the points given to the levels of activities across the various sections of service. This was computed after transforming the various points given to the level of services within the HIV and TB clinics to 0 or 1 scale (unit transformation for yes/no). The scores given to each question in the folder review under the respective clinics of HIV and TB was summed up to form a single score value for each chart or patient on TB/HIV related

services. Since we used a newly adapted TB/HIV tool and there had not been any cut off level set by the national TB/HIV guidelines to categorize levels of quality at individual patient level and facility level in our setting, we used experts' opinion to set a cut off level after weighing the levels of TB/HIV service given to individuals and offered by health facilities. After thorough consultation with selected district TB/HIV coordinators, facility managers and TB/HIV service providers who are experts in TB/HIV program we set a cut off level of 75% to categorize the relative service quality received by individuals and provided by facilities into two. For individual level quality of care received, service quality score levels below the cut- off level was labelled as “inadequate quality” and those at and above the cut- off level was termed as “adequate quality”. In a similar manner facilities with a 75% or more score for preparedness based on inputs being present was assessed as being “adequately prepared” and those with less were deemed inadequately prepared

Similarly, data from the folder review of the TB and HIV clinics was used to assess integration of TB/HIV services in each of the clinics; specifically we used two key indicators of integration: HIV testing offered among TB patients and TB screening offered among HIV positive patients in TB and HIV clinics respectively. Again, a score of 75% for patients receiving integrated care was chosen as a cut off level to categorize the clinics into two categories. TB/HIV integrations level below the cut- off level was labelled as “insufficient integration” and those above the cut-off level was termed as “relatively good integration”.

Factors affecting level of integration was seen from two angles, these were: facility level factors (type of facility, service inputs) and individual patient level factors. The facility level summary input factors were personnel/staffing, infrastructure, drugs and supplies, health system and materials on TB/HIV information systems whereas, individual patient level factors included age, sex, educational status, marital status, residence, employment, HAART treatment status, TB status, TB type and HIV status and CD4 count. All the above factors/variables were used as independent variables to perform univariate and bivariate regression analysis to dependent variable of quality or integration

Univariate analysis was done on all the independent variables (both facility level and individual patient level factors) with facility level quality of care (as dependent variable). Whereas, bivariate regression analysis was performed on those variables which show a significant association with the dependent variable on bivariate analysis

### **6.8. Validity**

The questionnaire and data extraction tool has face validity. The tools were adapted from the Ethiopian National TB/HIV guidelines, WHO monitoring and evaluation tool for TB/HIV programmes and South African National Standard TB/HIV/STI integrated audit tool, to ensure that it suits the existing setup of health services in Ethiopia/Hawassa. As the researcher selected questions from the above tools rationally cover the factors and outcomes to be measured, face validity had reasonably been ensured. In order to ensure content validity, a panel of experts in the fields of TB/HIV and program management including district TB/HIV coordinator, facility managers, and health professionals working at the TB/HIV clinics (Doctors and Nurses) assessed the content of the tools to determine their relevance and comprehensiveness data collection was done in a standardized manner. The use of simple random sampling for selection of patients'/clients' records would eliminate selection bias, a sufficiently large sample size was used.

Inclusion of all types of HIV/AIDS patients, either on ART or not allowed a comprehensive assessment of service delivery. In line with this, inclusion of patient enrolled throughout the year – would avoid seasonal variation of patient service delivery, if any.

### **6.9. Reliability**

Reliability of the folder reviews was done by re-assessing 5% of the folders and comparing it to the original assessment using the kappa test. The kappa result ranges in value from 0 to 1, the higher the score the more reliable the generated scale is. In our case, we used 0.7 as an acceptable reliability coefficient (Joseph and Rosemary, Undated).

### **6.10. Generalizability**

The results obtained can be generalized to the study population only.

### **6.11. Piloting**

The questionnaire was piloted in a health centre which was similar to the health centres in the sample and was located in the same zone but in an adjacent district. The population it served also had a similar health status, socioeconomic status and cultural background. The review of records was tested amongst six patient's registers and folders after which adjustments were made before final implementation of the study.

The pilot study helped to understand the difficulties in using the tools (both from the data collector's and patient's perspective) and it also assessed the extent of training needed for its effective independent use, and it was used to estimate the time needed to complete the clinic assessment.

### **6.13. Ethical considerations**

Ethical approval was requested from the ethics committees of the University of the Western Cape and Ethiopian Health Research Ethics Review Committee/the SNNPR Regional Health Bureau. Prior to conducting the data collection, permission to access patients' records was obtained from the health facility managers. Before being interviewed, facility managers were told about the study and assured confidentiality for their participation and informed written consent was obtained before the start of the interview. Code numbers were given for each interview form (a serial number on the form and code for location) to keep anonymity of data; the codes were noted on both documents, but consent forms (which contain the client's name and signature) were kept separate from questionnaires.

There was no specific risk or benefits for individuals from participating in the study as the interview was with facility managers and not with TB/ HIV service providers. Participants were allowed to withdraw at any stage without having to provide reasons for their withdrawal.

In order to keep confidentiality of patient medical records, names of individuals from the records were not taken and names of hospitals did not appear during data analysis and presentation.



The study would help the investigators, the district and the facility TB/HIV teams learn more about the implementation status of TB/HIV collaborative activities in health facilities in Hawassa town administration. The findings of the study would therefore help government and other organizations to plan for possible intervention measures.



## **VII. Results**

### **7.1. Introduction to results**

Service provision in Hawassa town administration is structured in a way that there are separate TB clinics, and HIV clinics in each of the health facilities. However, integrated TB/HIV services are provided at each of these clinics. Thus, the study reports HIV clinic and TB clinic activities separately. The study findings are presented using univariate analysis of facility inputs; descriptive statistics of patient background characteristics and outcome variables, with bivariate and multivariate analysis of independent and outcome variables.

### **7.2. Sample realization**

The planned sample size for the review of records of patients in the HIV and TB clinics was 306 records from the HIV clinics and 240 records from the TB clinics. After getting the total number of patients' seen in each facility for the period of Sep 2009 to Aug 2010, the above sample record numbers were shared among the four health facilities proportionate to their HIV and TB patients loads, in the specific period respectively. Unfortunately, some of the patients' records were not available for various reasons: some were transferred out to other facilities, other records did not fulfil the inclusion criteria, and in some the subsequent patients' records were either unavailable or did not fulfil the inclusion criteria. As a result we were able to obtain 284 records from HIV clinics and 238 records from TB clinics that were available and fulfilled the inclusion criteria. Access to patients' folders was made using medical registration numbers obtained from the electronic data base in the HIV clinics with the help of the data clerks and we then traced the charts for review. Challenges encountered in getting patients records were: some patients had clinic visits on the day we extracted their charts so we had to postpone the record review to another day; some providers were suspicious that the record review would mess up their chart order and content; some clinics' had very little space to move around in to get the records (especially in the hospitals) so we had to wait until service delivery was less busy; some clinic providers were not cooperative as they wanted to take part in the data collection despite the limited resources the study had to involve and pay all the clerks in the clinic for assisting with the data collection process.

### 7.3. HIV/AIDS clinic

This section includes results from facility managers' interviews, observations of HIV clinics, and a review of records of patients in the HIV clinics. The results includes the univariate analysis of facility inputs such as the training profile of health professionals, the availability of a minimum staff number, infrastructure and supplies, lab infrastructure for TB/HIV care, supplies and supply management system, health system procedures, information education and communication materials, job aids, and forms and registers (table A - G in Annex); individual patient background characteristics in HIV clinics, and descriptive statistics of outcome variables such as change in CD4 count, change in weight, performance of TB case finding, survival, and quality of HIV care delivered. In addition, it includes bivariate analysis using facility characteristics and individual patient background characteristics with the above outcome variables, and variables that showed a P value of 0.1 or less (in order to include as many variables as possible) in the bivariate analysis, were included in the multivariate analysis.

Table one shows the training profile of health professionals working in the HIV/AIDS clinics in the four facilities in Hawassa town administration. In one out of four facilities providers received inadequate training in all the required training parameters necessary to perform their duties, whereas training was adequate in each of the three other facilities. Each input variable was calculated from its own parameters using 75% present as a cut off level. Thus, in a specific facility input item if a facility had 75% of parameters and above it was classified as having adequate input and scored "1", if not as inadequate and scored "0". This classification was further coded as 1 and 0 values respectively. Then the above score is inserted into a summary composite score to calculate the overall input. Accordingly, a facility that had 75% and above score on summation of the various input variables would be classified as having adequate overall input and if less it would be classified as inadequate overall input.

**Table 1. Training Profile of Health Professionals Currently Working in HIV/AIDS Clinics of Health Facilities in Hawassa Town Administration, 2010/11**

Training profile of health professionals	Score “1” if $\geq 75\%$ ; score “0” if $< 75\%$			
	Facility W	Facility X	Facility Y	Facility Z
Proportion of physician trained on HIV clinical management	(1/1) “1”	(1/1) “1”	NA	NA
Proportion of physician trained on TB/HIV	(1/1) “1”	(1/1) “1”	NA	NA
Proportion of physician trained on HIV counseling and testing	(1/1) “1”	(1/1) “1”	NA	NA
Proportion of Nurse trained on HIV clinical management	(3/3) “1”	(1/1) “1”	(2/2) “1”	(2/3) “0”
Proportion of Nurse trained on TB/HIV	(1/3) “0”	(1/1) “1”	(2/2) “1”	(0/3) “0”
Proportion of Nurse trained on HIV counseling and testing	(3/3) “1”	(1/1) “1”	(2/2) “1”	(0/3) “0”
Pharmacy technician/technologist trained on basic ART	(3/3) “1”	(2/6) “0”	(2/2) “1”	(2/4) “0”
Proportion of HMIS officer/data clerk trained on HMIS	(2/2) “1”	(1/1) “1”	(1/1) “1”	(0/0) “0”
Proportion of adherence supporter/s trained on treatment adherence and care and support	(3/3) “1”	(1/3) “0”	(0/0) “0”	(0/0) “0”
<b>Overall score (adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math>)</b>	<b>(8/9) 90%</b>	<b>(7/9) 80%</b>	<b>(5/6) 83%</b>	<b>(0/6) 0%</b>

NB: Health centres are not expected to be staffed with physicians; in place of a physician they may have a health officer or BSC degree graduated nurse. So, the overall score is calculated out of 6 for some facilities and 9 for others

Table two shows the status of health system procedures in the HIV/AIDS clinics. Half of the facilities had adequate health system procedures to provide HIV/AIDS care. Of the three facilities that had regular supervision of TB/HIV activities none of them had action plans arising from the supervision

**Table 2. Status of Health System Procedures for HIV/AIDS Care in Health Facilities in Hawassa Town Administration, 2010/11**

	Fill "1" if its yes and observed or fill "0" if not			
	Facility W	Facility X	Facility Y	Facility Z
Is HCT offered every week day throughout the opening hours of the facility?	1	1	1	1
Can HIV positive patients routinely be seen every day of the week throughout the opening hours?	1	1	1	1
Does the HIV clinic have a mechanism for defaulter tracing?	1	1	1	1
Is there a quality assurance system at the facility for HIV Testing?	1	0	1	0
Is there a quality assurance system at the facility for HIV management and monitoring?	1	1	1	0
Is there a regular supervision of TB/HIV activity at the HIV/AIDS clinic in the facility?	1	1	1	0
Are action plans arising from the previous supervision available?	0	0	0	0
<b>Overall score adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math></b>	<b>6/7 (86%)</b>	<b>5/7 (71%)</b>	<b>6/7 (86%)</b>	<b>3/7 (43%)</b>

The rest of the tables describing the following: availability of minimum staff number, infrastructure and supplies, lab infrastructure for TB/HIV care, supplies and supply management system, information education and communication materials, job aids and forms and registers are shown in the appendix (Tables A – G)

Table three shows a composite score on the adequacy of overall inputs in HIV/AIDS clinics of health facilities in Hawassa town administration. Using the various facility inputs listed below and setting 75% as a cutoff point, facilities were further classified as having adequate and inadequate overall inputs. Each of the facilities were similarly characterized according to the composite score for each of the variables as shown in table 1 and 2. Two out of four facilities had inadequate overall facility inputs required to provide HIV/AIDS services. A major gap was observed in availability of information education and communication materials in three out of four facilities and in health system procedures in half of the facilities were deficient.

**Table 3. Composite score on adequacy of inputs in HIV/AIDS Clinics of Health Facilities in Hawassa Town Administration, 2010/11**

Facility inputs	Fill “1” if the input is adequate or fill “0” if not			
	Facility W	Facility X	Facility Y	Facility Z
Staff training	1	1	1	0
Minimum staff number	1	0	1	1
Infrastructure and supplies	1	1	1	0
Lab infrastructure for TB/HIV care	1	1	1	1
Supplies and supply management system	1	1	0	0
Health system procedures	1	0	1	0
Information Education and Communication Materials	1	0	0	0
Job Aids	1	1	1	0
Forms and registers	1	1	1	1
<b>Total input overall score (Adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math>)</b>	<b>9/9 (100%) Adequate</b>	<b>6/9 (67%) Inadequate</b>	<b>7/9 (78%) Adequate</b>	<b>3/9 (33%) Inadequate</b>

Table four shows the distribution of socio demographic and health service related characteristics of HIV/AIDS patients included in the study. A total of 284 HIV and AIDS charts were reviewed. Out of the total of 284 patients records, three charts had missing record on clients sex and marital status; 10 had missing records on residence; 16 had missing records on education; 21 had missing records on employment status and 6 charts had missing records on patients' treatment status.

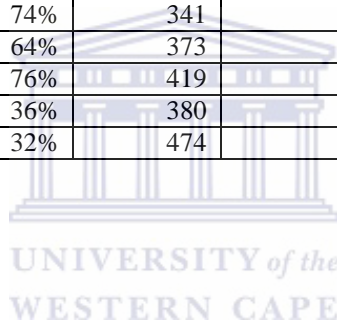
**Table 4. Background Characteristics of Patients in HIV/AIDS Clinics in Hawassa Town Administration, 2010/11**

Characteristics	Characteristics	Number	%
Age in years	< 30	118	42%
	>= 30	166	58%
	Total	284	100%
Sex	Male	99	35%
	Female	182	64%
	Total	281	100%
Marital status	Single	38	14%
	Married	158	56%
	Widowed	42	15%
	Divorced	43	15%
	Total	281	100%
Residence	Urban	224	82%
	Rural	50	18%
	Total	274	100%
Education	Uneducated	60	22%
	Primary	105	39%
	Secondary	66	25%
	Tertiary	37	14%
	Total	268	100%
Employment	Employed	103	41%
	Not employed	150	59%
	Total	253	100%
Type of facility	Hospital	178	63%
	Health center	106	37%
	Total	284	100%
Treatment status	On HAART	152	55%
	Not on HAART	126	45%
	Total	278	100%

Table five shows trends and continuity of CD4 count by treatment status and type of facility among HIV patients in Hawassa town administration.

**Table 5. Trends and continuity of CD4 Count by Treatment Status and Type of Facility among HIV Patients in Hawassa Town Administration, 2010/11**

Group	Variables	% patients tested	Mean CD4	STD deviation	Median	Inter quantile range
All patients	Baseline CD4	91%	361	303	265	130 - 508
	6 months CD4	60%	350	232	300	183 - 429
	1 Year CD4	52%	396	256	345	238 - 503
Patients on HAART	Baseline CD4	100%	190	133	165	90 - 255
	6 months CD4	78%	257	150	235	152 - 335
	1 Year CD4	65%	317	235	275	199 - 386
Patients not on HAART	Baseline CD4	81%	628	295	607	423 - 820
	6 months CD4	41%	562	247	518	406 - 681
	1 Year CD4	39%	555	223	504	393 - 704
Hospital patients	Baseline CD4	99%	335	302	234	117 - 470
	6 months CD4	74%	341	221	300	182 - 418
	1 Year CD4	64%	373	213	325	232 - 479
Health centre patients	Baseline CD4	76%	419	298	375	191 - 640
	6 months CD4	36%	380	265	308	190 - 494
	1 Year CD4	32%	474	357	435	256 - 637





**Table 6. Distribution of CD4 count change at one year follow up of all HIV/AIDS patients in Hawassa Town Administration, 2010/11**

	CD4 count change at one year	Frequency	Percent %
All HIV patients	Increased	89	60%
	Remain the same or decreased	59	40%
	Total	148	100%
HIV patients on HAART	Increased	78	79%
	Remain the same or decreased	21	21%
	Total	99	100%
HIV patients not on HAART	Increased	11	22%
	Remain the same or decreased	38	88%
	Total	49	100%

**Table 7. Trends in level of immune status (CD4 Count Level) among HIV positive patients in Hawassa Town Administration, 2010/11**

	CD4 count/mm3	Baseline		Six months		One year	
		Number	%	Number	%	Number	%
HIV positive patients on HAART	<200	92	61%	48	41%	25	25%
	200-350	43	28%	46	39%	43	43%
	>350	17	11%	24	20%	31	31%
	Total	152		118		99	
HIV positive patients not on HAART	<200	4	4%	1	2%	1	2%
	200-350	12	12%	8	15%	6	12%
	>350	86	84%	43	83%	42	86%
	Total	102		52		49	

**Table 8. Trends and continuity of weight measurement by treatment status and type of facility among HIV Patients in Hawassa town administration, 2010/11**

<b>Group</b>	<b>Variables</b>	<b>% patients weighed</b>	<b>Mean weight</b>	<b>STD deviation</b>	<b>Median</b>	<b>Inter quantile range</b>
All patients	Baseline weight	96%	54	10	53	47 - 60
	6 months weight	77%	56	10	55	48 - 62
	1 Year weight	72%	58	11	56	50 - 65
Patients on HAART	Baseline weight	98%	54	10	54	46 - 60
	6 months weight	94%	57	11	56	50 - 64
	1 Year weight	91%	59	12	58	50 - 65
Patients not on HAART	Baseline weight	94%	54	9	52	48-58
	6 months weight	60%	54	9	52	47-59
	1 Year weight	53%	55	9	52	48-61
Hospital patients	Baseline weight	95%	55	10	54	47-61
	6 months weight	82%	56	9	55	48-63
	1 Year weight	77%	57	10	57	50-65
Health Centre patients	Baseline weight	98%	53	11	52	46-57
	6 months weight	68%	56	12	54	48-61
	1 Year weight	64%	58	13	56	50-65



**Table 9. Distribution of weight change at one year follow up among all HIV/AIDS patients in Hawassa Town Administration, 2010/11**

	Weight change at one year	Frequency	Percent %
All HIV positive Patients	Increased	135	67%
	Remain the same or decreased	65	33%
	Total	200	100%
HIV positive patients on HAART	Increased	99	73%
	Remain the same or decreased	36	27%
	Total	135	100%
HIV positive patients not on HAART	Increased	36	55%
	Remain the same or decreased	29	45%
	Total	65	100%

Table 10 shows the distribution of functional status among HIV patients on HAART. For assessment of functional status data was available for 143, 142 and 136 HIV/AIDS patients at baseline, six months and one year period out of the 152 HIV patients on HAART respectively where as data for HIV patients not on HAART was available for 125, 76, and 70 patients at baseline, six months and one year period out of the 126 HIV patients not on HAART respectively

**Table 10. Trends in Distribution of Functional Status among HIV patients in Hawassa Town Administration, 2010/11**

	Functional status	At baseline		At six months		At one year	
		Frequency	%	Frequency	%	Frequency	%
HIV patients on HAART	Working	108	76%	133	94%	135	99%
	Ambulatory	33	23%	9	6%	1	1%
	bed ridden	2	1%	0	0%	0	0%
	Total	143	100%	142	100%	136	100%
HIV patients not on HAART	Working	109	87%	71	93%	66	94%
	Ambulatory	15	12%	5	7%	4	6%
	bed ridden	1	1%	0	0	0	0
	Total	125		76		70	

Table 11 assesses the TB case finding and management practice among HIV patients in HIV clinics in different facilities and in Hawassa town administration. Half of the facilities in the district had poor TB case finding and management practice among HIV patients but overall the TB case finding and management practice in the district was good, although isoniazid prophylaxis therapy was universally poorly provided.

**Table 11. TB Case Finding and Management at HIV Clinics in Health Facilities of Hawassa Town Administration, 2010/11**

	[% (score)] - Score “1” if $\geq 75\%$ ; score “0” if $<75\%$				
	Facility W	Facility X	Facility Y	Facility Z	District
% of HIV positive individuals screened for TB at baseline	96% (97/101) “1”	99 % (75/76) “1”	97% (65/67) “1”	85% (33/39) “1”	95% (270/283) “1”
% of HIV positive individuals screened for TB at last clinical visit	88% (90/102) “1”	96% (71/74) “1”	74% (49/66) “0”	82% (32/39) “1”	86% (242/281) “1”
% of HIV positive individuals with active TB provided with DOTs	97 % (30/31) “1”	100% (13/13) “1”	100% (5/5) “1”	100% (4/4) “1”	98% (52/53) “1”
% of HIV positive individuals with active TB provided with Cotrimoxazole	90% (28/31) “1”	100% (13/13) “1”	80% (4/5) “1”	100% (4/4) “1”	93% (49/53) “1”
% of HIV positive individuals with active TB provided with ART (N/%)	90% (27/30) “1”	85% (11/13) “1”	40% (2/5) “0”	50% (2/4) “0”	81 % (42/52) “1”
% of HIV positive individuals without active TB and no contraindication for IPT provided with IPT	9 % (6/70) “0”	6% (4/63) “0”	25% (15/59) “0”	0% (0/29) “0”	11% (25/221) “0”
<b>Overall score out of 5 (Good <math>\geq 75\%</math>; poor <math>&lt;75\%</math>)</b>	<b>5/6 (83%)</b>	<b>5/6 (83%)</b>	<b>3/6 (50%)</b>	<b>4/6 (67%)</b>	<b>5/6 (83%)</b>

Table 12. assesses the outcome of HIV clients by TB status in Hawassa town administration over a one year period. The prevalence of active TB among HIV positive clients in the district was 19% (53/274). Diagnosis of active TB was calculated from the 274 HIV/AIDS clients that underwent either baseline and/or last clinical visit TB screening. There were nine clients not screened either at baseline or at last clinical visit and one missing record.

**Table 12. Survival of HIV Clients by TB Status in Hawassa Town Administration, 2010/11**

TB status	Total	Alive and currently in care		Dead		Unknown status	
		Number	%	Number	%	Number	%
Diagnosed with active TB							
Yes	53	42	79%	1	2%	10	19%
No	221	162	73%	4	2%	55	25%
TB status Unknown	3	2	67%	1	33%	0	
Total	277	206	74.4%	6	2.1%	65	23.5%

Table 13. shows the survival status of HIV/AIDS clients whose treatment status and outcome were documented. Out of the 152 HIV/AIDS patients who started on HAART, the one year outcome was known/documented for 143 HIV/AIDS clients. Likewise out of the 126 HIV/AIDS clients enrolled in pre-ART care, only 69 had documented one year outcomes.

