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Technical Report: Impact Evaluation of the Uganda TB/HIV collaborative policy on treatment outcomes in patients co-infected with TB and HIV and health provider experiences for the period 2012/13-2015/16

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LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral therapy
CDC	Centers for Disease Control and Prevention
HC IV	Health Center level IV
HCT	HIV Counseling and Testing
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
HSD	Health Sub-District
IP	Implementing Partner
IRB	Institutional Review Board
METS	Monitoring and Evaluation Technical Support Project
M&E	Monitoring and Evaluation
MoH	Ministry of Health
MakSPH	Makerere University School of Public Health
NTLP	National TB and Leprosy Programme
PEPFAR	United States President's Emergency Plan for AIDS Relief
TB	Tuberculosis
WHO	World Health Organization

SECTION 1: EXECUTIVE SUMMARY

Background:

Uganda is one of the thirty countries world-wide, with the highest burden of TB and HIV co-infection. Since 2006, the Uganda Ministry of Health (MoH) has implemented a policy of collaborative TB/HIV activities; with a goal of reducing the burden of TB in HIV patients and conversely, reducing the burden of HIV in TB patients. In 2013, MoH developed a second edition of the TB/HIV collaborative policy. The revised edition, in contrast to the earlier version; emphasized offering routine HIV testing to presumptive TB patients in addition to those diagnosed with TB, early initiation of anti-retroviral treatment to all HIV-positive TB patients within 8 weeks of commencing TB treatment therapy and delivery of integrated TB and HIV services preferably at the same time and location; commonly referred to as the “one-stop model.” Following the 2013 TB/HIV collaborative policy, there was dramatic improvement in the indicators for TB/HIV collaborative activities particularly for the proportion of TB/HIV co-infected patients receiving TB/ART co-treatment. Despite the improvement in the indicators for TB/HIV collaborative activities, the impact of the 2013 TB/HIV collaborative policy on patient-level treatment outcomes remained unknown.

Objectives:

In this evaluation, the specific objectives were to determine if; 1) implementation of the policy had resulted in significant differences in the treatment outcomes of TB patients co-infected with HIV for the periods 2013-2016; 2) implementation of the policy had resulted in significant differences in the proportions of HIV patients diagnosed with TB among those enrolled in HIV care between 2013-2016; 3) the treatment outcomes of TB patients co-infected with HIV differ significantly across the various integration models for provision of TB/HIV collaborative services and 4) to explore the views and experiences of facility-level health workers concerning the policy in relation to provision of TB/HIV collaborative services?

Methods:

The evaluation targeted patients seen at Health Center IV (HCIV), General Hospitals, Regional and National Referral hospitals from the twelve health regions of MoH. A total of 158 health facilities were sampled for the evaluation, of which 116 were Health Center IVs, 22 were General Hospitals, 14 were Regional Referral Hospitals and 6 were National Referral Clinics. In each of the visited health facilities, records of TB and HIV patients for the two-time periods of July 01, 2012-June 30, 2013 and July 01, 2015-June 30, 2016 were abstracted. Alongside data abstraction, a survey of the health facility characteristics and the models employed for providing TB/HIV collaborative services was conducted. For the qualitative aspect of our evaluation, a total of 121

medical providers participated in one-on-one interviews with the research staff. Participants included medical doctors, clinical officers, nurse-counselors, pharmacy technicians and laboratory staff.

Results:

Overall, we abstracted a total of 35,314 TB-patient records of which 18,139 records were abstracted from 2012/13 and 17,175 from 2015/16. Cure and treatment completion increased in both TB/HIV negative and TB/HIV positive patients during the three-year period from 61.7 to 68.3% and 54.2 to 60.3% respectively. There was an increase in mortality in both patient-groups but more substantially among TB/HIV co-infected patients (12.5 to 15.5%) compared to TB/HIV negative patients (5.3 to 6.1%). There was a reduction in patients lost-to-follow-up (LTFU) in both TB/HIV negative (11.1 to 10.4%) and TB/HIV positive (11.8 to 9.7%) patients. Treatment failure was less than 1% in both review periods and remained similar in both patient-groups. Transfer-out although not considered not a “final” outcome in TB care, reduced for both TB/HIV negative (21 to 14.3%) and TB/HIV positive (20.9 to 13.6%) patients. Based on the difference-in-differences analysis, the only change in TB treatment outcomes conclusively attributable to the TB/HIV collaborative policy was lost-to-follow-up ($p=0.043$), despite the improvements in cure outcome ($p=0.055$).