**Table 13. Survival status of HIV patients on HAART in Hawassa Town Administration, 2010/11**

HAART treatment status	Documented outcome at 1 year	Number	Percent (%)
ART patients	Alive and on treatment	138	96.5%
	Dead	5	3.5%
	Total	143	
Pre-ART patients	Alive and in care	68	98.6%
	Dead	1	1.4%
	Total	69	

Table 14 describes the criteria for calculating a total weighted score for quality of HIV services. Every activity was equally important with none of the activities being of any greater importance than any other activity and each one was scored out of one. Thus, an activity was given a score of one if performed and zero if not. The total score was calculated out of 16 for pre ART patients and out of 18 for ART patients depending on the number of variables each have. The cut-off score dividing adequate and inadequate quality was set at 75%. Thus for Pre ART patients a score of  $\geq 12$  was classified as adequate quality whereas below 12 as inadequate quality and for ART patients a score of  $\geq 13.5$  was classified as adequate quality whereas below 13.5 as inadequate quality (See table H in appendix)

**Table 14. Criteria for calculating total weighed score for quality of HIV service**

Ser. No	Criteria	Weight score
1	Recorded of patient contact	1
2	Recorded care givers contact	1
3	Hemoglobin test performed at baseline	1
4	ALT/AST tests performed at baseline	1
5	Patient staged at baseline using WHO staging	1
6	Patient staged at least once per year using WHO staging	1
7	Baseline CD4 count performed	1
8	CD4 count done in the last six months	1
9	Functional status assessed at baseline	1
10	Functional status assessed once per year	1
11	Patient weight measured at baseline	1
12	Patient weight measured at last clinical visit	1
13	ARV eligibility assessed at baseline	1
14	TB screening performed at baseline	1
15	TB screening performed at last clinical visit	1
16	Patient given follow up appointment for the next visit	1
	<b>Total score for Pre ART care (all patients)</b>	<b>16</b>
17	Two counseling session given to patients before initiating HAART	1
18	All necessary investigations performed (CBC and BUN, and Creatinine)	1
	<b>Total weighed score for ART care (ART clients only)</b>	<b>18</b>

Table 15 shows quality of HIV/AIDS care in different facilities in Hawassa town administration based on the criteria shown in table 14. There was significant association between individual facility and quality of HIV care,  $P = 0.000$ . Half of the facilities in the district provided adequate quality HIV care and overall, the district provided adequate quality HIV care.

**Table 15. Shows quality of HIV/AIDS care in different facilities in Hawassa district**

Proportion of individuals who received HIV service	Facility name								District		p-value
	Facility W		Facility X		Facility Y		Facility Z				
	number	%	Number	%	Number	%	Number	%	Number	%	
Adequate quality	82	80%	69	91%	45	67%	19	49%	215	76%	0.000
Inadequate quality	20	20%	7	9%	22	33%	20	51%	69	24%	
Overall score (adequate >= 75; inadequate < 75)	“1” Adequate quality		“1” Adequate quality		“0” Inadequate quality		“0” Inadequate quality		“1” Adequate quality		

Table 16 is a composite table which shows the results of the bivariate analysis comparing socio-demographic and health service related factors to quality of HIV services, change in CD4 count, change in body weight, TB case finding practice at last clinical visit, and survival of HIV/AIDS patients at one year follow up in HIV/AIDS clinics in Hawassa town administration. The following variables including: type of facility, educational status, HAART treatment status, staff training, availability of minimum number of staff, infrastructure, supplies and supply management system, and availability of job aids had shown a positive association with quality of service received; sex, marital status, educational status, HAART treatment status, TB treatment status, staff training, availability of minimum number of staff, health system procedures, job aids, overall facility input, and quality of HIV care had shown a positive association with change in CD4 count; HAART treatment status and CD4 level had shown a positive association with change in body weight; facility type, HAART treatment status, marital statuses, health system procedures, supplies & supply management system, overall facility input as well as quality of HIV care had shown statistically significant association with TB case finding practice, and facility type, adequacy of staff training, infrastructure, supplies and supply management system and job aids, and quality of HIV care had shown statistically significant association with HIV/AIDS survival. Of all the variables, “patients treated with HAART” was the only variable significantly associated with all outcomes except survival. Individual bivariate tables for each of the outcome variables are located in Annexes Q - U.

**Table 16. Composite table on bivariate analysis comparing socio-demographic and health service related factors to quality of HIV services, change in CD4 count, change in body weight, TB case finding practice at last clinical visit and survival of HIV/AIDS patients at one year follow up in HIV/AIDS clinics in Hawassa town administration showing crude prevalence ratios and 95% confidence intervals.**



Variable	Group	Good Quality of services PR (95% CI)	Increase in CD4 count PR (95% CI)	Increase in Body Weight PR (95% CI)	TB case finding last visit PR (95% CI)	Survival of patients at 1 year PR (95% CI)
Age in years	< 30	0.975	0.857	0.811	1.019	1.028
	>= 30	(0.852-1.116)	(0.651-1.130)	(0.656-1.001)	(0.927-1.120)	(0.986-1.072)
Sex	Male	1.054	1.360	1.041	0.977	0.979
	Female	(0.923-1.204)	(1.058-1.749)	(0.852-1.271)	(0.883-1.082)	(0.928-1.034)
Marital status	Married +	0.857	1.088	0.983	0.944	1.004
	Widowed +	(0.757-0.970)	(0.818-1.447)	(0.798-1.209)	(0.859-1.036)	(0.954-1.056)
Residence	Single +					
	Divorced					
Residence	Urban	1.142	1.166	1.003	1.060	1.064
	Rural	(0.933-1.399)	(0.713-1.908)	(0.783-1.285)	(0.922-1.219)	(0.969-1.167)
Education	Tertiary +	1.195	1.394	1.091	1.036	1.001
	Secondary	(1.054-1.354)	(1.070-1.816)	(0.895-1.331)	(0.942-1.139)	(0.958-1.047)
Employment	Uneducated +					
	Primary					
Employment	Employed	1.130	1.098	1.026	0.969	1.026
	Not employed	(0.983-1.298)	(0.831-1.450)	(0.835-1.262)	(0.870-1.080)	(0.981-1.074)
Type of facility	Hospital	1.405	0.966	0.997	1.186	1.065
	Health center	(1.190-1.659)	(0.712-1.310)	(0.814-1.221)	(1.059-1.328)	(1.000-1.134)
Treated with HAART	Yes	1.780	3.510	1.324	1.257	0.979
	No	(1.510-2.098)	(2.065-5.965)	(1.041-1.684)	(1.133-1.396)	(0.939-1.022)
TB status	No active TB	0.881	0.671	0.922		0.999
	Has active TB	(0.775-1.001)	(0.532-0.847)	(0.740-1.150)		(0.949-1.052)
Staff training	Adequate	1.642	2.444 (0.446-13.413)	1.280	1.058	1.112
	Inadequate	(1.183-2.280)		(0.874-1.873)	(0.906-1.235)	(0.967-1.279)
Minimum number of staff	Yes	0.773	1.346	0.996	0.861	0.959 (0.928 – 0.992)
	No	(0.690-0.866)	(0.983-1.843)	(0.811-1.222)	(0.796-0.931)	
Infrastructure	Adequate	1.642	2.444	1.280	1.058	1.112
	Inadequate	(1.183-2.280)	(0.446-13.413)	(0.874-1.873)	(0.906-1.235)	(0.967-1.279)
Supplies & supply management	Adequate	1.405	0.956	0.997	1.186	1.065
	Inadequate	(1.190-1.659)	(0.712-1.310)	(0.814-1.221)	(1.059-1.328)	(1.000-1.134)
Health system procedures	Adequate	0.982	1.433	1.097	0.908	1.009
	Inadequate	(0.859-1.122)	(1.049-1.958)	(0.901-1.336)	(0.830-0.993)	(0.962-1.058)
IEC materials	Adequate	1.100	1.261	0.993	1.039	1.024
	Inadequate	(0.966-1.253)	(0.974-1.633)	(0.809-1.218)	(0.946-1.141)	(0.982-1.067)
Job aids	Adequate	1.642	2.444	1.280	1.058	1.112
	Inadequate	(1.183-2.280)	(0.446-13.413)	(0.874-1.873)	(0.906-1.235)	(0.967-1.279)
Facility input (Overall)	Adequate	0.982	1.433	1.097	0.908	1.009
	Inadequate	(0.859-1.122)	(1.049-1.958)	(0.901-1.336)	(0.830-0.993)	(0.962-1.058)
Quality of HIV care	Adequate		2.444	1.188	2.089	1.386
	Inadequate		(0.446-13.413)	(0.621-2.273)	(1.616-2.702)	(0.995-1.931)
Change in CD4	Improved			1.402		
	Not improved			(1.077-1.826)		

Table 17 is a composite table which shows the results of the multivariate analysis comparing socio-demographic and health service related factors to quality of HIV services, change in CD4 count, change in body weight, and TB case finding practice at last clinical visit in HIV/AIDS clinics in Hawassa town administration. For variables that showed statistically significant associations with the outcome variables on bivariate analysis we performed a backwards stepwise regression analysis to identify which among the independent variables are most related to the dependent variables and to explore the form of these relationships. To include variables into the regression analysis we used a p - value of 0.1 as cut off point for all the outcome variables except one year survival. Thus, variables which showed a p - value of 0.1 and less on bivariate analysis were included in the regression analysis and those that showed a p - value above 0.1 were excluded from regression analysis. Although quality of care had a positive association with TB case finding, this result was expected as TB case finding is included in the composite measure of 'quality of care', hence since it is in fact part of the 'independent' variable, the 'independent' variable is not fully independent as a result this variable was not included in the multivariate analysis. Whereas, for one year survival all the variables included in the bivariate analysis were used to do the regression analysis as there were only two variables (facility type and Supplies & supply management) that showed statistically significant but borderline association on bivariate analysis. However, none of these variables showed associations on multivariate analysis. For the rest of the outcome variables, the following associations were shown: HAART treatment and availability of minimum staff number were found to be strong predictors of quality HIV care; HAART treatment was also found to be strong predictor of CD4 improvement; CD4 count increment was found to be a strong predictor of change in body weight; availability of staff, health system procedures and quality of HIV care were found to be strong predictors for TB case finding, and quality of HIV care was found to be a strong predictor of survival among HIV/AIDS patients.

**Table 17. Multivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to Quality Services, change in CD4 count, change in body weight, TB Case Finding at last clinical visit and survival in HIV/AIDS Clinics with adjusted prevalence odds ratios and 95% confidence intervals being reported**

socio-demographic and health service related characteristics		Good Quality of services Adj POR (95% CI)	Increase in CD4 count Adj POR (95% CI)	Increase in Body Weight Adj POR (95% CI)	TB case finding Adj POR (95% CI)
Age in years	< 30			0.700 (0.330 - 1.485)	
	> 30				
Sex	Male		1.300 (0.498 - 3.396)		
	Female				
Education	Tertiary + Secondary	1.441 (0.574 - 3.620)	1.183 (0.482 - 2.901)		
	Uneducated + Primary				
Marital status	Widowed + married	0.616 (0.239 - 1.591)			
	Single + Divorced				
Residence	Urban				
	Rural				
Employment	Employed	1.098 (0.463 - 2.601)			
	Not employed				
Type of facility	Hospital	1.214 (0.460 - 3.208)			
	Health center				
Started on HAART	Yes	18.514 (7.043 - 48.668)	13.604 (4.887 - 37.873)	1.239 (0.494 - 3.104)	7.883 (2.998 - 20.731)
	No				
Active TB	No		2.901 (0.858 - 9.805)		
	Yes				
Staff training	Adequate	1.976 (0.588 - 6.637)			
	Inadequate				
Minimum number of staff	Available	0.167 (0.046 - 0.611)			0.587 (0.105 - 3.284)
	Not available				
Supplies & supply management system	Adequate				2.043 (0.785 - 5.315)
	Inadequate				
IEC materials	Adequate		0.305 (0.086 - 1.090)		
	Inadequate				
Overall facility input	Adequate				0.431 (0.151 - 1.225)
	Inadequate				
CD4 change	Improved			2.464 (1.016 - 5.979)	
	Not improved				

NB: multivariate analysis was not done for survival outcome as there were no significant associations on bivariate analysis.

## 7.4. TB clinic

This section includes results of interview with facility managers, observation of TB clinics, and review of records of patients in the TB clinics. More specifically it includes presentations of univariate analysis of facility inputs such as staff training profile, infrastructure and supplies, lab infrastructure for TB/HIV care, supplies and supply management system, health system procedures, information education and communication materials, job aids, forms and registers available in the TB clinics; composite scores of overall TB clinic imputes that categorized them into two broad categories (adequate and inadequate inputs); descriptive statistics of individual patient background characteristics in TB clinics, and descriptive statistics of outcome variables such as, HIV case finding, TB treatment outcome, and quality of TB care delivered. In addition, it includes bivariate analysis using facility characteristics and individual TB patient background characteristics with the above outcome variables and variables that showed a P value of 0.1 or less (in order to include as many variables as possible) in the bivariate analysis were included in multivariate analysis.

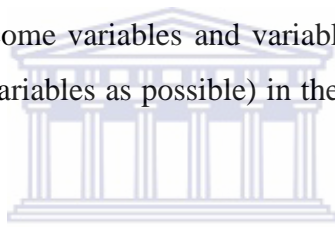


Table 18 shows the composite score on the adequacy of inputs for the TB clinics of the health facilities in Hawassa town administration. Using the various facility inputs listed below and setting 75% as a cutoff point, facilities were classified as having adequate or inadequate overall inputs. Thus for a specific facility input if a facility had 75% of the parameters and above it was classified as having adequate input, if not as inadequate. This classification was further coded as 1 and 0 values respectively. As explained in the analysis for HIV/AIDS, several items make up a specific variable, eg staff training. If greater than 75% of the items in a variable are adequate then the composite score for that variable is deemed adequate and given a score of “1”. If inadequate it gets a score of “0” (see tables I – O in Appendix). Then the above score for each of the variables were inserted into a summary composite score to calculate the overall input for each facility. Accordingly, a facility that had 75% and above score on summation of the various input variables would be classified as having adequate overall input and if less it would be classified as having inadequate overall input. Only one out of four facilities had adequate overall facility inputs required to provide appropriate and effective TB services.

Three out of four facilities had inadequate inputs for effective TB/HIV services at TB clinics

**Table 18. Composite score on adequacy of inputs in TB Clinics of Health Facilities in Hawassa Town Administration, 2010/11**

Facility inputs	Facility W	Facility X	Facility Y	Facility Z
Staff training	0	0	1	0
Infrastructure and supplies	1	1	0	0
Lab infrastructure for TB/HIV care	1	1	1	1
Supplies and supply management system	1	1	0	0
Health system procedures	1	0	1	0
Information education communication materials	0	0	1	0
Job aids	0	0	1	0
Forms and registers	1	1	1	1
<b>Total input overall score out of 6 (Adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math>)</b>	<b>5/8 (62.5%)</b>	<b>4/8 (50%)</b>	<b>6/8 (75%)</b>	<b>2/8 (25%)</b>

Table 19, shows the distribution of socio-demographic and health service related characteristics of TB patients included in the study in Hawassa town administration. A total of 238 TB patient registries were reviewed. Out of these, one registry had missing record on the patient's sex and 28 registries had missing records on patients' residence. The majority of the patients were aged 30 years and less, and two thirds were male, lived in urban areas, had pulmonary type TB and received services from the hospitals.

**Table 19. Background characteristic of patients in TB clinics in Hawassa Town Administration, 2010/11**

Characteristics		Number	Percent (%)
Age in years	< 30	141	59%
	$\geq 30$	97	41%
Sex	Male	152	64%
	Female	85	36%
Residence	Urban	133	63%
	Rural	77	37%
Type of TB	Pulmonary	166	70%
	Extra Pulmonary	72	30%
Type of facility	Hospital	152	64%
	Health center	86	36%
HIV test result	Positive	37	17%
	Negative	186	83%

# 98% of TB patients were tested for HIV

Table 20 shows the HIV case finding and management practices amongst TB patients in TB clinics at different facilities in Hawassa town administration. Most (3/4) of the facilities in the town had good HIV case finding practices amongst TB patients, but the overall management practice was poor due to the low percentage of HIV positive TB patients being provided with HAART and co-trimoxazole.

**Table 20. HIV case finding and Management in TB clinics of Health Facilities in Hawassa Town Administration, 2010/11**

	[% (score)] - Score "1" if $\geq 75\%$ ; score "0" if $<75\%$				
	Facility W	Facility X	Facility Y	Facility Z	District
% TB patient offered HIV counseling	87% (63/72) "1"	100% (80/80) "1"	100% (35/35) "1"	100% (51/51) "1"	96% (229/238) "1"
% of TB patients tested for HIV at baseline	98% (62/63) "1"	100% (80/80) "1"	97% (34/35) "1"	94% (48/51) "1"	98 % (224/229) "1"
% of TB patients HIV positive provided with DOTs	100% (6/6) "1"	100% (23/23) "1"	100% (4/4) "1"	100% (4/4) "1"	100% (37/37) "1"
% of TB patients HIV positive enrolled in HIV care	67% (4/6) "0"	83% (19/23) "1"	75% (3/4) "1"	75% (3/4) "1"	78 % (29/37) "1"
% of TB patients HIV positive provided with HAART	50% (3/6) "0"	70 % (16/23) "0"	50% (2/4) "0"	75% (3/4) "1"	64 % (24/37) "0"
% of TB patients HIV positive provided with Co-trimoxazole	33% (2/6) "0"	78% (18/23) "1"	100% (4/4) "1"	75% (3/4) "1"	73% (27/37) "0"
<b>Overall score out of 5 (Good <math>\geq 80\%</math>; poor <math>&lt;80\%</math>)</b>	<b>(50%) 3/56</b>	<b>(83%) 5/6</b>	<b>(83%) 5/6</b>	<b>(100%) 6/6</b>	<b>(66.7%) 4/6</b>

Table 21 shows the distribution of TB treatment outcomes in Hawassa town administration by actual facility, type of facility and HIV status. Ten patients had no record of TB treatment outcome. Treatment outcome of TB patients in Hawassa town was good, as 90% of TB patients completed their treatment or were cured, 2% had treatment failure, 3% died and 5% defaulted.

**Table 21. Distribution of Treatment Outcome of all TB Patients by Type of Facility in Hawassa Town Administration, 2010/11**

		Total TB patients	TB Treatment outcome									
			Cured		Completed Tx		Failed Tx		Died		Defaulted	
Type of facility#	Hospital	143	43	30%	92	64%	3	2%	5	4%	0	0%
	Health center	85	39	46%	31	37%	1	1%	3	3%	11	13%
	All facilities	228	82	36%	123	54%	4	2%	8	3%	11	5%
Facility	Facility W	64	5	8%	59	92%	0	0	0	0	0	0
	Facility X	79	38	48%	33	42%	3	4%	5	6%	0	0
	Facility Y	35	16	46%	12	34%	1	3%	2	6%	4	11%
	Facility Y	50	23	46%	19	38%	0	0	1	2%	7	14%
HIV status of TB patients ##	HIV positive	36	12	33%	19	53%	2	5.5%	2	5.5%	1	3%
	HIV negative	178	66	37%	96	54%	2	1%	5	3%	9	5%

#9 from the hospitals and 1 from the health center had undocumented TB treatment outcome .

## 223 TB patients know their HIV status and of these 9 patients did not have documented TB treatment outcomes

Table 22 describes the criteria for calculating total weighted score for quality of TB services. Every activity was equally important with none of the activities being of any greater importance than any other activity and each one was scored out of one. Thus an activity was given a score of one if performed and a score of zero if not. The total score was calculated out of 8 for all TB cases and out of 12 for sputum positive TB cases based on the number of variables these two categories have. The cut-off point dividing adequate and inadequate quality was set at 80%. An 80% cut-off was used as three facilities scored 98% or above and one facility scored 79%, hence the 80% cut off allows one to assess why the one facility scored much lower than the others. Thus for all TB cases a score of  $\geq 6.4$  was classified as adequate quality whereas below 7.2 as

inadequate quality and for sputum positive TB cases a score of  $\geq 9.6$  was classified as adequate quality whereas below 9.6 as inadequate quality (See Table P in Appendix).

**Table 22. Criteria for calculating total weighed score for quality of TB service**

Ser. No	Criteria	Weight score
1	Recorded patient's contact	1
2	Recorded care giver's contact	1
3	Patient weight recorded	1
4	Patient categorized	1
5	Correct initial phase regimen provided	1
6	Correct continuation phase regimen provided	1
7	HIV test offered	1
8	Treatment outcome documented	1
	<b>Total weighed score for All TB cases</b>	<b>8</b>
9	Initial sputum smear performed	1
10	Second month sputum smear performed	1
11	5 <sup>th</sup> month sputum smear performed	1
12	End of treatment sputum smear performed	1
	<b>Total weighed score for Sputum positive pulmonary TB cases</b>	<b>12</b>

Except for one person TB quality of care for all TB cases in all the four facilities was good. Thus we used sputum positive TB patients to do bivariate analysis on quality (as 8% of individuals received poor TB care among the sputum positive TB patients). This allowed us to see the TB treatment outcomes among the two groups

Table 23 is a composite table which shows the results of the bivariate analysis comparing socio-demographic and health service related factors to quality of TB services for sputum positive TB patients, to outcome of TB treatment and adequacy of HIV case finding and management practice in TB clinics in Hawassa town administration.



**Table 23. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to Quality of TB Services for Sputum positive TB patients (SP+ TB patients), outcome of TB treatment and adequacy of HIV case finding and management in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		Good quality of services among SP+ TB patients PR (95% CI)	Successful treatment outcome PR (95% CI)	Adequate HIV case finding and management PR (95% CI)
Age in years	< 30	1.163	1.076	0.835
	>= 30	(1.021 - 1.325)	(0.979 - 1.183)	(0.709 – 0.983)
Sex	Male	1.014	0.931	0.953
	Female	(0.894 - 1.149)	(0.858 -1.011)	(0.803 -1.132)
TB residence	Urban	0.955	1.162	0.648
	Rural	(0.843 - 1.080)	(1.031 - 1.309)	(0.567 – 0.742)
TB type	Pulmonary	N/A	0.935	2.138
	Extra pulmonary		(0.861 - 1.014)	(1.588 – 2.879)
Type of facility	Hospital	0.995	1.146	0.526
	Health center	(0.887 - 1.116)	(1.031 - 1.275)	(0.453 – 0.612)
HIV test	Positive	0.987	0.946	1.190
	Negative	(0.846 – 1.153)	(0.823 - 1.275)	(1.004 - 1.409)
Staff training	Adequate	1.044	0.871	1.550
	Inadequate	(0.928 - 1.174)	(0.735 - 1.035)	(1.399 – 1.716)
Infrastructure and supplies	Adequate	0.995	1.146	0.526
	Inadequate	(0.887 - 1.116)	(1.031 - 1.275)	(0.453 – 0.612)
Supplies and supplies management system	Adequate	0.995	1.146	0.526
	Inadequate	(0.887 - 1.116)	(1.031 - 1.275)	(0.453 – 0.612)
Health system procedures	Adequate	1.064	1.061	0.327
	Inadequate	(0.958 - 1.181)	(0.975 - 1.155)	(0.249 – 0.429)
IEC materials	Adequate	1.044	0.872	1.550
	Inadequate	(0.928 - 1.174)	(0.735 - 1.035)	(1.399 – 1.716)
Job aids	Adequate	1.044	0.872	1.550
	Inadequate	(0.928 - 1.174)	(0.735 - 1.035)	(1.399 – 1.716)
Overall TB input	Adequate	1.044	0.871	1.550
	Inadequate	(0.928 - 1.174)	(0.735 - 1.035)	(1.399 – 1.716)
HIV case finding and management	Adequate	0.916 (0.862 –	1.066	
	Inadequate	0.973)	(0.842 – 1.350)	
Quality of TB services among SP+ TB patients	Adequate		2.100	0.935
	Inadequate		(0.890 - 4.954)	(0.887 – 0.987)

NB: classification of outcome of TB treatment is as follows: successful treatment outcome for those who cured and completed TB treatment and unsuccessful outcome for those who died defaulted or failed treatment.

Table 24 is a composite table which shows the results of the multivariate analysis comparing socio-demographic and health service related factors to quality of TB services for sputum positive TB patients, to outcome of TB treatment and adequacy of HIV case finding and management practice in TB clinics in Hawassa town administration. For variables that showed statistically significant associations with the outcome variables on bivariate analysis we performed a backwards stepwise regression analysis to identify which among the independent variables are most related to the dependent variables and explored these relationships. To include variables into the regression analysis we used a p - value of 0.1 as cut off point for all the outcome variables except quality of TB service for sputum positive TB patients. Thus, variables which showed a p - value of 0.1 and less on bivariate analysis were included in the regression analysis and those that showed a p - value above 0.1 were excluded from regression analysis. Whereas, for quality of TB service for sputum positive TB patients all the variables included in the bivariate analysis were used to do the regression analysis as there were only two variables (Age and HIV case finding and management) that showed statistically significant but borderline association on bivariate analysis. For the rest of the outcome variables, Patient's age and HIV case finding and management practice were found to be strong predictors of quality TB service among sputum positive TB patients whereas only quality of Tb services was found to be the strong predictor of successful TB treatment outcome.

**Table 24. Multivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to Quality of TB Services among sputum positive TB patients, outcome of TB treatment and adequacy of HIV case finding and management with adjusted prevalence odds ratios and 95% confidence intervals being reported**

socio-demographic and health service related characteristics		Successful treatment outcome Adj POR (95% CI)	Good quality of services in SP+ TB patients Adj POR (95% CI)	Adequate HIV case finding and management Adj POR (95% CI)
Age in years	< 30		8.289 (0.750 – 91.606)	0.529 (0.232, 1.207)
	>= 30			
Sex	Male		5.093 (0.637 – 40.724)	
	Female			
Residence	Urban	1.374 (0.093 - 20.363)		2.012 (0.115 – 35.124)
	Rural			
TB type	Pulmonary			6.213 (2.742 – 14.074)
	Extra pulmonary			
Type of facility	Hospital	1.749 (0.103- 29.729)		
	Health center			
HIV test	Positive		0.873 (0.071 – 10.786)	
	Negative			
HIV case finding and management	Adequate			
	Inadequate			
Staff training	Adequate	0.478 (0.104 - 2.205)		
	Inadequate			
Quality of services for SP+ TB patients	Adequate	14.590 (2.400 - 88.692)		
	Inadequate			

## **VIII Discussion**

### **8.1. HIV/AIDS clinic**

#### **8.1.1. Resources for HIV/AIDS care and treatment services**

Resources are key factors in the successful implementation of TB/HIV collaborative activities because facilities require a more complex intervention than before, when they were only treating HIV or only treating TB. However, these resources are often in very short supply in low and middle income countries (Hongoro, McPake & Vickerman, 2004). In our study, the availability of a satisfactory level of every type of input resource for TB/HIV care was inadequate in half of the facilities in Hawassa town administration. However, this was mainly due to a lack of IEC materials and since these are not required in order to provide a seamless high quality integrated TB and HIV service, but would rather affect the ability to provide easy to digest information to patients, it is likely that the availability of adequate overall inputs (measured as a composite value) would not affect the breadth and quality of care, as they should generally be sufficient at all facilities, since only IEC materials are lacking. This was borne out by facility inputs having no effect on either quality of care, or integration of care (TB case finding), or outcome of care (increase in weight, or survival at 1 year) on bivariate analysis.

The finding on the lack of inputs is superficially worse than the Ethiopian national baseline HIV/AIDS quality assessment survey, which showed inadequate resource inputs required to provide quality antiretroviral treatment services in only 12.5 % (30 hospitals and 25 health centers) of the sample of health facilities providing ART services in the country (FMOH, 2009). The national study however noted specific gaps in the availability of clinical and implementation guidelines, referral forms and basic medical equipment for patient examination. These are all resources which are likely to adversely impact on both quality of care and integration of care, and ultimately on the outcome of care, hence the lack of resources in the national study had a very different implication to that seen in this current study. Notably, although the national study looked into very few components of facility input resources and fell far short of providing a comprehensive assessment of resources, since a large proportion of facilities had a deficit of key resources affecting clinical care, it can be deduced that nationally facilities were poorly prepared

to implement effective integrated TB/HIV care at that time. However contrary to this finding, a facility based cross-sectional study in a regional referral hospital in the North West region of Ethiopia, done at the same time as the national study, showed availability of adequate resources except for a shortage of co-trimoxazole (a key medication required for prevention and treatment of secondary infections due to HIV) to provide good quality HIV care (Alemayehu, Bushen & Muluneh, 2009). The implication is that the availability of resources was not homogenous throughout the country, but rather that there were regional pockets where resource availability was much greater than in the rest of the country.

In this current study in three out of four facilities, providers received adequate training in all the required parameters necessary to perform their duties, had at least the minimum number of staff, had adequate infrastructure and supplies, had adequate job aids, and adequate forms and registers. This is in line with the above argument where despite the inadequate level of overall inputs that resulted from the unavailability of IEC materials, all the remaining components of facility inputs consistently showed a positive association with the quality of HIV care. However having a minimum number of staff was counter intuitively associated with providing a lower quality of care, lower TB case finding practice and less survival outcome. This paradoxical effect of having minimally sufficient staff (as compared to insufficient staff) also resulted in the overall measure of inputs to facilities not having an association with quality of care provided, as the positive effect of the other variables was cancelled by the negative effect of the staffing levels. This negative effect of better staffing is almost certainly due to the inadequate measurement of whether a facility had sufficient staff or not. Sufficiency of staff was measured based on whether there was sufficient staff present according to a set norm for the type of health facility and did not at all take into account the utilization of the facilities and hence the actual workload of the facilities. Therefore, a facility which had the norm level of staff could quite easily have had a higher workload than the facilities with staff levels below the norm.

Laboratory infrastructure for TB/HIV care was adequate in all the health facilities in Hawassa town administration, reflecting adequate physical resourcing of the facilities, which is probably consequential upon dedicated funding having been available to resource facilities to care for HIV

and TB patients (Justman, Koblavi-Deme, Tanuri, Goldberg, Gonzalez & Gwynn, 2009). This is shown in other settings such as in Nigeria where all laboratories in facilities providing HIV/AIDS care and treatment services supported through PEPFAR were renovated and upgraded to provide a sustainable high quality laboratory system (Abimiku et al., 2010). In Ghana, HIV/AIDS program funds had generously supported and improved laboratory infrastructure and equipment, supplies and services (Adjei, Nazzar, Seddoh, Blok & Plummer, 2011). This provision of TB/HIV specific resources is contrasted with the provision of general supplies and the supply management system, which was only adequate for half of the facilities. This discrepancy plausibly reflects the lower level of resourcing of general services as opposed to those specifically geared towards diagnosis and cure of TB and HIV.

Similarly, half of the facilities had inadequate health system procedures; specifically there was no quality assurance system in half of the facilities and action plans arising from previous supervision visits were nonexistent in all of the facilities. Each of them represents the process aspect of quality which by itself is an integral aspect of the general health system. This further indicates that even within the HIV/AIDS program, a large part of the support is inclined to specific sections such as laboratory infrastructure which is the structural component of quality, with less investment in the process part which would also be needed to improve not only the HIV/AIDS program but also to the general health service/system. This asymmetrical investment in specific structural resources rather than in health system/service strengthening, is in contrast to the argument that HIV/AIDS resources if designed and implemented with the additional goal of achieving broader health benefits, may serve as a catalyst for the establishment of a more effective and responsive health system (Elsadir and Abrams, 2007).

#### **8.1.2. Continuity of care, follow up and treatment outcome of HIV/AIDS clients**

Establishing good chronic HIV care requires an effective patient monitoring system, which measures key indicators of good individual patient care and of program success (WHO, 2006b). Our study finding showed that most HIV/AIDS patients had their CD4 count (91%) and weight measurement (96%) done at baseline. The monitoring trend for both parameters however declined over time and the decline was more pronounced for pre-ART patients as opposed to

patients on HAART. Our study finding was similar to a national cross-sectional study in 2009 which showed an 89% baseline CD4 count but a decline to 51% at one year (FMOH, 2009).

Most of these patients who did not get their CD4 counts done were being cared for at the health centres and this is probably because health centres did not have CD4 count machines and needed to transport samples to the nearby hospitals. The challenges faced in transporting the samples were that there was no dedicated inter-facility transport service and hence staff had to use public transportation to get the samples to the hospital. Making matters worse was the anecdotally noted prioritization of samples from the hospitals for CD4 testing, with samples received from health centers being tested after the hospital tests were completed. Additionally a purported low compliance of patients returning to receive their CD4 results, may partially explain the lower levels of monitoring exhibited by the staff (EHNRI, 2012).

All (100% of) patients on HAART had their baseline CD4 count done compared to only 80% of the pre-ART patients, which reflects the protocol that a patient should not be commenced on HAART without doing a baseline CD4 count and indeed the value of the CD4 count is the most important criterion for commencing HAART. Similarly more patients on HAART had their weight measured at baseline (98%), six months (94%) and one year (91%) compared to clients on pre-ART (94%, 60%, 53% respectively). This might be because providers could be reluctant to monitor pre-ART clients as they might look healthy, or that more focus might be given to the monitoring of ART patients by supervisors.

The greater emphasis given to the care of patients on HAART is also shown by the provision of higher quality services and improved TB case finding to HIV patients on HAART than to those who are on pre-ART. This difference in practices added to the beneficial effect of HAART medication itself, may have contributed to the observed marked improvement in CD4 count and weight among HAART patients as compared to pre-ART patients. As noted for monitoring above, it seems that there are clearer case management protocols for those on HAART than those not on HAART and higher priority is given to those on HAART, as there is also greater managerial and supervisory concern regarding the care of HAART patients. The reportable



indicators in the national HIV/AIDS program focus on HAART patients (they include lost to follow ups, deaths and numbers of patients on HAART) as opposed to pre-ART patients. Thus once the patient is classified as pre-ART, providers are less likely to follow them up as carefully as they do for patients on HAART. Since supervisors and managers are accountable to the performance of the facility based on the above national indicators, they would naturally prioritise HAART patients. Such prioritization would include thorough patient evaluation, monitoring drug adherence, defaulter tracing and educating of patients on HAART, all of which would allow frequent patient encounters with the health service and subsequently increase the likelihood of the monitoring of their CD4 counts, TB screening, prophylaxis provision, weight measurement, and nutritional and positive living advice provision. In addition HAART patients have a much more frequent routine follow-up schedule (every week for two weeks, then every two weeks until the 4<sup>th</sup> week, then every four weeks until the 3<sup>rd</sup> month, then every two months) as opposed to pre-ART patients that have a much less intensive follow-up schedule (it was every 6 months initially but then was later revised to be every 3 months in 2007 as outlined in the national guidelines (FHAPCO, 2007)). This further would allow them to have more frequent contact to the health service and hence make it more likely that they would receive the above monitoring.

The effect of the difference in care is also shown by the proportion of patients that showed an increase in CD4 count. Seventy nine percent of patients on HAART as opposed to only 22% of patients not on HAART showed an increased CD4 count at one year of follow-up. Likewise, three fourths of patients on HAART as compared to slightly more than half of the clients in pre-ART care had gained weight at one year. However, the overall decline in patient monitoring in both groups indicates a lack of continuity in patient monitoring as a whole and may warrant system wide improvements.

Of the HIV positive patients on HAART, 11% had CD4 count greater than 350 and 16% of HIV patients not on HAART had CD4 count less than 350. This is because some patients were clinically staged using WHO staging in the health centres (at which facilities there is a delay in receiving CD4 Results) and then got their CD4 count results later. Patients with a healthy clinical appearance were then not commenced on HAART, despite their CD4 being low enough to



require HAART (less than 350), which indicates that HAART initiation assessment is done fairly well at the first visit, but becomes less pronounced at subsequent visits. A similar finding was observed in a hospital based cross-sectional study that showed more than a quarter (29%) of HIV-infected patients who should have been started on HAART, did not start ART (Alemayehu et al., 2009). This is borne out by the decreasing level of testing for CD4 during pre-ART care over time.

Overall, HIV/AIDS patients in Hawassa town administration present to the health system at a relatively late stage of the disease. This is seen by the baseline median CD4 count of 265 (IQR 130 – 508) for all HIV positive patients. Making the situation even worse, patients started HAART relatively late (the median CD4 count for those who initiated HAART was 165 (IQR, 90 - 255)) given the recommended 350 CD4 count cut-off level to commence HAART treatment for most patients (WHO stages III and IV), and despite the fact that most HIV/AIDS patients (91%) had their CD4 measured at baseline. However, our study finding showed earlier presentation of patients than a national study (baseline median CD4 count 125 (IQR 68-189)) (FMOH, 2009) and a study in Cameroon (baseline median CD4 count of 105 (IQR 42 – 167)) (Sieleunou, Souleymanou, Schonenberger, Menten & Boelaert, 2009). When looking at the distribution by type of facility, HIV/AIDS patients presented to the health system at an earlier stage in health centres (median CD4 375 with IQR 191 – 640) as compared to hospitals (234 with IQR 117 – 470), which is consistent with the role of the health centre as the first point of contact for testing and, if shown to be positive, caring for people with HIV and TB.

In spite of late presentation for care, delayed treatment initiation and declining patient monitoring, HAART initiation had led to an acceptable improvement in median CD4 count (from 165 with IQR 90 – 255) at baseline to 235 (IQR 152 – 335) and 275 (IQR 199 – 386) at six months and one year respectively); increased body weight (patients on HAART gained more weight (5kg) than those on pre-ART care (1 kg) at one year follow up); and elevated functional status (among HAART patients there were 23% ambulatory but not able to work and 1% bed ridden patients at baseline, but 99% became able to work one year later). This shows an initial immunological and clinical improvement after treatment with HAART, confirming its effectiveness and the probable reasonably good adherence in the early phase of treatment. Comparable improvement was found in the national baseline study from a median CD4 count

125 (IQR 68-189) at baseline to 242 (IQR 161-343), 269 (IQR 185-380) at six months and one year, and an increase in proportion of patients with working functional status from 60% at baseline to 84% and 86% at six months and one year (FMOH, 2009). A similar change in CD4 count was observed in a Cameroonian study that showed a gain in CD4 of 136 at six months and 150 at 12 months from the baseline value of 105 and a comparable increase in body weight compared to baseline with an average weight gain of 6.3 kg at one year (Sieleunou et al., 2009)

HIV/AIDS patients, who are male, have higher educational level, and those treated with HAART had improved CD4 count at one year, but paradoxically HIV patients with active TB had a greater improved CD4 count than those without active TB, suggesting that the focus given to integrated TB/HIV care might have biased providers to give undue emphasis to the care of these patients with TB and HIV, than to the rest. This is supported by the fact that more HIV patients with TB (86.7%) received good quality HIV services as opposed to HIV patients without TB (76.4%) and that more HIV patients with TB had better survival (79% alive at one year) as opposed to HIV patients without TB (73% alive at one year), although the associations did not show statistical significance. Likewise, facilities with adequate overall facility input and health system procedures had a statistically significant improvement in one-year CD4 count. On multivariate analysis, HAART treatment status was found to be a strong predictor of CD4 improvement, indicating that HAART is the key to improvement in patients' immune status and has a far greater effect than any other facility input or individual patient characteristics, and hence requires very close monitoring by providers and program managers.

Similarly, HAART treatment and improvement in CD4 counts were found to have statistically significant association with body weight gain among HIV/AIDS patients. However, on multivariate analysis, change in CD4 count was found to be a strong predictor of body weight gain. This is consistent with the fact that immunological improvement is a strong predictor of overall clinical improvement (Goujard et al., 2006). It may also indicate that other parameters that make HAART more successful (such as drug adherence and good nutrition) may also be essential to result in improved immune status and subsequent clinical improvement (Evans et al., 2013; Berhe, Tegabu & Alemayehu, 2013) or CD4 improvement might just reflect the causal

effect of HAART treatment, with CD4 improvement simply being an intermediate variable in the causal pathway between providing HAART and weight gain.

### **8.1.3. TB case finding and management among HIV/AIDS patients**

The dramatic spread of HIV has been accompanied by a major increase in the number of new cases of tuberculosis (WHO, 2009). Between 2005 and 2011 implementation of collaborative TB/HIV activities saved millions of lives, but much more needs to be done to achieve universal access to these life saving measures and to eliminate HIV associated TB deaths (WHO, 2011). Accordingly, the federal ministry of health of Ethiopia has been implementing intensified TB case finding since 2005. In our study, the TB case finding and management practice was adequate in the health facilities in Hawassa town. Ninety five percent and 86% of HIV positive patients were screened for TB at baseline and at their last clinical visit respectively, and the vast majority of patients co -infected with TB and HIV were provided with DOTS, CPT and ART (at levels of 98%, 93%, 81% respectively). Taken together these findings signify a very good performance in TB case finding and management, as it nearly achieved the national TB/HIV strategic plan target of screening all HIV/AIDS patients for TB and providing DOTS and CPT to all TB/HIV co infected patients in the HIV clinics (FMOH, 2007a).

The TB screening of patients with HIV practice in our study (95%), is much better than the routinely reported national performance (44%) (FHAPCO, 2012), higher than that in a national study in Ethiopia (68%) (FMOH, 2009) and higher than the performance in South Africa (76%) (Chehab, Vilakazi-Nhlapo, Vranken, Peters & Klausner, 2013). However, a similar level of performance was observed in Rwanda after a nationwide implementation of intensified TB case finding among HIV patients upon enrolment for HIV care, that increased from 77% to 94% from 2006 to 2011 (Uwinkindi et al., 2014). This is in line with the observation above where greater focus was put on TB/HIV care which is clearly beneficial to the care of co infected patients and should be reproduced in the care of all HIV patients (including those not on HAART) and at other TB/HIV entry points such as TB clinics where the HIV case finding and management practice performance was relatively low. Our finding is consistent with the large global increase in TB screening among people living with HIV and provision of IPT in 2010, which occurred subsequent to increased dedicated funding for TB in several developing countries (WHO, 2011).

However, only 11% of HIV positive individuals without active TB were provided with Isoniazid Prophylactic Therapy (IPT) which is way below the national and global target of 50% (FMOH, 2007a), which reflects a greater focus on treatment of TB than prevention of TB. Indeed the low level national and global target for TB prophylaxis echoes this lack of emphasis on prevention. However the high TB treatment levels achieved suggests that if the policy becomes more focused towards prevention of TB, then this is likely to translate into as high a level of prophylaxis against TB as there is for treatment of TB. Although the provision of IPT was low, it was slightly higher than the national performance of 6.6% (FHAPCO, 2012) and a wide national study that showed 5% IPT provision (FMOH, 2009). Much higher IPT performance is seen in South Africa where 46% of HIV patients with no TB were offered IPT (Chehab et al., 2013). The finding on IPT provision indicates significant missed opportunities to prevent TB, given the high prevalence of TB among HIV patients. Besides, the apparently low importance placed on TB prophylaxis (or perhaps because of this low importance), the limitation in availability of IPT may also partially explain the observed low IPT prophylaxis levels. Indeed previous national TB/HIV program meetings noted a lack of data with which to estimate IPT demand for the purpose of TB prevention in HIV patients and note that most of the Isoniazid available at facilities was procured as part of DOTs package for TB treatment purposes, rather than via IPT requests, and was not enough to provide medication for the HIV patients who required IPT.

Adequate supplies and supply management systems, type of facility and HAART status had statistically significant associations with TB case finding practices. Patients seen in Hospitals and patients on HAART underwent better TB case finding and management. Again this reflects the better care provided to patients on HAART compared to those not on HAART, for the same reasons as stated above. On the other hand the observed difference by facility type was also expected because hospitals may have a better capacity to diagnose TB since HIV makes the presentation of TB atypical (Gupta, Lawn, Bekker, Caldwell, Kaplan & Wood, 2013) and hence requiring additional diagnostic tests such as X-rays, which were not present in health centres. Or it may simply reflect greater adherence to the policy guidelines regarding TB case finding at the hospitals.

As in quality of HIV service, the paradoxical effect of having minimally sufficient staff (as compared to insufficient staff) as with having minimally adequate health system procedures (as opposed to adequate health system procedures) resulted in a negative association with TB case finding practices. Whereas having adequate supplies and a supply management system had a positive effect on TB case finding. However, on multivariate analysis, only HAART treatment status was found to be a strong predictor of TB case finding.

Although quality of care had a positive association with TB case finding, this result was expected as TB case finding is included in the composite measure of 'quality of care', hence since it is in fact part of the 'independent' variable, the 'independent' variable is not fully independent and to the extent that TB case finding is part of the measurement of 'quality of care', a positive association is both expected and fully explained.

#### **8.1.4. Quality of HIV/AIDS services**

The Donabedian model of quality which includes three aspects: structural, process and outcome was used in our study. The process factors constitute ingredients of HIV/TB care delivered to patient by service providers; structural factors include the organizational and managerial factors at health facilities that define the availability, accessibility and convenience of HIV/TB care to patients while as the name implies treatment outcomes are regarded as outcomes of structural and/or process factors (Donabedian, 2003). In our study we used process aspects as measure of "quality of service delivered to patients" and we assessed structural factors as measure of "facility resource input". Facility inputs were also used as independent variable to see its effect on quality of service delivered and treatment outcomes.

Quality of HIV/AIDS care in Hawassa town administration was adequate in half of the health facilities. Patients who received HIV/AIDS services in the hospitals had better quality services than those who received it in the health centres and this association was confirmed on bivariate analysis, but this result was not significant on multivariate analysis. This may be because hospitals did better work-up of patients at enrolment, had better monitoring, had better capacity to perform TB screening and management, and had more highly qualified and trained staff. The

fact that two thirds of the patients included in this study were seen at the hospitals made the overall quality of HIV/AIDS care provided in the town, adequate. A hospital based study in Northern Ethiopia that assessed quality of HIV/AIDS services using three components - structure, process and outcome, showed that a significant proportion of patients had missed important components of care recommended by the national guidelines, resulting in gaps in process and outcome (Alemayehu et al., 2009). The same study noted that a better quality of care was provided to patients at enrollment than during follow up. A similar finding was observed in a wider national study which showed a gap in the level of quality for each quality indicator which varied from region to region (FMOH, 2009). In the absence of an effect of overall facility inputs on quality of HIV service in our study, the finding of good quality HIV service in the town as a whole may indicate reasonably good practices around processes involved in quality of care, since our variables that make up quality of care are all process variables. On the other hand, the variation by type of facility indicates the need for more focus in the health centers with regards to quality of HIV/AIDS services.