At regional-level, cure and treatment completion outcomes improved across nearly all the regions. Mortality increased or remained similar across all regions except Arua and Moroto where it reduced. LTFU reduced across most regions except Jinja, Masaka, Kabale, Moroto and Soroti. Treatment failure remained similar in the two review periods across all regions. Transfer-out decreased across all regions except in Gulu and Mbale.

At all the health facility-levels, there was an increase in treatment cure and a decrease in patients transferred-out in 2016 compared to 2013. At the National referral Hospital Clinics, treatment completion decreased from 43.5% to 38%, mortality increased by more than double from (6.8% to 14.6%), lost-to-follow-up decreased more than three-fold (18.1% to 4.9%) while treatment failure remained un-changed (0.6% to 0.5%). At the Regional Referral Hospitals, treatment completion increased (24.3 to 32.6%), while mortality (12% versus 11.1%), patients lost-to follow-up (9.5% versus 10%) and treatment failure (0.5% versus 1%) largely remained un-changed. At General Hospital level, treatment completion (33.5% versus 34%), mortality (7.6% versus 7.7%), and failure (1% versus 0.7%) remained un-changed while patients lost-to-follow-up increased from 10.9-12.6%. At Health Center IV level, there was a decrease in treatment completion (41% versus 38.7%), an increase in mortality (6.6% versus 7.6%) while patients lost-to follow-up (12.2% versus 12.9%) or having treatment failure (0.9% versus 1%) remained unchanged.

There was an overall increase in treatment cure across all age-groups from 23.1% in 2012/13 to 29.1% in 2015/16 except in those aged 0-4 years (6.2% versus 5.3%). Similarly, treatment completion increased across all age-groups (34.4% versus 35.5%) except among those aged 0-4 years (56.7% versus 50%) and 25-34 years (34.4% versus 34.4%). Lost-to-follow-up decreased across all age-groups from 12.4% to 10.4% except in those aged 0-4 years (16% versus 22.3%) and 5-14 years (16.2% versus 13.4%). Treatment failure remained un-changed across all age-

groups. There was an overall increase in mortality across all age-groups from 8.8% to 10.1% except those aged 0-4 years (7.5% versus 6.7%) and 5-14 years (7.1% versus 6.7%). Mortality increased substantially particularly in those aged 65 years and above from 13.3% to 16.1%. There was an overall decrease in transfer-out across all age-groups from 20.5% to 14.1% except in those aged 0-4 years (13.4% versus 15.7%) and 5-14 years (17.6% versus 15.4%).

There was a significant decrease in the proportions of HIV patients diagnosed with TB before and after the implementation of the TB/HIV collaborative policy at national-level (1.6 to 0.8%) and at all health-facility levels (NRH: 6.1 to 2.8%); (RRH: 1.7 to 0.5% (General Hospitals: 0.8 to 0.3%); (HCIV: 0.7-0.4%), yet just about 60% of HIV patients diagnosed with TB were on ART.

The “one-stop” TB/HIV integration model was mainly implemented at the National Referral Hospital clinics (83.3%) versus Regional Referral Hospitals (42.9%), General Hospitals (59%) and Health Center IV (62%). A substantial number of Regional Referral Hospitals (35.7%), General Hospitals (36.4%) and Health Center IV (32.2%) did not have clear TB/HIV integration models. TB/HIV co-infected patients seen at health facilities implementing the full integration model had higher cure outcomes and lower LTFU when compared to entry via TB or HIV service (31.8% versus 16.2% and 8% versus 16% respectively). Compared to health facilities implementing no integration model, the one-stop model had better results for all treatment outcomes (cure: 31.8% versus 29%; completed: 37.3% versus 31.1%; died: 11% versus 7.9%; LTFU: 8% versus 13.1%; transfer out: 11% versus 17.4%) except for failure (0.8% versus 0.9%).

Medical providers generally had a positive view about the TB/HIV collaborative activities. Key themes were: (1) reduced time of patients spent in health facilities, (2) reduced costs of care to patients and (3) better TB treatment outcomes. However, provision of the collaborative activities was hampered by several gaps including gaps in knowledge about TB among HIV care providers, especially among lower-level cadres, staffing shortages, stock-out of TB medicines and laboratory supplies. Regions with refugee populations and the Karamoja region faced additional implementation challenges related to low capacity to provide TB/HIV collaborative services and food shortage respectively.

Conclusions:

The 2013 TB/HIV collaborative policy mainly resulted in reduction of TB/HIV co-infected patients lost-to-follow-up (LTFU) possibly leading to the improvements in TB cure rates. The policy did not have impact on TB mortality which is the most useful indicator for monitoring TB/HIV collaborative activities. Further, the policy did not result in increased diagnosis of TB among patients in HIV care and only achieved the one-stop model of TB/HIV integration at national-referral hospital clinics. Health facilities implementing the one-stop model of TB/HIV integration generally had better patient outcomes compared to other models. Overall, medical providers had a positive view about the TB/HIV collaborative policy, but implementation of the policy was hampered by a host of challenges including knowledge gaps on TB, staffing shortages, stock of medicines and laboratory commodities. Regions with refugee populations and Karamoja region faced additional challenges arising from limited capacity to implement the policy and food shortage respectively.

SECTION 2: INTRODUCTION

2.1. Background to the study

In 2004, the World Health Organization published an interim policy on TB/HIV collaborative activities, which was revised later in 2012, to address the co-epidemics of TB and HIV. The goal of implementing the activities in a collaborative manner was to decrease the burden of both infections in the population ultimately leading to reduced mortality from HIV-associated TB [4]. Uganda is a high TB/HIV burden country and is among the 30 countries in the world that account

Box 1: Recommended collaborative TB-HIV activities

- A To establish the mechanisms for collaboration
 - A.1 A coordinating body for TB-HIV activities effective at all levels
 - A.2 Surveillance of HIV prevalence among TB patients
 - A.3 Joint TB-HIV planning
 - A.4 Monitoring and evaluation
- B To reduce the burden of TB in people living with HIV
 - B.1 Intensified TB case finding
 - B.2 Treatment of latent TB infection (TB preventive treatment)
 - B.3 TB infection control in health care and congregate settings
- C To reduce the burden of HIV in TB patients
 - C.1 HIV testing and counseling
 - C.2 HIV prevention methods
 - C.3 Co-trimoxazole preventive treatment
 - C.4 HIV/AIDS care and support
 - C.5 Antiretroviral treatment

for 85-89% of HIV-associated TB globally [18]. The first edition of the Uganda TB/HIV collaborative policy-guidelines which were adapted from the 2004 WHO interim policy, were developed in 2006. This was followed by a second edition of the policy-guidelines in **May 2013**. The second edition of the policy expanded the 2006 guidelines by emphasizing the offer of routine HIV testing to individuals with presumptive TB and not only those diagnosed with TB, early initiation of anti-retroviral treatment to all HIV-

positive TB patients within eight weeks of commencing TB treatment [19], and provision of integrated TB and HIV services preferably at the same time and location using the “one-stop center model”. The policy aims were laid out in a 12-point package of activities (Box 1), which were jointly implemented by the Uganda National TB and AIDS Control Programs. Through the support of donors such as PEPFAR, rapid roll-out and provision of TB/HIV collaborative services was achieved during the period 2013-2016 [20, 22], with dramatic improvement in indicators for TB/HIV collaborative activities particularly for TB and ART co-treatment (see **(Figure 1)**). Documented HIV test results increased from 81% in 2013 to 97% in 2016; TB/HIV co-infected patients on co-trimoxazole preventive treatment remained above 95% from 2013 to 2016; while TB/ART co-treatment increased from 56% in 2013 to 88% in 2016. On the other hand, the proportion of TB patients co-infected with HIV fell from 49% in 2013 to 42% in 2016.