Patients on HAART received markedly better quality HIV/AIDS services than patients not on HAART, with a high adjusted prevalence odds ratio (18.5). This, as noted before, reflects a bias towards implementing HIV amelioration services, which in turn reflects the large degree of systemic support for care aimed at minimising the effect of HIV infection and curing TB. On multivariate analysis, HAART treatment status was found to be a strong predictor of good quality HIV/AIDS service with an adjusted POR much higher than that seen on bivariate analysis. Apart from their association with good quality HIV care, the other socio-demographic variables including better education, being single and divorced, and each facility input, except minimum number of staff, all independently had a positive statistical association with HAART itself. This means that the effect of HAART was diluted by the shared effect of the above variables on bivariate analysis, but when these variables were controlled on multivariate analysis, the association became extremely high. The evidence of a causal relationship between HAART and quality of HIV service based on strength of association is therefore very high.



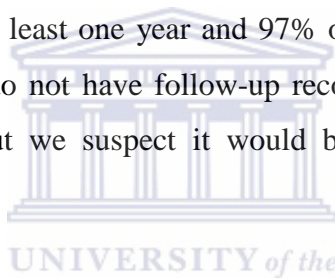
As explained in the facility input section, adequate training of staff, availability of adequate infrastructure and supplies, a functional supply management system, as well as availability of job aids, lead to good quality HIV/AIDS services on bivariate analysis, but its effect was cancelled out by the effect of staffing levels which resulted in lower quality of care. The strength of this paradoxical effect of having minimally sufficient staff (as compared to insufficient staff) was further noted by the high adjusted risk ratio on multivariate analysis (0.167) as opposed to no statistical association for the above variables on multivariate analysis. Previously we speculated that this paradoxical effect could be because the measurement of adequacy of staff did not consider the workload of the staff, therefore it could be that facilities with more staff would attract greater utilisation and hence result in a greater workload and by implication result in a lower quality of care. However given the high adjusted odds ratio this plausible assumption, even if true, does not provide a full explanation of the counter-intuitive effect of 'less staff results in higher quality of care' and suggests that there must be some other currently unknown explanation for this phenomenon. A possible further partial explanation is that the facilities that had a minimum number of staff were also the ones which had inadequacies of other inputs such as trained staff, infrastructure, supplies, supply management system and job aids and hence it was these causing the lower quality observed. This is indeed the case as shown in table 3 where facility 'Z' although having sufficient staff is deficient in many of the other input resources. However this is still not a sufficient explanation for the strong negative association of having a minimum number of staff shown on multivariate analysis, hence the real factor/s presumably causing this presumed residual confounding effect is either 'high workload' and/or some other unidentified factor.

#### **8.1.5. Retention in care and outcome of HIV/AIDS patients**

Looking at the overall outcome distribution of HIV/AIDS patients who initiated HAART at one year follow up, 91% of these patients were retained in care at the end of the year (alive and were on treatment). This finding was higher than that of a hospital based follow up study in the same region that found a 63% one and half year retention in care (Mulissa, Jerene & Lindtjørn, 2010), a wider more representative national study which showed a 74% one year retention rate for HIV patients seen from 2006-2008 (Assefa et al., 2011), and to a study in Cameron (77% 1 year survival) (Sieleunou et al. 2009). The consistently lower retention rates in the two national

studies could be explained by the timing of program implementation as both were assessed in the earlier period of ART initiation in the country when HIV infection stigma and discrimination prevailed people's awareness of the benefit of ART was lower, access to services were limited, and the overall HIV/AIDS care and treatment program had not matured enough yet. Conversely, the observed improvement in retention rate in our study could be a reflection of the improvement in HIV/AIDS service delivery including improved quality of and access to services, engagement of multiple actors with increasing resources, improved community awareness of treatment options and a lessening of socio-cultural barriers over time (FHAPCO, 2012).

One of the goals of any HIV program should be to increase survival and reduce mortality among infected individuals. Thus, survival and mortality of HIV/AIDS patients are key impact indicators (WHO, 2006b). Of the HIV/AIDS patients who were started on ART, 94% had a follow-up outcome recorded for at least one year and 97% of these were alive at one year. For the remaining 6% for whom we do not have follow-up records, we do not know the one-year survival outcome is unknown, but we suspect it would be lower than for those who were retained.



Globally, HIV/AIDS has posed a significant mortality and morbidity in recent decades. However, the introduction of HAART has made a significant contribution to the survival of people infected with HIV. This was shown by a study conducted in the USA comparing the mortality trends during various time periods: pre HAART era (1990 - 1996), early HAART era (1997 - 1999) and late HAART Era (2000 - 2003) which revealed a 10.3%, 2.8% and 0.2% annual mortality in 1995, 1999 and 2003 years respectively, with increasing mortality trend in the pre-HAART era and a declining trend in the post HAART eras (Crum et al., 2006). A wider study from seven demographic surveillance sites in eastern and southern African countries further analyzed the mortality trend in adults (ages 15 – 64) by HIV status before and after the introduction of HAART and found a crude mortality rate of 77.8 per 1000 for HIV positive individuals as compared to 6.7 per 1000 for HIV negatives in the pre-HAART era (years 2000 – 2003) with a relative risk of 11.6 (95% CI, 10.7 – 12.7), whereas after the wide scale introduction of HAART the crude mortality for HIV positives dropped down to 31.6 per 1000



and 9.5 for HIV negatives with a corresponding relative risk of 3.3 (95% CI:3.1 -3.5) in the years 2009 -2011 (Reniers et al., 2014). The documented mortality rate in the first year of treatment in our study was similar to the South Africa one at 3% (or 30 per 1000) which probably reflects the effectiveness of HAART. The finding is much better than the 11.3% mortality seen in a study in the same region (Mulissa et al., 2010) and to the 6% mortality in a wider national study (Assefa et al., 2011). It is also much lower than the average mortality rates (8 – 26%) in sub-Saharan African countries, than the 3 -13 % in HIV programs in Latin America and Caribbean, and 11 - 13 % in HIV programs in South-East Asia (Lauren, Meintges, McIlhleron, Harries & Wood, 2013). However, many of the above studies may have used a different denominator including patients whose outcome were not known or documented resulting in lower mortality rates (as they have a larger denominator) than what we found in our study, where we only analyzed mortality of patients who had a documented outcome status (noted alive or dead).

Out of the HIV/AIDS patients who initiated ART, 6% had an unknown outcome status at the end of one year; this could be because of death, being lost to follow up or as a result of poor documentation. The above finding, however, is better than a national study that revealed 19% with unknown status at one year (Assefa et al., 2011) but the corresponding figure for pre-ART patients was very high (unknown status of 45%) and points out the need for better recording of annual survival data. It is also a significant number to worry about looking at the distribution of lost to follow up in a previous study in the same region, which showed that out of the 13.4% lost to follow up, 41% have died, 20% were under follow up at another facility, 14% stopped treatment, 10% left the region, 9% were on traditional treatment and 6% were status unknown “true lost” (Mulissa et al., 2010). A study in rural Malawi also revealed the same: 54% were dead and 20% moved away, with their main reasons for defaulting being stigma (43%), care dissatisfaction (34%) and improved health (28%) (McGuire et al., 2010). So in addition to better recording of survival data, it is also necessary to find the causes for lost to follow-ups to design adapted solutions.

On bivariate analysis, a few of the socio-demographic or facility characteristics that showed statistically significant associations were borderline and most failed to show a meaningful

association with survival of patients, possibly because this may require an extended period of observation (not just one year) to show the existing effect. As a result, multivariate analysis was not done for this specific outcome.

## **8.2. TB clinic**

### **8.2.1. Resources for TB services**

A nurse and a laboratory technician is the standard minimum required to run a TB clinic, so in general facilities that have a TB DOTs service would, by default, have these service providers, so it is unlikely that there would be any difference across the facilities with regards to staff availability. As a result, we did not use minimally adequate number of staff as an independent variable, but instead we used adequately trained service providers as measure of both staff number and training. That gave us five indicators to weigh training adequacy (Tuberculosis training, TB/HIV training, provider initiated HIV counseling and testing training, HIV testing and AFB microscopy training for a laboratory technician) to use to calculate a composite score of adequately trained and inadequately trained providers. This would allow us to assess the effect of trained providers on any other outcome variables of interest.

In reference to the Donabedian model of quality: structural factors include the organizational and managerial factors at health facilities that define the availability, accessibility and convenience of HIV/TB care to patients (Donabedian, 2003). In our study these structural factors are represented as facility inputs and include most of the above elements. Resources are needed to provide adequate inputs for facilities to provide quality TB/HIV services. In this regards, International donor funding for TB control has increased by 50% since 2006, but still falls far short of the required funding needed for comprehensive TB services throughout the country (WHO, 2011). The same source also noted that funding for TB/HIV collaborative activities is increasing, but since it is usually channeled to the national HIV programmes and non-governmental organizations, rather than to national TB control programmes, the national TB programme still suffers from a paradoxical shortage of funds. In Hawassa town administration, three out of four facilities had inadequate overall inputs required for good quality TB care and the fourth barely managed to achieve adequate status. Most of the inputs, including staff training, availability of information education and communication materials and job aids, were inadequate in most of the

facilities (3/4) and infrastructure and supplies, supply management system and health system procedures, were present in only half of the facilities. However, laboratory infrastructure and availability of forms and registers for TB/HIV and TB care were adequate in all of the facilities. Similar finding was seen in a cross sectional study in Northern Ethiopia which assessed 7 hospitals, 9 health centers and 28 clinics (Mengiste, 2009). The study found that the required inputs (structural factors) have not been available or implemented optimally, and specifically found that none of the TB focal persons were trained, teaching materials were scarce in most health facilities, and only 18% of providers were supervised (of these only 11% received written feedback), however there was no interruption of TB drug supply and standard patient treatment registers were available in all facilities

Unlike the HIV/AIDS service inputs, the TB inputs that were deficient were inputs that are required to provide integrated TB and HIV services. As a result the inadequacy of overall inputs affected the low performance of HIV case finding and management practices (those with adequate inputs were 1.6 times more likely to have adequate HIV case finding and management practices), but interestingly it failed to show statistical association with TB treatment outcomes and quality of care for TB patients. Despite this lack of effect of inputs on outcomes in this study, the absolute deficits in inputs for TB clinics suggests that managers and donors should be alerted that HIV/AIDS investments need to go beyond HIV/AIDS clinics and strengthen other entry points such as TB clinics, in order to improve integration of HIV and TB services, and indeed to impact on overall health services quality.

### **8.2.2. HIV case finding and management among TB patients**

The HIV epidemic has led to a dramatic increase in the incidence of TB cases with a global co-infection rate of 23% and with a much higher rate in the African region (44%) which accounts for 82% of the global TB cases among people living with HIV (WHO, 2011). The national TB/HIV co-infection rate for Ethiopia was 15% in 2010 (FHAPCO, 2012). Our study finding is slightly higher (17%) than the national report, but comparable to the 18% prevalence in the SNNPR region in 2005 where the urban rural prevalence was 25% (versus 16% in the rural areas) (Datiko, 2008), our study finding showed a declining TB/HIV co-infection rate in SNNPR. The fact that our study contains more urban patients (2/3 of TB patients) makes the

difference more significant. Lower TB/HIV co infection rate (11.4%) was documented in rural health centers in North-West Ethiopia (Tadesse & Tadesse, 2013) and a higher prevalence (20%) was reported in private health facilities in Addis Ababa (Alemie and Gebreselassie, 2014). The wide variation in the prevalence is explained by the difference in HIV prevalence in the specific regions as the rate of TB/HIV co infection depends on the prevalence of HIV infection in the community (Datiko et al., 2008). As high as 55% TB/HIV co-infection rate was observed in South Africa and Kenya (Chehab et al., 2013; Chakaya, 2008). The HIV epidemic provides the fuel for spreading TB disease, which means that the containment of both requires a concerted effort from all actors within both the TB and HIV programs and the joint programs (where they exist).

Globally, there has been a large increase in HIV testing among TB patients (WHO, 2011). In 2010, 35% of TB patients were tested for HIV globally, while 59% in the African region (WHO, 2011) and 43% in Ethiopia were tested for HIV (FHAPCO, 2012). In our study, HIV testing was at a very high level with 98% of those who were offered a test actually consenting and being tested. This is after 96% of all TB patients were provided with HIV testing preparatory counselling. A lower testing rate (78.2%) was documented in rural health centres in North-West Ethiopia under routine program conditions (Tadesse & Tadesse, 2013) and in private health facilities in Addis Ababa (70%) (Alemie & Gebreselassie, 2014). The finding is also above the national target of providing HIV testing and counselling to all TB patients and testing at least 80% of those counselled (FMOH, 2007a), suggesting that there was an excellent performance in terms of providing HIV testing services and a commensurate positive uptake by patients, which could be taken as reasonable evidence of the successful implementation of integrated TB/HIV care in Hawassa town. Similar successful achievements were documented on HIV testing of TB patients after scale up of TB/HIV collaborative activities in Rwanda (from 48% in 2005 to 97% in 2009) (Pevzner, 2011) and Kenya (from 60% in 2006 to 88% in 2008) (CDC, 2010).

Unfortunately, the overall HIV case finding and HIV management practices (implementation of collaborative TB/HIV activities) in TB clinics in Hawassa town was inadequate. Major deficiencies were noted in the provision of co-trimoxazole and HAART for TB/HIV co-infected

patients, where 73% were provided with co-trimoxazole and only 64% were provided with HAART. However, it is better than the national performance of 69% co-trimoxazole prophylactic therapy, 39% antiretroviral therapy (ART) (FHAPCO, 2012) and the low (46%) global coverage of HAART for TB/HIV co-infected patients. Our performance was slightly lower but comparable to a national study in South Africa in 2011 which showed provision of CPT and HAART to 77% and 38% of TB/HIV co-infected patients respectively (Chehab et al., 2013). However, after scale up of TB/HIV collaborative activities impressive achievements were shown in co-trimoxazole provision in Rwanda from a baseline of 2.5% in 2005 to 92% in 2009, and high performance was maintained in Kenya from a baseline of 87% in 2006 to 92% in 2009. On the contrary, provision of HAART, although improved from baseline, remained low in both countries (Rwanda from 12.5% in 2005 to 49% and Kenya from 26% to 34% from 2006 to 2009) (Pevzner, 2011; CDC, 2010). Though our findings revealed an encouraging performance in Hawassa town, it did not achieve the expected target set in the national strategic framework (CPT to all TB/HIV co-infected patients) (FMOH, 2007a) and the WHO's recommendation to provide HAART to all TB patients living with HIV, regardless of their CD4 cell count (WHO, 2011). Overall, the combined evidence indicates that efforts to identify HIV positive TB patients in many countries and settings were encouraging, but were not necessarily linked to providing proper care for the identified TB/HIV co-infected patients.

Although both TB and HIV treatments require a chronic care model, TB treatment is usually completed in 6 to 9 months while HIV treatment is indefinite and requires lifelong follow-up and engagement of patients with the health service. In addition to this TB and HIV treatments are often separated, which means that they are provided by different sets of staff at either different facilities or at different rooms within the same facility. Thus, HIV testing of TB patients could serve as an opportunity for co-infected patients to enter into and continue with a continuum of care after the completion of their TB treatment. The continuum of care includes at a minimum: HIV diagnosis, monitoring of HIV patients for HAART eligibility assessment, opportunistic infection screening and management, initiation of HAART when required, HAART adherence support, HIV health education, STI prevention and treatment, family planning, antenatal HIV prophylaxis and care and viral suppression/immune recovery monitoring. When individuals

move from one stage to the other, there are significant drop-offs at each stage of the continuum of care, thus closely examining these drop-offs by program managers and service providers will help them to pin point gaps that may exist and to implement systems improvements that supports HIV/AIDS individuals to have a sustained high quality of care. In our study from the identified TB/HIV co-infected patients, 22% were not enrolled into chronic HIV care. This was better than a national study finding that failed to link 36% of TB/HIV co infected patients into chronic HIV care and treatment services (FMOH, 2009). Given the challenge that patients' face due to the separate TB and HIV clinics that results in HIV positive TB patients having to go to the HIV clinic to get their HAART medication and TB positive HIV patients having to go to the TB clinic to get their anti-TB medication within the same facility, it seems sensible to provide one stop combined HIV and TB services. These one stop combined HIV and TB services would probably make it more likely for facilities to achieve the national target of linking all TB/HIV co-infected patients to chronic HIV care and treatment services (FMOH, 2007a). Therefore, there is a need to consider a mechanism which allows patients get one stop shopping services (receive both anti-TB and HAART drugs at the same service point within each of the clinics) or alternatively (and probably second best) to investigate the existing referral linkages between the HIV and TB services and design improvement measures. Failure to link significant proportions of TB patients with HIV to HAART, despite excellent case finding, also indicates a huge missed opportunity, as the facility and service providers invested their resources to identify these cases. In this regard it is important to note that HIV is for most of the time an asymptomatic disease and therefore it is a huge challenge to identify and treat people who have the HIV infection. These patients came into direct contact with the health facility while looking for help for their TB symptoms, hence making it easier to uncover their HIV infection without requiring the extra resources one would need to have in order to identify asymptomatic HIV infected people within the community. Thus, failure to treat TB patients diagnosed with HIV contradicts the primary theory behind integration, which promises that dual intervention reduces TB case fatality, improves patient treatment outcomes, improves general health services delivery through enhanced referral networks and allows better use of resources (Antonuccia et al., 2000; WHO, 2004b). It also promises to decrease the incidence of TB, if HIV positive patients are provided with prophylaxis against TB.



### **8.2.3. TB care and treatment outcomes**

The overall goals of Tuberculosis treatment are to cure the individual and to minimize the transmission of mycobacterium tuberculosis to other people (CDC, 2010). Thus successful treatment of tuberculosis has benefits for both the individual patient and the community in which the patient resides. In view of this, ensuring individual patient and programme success requires periodic measurement of outcomes to guide improvement measures. The outcome of TB treatment in Hawassa town administration was favourable, with 90% of all new TB patients either proven to be cured of TB or having completed TB treatment course. The finding was higher than the SNNPR region average (82%) seen over the past 10 years (2003—2012) for all new TB cases (Dangiso, 2014), the Arsi zone of Oromia region average (84.8%) seen over the past 14 years (1997 – 2011) for new sputum positive TB patients (Shallo, et al., 2014), and also surpassed the national performance benchmark (84%) and the WHO target (85%) for new sputum positive TB patients (FMOH, 2007a). Similarly high performance was shown in Tigray region (90.38%) (Berhe et al., 2013) but as low as 72.2% TB treatment success rate was also seen in Gambela region over a period of 5 years (2006 – 2010) (Demeke, Legesse & Bati, 2013) indicating wide variations across regions in the country. As stated in the source, the unsatisfactory performance in Gambela region could be the result of the mobility of the community from place to place before completion of their treatment and/or it could be due to a weak TB prevention and control program. Likewise, a comparable treatment success rate was seen in rural Nigeria (84.7%) (Jombo, 2008), in southern India (85.7%) (Vasudevan, JayaKumar, & Gnanasekaran, 2014) and in Shanghai, China (82.4%) (Shen et al., 2009). Our study finding was also higher than the average performance in the African region (81%) which has recorded a steady improvement since 1997 and the global performance (87%) for sputum positive TB patients in 2009 (WHO, 2011). Overall, it is a reflection of the significant progress that had been made in the past years within the TB control program in the SNNPR region (success rate from 82% in 2003 to 92% in 2012), in other regions, and in the country as a whole (success rate from 78% in 2006 to 84% in 2009) and parallels the expansion of the DOTs programme coverage (Dangiso, 2014; Shallo et al., 2014; FMOH, 2007a; WHO, 2011). Thus, if the observed performance is maintained and replicated in other low performing regions such as seen in

Gambela region, it would not take long for Ethiopia, which is one of the high burden TB countries (HBD) to meet the national and global target of a 85% success rate in treating TB cases.

In our study 3% of TB patients died during TB treatment. A comparable mortality rate (3%) was observed in the SNNPR region (Dangiso, 2014), in Addis Ababa region (3.7%) (Getahun et al., 2011), in Gambela region (2.4%) (Demeke, Legesse & Bati, 2013) and in Tigray region (3.9%) (Berhe et al., 2013) in Ethiopia. In other countries such as in Nigeria (3.3%), India (2.7%), and Shanghai, China (2.7%) (Shen et al, 2009) similar mortality rates were noted. However, a higher annual mortality (7 %) was observed in a 14 year long prospective cohort study in Arsi zone of Oromia region (Shallo et al., 2014). The high death rate in this study was partly due to HIV infection as shown by its independent statistical association with poor treatment outcome and the higher mortality noted among high HIV prevalent districts in the study which was also statistically significant. The mortality is better than the 2006 national performance (5.3% for sputum positive TB patients) and lies within the target set for 2010 (< 5%) (FMOH, 2007a). Complementing the performance of low mortality, the defaulter rate in our study (5%) was also better than in Oromia (7.8%) and SNNPR (9%) regions, but much lower rates were found in Gambela (2.9%) (Demeke, Legesse & Bati, 2013) and Tigray (3.3%) (Berhe et al., 2013) regions. Similarly, a comparable defaulter rate was seen in other settings in rural Nigeria (5.5%) and Shanghai, China (5.9%) (Shen et al., 2009). These findings could be explained by the high treatment success rate and good quality of TB service provided in all facilities in Hawassa town. With the emergence and spread of Multi Drug Resistant TB in recent years in Ethiopia (Biadglegne et al., 2014) identification of treatment failures in the routine DOTs program becomes highly necessary. In our study 2% of TB patients treated under DOTs had failed treatment and the figure was higher than those reported in SNNPR (0.2%), Gambela (0.4%) and Arsi regions (0.4%), but lower than in the Tigray (3.7%) region but with a similar performance to that noted in India (2.1%) and Nigeria (2.5%). Given the unsatisfactory or in most cases unavailable diagnostic facilities in the region and the country (Biadglegne et al., 2014), it is possible for the reported treatment failure proportion to be underestimated.



As expected, living in an urban residence, but rather surprisingly receiving TB services at hospitals were both found to have a statistically significant association with a successful TB treatment outcome. Health centers had higher defaulter rates (13%) and less treatment completion rate (83%) as compared to hospitals, where there were no defaulters and a 94% completion rate. This was unexpected because hospitals had more HIV positive TB patients (HIV prevalence 20.6%) as compared to health centres (HIV prevalence 9.8%) and HIV adversely affects TB treatment compliances because of overlapping drug adverse effects (Lawn et al., 2013) with subsequent less TB treatment success rates for TB/HIV co infected patients (which are found more in the hospitals) (Pevzner, E., 2011) In addition, hospitals in our study had inadequate HIV case finding and management practices compared to health centers. In support of the above reasoning and contrary to our study finding, a more recent and representative regional study which looked into the distribution of performance by geographic area, found a better TB treatment outcome in rural as opposed to urban areas (Dangiso, 2014). The finding may likely be related to patient factors which were not assessed in our study such as difference in socio-economic status, awareness about the disease and treatment, and closer distance and more accessible transport to the hospitals, which could be characteristic to Hawassa town as the capital of SNNPR and may not represent the entire urban regional condition. So our results could simply represent the town administration and not the entire regional scenario. However, on multivariate analysis only the quality of sputum positive TB service was a strong predictor of successful TB treatment outcome and none of the above socio-economic and location factors were found to be strong predictors of TB treatment outcomes.