The recommended **models** for provision of integrated TB/HIV services in Uganda were principally three depending on the health-facility design or patient volume: 1) in the **one-stop model**, which was the preferred type in the 2013 policy-guidelines, TB/HIV co-infected patients would be treated for both TB and HIV by the same health worker, during the same clinic visit at one stop center; 2) in the **entry via TB services** model, TB clinics would conduct HIV testing for

presumptive or diagnosed TB patients, and then refer those who test positive for HIV care after cotrimoxazole preventive therapy; 3) in the **entry via HIV services** model, HIV patients would be screened for TB using a standard TB Intensified Case Finding Form and referred for TB diagnosis and treatment based on the outcome of the screening.

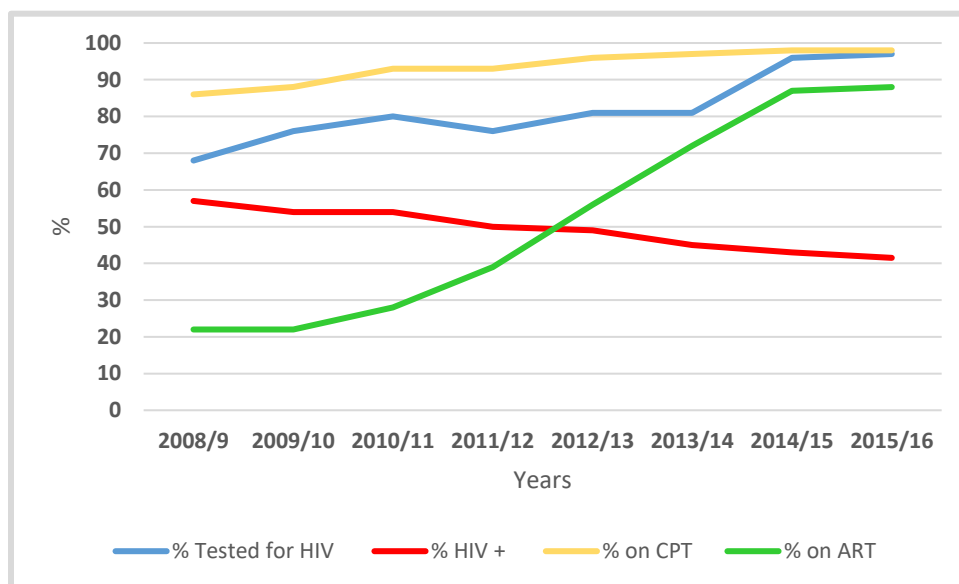


Figure 1: Performance against TB/HIV indicators 2008-2016 (Source: NTL annual report 2015/16)

2.2. Rationale for the evaluation:

The purpose of this study was to evaluate the impact of the TB/HIV collaborative activities on treatment outcomes in TB/HIV co-infected patients with focus on mortality from HIV-associated TB, see logic model in **Figure 2** below. Despite the remarkable improvement in the indicators for TB/HIV collaboration in Uganda, the impact of the collaborative activities on treatment outcomes among patients with TB/HIV co-infection was unknown. The little available literature on TB/HIV collaboration mainly reported ‘outputs’ such as proportion of TB patients tested for HIV; with few reports on downstream ‘impact’ such as outcomes of TB treatment or antiretroviral therapy [20, 23]. It was important to understand and describe the impact of the TB-HIV collaborative policy in Uganda in order to inform future program decisions about further scale-up and investment in light of the limited resources available for TB control [3]. In addition, the proposed evaluation is part of the data activities recommended by the WHO, PEPFAR and the Global Fund to Fight AIDS, Tuberculosis and Malaria [25]. The qualitative objective in this evaluation sought to describe the experiences, challenges and recommendations of frontline health care workers regarding provision of collaborative TB/HIV services. This was considered important to ensure sustainable and effective collaboration between TB and HIV services.

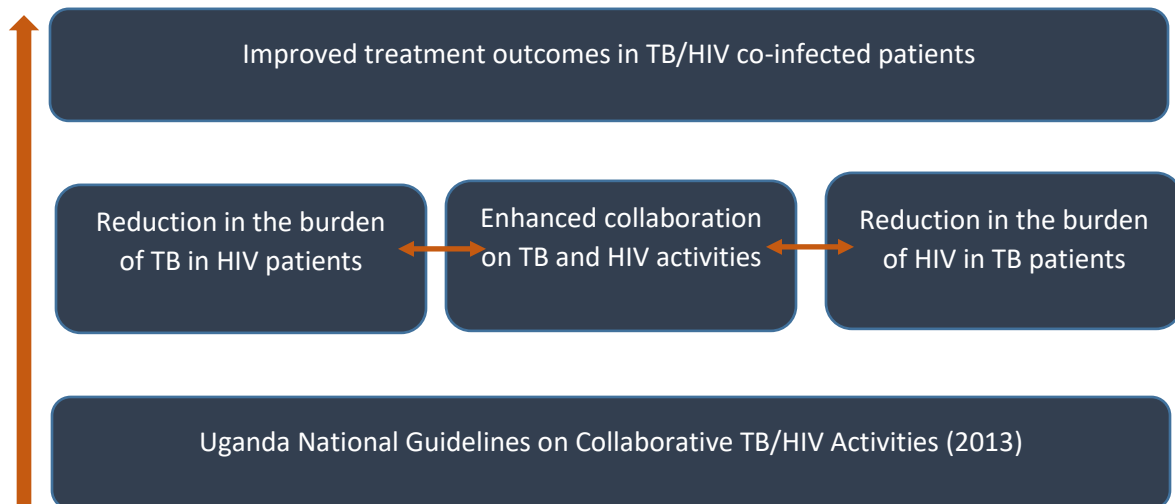


Figure 2: Logic model for TB-HIV collaborative activities

SECTION 3: EVALUATION QUESTIONS

3.1. Primary evaluation question

1. Has implementation of the 2013 Uganda TB/HIV collaborative policy resulted in significant changes in the TB treatment outcomes of TB/HIV co-infected patients for the time periods of 2012/13 and 2015/16?

3.2. Secondary evaluation questions

1. Has implementation of the TB/HIV collaborative policy changed the proportion of HIV patients diagnosed with TB in those newly or already enrolled in HIV care between 2012/13 and 2015/16?
2. Is there a significant difference in the cure/completion, failure, lost-to-follow-up and death outcomes of TB/HIV co-infected patients across the existing delivery models of TB/HIV collaborative services?
3. What are the views and experiences of facility-level health workers concerning the implementation of the TB/HIV collaborative policy?

3.3. Evaluation hypothesis

The evaluation was based on three hypotheses outlined below:

1. The TB treatment outcomes of TBHIV co-infected patients in 2015/16 would be significantly different from the outcomes in 2012/13.
2. The proportions of HIV patients diagnosed with TB in 2015/16 would be significantly different from the proportions in 2012/13.
3. The TB treatment outcomes of TBHIV co-infected patients would be significantly different based on the delivery models for the TB/HIV collaborative services.

3.4. Study definitions

TB patients with HIV co-infection were those registered in the facility TB register with documented HIV-positive status. **HIV patients diagnosed with TB** were those registered in the facility Pre ART or ART registers with documented TB diagnosis. **TB treatment outcomes** were those recorded as either 'cured', 'completed treatment', 'died or lost to follow-up'. **A TB or HIV medical provider** was any medical worker directly involved in provision of treatment to TB and HIV patients.

SECTION 4: METHODS

4.1. Study setting

Uganda has 12 health regions comprised of 112 districts (Figure 2 below). Health regions are served by regional referral hospitals, while the districts are served by a hospital or health center IV or both. The regions have variable HIV and TB prevalence, health infrastructure and human resource staffing. HIV prevalence is highest in the Central/Masaka region at (10.4%) and lowest in West Nile/Arua region (4.3%), [26]. In regard to TB, prevalence is highest in the mid-North/Gulu region (189 per 100,000 population) and lowest in North-East/Soroti region (65 per 100,000 population) [27].