Although not statistically significant, HIV positive TB patients had higher mortality (5.5%) and failure rates (5.5%) compared to HIV negatives (3% mortality and 1% failure rates). The higher mortality among TB/HIV co-infected patients than HIV negative TB patients in the current study substantiates a previous report of higher mortality among TB/HIV co-infected patients in the same region (Shaweno and Worku, 2012; Shallo et al., 2014) and in Rwanda (Pevzner, 2011). These two combined, warrants the need for more emphasis to be placed on the care of HIV infected TB patients, especially given the observed inadequate overall HIV case finding and management practice in health facilities in the town.

#### **8.2.4. Quality of TB services for sputum positive TB patients**

Using the composite score for “quality of TB care for all TB patients” we found that all except one patient received good quality TB services in all facilities. This indicates an excellent performance in the process aspect of TB quality of care, which shows providers’ adherence to national standards of care. However, we cannot rule out the possible limitation in our measurement tool as the variables used for weighing quality might not be inclusive of all the important process variables and even the variables captured were evidence of documentation of processes and not evidence of the actual activity having being performed. Thus, the tool may have overestimated the actual practices by using only the easily captured and routinely performed activity measures and some activities might be well documented, but might not necessarily have been performed as indicated. Nonetheless, taken together with the favourable treatment outcome, it indicates the existence of an established foundation for good practices within the TB DOTs program (process factors related to quality of care are good), despite most facilities having inadequate inputs, and hence this could serve as an opportunity for integration of HIV/AIDS services within the existing established TB DOTs program.

A study that used a prospective assessment of quality of TB services in four regional referral hospitals’ in Zimbabwe, revealed that inpatient management of TB in all hospitals did not meet the local and international standards of quality because of structural and process deficiencies (Hongoro, 2005). The structural factors correlate to ‘inputs’ in our study while the process factors correlate to quality of TB services delivered by providers in our study. Although the prospective approach might have directly or indirectly introduced a Hawthorne effect, it was able to provide insight into hospital level quality issues for monitoring and improving quality of services (Hongoro, 2005). On the contrary, a quality audit tool used to assess access and quality of care in the TB control program in Cape Town, South Africa, showed mostly high quality of care, at baseline assessment, where quality was defined as adherence to local protocols and standards for TB care (Scott, 2012). Although quality was assessed by individual indicators of components of quality of care and not via a composite score of quality of care, the quality audit tool identified various gaps in performance levels with respect to specific indicator variables, which required improvement measures and helped to draw general conclusions about the overall quality of TB services provided. Regardless of the method and tools used, periodic assessment of

the quality of care provided and feeding of the results into quality improvement efforts, with the participation of all key stakeholders and patients in the program, would serve as a means to increase the success of the TB/HIV program.

Since in this current study almost all patients received good quality TB services, using the above composite score, which applied to all types of TB, we used a different composite score with a higher number of variables to assess the “quality of TB services for sputum positive TB patients only”. This showed that 8% of sputum positive TB patients received poor TB care while the remaining 92% sputum positive TB patients received good quality TB care. Thus, even increasing the number of process variables to look deeper into the process of TB care hasn’t brought much change in the measured level of TB quality, which remains high and hence this provides further evidence of the existence of a high quality TB DOTs service in Hawassa town administration. On bivariate analysis, age less than 30 years and HIV case finding and management had a statistically significant, but borderline association, with good quality of TB services for sputum positive TB patients, however no potentially causative factor showed any association with good quality of TB care on multivariate analysis. A study in 44 public health facilities in Ethiopia showed provider training and availability of a daily TB service as independent positive predictors of good quality TB care (Mengiste, 2009). However, our ability to detect any association was severely hampered by the effective small sample size (as shown by the wide confidence intervals in table 28) since only a small proportion of patients (8%) did not receive good quality care.

## **VIII. Limitations of the study**

Our study has both strengths and weakness. One of the strengths was that we were able to find a good number of records (93%) of our sample size in HIV clinics and reviewed 99% of sampled register data in TB clinics. The other strength of our study was that we used mixed methods to capture information on TB/HIV practice which included record review, facility observation and interview with facility managers and service providers to get as detailed information as we could and above all we included many outcome indicators such as quality, integration, CD4 count, weight, functional status, survival, mortality, retention in care and TB treatment success which would provide as a comprehensive look into the program.

The limitations of our study include: respondent bias where the facility managers might consider the information we were looking for as an indirect measure of their overall facility management performance and could blend and shape their answers to what they think was the right “fake” answer. In addition, we cannot rule out the possible limitation in our measurement tool as the variables used for weighing quality might not be inclusive of all the important process variables and even the variables captured were evidence of documentation of processes and not evidence of the actual activity being performed.

Since a cross sectional study gives a snapshot estimate of measure – in this case program performance in terms of service quality, continuity and integration - it may not help to conclude the observed level of performance as had been there or would be there for some time before or after the time of the assessment. It requires carrying out repeated measurements/regular monitoring of the performance to confidently declare the observed performance over a certain period of time. In addition, as measurements of exposures and effects – in our case input and outcome indicators were made at the same time, it would make it difficult to assess the reasons for associations demonstrated and this would affect exposures that were not fixed characteristics of individuals, in our case facility level input factors, as it would be difficult to know whether these factors were there long before the effect/service.

In assessing program performance including quality of service given, it's important to include patients' as well as providers' (insiders) perspective. Assessing provider's perception of quality of care is used to see the perceived quality from the provider's angle with expected compliance to standard practice and real practice, and this is usually assessed in process evaluation to detect gaps in the perception of quality of care with the real practice and standard. It is best assessed using a qualitative method, but this study falls short of assessing this – limiting the comprehensive nature of the overall insights into the program performance status.

Lastly, we could not rule out the possible threats of absence and incompleteness of data in the charts on the validity of our study, because of the poor recording practices observed in our setting as noted in data capturing. To the extent that the characteristics or management of those individuals with poor data in the charts might be different from the general group, this might have biased our conclusions.



## IX. Conclusion

Despite the WHO's recommendation of integrated care as an effective means to control the HIV/AIDS and TB epidemic and the Ethiopian government's commitment to this, there was little evidence of integrated TB and HIV/AIDS care in Hawassa town administration, despite increasing resources and service scale ups. Listed below for both HIV/AIDS and TB clinics are the existing areas of strengths and weaknesses in the implementation of integrated TB/HIV activities found by this study.

**HIV/AIDS clinic:** Most of the health facilities in Hawassa town administration were deficient in overall resources for integrated TB/HIV care, mainly because of the unavailability of IEC materials, and there was no homogeneity across the facilities. Within the HIV/AIDS program itself HIV/AIDS investments were geared towards structural components of the health system such as laboratory facilities and services which were better upgraded and equipped, but this appeared to be at the expense of general health services and appeared not to stimulate integrated care. Having a minimum number of staff was counter intuitively associated with providing a lower quality of care, lower TB case finding practices and less survival outcome. However, as the exposures and outcomes were assessed at the same time it is difficult to draw plausible reasons for these associations and it requires a closer look into what caused this paradoxical effect.

Patient monitoring was done fairly well at patient's entry into the health system, but declined in subsequent visits with pronounced gaps observed in health centres as opposed to hospitals, which was also shown in previous national studies. HIV patients on HAART received better quality of services and had improved TB case finding compared to those who are on pre-ART. This was not affected by facility type and its effect was clearly reflected in better patient treatment outcomes such as increase in CD4 count, weight gain and functional status improvement. HAART status was also found to be the strongest predictor of TB case finding amongst HIV patients. In line with this, TB case finding and management of HIV/TB co infected patients appears to have become a routine practice in health facilities in Hawassa town which was a promising finding given the high TB/HIV co-infection rate in the town and given that the

country is one of the high TB burden countries globally and home to large absolute numbers of HIV patients in Africa. However, IPT provision to HIV patients shown to be TB free lagged way behind the national and international targets for this service. Overall, greater focus was given to TB treatment as opposed to TB prevention, despite global emphasis on TB prevention.

The study also showed a fairly good quality of HIV care unlike previous local and national studies. In all cases, the performance varied by HAART status, type of facility and geographic region, as well as timing of service (during initial visit versus later in the follow up period). Patients on HAART and those who received services from hospitals received better quality of HIV care than those on Pre ART and those who received services from health centres, while regions with weak TB program such as Gambela provided low TB quality. However, the existing good quality of HIV care should be complemented with providers and patients perspective in order to be representative of the overall insight into performance status. Consequently, the observed quality HIV/AIDS service in our study appeared to have resulted in successful treatment outcomes with high survival, low mortality as well as high retention of patients in care, which were better than previous years and better than that seen in other parts of the world with similar socio-economic circumstances. However, the significant number of patients with unknown outcome status, which was alarmingly higher among Pre-ART patients as opposed to HAART patients, pointed to poor documentation practices.

**TB clinic:** Consistent with a previous national study in Ethiopia, resources for the TB program were deficient in Hawassa. The deficiency was primarily reflected in the low performance of HIV management practices, but did not adversely affect the TB DOTs service, which was shown to be of an excellent quality and nor did it affect HIV case finding which was very high at 98% . The finding of poor HIV management was concerning given the high prevalence of HIV among TB patients in Hawassa and might reflect the channeling of increasing TB/HIV program funding through the HIV program only, instead of channeling it to the TB program as well.

It is noted that evidence from other countries shows that it is possible to achieve high performances in the provision of co-trimoxazole and HAART if programs are well planned, implemented and monitored.

Our study also showed very high quality TB service provision and this was reflected in the favourable overall TB treatment outcome with a high success and low mortality rate. These combined favourable outcomes clearly indicated the existence of an established TB DOTS program in the town.

Lastly, it was noted that the adapted integrated TB/HIV evaluation tool was able to indicate the level of TB/HIV quality of care and integration, and identified the input, structural and process deficiencies in HIV and TB services with reference to national and international standards of care. Thus, it can be continuously improved and used to periodically assess the level and quality of integrated TB/HIV care.





## **X. Recommendations**

Procedures which allow patients to receive one stop shopping services (receive both anti-TB and HIV care at the same service point within each of the clinics) needs to be implemented, or alternatively (and second best) the existing referral linkages between the HIV and TB services need to be improved.

HIV/AIDS investments need to be more widely distributed across all HIV/AIDS program elements and in particular extend beyond specific HIV/AIDS clinics to strengthen other HIV entry points, such as TB clinics.

Efforts to improve HIV patient monitoring at subsequent visits with a greater emphasis being placed on Pre-ART patients and on health centres should be prioritized.

Facilities need to improve provision of IPT to HIV positive patients without TB in HIV clinics, and improve provision of co-trimoxazole and HAART to TB/HIV co infected patients in the TB clinics.

Further operational research is needed to investigate “factors contributing to weak Pre-ART care and measures to improve it” and “reasons for very low TB prevention among HIV/AIDS patients without active TB”.

The ministry of health should carry out similar regular integrated TB/HIV program evaluations periodically to ensure maintenance of existing good performances, identify performance gaps and implement continuous quality improvement measures, that supports sustained high quality of care for patients infected with TB and/or HIV.

## XI. References

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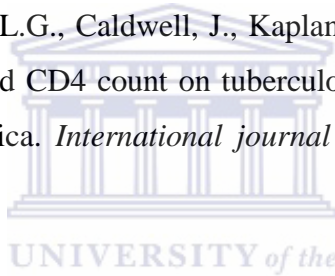
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## XII. Annexes

### Annex 1. Result tables

Table A shows the distribution of minimum required personnel of different cadre in health facilities in Hawassa town administration. To assess the minimum required number of multidisciplinary health care providers' team we used the Federal Ministry of Health's standard for accreditation of facilities for providing HAART services. The criterion was set based on the grade/level of the facility within the national health care system. Thus facilities were classified as those that fulfilled the expected minimum required health care providers' team and those that did not.

**Table: A. Minimum Personnel Required in HIV/AIDS Clinics of Health Facilities in Hawassa Town Administration, 2010/11**

Cadre of health worker	Facility W		Facility X		Facility Y		Facility Z	
	Expected	Available	Expected	Available	Expected	Available	Expected	Available
Medical doctor/Health officer/BSC nurse	1	1	1	1	1	1	1	1
Nurses	2	3	2	1	1	1	1	1
Pharmacy technician/pharmacist	2	3	2	2	1	2	1	2
Lab Technician/technologist	2	6	2	3	1	4	1	4
The facility has minimum required personnel (Yes/No)	Yes		No		Yes		Yes	

Table B shows the availability of infrastructure and supplies for HIV/AIDS care. Three out of the four facilities had adequate infrastructure and supplies for HIV/AIDS care. Half of the facilities had no examination couch for patient examination and none of them had functional otoscope for ear and throat examination.

**Table: B. Availability of Infrastructure and Supplies for HIV/AIDS Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of infrastructure and supplies	Fill "1" if its yes and observed or fill "0" if not			
	Facility W	Facility X	Facility Y	Facility Z
Is/are there separate room/s dedicated for HIV/AIDS care and treatment/ART?	1	1	1	1
Is the room private? (Restricted access / client cannot be seen or overheard by people outside the room)?	1	1	1	1
Is there flowing water, for hand washing in HIV clinic?	1	1	1	0
Is there a working scale at the ART room?	1	1	1	0
Is there an examination couch?	0	1	1	0
Is there a separate waiting area for HIV clinic?	1	1	1	1
Is there a functional otoscope for ear and throat examination?	0	0	0	0
Is the light adequate for examination?	1	1	1	1
<b>Overall score (adequate <math>\geq</math> 75%; inadequate <math>&lt;</math>75%)</b>	<b>6/8 (75%)</b>	<b>7/8 (87.5%)</b>	<b>7/8 (87.5%)</b>	<b>4/8 (50%)</b>

Table C shows the availability of functional laboratory infrastructure for TB/HIV care. All the four health facilities in the district had adequate lab services with functional laboratories to provide TB/HIV care

**Table: C. Availability of Functional Laboratory Infrastructure for TB/HIV Care in Health Facilities in Hawassa Town Administration, 2010/11**

Types of lab services with functional equipment and reagent	Fill "1" if its yes and observed or fill "0" if not			
	Facility W	Facility X	Facility Y	Facility Z
Full blood count (Hgb, WBC and Diff)	1	1	1	0
AFB smear	1	1	1	1
Microscopy for Ova or Parasite	1	1	1	1
Malaria smear	1	1	1	1
Pregnancy test	1	1	1	1
Serology for HIV	1	1	1	1
RPR/VDRL	1	1	1	1
<b>Overall score (adequate <math>\geq</math> 75%; inadequate <math>&lt;</math>75%)</b>	<b>7/7 (100%)</b>	<b>7/7 (100%)</b>	<b>7/7 (100%)</b>	<b>6/7 (86%)</b>

NB: The laboratories in the health centres were not expected to have CD4 count or clinical chemistry machines. They performed these tests by transporting samples to the hospitals. Therefore the overall score is calculated out of seven lab services.

Table D shows the availability of supplies and functional supply management systems for HIV/AIDS care. Half of the facilities had adequate supplies and functional supply management system to provide HIV/AIDS care. Half of the facilities didn't have protective hand gloves and soap and towel for hand washing and despite the presence of male condom, in all of the facilities, dildo was found in only one.

**Table: D. Availability of Supplies and Supply Management System for HIV/AIDS Care in Health Facilities in Hawassa Town Administration, 2010/11**

	Fill "1" if it's no or fill "0" if yes to the first four questions and Fill "1" if it is yes and observed or fill "0" if not			
	Facility W	Facility X	Facility Y	Facility Z
Was there a stock- out of HIV rapid test kits (screening or confirmatory) in the last month?	1	1	1	0
Was there stock-outs of Co-trimoxazole (Bactrim) in the last month?	1	1	0	1
Was there a stock- out of Isoniazid for TB prevention in the last month?	1	1	1	0
Was there a stock- out of Anti TB drugs (Regimen 1) in the last month?	1	1	1	0
Is there a mechanism in place to monitor stock levels of each of these items (bin cards and electronic systems)	1	1	1	1
Are there protective hand gloves in the HIV/AIDS clinic?	1	0	1	0
Are soap and towel present for hand washing in the HIV/AIDS clinic?	1	0	1	0
Are there protective materials (safety box) in the HIV clinic?	1	1	0	1
Are male condoms available in the HIV/AIDS rooms?	1	1	1	1
Is there a dildo in the HIV/AIDS rooms?	0	1	0	0
<b>Overall score (adequate <math>\geq</math> 75%; inadequate <math>&lt;</math>75%)</b>	<b>9/10 (90%)</b>	<b>8/10 (80%)</b>	<b>7/10 (70%)</b>	<b>4/10 (40%)</b>



Table E shows the availability of information education and communication materials on various topics targeting patients. Over all there appeared to be serious shortage of client's education materials in the HIV/AIDS clinics in the district.

**Table: E. Availability of Information Education and Communication Materials for HIV/AIDS Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of IEC materials	If the material is available and observed score "1" if not available score "0"			
	Facility W	Facility X	Facility Y	Facility Z
STI transmission and treatment	0	1	0	0
Prevention of Mother to Child Transmission of HIV	1	0	0	1
Nutritional advise for HIV patients	1	0	1	0
Family Planning methods	1	0	1	0
ARV treatment adherence	1	1	1	0
HIV prevention	1	0	1	0
TB prevention , screening and treatment	1	0	1	0
<b>Overall score (Adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math>)</b>	<b>6/7 (86%)</b>	<b>2/7 (29%)</b>	<b>5/7 (71%)</b>	<b>1/7 (14%)</b>

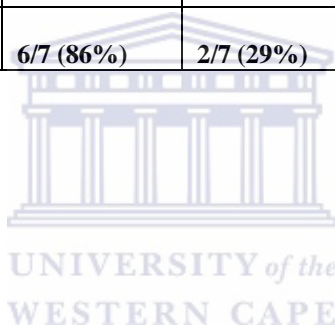


Table F shows the availability of provider support job aids for HIV/AIDS care. All the facilities had the necessary job aids for HIV care and treatment service.

**Table F: Availability Job Aids for HIV/AIDS Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of guidelines and protocols	If the material is available and observed score “1” if not available score “0”			
	Facility W	Facility X	Facility Y	Facility Z
National ART management guideline	1	1	1	1
National OI management guideline	1	1	1	1
National Pediatric HIV/AIDS guideline	1	1	1	1
National PMTCT guideline	1	0	0	0
TB/HIV implementation guideline	1	1	1	0
National CPT guideline	0	1	1	0
Counseling and testing guidelines	1	1	1	0
<b>Overall score (Adequate <math>\geq</math> 75%; inadequate <math>&lt;</math>75%)</b>	<b>6/7 (86%)</b>	<b>6/7 (86%)</b>	<b>6/7 (86%)</b>	<b>3/7 (43%)</b>

Table G shows the availability of forms and registers for HIV/AIDS care. All had the necessary forms and registers for HIV care and treatment service. Most (3/4) of the facilities didn't have IPT register at the ART clinics.

**Table: G. Availability of forms and registers for HIV/AIDS Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of forms and registers	If the material is available and observed score “1” if not available score “0”			
	Facility W	Facility X	Facility Y	Facility Z
ART/Pre ART register	1	1	1	1
Pre ART register	1	1	1	1
HIV/AIDS intake forms	1	1	1	1
HIV/AIDS follow up forms	1	1	1	1
IPT register at the ART clinic	1	0	0	0
Referral forms within facility	1	1	0	0
Referral forms outside facility	1	1	1	1
Quarterly reporting forms HIV care	1	1	1	1
Quarterly reporting forms TB/HIV	1	1	1	1
<b>Overall score (Adequate <math>\geq</math> 75%; inadequate <math>&lt;</math>75%)</b>	<b>9/9 (100%)</b>	<b>8/9 (89%)</b>	<b>7/9 (78%)</b>	<b>7/9 (78%)</b>

**Table H. Distribution and classification of quality of care for HIV positive patients**

Variable	Mean	SD	Median	IQ range	Cut off % for quality (adequate, inadequate)
Quality of HIV care for all patients	13.5	2.9	14	13-16	75% of 16 ( $\geq 12$ ; $< 12$ )
Quality of HIV care for patients on HAART	16.9	1.4	17	16-18	75% of 18 ( $\geq 13.5$ ; $< 13.5$ )
Quality of HIV care for patients not on HAART	12	3.3	13	9 - 15	75% of 16 ( $\geq 12$ ; $< 12$ )

Table I provides the scoring for the variable “staff training” and has as items the various types of staff working in the TB programme with the types of training provided in Hawassa. In most of the facilities in the district (75%), providers working in the TB program received inadequate training considered necessary for them to perform their duties and the overall training profile in the district TB clinics was inadequate.

**Table: I. Training Profile of Health Professionals Currently Working in TB Clinics of Health Facilities in Hawassa Town Administration, 2010/11**

Lists of health professionals currently working in TB clinics by training	Score “1” if $\geq 75\%$ ; score “0” if $< 75\%$			
	Facility W	Facility X	Facility Y	Facility Z
Proportion of Nurse trained on Tuberculosis	1 (1/2)	0 (1/2)	1 (1/1)	1 (1/1)
Proportion of Nurse trained on TB/HIV	1 (2/2)	0 (1/2)	1 (1/1)	1 (1/1)
Proportion of Nurse trained on PIHCT	1 (2/2)	1 (2/2)	1 (1/1)	0 (0/1)
Proportion of Laboratory technician trained on AFB microscopy	0 (2/8)	1 (3/3)	1 (4/4)	0 (0/4)
Proportion of Laboratory technician trained on HIV testing	0 (2/8)	1 (1/3)	1 (4/4)	0 (1/4)
<b>Overall score adequate <math>\geq 75\%</math>; inadequate <math>&lt; 75\%</math></b>	<b>3/5 60%</b>	<b>3/5 60%</b>	<b>5/5 100%</b>	<b>2/5 40%</b>

NB: in all the facilities there was no physician or health officer assigned in the TB clinic to provide DOT.

Table J shows the availability of “infrastructure and supplies for TB care” as an input variable. Half of the facilities had inadequate infrastructure and supplies for TB care. Out of the four facilities, only one had an examination couch.