Figure 3: Map of the Health Regions of Uganda

4.2. Study design

We employed a **pre and post** study design for **objectives one** and **two** of our evaluation. This involved collection of retrospective TB and HIV patient data for the period July 2012- June 2013

and July 2015-June 2016. The time interval of three years was considered adequate for the impact of the policy to become apparent. We also considered three years to be a right balance because conducting the evaluation before this time would be too early with a risk of finding only partial or no impact, while a longer period beyond three years could result in continued expansion of poorly designed TB/HIV collaborative interventions. For **objective three**, we conducted a **cross-sectional survey** to establish the existing models for delivery of the TB/HIV collaborative services. We compared TB and HIV patient data across the various models established from the survey. The **qualitative data** collection of the evaluation was conducted using the phenomenology qualitative study approach because the focus was to describe the experiences of medical providers in relation to implementation of the TB/HIV policy. Data collection was conducted between November and December 2017.

4.3. Study population

For **quantitative data**, the study population comprised of health facility records of TB patients (including those co-infected with HIV) and HIV patients seen in Uganda's public health facilities across the various levels of health care namely; national and regional referral hospitals, district hospitals and health center IVs. The study focused on public health facilities because TB and HIV services in these facilities are provided per Ministry of Health guidelines free of cost. For **qualitative data**, the study population comprised medical providers directly involved in provision of treatment to TB/HIV co-infected patients in the selected health facilities.

4.4. Sampling strategy

For the **quantitative** data of the evaluation, we purposively selected the two National Referral Hospitals and the fourteen Regional Referral Hospitals because the TB/HIV collaborative policy was rolled-out initially in National and Regional Referral hospitals. To select the district hospitals and Health Center IVs, we employed a stratified one-stage cluster sampling method. This was achieved by listing all the public hospitals and health center IVs across the twelve health zones in the country. The obtained list was then separated into two strata- one of district hospitals and the other of Health Center IVs. We then established the proportionate representation of the district hospitals versus Health Center IVs on the overall list. This was used to determine the number of hospitals versus Health Center IVs to be included in the sample. First, we assigned random numbers to each listed health facility using Excel software. Second, we sorted the random values in ascending order to randomly sort the health facilities. We then selected the health facilities until the required number in each stratum is obtained. The **qualitative data** was obtained through purposive sampling of medical workers at the TB and HIV clinics. We targeted the various range of cadres involved in TB/HIV care including medical doctors, clinical officers, nurse-counselors, pharmacy technicians and laboratory staff.

4.5. Sample size

We visited a total of 159 health facilities which included six HIV and TB clinics at the two national referral hospitals, fourteen (14) regional referral hospitals, twenty-one (23) district hospitals and one hundred and sixteen (116) health center IVs (See **Appendix 1**). In each of the visited health facilities, records of TB and HIV patients for the two-time periods of July 2012- June 2013 and July 2015-June 2016 were obtained. For the qualitative aspect of our evaluation, a total of 121 medical providers participated in the qualitative interviews.

4.6. Eligibility

The evaluation was conducted in referral hospitals, district hospitals and health center IVs since implementation of the policy focused on these health-facility levels initially. We therefore excluded health center IIIs although they currently provide TB and ART treatment. For a facility to be eligible, the facility should have provided integrated TB/HIV services since 2012 and have the required source documents available on-site. In case a facility did not meet this criterion, we moved to the next facility in the health region. For the medical provider staff, only those directly involved in treatment of TB or HIV patients for at-least one year were eligible. In addition, only those facility staff, willing to participate in the study were enrolled.