**Table: J. Availability of Infrastructure and Supplies for TB Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of infrastructure and supplies	Fill “1” if its yes and observed or fill “0” if not			
	Facility W	Facility X	Facility Y	Facility Z
Is/are there separate room/s dedicated for TB/DOTS service?	1	1	0	1
Is the room private? (Restricted access / client cannot be seen or overheard by people outside the room)?	1	1	1	1
Is there flowing water, for hand washing in TB clinic?	1	1	1	0
Is there a working scale at the TB room?	1	1	1	1
Is there an examination couch?	0	0	1	0
Is there a separate waiting area for TB clinic?	1	1	0	1
<b>Overall score adequate &gt;= 75%; inadequate &lt;75%</b>	<b>5/6 (83.3%)</b>	<b>5/6 (83.3%)</b>	<b>4/6 (66.6%)</b>	<b>4/6 (66.6%)</b>

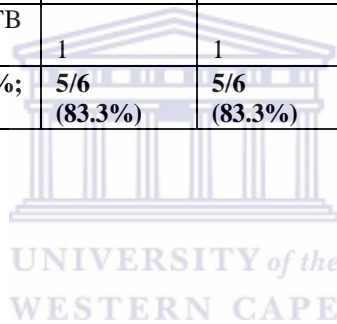


Table K shows the availability of supplies and supply management systems for TB care. Half of the facilities had inadequate supplies and supply management systems for TB care. Male condoms were available in all of the facilities but a dildo was not found in any of the facilities.

**Table: K. Availability of Supplies and Supply Management System for TB Care in Health Facilities in Hawassa Town Administration, 2010/11**

	Fill “1” if it’s no or fill “0” if yes to the first three questions and Fill “1” if it is yes and observed or fill “0” if not			
	Facility W	Facility X	Facility Y	Facility Z
Was there a stock- out of HIV rapid test kits (screening or confirmatory) in the past one month?	1	1	1	0
Was there stock-outs of Cotrimoxazole (Bactrim) in the past one month?	1	1	0	1
Was there stock-outs of Anti TB drugs in the past one month?	1	1	1	0
Is there a mechanism in place to monitor stock levels of each of these items (bin cards and electronic systems)	1	1	1	1
Are there protective hand gloves in the TB clinic on the day of assessment?	1	1	0	0
Are soap and towel present for hand washing in the TB clinic on the day of assessment?	1	1	1	0
Are there protective materials (safety box) in the TB clinic on the day of assessment?	1	1	0	1
Are condoms available in the TB rooms on the day of assessment?	1	1	1	1
Is there a dildo in the TB rooms on the day of assessment?	0	0	0	0
<b>Overall score adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math></b>	<b>8/9 (88.8%)</b>	<b>8/9 (88.8%)</b>	<b>5/9 (55.5%)</b>	<b>4/9 (44.4%)</b>

Table L shows the status of health system procedures in TB clinics. Half of the facilities had adequate health system procedures to provide TB care. Three out of four facilities had regular supervision of TB/HIV activity. However none of the facilities had action plans arising from the previous supervision.

**Table: L. Status of Health System Procedures for TB Care in Health Facilities in Hawassa Town Administration, 2010/11**

	Fill “1” if its yes and observed or fill “0” if not			
	Facility W	Facility X	Facility Y	Facility Z
Is TB DOTS service offered every day, throughout the opening hours of facility?	1	1	1	1
Does the clinic have a mechanism for TB contacts tracing?	1	0	1	1
Does the TB clinic have a mechanism for defaulter tracing?	1	1	1	1
Is there a quality assurance system at the facility for AFB sputum examination?	1	1	1	1
Is there a quality assurance system at the facility for TB medication management and monitoring?	1	0	1	1
Is there a regular supervision of TB/HIV activity at the TB clinic in the facility?	1	1	1	0
Are action plans arising from the previous supervision available?	0	0	0	0
<b>Overall score (adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math>)</b>	<b>6/7 (85.7%)</b>	<b>4/7 (57%)</b>	<b>6/7 (85.7%)</b>	<b>5/7 (71.4%)</b>

Table M shows the availability of information education and communication materials in different facilities. Only one facility had adequate IEC materials and none of the facilities had IEC materials on STI transmission and treatment

**Table: M. Availability of Information Education and Communication Materials for TB Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of IEC materials	If the material is available and observed score “1” if not available score “0”			
	Facility W	Facility X	Facility Y	Facility Z
TB prevention , screening and treatment	1	1	1	1
STI transmission and treatment	0	0	0	0
HIV counseling and testing	1	1	1	0
Nutrition	0	0	1	0
TB treatment adherence	1	1	1	0
<b>Overall score adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math></b>	<b>3/5 (60%)</b>	<b>3/5 (60%)</b>	<b>4/5 (80%)</b>	<b>1/5 (20%)</b>

Table N shows the availability of national guidelines and protocols in different facilities in Hawassa town administration. Only one out of the four facilities had adequate national guidelines and protocols

**Table: N. Availability of guidelines and protocols for TB Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of guidelines and protocols	If the material is available and observed score “1” if not available score “0”			
	Facility W	Facility W	Facility W	Facility W
National Tuberculosis, TB/HIV and Leprosy guideline	1	1	1	1
TB/HIV implementation guideline	0	0	0	1
National CPT guideline	0	0	1	0
National HIV Counseling and testing guidelines	0	1	1	0
<b>Overall score adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math></b>	<b>1/4 (25%)</b>	<b>2/4 (50%)</b>	<b>3/4 (75%)</b>	<b>2/4 (50%)</b>

Table O shows the availability of forms and registers for TB care. All of the facilities had adequate forms and registers for TB care.

**Table: O. Availability of Forms and Registers for TB Care in Health Facilities in Hawassa Town Administration, 2010/11**

Lists of forms and registers	If the material is available and observed score “1” if not available score “0”			
	Facility W	Facility W	Facility W	Facility W
Unit TB register	1	1	1	1
Referral forms within facility	1	0	0	1
Referral forms outside facility	1	1	1	1
Quarterly reporting forms TB	1	1	1	1
Quarterly reporting forms ( TB/HIV)	1	1	1	1
<b>Overall score adequate <math>\geq 75\%</math>; inadequate <math>&lt;75\%</math></b>	<b>5/5 (100%)</b>	<b>4/5 (80%)</b>	<b>4/5 (80%)</b>	<b>5/5 (100%)</b>

**Table P. Distribution of quality of TB care for TB Patients in Hawassa Town Administration, 2010/11**

Variable	Mean	SD	Median	IQ range	Cut-off % for quality (adequate; inadequate)
Quality of TB care for all TB patients	8.5	0.7	9	8-9	80% of 8 ( $\geq 6.4$ , $<6.4$ )
Quality of TB care for sputum positive TB patients	9.6	1.8	9	8-12	80% of 12 ( $\geq 9.6$ , $<9.6$ )



**Table: Q. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to Quality Services in HIV/AIDS Clinics in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		Adequate quality	Inadequate quality	Crude Prevalence Ratio	95% C.I.
		Number	Number		
Age in years	< 30	88	30	0.975	(0.852 - 1.116)
	>= 30	127	39		
Sex	Male	78	21	1.054	(0.923 - 1.204)
	Female	136	46		
Marital status	Married + Widowed	146	54	0.857	(0.757 - 0.970)
	Single + Divorced	69	12		
Residence	Urban	174	50	1.142	(0.933 - 1.399)
	Rural	34	16		
Education	Tertiary + Secondary	88	15	1.195	(1.054 - 1.354)
	Uneducated + Primary	118	47		
Employment	Employed	83	20	1.130	(0.983 - 1.298)
	Not employed	107	43		
Type of facility	Hospital	151	27	1.405	(1.190 - 1.659)
	Health center	64	42		
Treated with HAART	Yes	146	6	1.780	(1.510 - 2.098)
	No	68	58		
TB status	No active TB	169	52	0.881	(0.775 - 1.001)
	Has active TB	46	7		
Staff training	Adequate	196	49	1.642	(1.183 - 2.280)
	Inadequate	19	20		
Minimum number of staff	Available	146	62	0.773	(0.690 - 0.866)
	Not Available	69	7		
Infrastructure	Adequate	196	49	1.642	(1.183 - 2.280)
	Inadequate	19	20		
Supplies and supply management system	Adequate	151	27	1.405	(1.190 - 1.659)
	Inadequate	64	42		
Health system procedures	Adequate	127	42	0.982	(0.859 - 1.122)
	Inadequate	88	27		
IEC materials	Adequate	82	20	1.100	(0.966 - 1.253)
	Inadequate	133	49		
Job aids	Adequate	196	49	1.642	(1.183 - 2.280)
	Inadequate	19	20		
Facility input (Overall)	Adequate	127	42	0.982	(0.859 - 1.122)
	Inadequate	88	27		

NB: all facilities had adequate stationeries for HIV/AIDS services and in all health facilities there were adequate lab infrastructure. Thus these two variables were not included in the bivariate analysis

**Table: R. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to change in CD4 count in HIV/AIDS Patients in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		Improved CD4	Didn't improve	Crude Prevalence Ratio	95% C.I.
		Number	Number		
Age in years	< 30	34	28	0.857	(0.651 - 1.130)
	>= 30	55	31		
Sex	Male	33	12	1.360	(1.058 - 1.749)
	Female	55	47		
Marital status	Married + Widowed	60	37	1.088	(0.818 - 1.447)
	Single + Divorced	29	22		
Residence	Urban	79	48	1.166	(0.713 - 1.908)
	Rural	8	7		
Education	Tertiary + Secondary	45	18	1.394	(1.070 - 1.816)
	Uneducated + Primary	41	39		
Employment	Employed	38	23	1.098	(0.831 - 1.450)
	Not employed	42	32		
Type of facility	Hospital	68	46	0.966	(0.712 - 1.310)
	Health center	21	13		
Treated with HAART	Yes	78	21	3.510	(2.065 - 5.965)
	No	11	38		
TB status	No active TB	65	52	0.671	(0.532 - 0.847)
	Has active TB	24	5		
Staff training	adequate	88	56	2.444	(0.446 - 13.413)
	inadequate	1	3		
Minimum number of staff	Yes	64	33	1.346	(0.983 - 1.843)
	No	25	26		
Infrastructure	Adequate	88	56	2.444	(0.446 - 13.413)
	Inadequate	1	3		
Supplies & supply management system	Adequate	68	46	0.956	(0.712 - 1.310)
	Inadequate	21	13		
Health system procedures	Adequate	63	30	1.433	(1.049 - 1.958)
	Inadequate	26	29		
IEC materials	Adequate	43	20	1.261	(0.974 - 1.633)
	Inadequate	46	39		
Job aids	Adequate	88	56	2.444	(0.446 - 13.413)
	Inadequate	1	3		
Facility input (Overall)	Adequate	63	30	1.433	(1.049 - 1.958)
	Inadequate	26	29		
Quality of HIV care	Adequate	88	56	2.444	(0.446 - 13.413)
	Inadequate	1	3		

**Table: S. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to change in body weight in HIV/AIDS Patients in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		Improved weight Number	Didn't improve Number	Crude Prevalence Ratio	95% C.I.
Age in years	< 30	48	33	0.811	(0.656 - 1.001)
	>= 30	87	32		
Sex	Male	47	21	1.041	(0.852 - 1.271)
	Female	87	44		
Marital status	Married + Widowed	94	46	0.983	(0,798 - 1.209)
	Single + Divorced	41	19		
Residence	Urban	108	49	1.003	(0.783 - 1.285)
	Rural	24	11		
Education	Tertiary + Secondary	55	23	1.091	(0.895 - 1.331)
	Uneducated + Primary	73	40		
Employment	Employed	52	24	1.026	(0.835 - 1.262)
	Not employed	66	33		
Type of facility	Hospital	89	43	0.997	(0.814 - 1.221)
	Health center	46	22		
Treated with HAART	Yes	99	36	1.324	(1.041 - 1.684)
	No	36	29		
TB status	No active TB	105	52	0.922	(0.740 - 1.150)
	Has active TB	29	11		
Staff training	Adequate	122	54	1.280	(0.874 - 1.873)
	Inadequate	13	11		
Minimum number of staff	Yes	91	44	0.996	(0.811 - 1.222)
	No	44	21		
Infrastructure	Adequate	122	54	1.280	(0.874 - 1.873)
	Inadequate	13	11		
Supplies and supply management system	Adequate	89	43	0.997	(0.814 - 1.221)
	Inadequate	46	22		
Health system procedures	Adequate	78	33	1.097	(0.901 - 1.336)
	Inadequate	57	32		
IEC materials	Adequate	45	22	0.993	(0.809 - 1.218)
	Inadequate	90	43		
Job aids	Adequate	122	54	1.280	(0.874 - 1.873)
	Inadequate	13	11		
Facility input (Overall)	Adequate	78	33	1.097	(0.901 - 1.336)
	Inadequate	57	32		
Quality of HIV care	Adequate	131	62	1.188	(0.621 - 2.273)
	Inadequate	4	3		
Change in CD4	Improved	67	19	1.402	(1.077 - 1.826)
	Not improved	30	24		

**Table: T. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to TB Case Finding at last clinical visit in HIV/AIDS Patients in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		TB case finding done	No TB case finding done	Crude Prevalence Ratio	95% C.I.
		Number	Number		
Age in years	< 30	101	15	1.019	0.927 - 1.120
	>= 30	141	24		
Sex	Male	83	15	0.977	0.883 - 1.082
	Female	156	24		
Marital status	Married + Widowed	169	30	0.944	(0.859 - 1.036)
	Single + Divorced	72	8		
Residence	Urban	193	29	1.060	0.922 - 1.219
	Rural	41	9		
Education	Tertiary + Secondary	91	12	1.036	(0.942 - 1.139)
	Uneducated + Primary	139	24		
Employment	Employed	85	17	0.969	0.870 - 1.080
	Not employed	129	21		
Type of facility	Hospital	161	15	1.186	1.059 - 1.328
	Health center	81	24		
HAART	Yes	146	6	1.257	1.133 - 1.396
	No	94	29		
Adequacy of staff training	Adequate	210	32	1.058	0.906 - 1.235
	Inadequate	32	7		
Availability of minimum staff number	Available	171	36	0.861	0.796 - 0.931
	Not available	71	3		
Infrastructure and supplies	Adequate	210	32	1.058	0.906 - 1.235
	Inadequate	32	7		
Supplies and supply management system	Adequate	161	15	1.186	1.059 - 1.328
	Inadequate	81	24		
Health systems procedure	Adequate	139	29	0.908	0.830 - 0.993
	Inadequate	103	10		
IEC materials	Adequate	90	12	1.039	0.946 - 1.141
	Inadequate	152	27		
Job aids	Adequate	210	32	1.058	0.906 - 1.235
	Inadequate	32	7		
Facility input (overall)	Adequate	139	29	0.908	0.830 - 0.993
	Inadequate	103	10		
Quality of HIV care	Adequate	211	4	2.089	1.616 - 2.702
	Inadequate	31	35		

**Table: U. Bivariate analysis comparing socio-demographic and health service related factors to survival of HIV/AIDS Patients in Hawassa town administration 2010/2011**

socio-demographic and health service related characteristics		Alive	Dead	Crude Prevalence Ratio	95% C.I.
		Number	Number		
Age in years	< 30	83	1	1.028	(0.986 - 1.072)
	>= 30	123	5		
Sex	Male	69	3	0.979	(0.928 - 1.034)
	Female	136	3		
Marital status	Married + Widowed	143	4	1.004	(0.954 - 1.056)
	Single + Divorced	63	2		
Residence	Urban	161	3	1.064	(0.969 - 1.167)
	Rural	36	3		
Education	Tertiary + Secondary	81	2	1.001	(0.958 - 1.047)
	Uneducated + Primary	116	3		
Employment	Employed	79	1	1.026	(0.981 - 1.074)
	Not employed	102	4		
Type of facility	Hospital	137	1	1.065	(1.000 - 1.134)
	Health center	69	5		
HAART	Yes	138	5	0.979	(0.939 - 1.022)
	No	68	1		
TB status	No active TB	162	4	0.999	(0.949 - 1.052)
	Has active TB	42	1		
Staff training	Adequate	183	3	1.112	(0.967 - 1.279)
	Inadequate	23	3		
Infrastructure and supplies	Adequate	183	3	1.112	(0.967 - 1.279)
	Inadequate	23	3		
Supplies and supply management system	Adequate	137	1	1.065	(1.000 - 1.134)
	Inadequate	69	5		
Health systems procedure	Adequate	119	3	1.009	(0.962 - 1.058)
	Inadequate	87	3		
IEC materials	Adequate	73	1	1.024	(0.982 - 1.067)
	Inadequate	133	5		
Job aids	Adequate	183	3	1.112	(0.967 - 1.279)
	Inadequate	23	3		
Facility input overall	Adequate	119	3	1.009	(0.962 - 1.058)
	Inadequate	87	3		
Quality of HIV care	Adequate	196	2	1.386	(0.995 - 1.931)
	Inadequate	10	4		
				Fischer's test	
Minimum staff number	Available	142	6	0.102	
	Not available	64	0		

**Table: V. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to Quality of TB Services for Sputum positive TB patients in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		Good quality	Poor quality	Crude Prevalence Ratio	95% CI
		Number	Number		
Age in years	< 30	55	1	1.163	(1.021 - 1.325)
	>= 30	38	7		
Sex	Male	61	5	1.014	(0.894 - 1.149)
	Female	31	3		
TB residence	Urban	42	5	0.955	(0.843 - 1.080)
	Rural	44	3		
Type of facility	Hospital	45	4	0.995	(0.887 - 1.116)
	Health center	48	4		
HIV test	Positive	13	1	0.987	(0.846 - 1.153)
	Negative	79	5		
Staff training	Adequate	20	1	1.044	(0.928 - 1.174)
	Inadequate	73	7		
Infrastructure and supplies	Adequate	45	4	0.995	(0.887 - 1.116)
	Inadequate	48	4		
Supplies and supplies management system	Adequate	45	4	0.995	(0.887 - 1.116)
	Inadequate	48	4		
Health system procedures	Adequate	26	1	1.064	(0.958 - 1.181)
	Inadequate	67	7		
IEC materials	Adequate	20	1	1.044	(0.928 - 1.174)
	Inadequate	73	7		
Job aids	Adequate	20	1	1.044	(0.928 - 1.174)
	Inadequate	73	7		
Overall TB input	Adequate	20	1	1.044	(0.928 - 1.174)
	Inadequate	73	7		
HIV case finding and management	Adequate	92	6	2.816	(0.568 - 13.965)
	Inadequate	1	2		

**Table: W. Bivariate Analysis Comparing Socio-Demographic and Health Service Related Factors to outcome of TB treatment in TB Clinics in Hawassa Town Administration, 2010/11**

socio-demographic and health service related characteristics		Successful outcome	Unsuccessful outcome	Crude Prevalence Ratio	95% CI
		Number	Number		
Age in years	< 30	125	10	1.076	(0.979 - 1.183)
	>= 30	80	13		
Sex	Male	126	18	0.931	(0.858 - 1.011)
	Female	78	5		
Residence	Urban	116	8	1.162	(1.031 - 1.309)
	Rural	62	15		
TB type	Pulmonary	140	19	0.935	(0.861 - 1.014)
	Extra pulmonary	65	4		
Type of facility	Hospital	135	8	1.146	(1.031 - 1.275)
	Health center	70	15		
HIV test	Positive	31	5	0.946	(0.823 - 1.275)
	Negative	162	16		
Staff training	Adequate	28	7	0.871	(0.735 - 1.035)
	Inadequate	177	16		
Infrastructure and supplies	Adequate	135	8	1.146	(1.031 - 1.275)
	Inadequate	70	15		
Supplies and supplies management system	Adequate	135	8	1.146	(1.031 - 1.275)
	Inadequate	70	15		
Health system procedures	Adequate	106	8	1.061	(0.975 - 1.155)
	Inadequate	99	15		
IEC materials	Adequate	42	8	0.872	(0.735 - 1.035)
	Inadequate	163	15		
Job aids	Adequate	28	7	0.872	(0.735 - 1.035)
	Inadequate	177	16		
Overall facility input	Adequate	28	7	0.871	(0.735 - 1.035)
	Inadequate	177	16		
Quality of TB services	Adequate	81	9	2.100	(0.890 - 4.954)
	Inadequate	3	4		

NB: classification of outcome of TB treatment is as follows: successful treatment outcome for those who cured and completed TB treatment and unsuccessful outcome for those who died defaulted or failed treatment.

## Annex. 2. TB/HIV data extraction tool

### 1. Facility Manager Questionnaire

#### Identification:

Date: \_\_\_\_\_ Serial

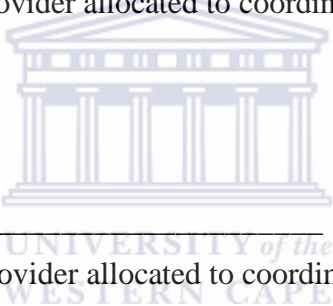
l number: \_\_\_\_\_

Facility code: \_\_\_\_\_

Name and signature of data collector: \_\_\_\_\_

#### A: Staffing

##### Program coordination

1. Is there a specific health care provider allocated to coordinate HIV/AIDS programme in the facility?  

  - ☐ Yes,
  - ☐ No
  - ☐ Staff category (if yea): \_\_\_\_\_
2. Is there a specific health care provider allocated to coordinate the TB programme in the facility
  - ☐ Yes,
  - ☐ No
  - ☐ Staff category (if yea): \_\_\_\_\_
3. Is there a specific health professional allocated to coordinate TB/HIV collaborative activity in the facility
  - ☐ Yes,
  - ☐ No
  - ☐ Staff category (if yea): \_\_\_\_\_



**Table: 1. Training profile of staff working in HIV and TB clinics**

**Instruction:** the first few sections (Staff code; Staff category and place of work) need to be filled in by the facility manager whereas the remaining data need to be collected from every staff member listed

Use the following staff category accordingly: Physician, health officer, Nurse, Pharmacist/technician, HMIS officer/data clerk, Adherence supporter/case manager, Lab technician/technologist, HIV programme coordinator and TB program coordinator

Staff Code	Staff Category	Work in HIV or Work in TB clinic	Had HIV training	Had TB/HIV integration training	Had basic ART for pharmacist training	Had HMIS training	Had Lab training on CD4 count and clinical chemistry	Had HIV treatment adherence, care and support	Had HIV counselling and testing training	Had TB DOTs training	Had sputum AFB microscopy training



## **B. Infrastructure**

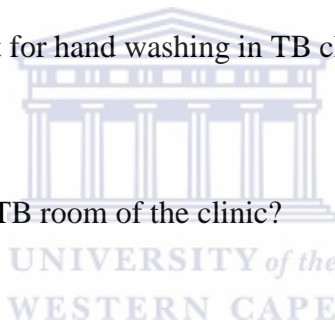
### **1. HIV/AIDS room**

1. Is/are there separate room/s dedicated for HIV/AIDS care and treatment/ART?
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, how many: \_\_\_\_\_
2. Is the room private? (Restricted access / client cannot be seen or overheard by people outside the room):
  - ☐ Yes, observed
  - ☐ No
3. Is there a waiting area for HIV clinic?
  - ☐ Yes, observed
  - ☐ No
4. Is a flowing water sink, present for hand washing in HIV clinic?
  - ☐ Yes, observed
  - ☐ No
5. Is there a working scale at the ART room?
  - ☐ Yes, observed
  - ☐ No
6. Is there an examination couch?
  - ☐ Yes, observed
  - ☐ No
7. Is there functional Otoscope for ear and throat examinations?
  - ☐ Yes, observed
  - ☐ No
8. Is the adequate light for clinical examination (defined as fixed or mobile angle-poised)
  - ☐ Yes, observed
  - ☐ No



## 2. TB room

1. Is/are there separate room/s dedicated for TB/DOTS service?
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, how many: \_\_\_\_\_
2. Is the room private? (Restricted access / client cannot be seen or overheard by people outside the room):
  - ☐ Yes, observed
  - ☐ No
3. Is there a separate waiting area for TB clinic?
  - ☐ Yes, observed
  - ☐ No
4. Is a flowing water sink, present for hand washing in TB clinic?
  - ☐ Yes, observed
  - ☐ No
5. Is there a working scale at the TB room of the clinic?
  - ☐ Yes, observed
  - ☐ No
6. Is there an examination couch?
  - ☐ Yes, observed
  - ☐ No



### 3. Laboratory:

1. Is the laboratory able to do full blood count (Hgb, WBC and Diff)?
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA
2. Does the laboratory has functional microscope to do AFB smear?
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA
3. Is the laboratory able to do microscopy for Ova or Parasite?
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA
4. Is the laboratory able to do malaria smear
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA
5. Is the laboratory able to do pregnancy test
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA
6. Is the laboratory able to do serology for HIV
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA
7. Is the laboratory able to do RPR/VDRL
  - ☐ Yes, observed
  - ☐ No
  - ☐ NA



8. Is the laboratory able to do clinical chemistry (BUN, Creatinine, LFT, Indian ink)
- ☐ Yes, observed
  - ☐ No
  - ☐ NA
9. Does the laboratory has functional machine to do CD4 count
- ☐ Yes, observed
  - ☐ No
  - ☐ NA



## C: Drugs an



- If yes, describe: \_\_\_\_\_

### **HIV/AIDS clinic**

1. Are there protective materials (safety boxes) for sharp instruments in the HIV/AIDS
  - Yes, observed
  - No
2. Are there protective hand gloves in the HIV/AIDS clinic?
  - Yes, observed
  - No
3. Is there soap and towel present for hand washing in the HIV/AIDS clinic?
  - Yes, observed
  - No
4. Are male condoms available in the HIV/AIDS rooms
  - Yes, observed
  - No
5. Is there a dildo in the HIV/AIDS rooms
  - Yes, observed
  - No



### **TB clinic**

1. Are there protective materials (safety box) in the TB clinic
  - Yes, observed
  - No
2. Are there protective hand gloves in the in the TB clinic
  - Yes, observed
  - No
3. Is there soap and towel present for hand washing in the TB clinic?
  - Yes, observed
  - No
4. Are condoms available in the TB room

- Yes, observed
  - No
5. Is there a dildo in the TB room?
- Yes, observed
  - No





## D: Health Systems procedures

### HIV/AIDS unit

1. Is HCT offered every day, throughout the OPD opening hours?

- ☐ Yes, observed
- ☐ No

2. Which days of the week is the HIV clinic open and which times of the day?

Monday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

Tuesday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

Wednesday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

Thursday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

Friday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

Saturday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

Sunday

- ☐ Open, time: \_\_\_\_\_
- ☐ Closed

3. Does the HIV clinic have a mechanism for defaulter tracing?

- ☐ Yes, observed



- No

If yes, what is the mechanism? \_\_\_\_\_

4. Is there a quality assurance system at the facility for HIV management and monitoring?  
if yes, then describe.....

### **TB unit**

1. Which days of the week is the TB clinic open and which times of the day?

Monday

- Open, time: \_\_\_\_\_
- Closed

Tuesday

- Open, time: \_\_\_\_\_
- Closed

Wednesday

- Open, time: \_\_\_\_\_
- Closed

Thursday

- Open, time: \_\_\_\_\_
- Closed

Friday

- Open, time: \_\_\_\_\_
- Closed

Saturday

- Open, time: \_\_\_\_\_
- Closed

Sunday

- Open, time: \_\_\_\_\_
- Closed

2. Does the clinic have a mechanism for tracing TB contacts tracing
  - Yes



- No

If yes, what is the mechanism?

3. Does the TB clinic has a mechanism for defaulter tracing?

- Yes
- No

If yes, what is the mechanism? \_\_\_\_\_

4. Is there a quality assurance system at the facility for TB medication management and monitoring?

- Yes
- No

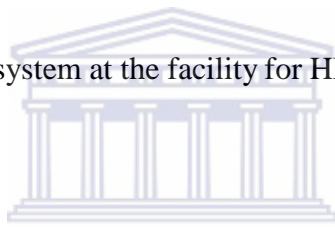
If yes, then describe.....

### **Laboratory**

1. Is there a quality assurance system at the facility for HIV Testing?

- Yes
- No

If yes, then describe.....



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2. Is there a quality assurance system at the facility for AFB sputum examination

- Yes
- No

If yes, then describe.....

### **TB/HIV collaborative services**

1. Is there regular supervision of collaborative TB/HIV services in the facility?

- Yes
- No
- If yes describe: \_\_\_\_\_

2. Are action plans arising from the previous supervision available?

- Yes, observed plans

- No
- 3. Are action plans drawn out of the supervision implemented and monitored? (look for evidence of implementation such as report on training, new system, new process and monitoring such as existence of new systems or process in place?)
  - Yes
  - No
  - If yes describe: \_\_\_\_\_



## **E. Information systems on TB/HIV (Guidelines, forms, registers and tools)**

/Consulting Room Observations/

### **1. HIV/AIDS clinic**

**Are there educational leaflets and/or posters in the local language (Amharic)?**

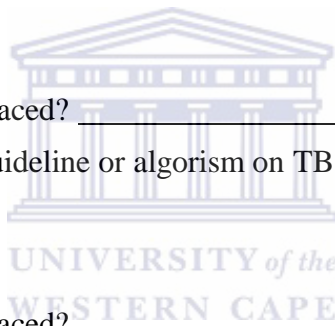
1. STI transmission and treatment
  - ☐ Yes, observed
  - ☐ No
2. Prevention of Mother to Child Transmission of HIV
  - ☐ Yes, observed
  - ☐ No
3. Nutritional advice for HIV clients
  - ☐ Yes, observed
  - ☐ No
4. Family Planning methods
  - ☐ Yes, observed
  - ☐ No
5. ARV treatment adherence
  - ☐ Yes, observed
  - ☐ No
6. HIV prevention
  - ☐ Yes, observed
  - ☐ No
7. TB prevention, screening and treatment
  - ☐ Yes, observed
  - ☐ No

**Are there guidelines/algorithms/standard operating procedures (SOPS) in the room on?**

8. ART management



- ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 9. Opportunistic Infection management
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 10. Pediatric HIV/AIDS care and treatment
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 11. National PMTCT
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 12. TB/HIV implementation (guideline or algorithm on TB diagnosis and/or screening)?
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 13. Co-trimoxazole Preventive Therapy:
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 14. Isoniazid preventive therapy
  - ☐ Yes, observed
  - ☐ No
  - ☐ If yes, where are they placed? \_\_\_\_\_
- 15. HIV Counseling and testing
  - ☐ Yes, observed
  - ☐ No



- If yes, where are they placed? \_\_\_\_\_

**Are there stationeries for HIV/TB care? (Forms, registers and tools and etc...)**

16. ART register?

- Yes, observed
- No

17. Pre ART register?

- Yes, observed
- No

18. HIV/AIDS care intake forms?

- Yes, observed
- No

19. HIV/AIDS care follow up form?

- Yes, observed
- No

20. IPT register at the ART clinic?

- Yes, observed
- No

21. Within facility referral form?

- Yes, observed
- No

22. Outside facility referral form?

- Yes, observed
- No

23. Quarterly reporting forms (ART/Pre ART)

- Yes, observed
- No

24. Quarterly reporting forms (TB/HIV)?

- Yes, observed
- No



## 2. TB clinic

**Are there educational leaflets and/or posters in the local language (Amharic)?**

1. TB prevention, screening and treatment

- ☐ Yes, observed
- ☐ No

2. STI transmission and treatment

- ☐ Yes, observed
- ☐ No

3. HIV counseling and testing

- ☐ Yes, observed
- ☐ No

4. Nutrition

- ☐ Yes, observed
- ☐ No

5. TB treatment adherence

- ☐ Yes, observed
- ☐ No



**Are there HCT and TB/HIV guidelines/algorithms/SOPS in the room on?**

6. Tuberculosis, TB/HIV and Leprosy (national guideline;

- ☐ Yes, observed
- ☐ No

If yes, where are they placed? \_\_\_\_\_

7. TB/HIV implementation (national guideline or algorithm on TB diagnosis and/or screening

- ☐ Yes, observed
- ☐ No

If yes, where are they placed? \_\_\_\_\_

8. CPT

- ☐ Yes, observed



- ☐ No

If yes, where are they placed? \_\_\_\_\_

9. HIV counseling and testing

- ☐ Yes, observed
- ☐ No

If yes, where are they placed? \_\_\_\_\_

**Are there stationeries for TB and TB/HIV care? (Forms, registers and tools and etc...)**

10. TB unit register

- ☐ Yes, observed
- ☐ No
- ☐ If yes, where are they placed? \_\_\_\_\_

11. Within facility referral forms

- ☐ Yes, observed
- ☐ No
- ☐ If yes, where are they placed? \_\_\_\_\_

12. Outside facility referral forms

- ☐ Yes, observed
- ☐ No
- ☐ If yes, where are they placed? \_\_\_\_\_

13. TB quarterly reporting forms

- ☐ Yes, observed
- ☐ No
- ☐ If yes, where are they placed? \_\_\_\_\_

14. TB/HIV quarterly reporting forms?

- ☐ Yes, observed
- ☐ No
- ☐ If yes, where are they placed? \_\_\_\_\_



## 2. General HIV/AIDS, ART Care Folder Review

### A. Identification:

Date: \_\_\_\_\_ Serial

I number: \_\_\_\_\_

Facility code: \_\_\_\_\_

Name and signature of data collector: \_\_\_\_\_

### B. Socio demographic characteristics:

Age (in completed years): \_\_\_\_

Sex

- ☐ Male
- ☐ Female

Marital status

- ☐ Single
- ☐ Married
- ☐ Cohabiting
- ☐ Widowed
- ☐ Divorced

Residence

- ☐ Urban
- ☐ Rural

Educational status: highest education standard achieved: \_\_\_\_\_

Employed?

- ☐ Yes
- ☐ No

If employed,

- ☐ Full time
- ☐ Part time

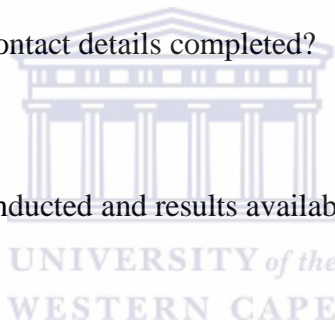


- ☐ Formal
- ☐ Informal
- ☐ Self employed

### **C. Service delivery**

#### **For all HIV clients (Both ART/Pre ART):**

1. Date of first assessment (EC): \_\_\_\_\_
2. Are all contact details for the client entered on the HIV care intake form? (Name, Surname, home/and/or work address, house number and telephone number)
  - ☐ Yes
  - ☐ No
3. Was a care giver identified and contact details completed?
  - ☐ Yes
  - ☐ No
4. Have hemoglobin test been conducted and results available in the folder?
  - ☐ Yes
  - ☐ No
5. Have ALT/AST tests been conducted and results available in the folder?
  - ☐ Yes
  - ☐ No
6. Did client undergo WHO clinical staging at Baseline?
  - ☐ Yes
  - ☐ No
7. Did client undergo WHO clinical staging at least once per year?
  - ☐ Yes
  - ☐ No
8. Was CD4 count done at baseline?
  - ☐ Yes
  - ☐ No



9. Was CD4 count done in the last six months?

- ☐ Yes
- ☐ No

10. CD4 count (count/mm3) at:

i. Baseline: \_\_\_\_\_

ii. Six months: \_\_\_\_\_

iii. Year: \_\_\_\_\_

11. Was the functional status assessed at baseline?

- ☐ Yes
- ☐ No

12. Was the functional status assessed at least once per year?

- ☐ Yes
- ☐ No

13. Functional status (Working, Ambulatory, Bedridden) at:

i. Baseline: \_\_\_\_\_

ii. Six months: \_\_\_\_\_

iii. Year: \_\_\_\_\_

14. Was the weight recorded at baseline?

- ☐ Yes
- ☐ No

15. Was the weight recorded at the last clinical visit?

- ☐ Yes, fill the number below
- ☐ No

16. Weight at

i. Baseline: \_\_\_\_\_

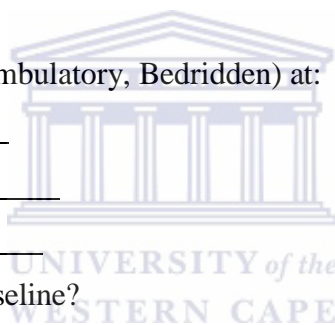
ii. Six months: \_\_\_\_\_

iii. One Year: \_\_\_\_\_

17. Was the client assessed for meeting the criteria for ARVs eligibility?

At baseline: (both the medical and social criteria)

- ☐ Yes



- ☐ No

At last visit

- ☐ Yes
- ☐ No

18. Is there a record of screening for TB at baseline? (minimum symptom screen of weight loss and cough; appropriate tests (AFB and/or CXR) done and recorded if symptomatic)

- ☐ Yes
- ☐ No

19. Is there a record of screening for TB at the last clinical visit? (minimum symptom screen of weight loss and cough; appropriate tests (AFB and/or CXR) done and recorded if symptomatic?)

- ☐ Yes
- ☐ No

20. Is client diagnosed with active TB? ("NA" if not screened for TB, skip to question 23 if no )

- ☐ Yes
- ☐ No
- ☐ NA

21. If client diagnosed to have active TB, was he/she provided with Co-trimoxazole at time of diagnosis

- ☐ Yes
- ☐ No

22. If client diagnosed to have active TB, was he/she provided with DOTS?

- ☐ Yes
- ☐ No

23. If the client is not diagnosed with active TB, was he/she provided with IPT for six months?

- ☐ Yes
- ☐ No

24. Was a follow-up appointment date and management plan noted at the last visit?

- ☐ Yes
- ☐ No

25. Does the client require ARVs?

- ☐ Yes
- ☐ No

26. Has client been commenced on ARVs?

- ☐ Yes
- ☐ No
- ☐ NA

27. Did client undergo at least 2 information/counseling sessions prior to commencing ARVs?

- ☐ Yes
- ☐ No
- ☐ NA

28. Were other necessary investigations (CBC and/or, ALT/AST, BUN and Creatinine done prior to ARV initiation and results recorded?

- ☐ Yes
- ☐ No

29. Survival status: (for both Pre ART and ART patients)

- ☐ Alive
- ☐ Dead, date of death: \_\_\_\_\_

30. Treatment status: (for those on ARVs)

- ☐ Still on treatment
- ☐ Stopped treatment; date: \_\_\_\_\_
- ☐ Defaulted; date: \_\_\_\_\_



### 3. TB register review

#### A. Identification:

Date: \_\_\_\_\_ Seria

I number: \_\_\_\_\_

Facility code: \_\_\_\_\_

Name and signature of data collector: \_\_\_\_\_

#### B. Socio demographic characteristics:

Age (in completed years): \_\_\_\_\_

Sex

- ☐ Male
- ☐ Female

Marital status

- ☐ Single
- ☐ Married
- ☐ Cohabiting
- ☐ Widowed
- ☐ Divorced



Residence

- ☐ Urban
- ☐ Rural

Educational status: highest education standard achieved: \_\_\_\_\_

Employed?

- ☐ Yes
- ☐ No

If employed,

- ☐ Full time
- ☐ Part time
- ☐ Formal
- ☐ Informal

- Self employed

**C. Service delivery:**

1. Date of first assessment (EC): \_\_\_\_\_
2. Are all contact details for the client entered on the TB register? (Name, Surname, home and work address and telephone numbers of client and next of kin details)
  - Yes
  - No
3. Is a contact person for the patient identified and contact details completed?
  - Yes
  - No
4. Is patient categorized from I- IV (Annex-4) based on severity, site and previous treatment history to decide on appropriate treatment regimen and result noted? (Confirm against client history)
  - Yes
  - No
5. Has the correct regimen been prescribed as per the category?
  - A. For initiation phase?
    - Yes
    - No
  - B. For continuation phase?
    - Yes
    - No
6. Is initial sputum smear result filled or result noted?
  - Yes
  - No
  - NA
7. Result of sputum smear
  - AFB positive
  - AFB negative



8. If sputum AFB smear positive at baseline

A. Was second month smear result in folder?

- ☐ Yes
- ☐ No
- ☐ If yes what was the result: \_\_\_\_\_

B. Was 5th month smear result in folder?

- ☐ Yes
- ☐ No
- ☐ If yes what was the result: \_\_\_\_\_

C. Was final (end of treatment) sputum smear result in folder?

- ☐ Yes
- ☐ No
- ☐ If yes what was the result: \_\_\_\_\_

9. Is patient's weight determined and recorded?

- ☐ Yes
- ☐ No

If yes weight in kg: \_\_\_\_\_

10. Is there a record that the client had an HIV test offered? (Current or previous)

- ☐ Yes
- ☐ No

11. Is client HIV-positive? ("NA" if not tested)

- ☐ Yes
- ☐ No
- ☐ NA

12. A. If HIV-positive, has the patient been enrolled in HIV care?

- ☐ Yes
- ☐ No

B. Does the patient require ARV?

- ☐ Yes

☐ No

C. If require ARV, has the patient been commenced on ARVs?

☐ Yes

☐ No

☐ NA

D. If HIV-positive, is Co-trimoxazole prophylaxis prescribed?

☐ Yes

☐ No

☐ NA

13. Is patient's treatment outcome documented?

☐ Yes

☐ No

☐ NA

14. What was the outcome of TB treatment? Select the one that applies

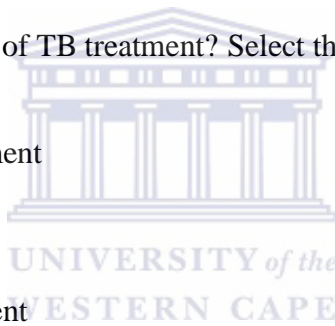
☐ Cured

☐ Completed treatment

☐ Failed treatment

☐ Died

☐ Defaulted treatment



### **Annex -3. Operational definitions of terms**

1. **Trained on TB/HIV:** health care provider (could be a doctor, health officer or a nurse) who undertook a five days in service training course on TB/HIV collaborative activities using national curriculum.
2. **Trained on Tuberculosis:** health care provider (could be a doctor, health officer or a nurse) who undertook a five days in-service training course on tuberculosis screening, diagnosis, care and treatment as well as prevention and recording and reporting activities using a national curriculum.
3. **Trained on HIV/AIDS clinical training (IMAI/Basic ART):** health care provider (could be a doctor, health officer or a nurse) who undertook a ten days in-service IMAI training course or a 7 days basic ART training course on HIV/AIDS care and treatment using the national IMAI curriculum or basic ART curriculum developed by CDC/PEPFAR partners respectively.
4. **Trained on Basic ART for pharmacy:** a pharmacist or pharmacy technician who undertook a six days in-service training course on basic ART.
5. **Trained on CD4 count and clinical chemistry:** a laboratory technician or technologist who undertook a 10 days in-service training course on ART treatment monitoring using CD4 count and clinical chemistry tests such as ALT, AST, blood urea nitrogen (BUN) and serum creatinine testing
6. **Trained on AFB microscopy:** laboratory technician or technologist who undertook a 3 days in-service training course on Acid Fast Bacilli (AFB) sputum microscopy
7. **Trained on HIV counseling and testing (HCT):** health care provider (could be a doctor, health officer or a nurse) who undertook either a three weeks Voluntary HIV Counseling and Testing (VCT) or a three days Provider Initiated HIV Counseling and Testing (PIHCT) in-service training courses using a national curriculum.
8. **Quality of care:** in this particular study quality of care is defined as the score of quality measurement scale based on the points given to the levels of activities across the various sections of services in TB and HIV clinics as identified by the review of TB and HIV records. Using experts' opinion, we set a cut off level of 80% to categorize the

relative service quality received by individuals and provided by facilities into two. A quality

score value = and above 80% is defined as good quality of care; while a quality score value below 80% score value is defined as poor quality of care.

9. **TB/HIV program integration:** The term ‘programme integration’ refers to joining together different kinds of services or operational programmes in order to maximize outcomes, e.g. by organizing referrals from one service to another or offering one-stop comprehensive services. Specific to TB/HIV, it implies provision of TB case finding and management among HIV clients and HIV case finding and management among TB patients. In this particular study Integration is represented as the provision of HIV testing service in TB clinic and TB screening service in HIV care and treatment clinic in lieu of applicability of these two variables for all TB and HIV cases. Whereas details of integration for specific groups of patients (TB/HIV co infected patients) will be presented under the section of “TB case finding and management in HIV clients” and “HIV case finding and management in TB patients”
10. **Functional status:** is the ability of a client to perform specific activities and is used to assess the clinical condition of the client in chronic HIV care. It is assessed by looking at general condition of the client including how he presented to medical care and enquiring him as to what activities he is able to perform and it is assessed at initial and every clinical visit by a health care provider. Clients’ functional status is classified into different levels, these are: **Working:** is defined as able to perform usual work in or out of the house, harvest. **Ambulatory:** able to perform activities of daily living. **Bedridden:** not able to perform activities of daily living.
11. **Action plan:** is a plan drawn out of a supervisory observation and it includes information on specific outputs expected and activities that will be carried out to result in the proposed outputs, with details including the responsible unit, budget and timing.
12. **Adherence supporters/:** These are people living with HIV that are trained on adherence counseling, referral linkage as well as tracing defaulters who voluntarily support the chronic HIV/AIDS care and support services in the health facilities
13. **Within facility referral form:** is a referral form used to link services between various HIV care entry points (testing centers) and ART clinic within the health facility

14. **Outside facility referral form:** is a referral for used to facilitate referral between the health facility and other facilities outside the hospital and vice versa



## Annex -4. Questionnaire items used for developing scores

### 1. Input factors

#### A. Personnel

Q. No	Question	score values	
		1	0
	Score “1” if $\geq 50\%$ ; score “0” if $< 50\%$		
1	Proportion of staff (by category) working in HIV/AIDS clinic	Yes	No
2	Proportion of staff (by category) working in TB clinic	Yes	No
3	Proportion of staff (by category) working in both HIV/AIDS and TB clinics	Yes	No
Total number of score points = 8			

#### Trained health care providers working in HIV/AIDS clinics

Q. No	Question
	Score “1” if $\geq 75\%$ ; score “0” if $< 75\%$
1	Proportion of physician trained on HIV clinical management and TB/HIV
2	Proportion of health officer trained on HIV clinical management and TB/HIV
3	Proportion of nurse trained on HIV clinical management and TB/HIV
4	Proportion of pharmacy technician/pharmacist trained on ART....
5	Proportion of laboratory technician trained on CD4 and Clinical chemistry
6	Proportion of health care provider allocated to manage the HIV/AIDS programme in the facility?
7	Proportion of HMIS officer/data clerk trained on HMIS
8	Proportion of adherence supporters/peer educator trained on Tx adherence and care and support
Proportion of all staff adequately trained	

#### Trained health care providers working in TB clinics

Q. No	Question
	Score “1” if $\geq 75\%$ ; score “0” if $< 75\%$
1	Proportion of physician trained on Tuberculosis management, TB/HIV and HCT
2	Proportion of health officer trained on Tuberculosis management, TB/HIV and HCT
3	Proportion of nurse trained on Tuberculosis management, TB/HIV and HCT in each of the examination room?
4	Proportion of laboratory technician trained on AFB microscopy
5	Proportion of health care provider allocated to manage the TB programme in the facility?
Proportion of all staff adequately trained	

## B. Infrastructure

### HIV/AIDS clinic

Q. No	Question	score values	
		1	0
1	Is/are there separate room/s dedicated for HIV/AIDS care and treatment/ART? Is the room private? (Restricted access / client cannot be seen or overheard by people outside the room) ?	Yes, observed	Else
2	Is there a separate waiting area for HIV clinic?	Yes, observed	Else
3	Is there flowing water, soap and towel for hand washing in HIV clinic?	Yes, observed	Else
4	Is there a working scale at the ART room?	Yes, observed	Else
5	Is there an examination couch?	Yes, observed	Else
6	Is there functional Otoscope for ear and throat examinations	Yes, observed	Else
7		Yes, observed	Else

Total number of score points = 7

### TB clinic

Q. No	Question	score values	
		1	0
1	Is/are there separate room/s dedicated for TB/DOTS service? Is the room private? (Restricted access / client cannot be seen or overheard by people outside the room)?	Yes, observed	Else
2	Is there a separate waiting area for TB clinic	Yes, observed	Else
3	Is there flowing water, soap and towel for hand washing in TB clinic?	Yes, observed	Else
4	Is there a working scale at the TB room of the facility?	Yes, observed	Else
5	Is there an examination couch?	Yes, observed	Else
6		Yes, observed	Else

Total number of score points = 6

### Laboratory

Q. No	Question	score values	
		1	0
1	Is there a functional CD4 machine in the facility? Is there a functional photometer to perform liver function tests (AST and ALT) and renal function tests (BUN and Creatinine)?	Yes, observed	Else
2	Is there a functional complete blood count (CBC) machine in the facility?	Yes, observed	Else
3	Is there a functional microscope for sputum smear examination in the facility?	Yes, observed	Else
4		Yes, observed	Else

Total number of score points = 4

## C. Drugs and supplies

### HIV/AIDS clinic

Q. No	Question	score values	
		0	1
1	Was there stock- outs of HIV rapid test kits (screening or confirmatory)?	Yes	No
2	Was there stock- outs of Cotrimoxazole (Bactrim)?	Yes	No
3	Was there stock- outs of Isoniazid for TB prevention?	Yes	No
4	Was there stock- outs of Anti TB drugs (Regimen 1 or 2)?	Yes	No
5	Was there stock- outs of any ARV drugs?	Yes	No
	Is there a mechanism in place to monitor stock levels of each of these items		
6	(bin cards and electronic systems)	Yes, observed	No
7	Are there protective hand gloves in the HIV/AIDS clinic?	Yes, observed	No
8	Are soap and towel present for hand washing in the HIV/AIDS clinic?	Yes, observed	No
9	Are there protective materials (safety box) in the HIV clinic?	Yes, observed	No
10	Are condoms available in the HIV/AIDS rooms?	Yes, observed	No
11	Is there a dildo in the HIV/AIDS rooms?	Yes, observed	No
Total number of score points = 9			

### TB clinic

Q. No	Question	score values	
		1	0
1	Was there stock- outs of HIV rapid test kits (screening or confirmatory)?	Yes	No
2	Was there stock- outs of Cotrimoxazole (Bactrim)?	Yes	No
3	Was there stock- outs of Anti TB drugs (Regimen 1 or 2)?	Yes	No
4	Was there stock- outs of any ARV drugs?	Yes	No
	Is there a mechanism in place to monitor stock levels of each of these items	Yes, observed	No
5	(bin cards and electronic systems)	Yes, observed	No
6	Are there protective hand gloves in the in the TB clinic?	Yes, observed	No
7	Are there protective materials (safety box) in the TB clinic?	Yes, observed	No
8	Are condoms available in the TB room?	Yes, observed	No
9	Is there a dildo in the TB room?	Yes, observed	No
Total number of score points = 9			



## D. Health systems Procedures

### HIV/AIDS clinic

---

Q.

No

Question

score values



## E. Information systems

### HIV/AIDS clinic

Q. No	Question	Score values	
		1	0
	Are there educational leaflets or posters in the local language (Amharic) in the room on?		
1	STI transmission and treatment?	Yes, observed	No
2	Prevention of Mother to Child Transmission of HIV	Yes, observed	No
3	Nutritional advice for HIV clients	Yes, observed	No
4	Family Planning methods	Yes, observed	No
5	ARV treatment adherence	Yes, observed	No
6	HIV prevention	Yes, observed	No
7	TB prevention, screening and treatment	Yes, observed	No
	<b>If yes to 5 or more then score “2”; if yes to 1-4 then score “1” if yes to none score “0”</b>		
	Are there guidelines/Algorithms/SOPS in the room on?		
1	ART management?	Yes, observed	No
2	OI management		
3	Pediatric HIV/AIDS care and treatment?	Yes, observed	No
4	PMTCT?	Yes, observed	No
5	TB/HIV implementation (guideline or algorithm on TB diagnosis and/or screening?)	Yes, observed	No
6	National Co-trimoxazole Preventive Therapy?	Yes, observed	No
7	HIV Counseling and testing?	Yes, observed	No
	<b>If yes to 5 or more then score “2”; if yes to 1-4 then score “1” if yes to none score “0”</b>		
	Are there stationeries for HIV/TB care in the examination room?		
1	ART register in the room?	Yes, observed	No
2	Pre ART register in the room?	Yes, observed	No
3	HIV/AIDS care intake and follow up forms?	Yes, observed	No
4	IPT register?	Yes, observed	No
5	Within facility referral forms?	Yes, observed	No
6	Outside facility referral forms?	Yes, observed	No
7	TB/HIV referral form (External)?	Yes, observed	No
8	Quarterly reporting forms (ART/Pre ART)?	Yes, observed	No
9	Quarterly reporting forms (TB/HIV)?	Yes, observed	No
	<b>If yes to 7 or more then score “2”; if yes to 1-6 then score “1” if yes to none score “0”</b>		
	<b>Total number of score points = 6</b>		

## TB clinic

Q. No	Question	score values	
		1	0
	Are there suitable educational leaflets in the local language (Amharic)?		
1	TB prevention, screening and treatment?	Yes, observed	Else
2	STI transmission and treatment?	Yes, observed	Else
3	HIV counseling and testing?	Yes, observed	Else
4	Nutrition?	Yes, observed	Else
5	TB treatment adherence?	Yes, observed	Else
	<b>If yes to 4 or more then score “2”; if yes to 1-3 then score “1” if yes to none score “0”</b>		
	Are there HCT and TB/HIV guidelines /algorithms/SOPS in the room on?		
1	Tuberculosis, TB/HIV and Leprosy (guideline)?	Yes, observed	Else
2	TB/HIV implementation (guideline)?	Yes, observed	Else
3	CPT?	Yes, observed	Else
4	HIV Counseling and testing?	Yes, observed	Else
	<b>If yes to 3 or more then score “2”; if yes to 1-2 then score “1” if yes to none score “0”</b>		
	Are there stationeries for TB and TB/HIV care? (Forms, registers and tools)		
1	Unit TB register?	Yes, observed	Else
2	CPT register?	Yes, observed	Else
3	Outside facility referral forms?	Yes, observed	Else
4	Within facility referral forms?	Yes, observed	Else
5	Quarterly reporting forms (TB/HIV)?	Yes, observed	Else
6	Quarterly reporting forms (TB)?	Yes, observed	Else
	<b>If yes to 5 or more then score “2”; if yes to 1-4 then score “1” if yes to none score “0”</b>		
<b>Total number of score points = 6</b>			

## 2. TB/HIV service quality in HIV clinics

Q. No	Question	score values	
		1	0
	For all HIV clients (both ART and Pre ART) score with the following questions		
1	Are all contact details for the client entered on the HIV care intake form?	Yes	No
2	Was a care giver identified and contact details completed?	Yes	No
3	Were Hgb and/or ALT/AST tests conducted and results available in the folder?	Yes	No
4	Did client undergo WHO clinical staging? (Baseline and at last clinical visit)	Yes	No
5	Has a CD4 count been done at baseline and in the last six months)?	Yes	No
6	Was the functional status recorded at baseline and at the last clinical visit?	Yes	No
7	Was the weight recorded at baseline and at the last clinical visit?	Yes	No
8	Was the client been assessed for meeting the criteria for ARVs eligibility	Yes	No
9	Is there a record of screening for TB at the last clinical visit?	Yes	No
10	Was a follow-up appointment date and management plan noted at the last visit?	Yes	No
<b>Total number of score points = 10</b>			
	If a client has started ARVs score with the following questions		
	Did client undergo at least 2 information/counselling sessions prior to commencing		
1	ARVs?	Yes	No
	Were necessary investigations (CBC and/or ALT/AST, BUN and Creatinine done		
2	prior to ARV initiation and results recorded?	Yes	No
<b>Total number of score points = 2</b>			
<b>Overall total score for pre ART patients = 10 and for ART patients = 12</b>			

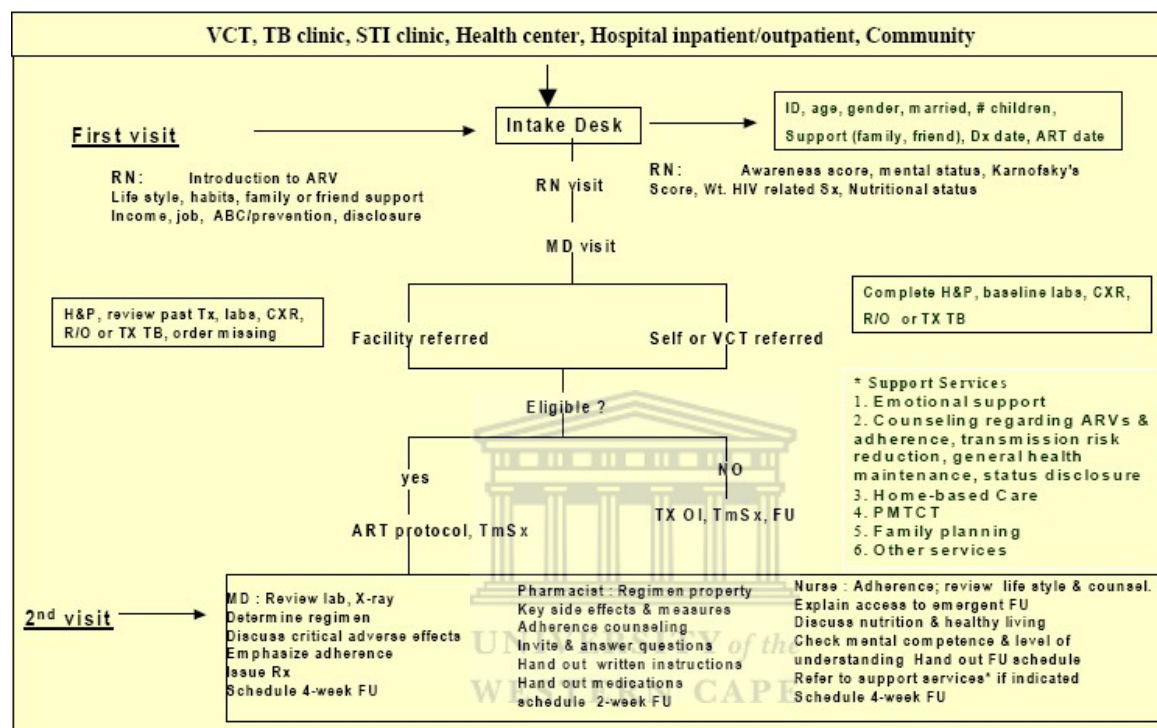
WESTERN CAPE

### 3. TB/HIV service quality in TB clinics

Q. No	Question	score values	
		1	0
1	Are all contact details for the client entered on the TB register?	Yes	No
2	Is a contact person for the patient identified and contact details completed?	Yes	No
3	Is patient categorized and result noted?	Yes	No
4	Has the correct regimen been prescribed as per the category for the intensive phase?	Yes	No
5	Has the correct regimen been prescribed as per the category for the continuation phase?	Yes	No
6	Is initial sputum smear result filled or result noted?	Yes	No
7	Is patient's weight determined and recorded?	Yes	No
8	Has the correct drug dosage been given for the intensive phase?	Yes	No
9	Has the correct drug dosage been given for the continuation phase?	Yes	No
10	Is there a record that the client had an HIV test (Current or previous)?	Yes	No
11	Documented outcome of TB treatment for smear positive new TB patients?	Yes	No
<b>Total number of score points = 11</b>			
For patients sputum smear positive at baseline score with the following questions			
1	Was 2 <sup>nd</sup> month smear result in folder?	Yes	No
2	Was 5 <sup>th</sup> month smear result in folder?	Yes	No
3	Was final (end of treatment) smear result in folder?	Yes	No
<b>Total number of score points = 3</b>			
<b>Overall total score for patients with sputum smear positive at baseline = 14 and for patients with sputum smear negative at baseline = 11</b>			

## Annex - 4. National protocols and guidelines on AIV/AIDS and TB/HIV management

Figure 3. ART Patient Flow



Guideline for Implementation of Antiretroviral Therapy in Ethiopia, Ministry of Health, 2005.

Table 1: Criteria for initiation of ART in adults and adolescents

CD4 count not available	CD4 count available
WHO clinical stage IV and III irrespective of Total Lymphocyte Count (TLC)	WHO clinical stage IV, irrespective of CD4 count
WHO Clinical stage II if TLC $\leq 1200/\text{mm}^3$	WHO clinical stage III, if CD4 cell counts $\leq 350/\text{mm}^3$
Do not treat WHO clinical stage I, in absence of CD4 count	All WHO clinical stages, if CD4 cell counts $\leq 200/\text{mm}^3$
WHO clinical staging in adults and adolescents is given in Appendix 1 TLC is only useful in deciding when to initiate ART in symptomatic patients with WHO clinical stage II disease. The use of CD4 cell count to guide treatment decision is advisable. For example, pulmonary TB may occur at any CD4 level and other conditions may be mimicked by non - HIV aetiologies.	

Guideline for Management of Opportunistic Infections and Antiretroviral Treatment in Adults and Adolescents in Ethiopia, Federal HIV/AIDS Prevention and Control Office, Federal Ministry of Health, July, 2007.

## ARV ELIGIBILITY CRITERIA

### Clinical criteria:

- CD4 count
- WHO stage

### Social criteria

- Resident of catchment area
- No identified barriers for adherence

A person needs to fulfill both the clinical and social criteria to be eligible to initiate ARV

*Federal Ministry of Health of Ethiopia, HIV care/ART clinic intake form: G. ART ASSESSMENT AND PLAN*

## Cotrimoxazole Prophylaxis is indicated:

### 2. For adults and adolescents (over the age of 13 years):

- Patients in WHO HIV-clinical stage 2, 3, or 4 in the absence of CD4 count;
- Patients in WHO HIV clinical stage 3 or 4 irrespective of level of CD4 count;
- Patients with CD4 cell count of 350 cells/mm<sup>3</sup> or below;
- TB-HIV co-infected patients;
- Patients with documented prior history of Pneumocystis Pneumonia.

*Guideline for Cotrimoxazole Prophylaxis in HIV/AIDS Care and Treatment, HIV/AIDS prevention and control office (HAPCO), Federal Ministry of Health, February, 2006*

**Table 4: Procedure of Baseline Assessment and Follow up**

<b>Baseline assessment, week 0</b>		
<b>Objectives</b>	<b>Activities</b>	<b>Decision</b>
Assess patient eligibility	<ul style="list-style-type: none"> <li>Check HIV test document or request test                             <ul style="list-style-type: none"> <li>For transfer-ins check referral form</li> </ul> </li> <li>Register, fill intake format</li> <li>Clinical assessment: Hx of any HIV related illnesses in the past, OIs, co-morbidities, pregnancy, past and current medication</li> <li>Stage</li> <li>Counselling and education: determine treatment readiness, social background, disclosure,                             <ul style="list-style-type: none"> <li>Lab assessment: CD4, TLC, (if stage III and IV CBC, ALT, creatinine). If TB suspect sputum smear. Pregnancy and other tests as necessary.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Develop impression on treatment readiness</li> <li>Start CPT if clinically indicated</li> <li>Treat OI</li> <li>Determine eligibility in III and IV</li> <li>Advise to come with support</li> <li>Refer if necessary</li> <li>Continue ART for in transfer-ins</li> <li>Give appointment of 1 week</li> </ul>
<b>2<sup>nd</sup> Visit, 1 week after baseline visit</b>		
To decide on initiation	<ul style="list-style-type: none"> <li>Review clinical and lab data</li> <li>Adherence counselling and ensure readiness</li> <li>Drug counselling and education</li> <li>Discuss with family or closest support</li> </ul>	<ul style="list-style-type: none"> <li>Decide eligibility for stage I and II</li> <li>Non-eligible patients come every 3/12 for CPT and every 6/12 for clinical evaluation/CD4 count</li> <li>Start CPT or IPT (as indicated)</li> <li>Treat OI including TB</li> <li>Manage toxicity and intolerance</li> <li>Determine treatment readiness</li> <li>Decide on regimen</li> <li>Refer</li> <li>Appointment to return after 2 weeks</li> </ul>
<b>3<sup>rd</sup> visit, 2 weeks after initiation</b>		
To determine toxicity/intolerance, adherence, and IRIS	<ul style="list-style-type: none"> <li>Clinical assessment</li> <li>Counselling to assessment adherence and support</li> <li>Lab tests if necessary</li> </ul>	<ul style="list-style-type: none"> <li>Decide escalation of nevirapine</li> <li>Decide on continuation ARV drugs</li> <li>Treat OI if diagnosed</li> <li>Give appointment to return in 2 weeks</li> </ul>

*Guideline for Management of Opportunistic Infections and Antiretroviral Treatment in Adults and Adolescents in Ethiopia, Federal HIV/AIDS Prevention and Control Office, Federal Ministry of Health, July, 2007.*



**Table 5: Summary of Laboratory Monitoring for Adolescents and Adults on ART**

Regimen	Drugs	Monitoring Tests	Frequency
First-line Regimens	<b>D4T/3TC/NVP</b>	CD4 count	At baseline and 6 monthly (if available)
		ALT	Symptom-directed
	<b>ZDV/3TC/NVP</b>	Haemoglobin	At baseline, 4th, 8th, and 12 <sup>th</sup> weeks. thereafter symptom-directed
		ALT	Symptom-directed
		CD4 Count	Baseline and 6 monthly (if available)
	<b>d4T/3TC/EFV</b>	Pregnancy Test	Baseline, thereafter as indicated
		ALT	Symptom-directed
		CD4 Count	At baseline and 6 monthly
	<b>ZDV/3TC/EFV</b>	Haemoglobin,	At baseline, 4th, 8th, and 12 <sup>th</sup> weeks; thereafter symptom-directed
		Pregnancy test	At baseline, thereafter as indicated
		ALT	Symptom-directed
		CD4 count	At baseline and 6 monthly

*Guideline for Management of Opportunistic Infections and Antiretroviral Treatment in Adults and Adolescents in Ethiopia, Federal HIV/AIDS Prevention and Control Office, Federal Ministry of Health, July, 2007.*



## **Annex – 5. Consent form**

### **CONSENT FORM**

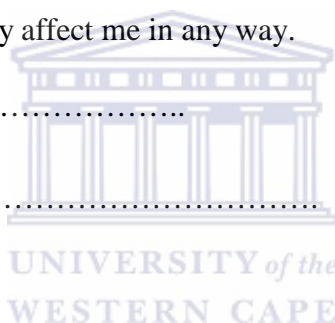
**Title of Research Project:** Assessment of an integrated TB/HIV programme at health facilities in Hawassa district, Ethiopia.

The study has been described to me in language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name.....

Participant's signature.....

Date.....



Should you have any questions regarding this study or wish to report any problems you have experienced related to the study, please contact the study coordinator:

**Study Coordinator's Name: Shumet Adnew Lonsako**

**Student at the University of the Western Cape/South Africa/**

**Hawassa, Ethiopia**

**Telephone:**

**Cell: (251) 911 196473**

**Email: shume96@yahoo.com**

## **Annex - 6. Information sheet**

### **INFORMATION SHEET**

**Project title:** Assessment of an integrated TB/HIV programme at health facilities in Hawassa district, Ethiopia.

This is a research project being conducted by Shumet Adnew a master student at the University of the Western Cape. As you are managing this facility, we are inviting you to participate in this research project in which we plan to assess the implementation of integrated TB/HIV collaborative activities in health facilities. The purpose of this research project is to demonstrate to service providers, facility leaders and district TB/HIV coordinators the existing areas of strengths and weaknesses in the implementation of collaborative TB/HIV activities in health facilities, and outline a set of feedbacks and recommendations to address the identified shortcomings, if any, for future programme improvement.

If you agree to participate in this study, you will be asked to respond to some questions on staffing, infrastructure, drugs and supplies, existence of health systems procedures, and information systems for the TB/HIV programme. The study will be conducted in three health centers and one hospital in the district, we expect you to participate in the interview for 20-30 minutes and to fill the questionnaire in 20 minutes. Some of the questions that we are asking you are, number of staff trained on ATT, TB/HIV and PIHCT, number of full time providers, presence of TB/HIV focal person and its functionality, presence of mechanisms for TB contact and defaulter tracing, presence of quality assurance system, availability of IEC materials, etc. We will also have to access the folders of some patients with TB and HIV/AIDS.

If you participate in this study your participation will be kept confidential and we will not request personal information from you. The confidentiality of the patients will be strictly maintained. Your facility identity will not be revealed either.

There are no known risks associated with participating in this research project, we will arrange you a convenient place and time for the interview.

This research is not designed to help you personally, but the results may help the investigator learn more about the current implementation status of TB/HIV collaborative activities in Hawassa district. We hope that in the future, the study assists the health facility team to continuously seek effective strategies to improve identified problems in service provision. In addition, the finding of the study will help government and other organizations to plan for possible intervention measures and might assist other researchers as baseline data for subsequent studies.

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, there will be no adverse consequences

If you later have any questions about the research study itself, please contact me at

Shumet Adnew Lonsako

P. O. Box 631

Hawassa, Ethiopia

Tel: 251 9 11 196473

Email: shume96@yahoo.com

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact

My supervisor Dr Gavin Reagon:

University of the Western Cape

Private Bag X17

Bellville 7535

Tel

Fax

Email

This research has been approved by the University of the Western Cape's Senate Research Committee and the Ethiopian Health Research Ethics Review Committee