4.8. Data collection and sources:

The data for the **quantitative** aspect of the evaluation was sourced from the following facility registers: TB registers, Pre-ART and ART registers (**Appendices 1, 2 and 3**). Data was collected by manual abstraction of the required data elements for the period July 01, 2012-June 30, 2013 and July 01, 2015-June 30, 2016. The elements for which data was the following: demographics (excluding patient identifier information), type of TB diagnosed, date and category of TB treatment initiated, HIV status, medication provided (co-trimoxazole or ART), and treatment outcome (**Appendix 5**). For the HIV patients diagnosed with TB, data was abstracted for the following: demographics (excluding patient identifier information), date enrolled in HIV care, start date for ART, nutritional status, clinical stage and pregnancy status if female (**Appendix 6**). The data abstraction was performed by research assistants trained in the evaluation protocol with prior experience in similar activities. Their training covered data collection tools, data entry, data privacy, confidentiality, and security practices to ensure physical and electronic security of the collected data. Further, the research assistants were supervised by staff from the Ministry of Health and the MaKSPH-METS program. Information on the existing TB/HIV delivery models and health facility characteristics was collected co-currently alongside the data abstraction above (**Appendix 7**). The survey information included level of the health facility, existing number of staff, range of TB/HIV collaborative services offered, model of TB/HIV integration, available TB diagnostics, and the number of TB patients treated in the study year.

For the **qualitative** data, we conducted one-on-one interviews with the TB and HIV medical providers using an open-ended topic guide (**Appendix 8**). We interviewed a range of providers including clinicians, nurse-counselors, laboratorians and pharmacy technicians. In each region, we ensured participation from a referral hospital, district hospital and health center IV. Interviews were conducted by two research assistants - a moderator and an assistant moderator both trained in qualitative interviewing. Interviews lasted between 30 and 50 minutes were tape recorded and notes taken at the same time. Interviews were conducted in English, however moderators were also conversant in local vernacular while his or her assistant was a skilled notes taker. The interviews were conducted in a private place that was comfortable for the interviewees. **Figure 4** below summarizes the data source and data collection method for each research question:

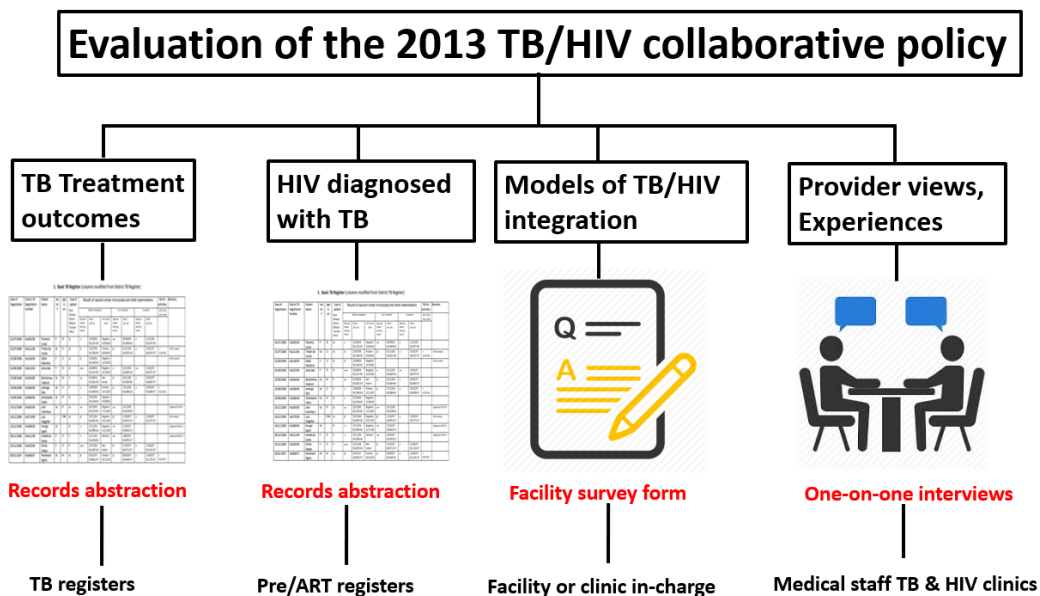


Figure 4: Data collection methods and sources for the impact evaluation.

4.9. Data management and Quality Assurance

Quantitative data: Each filled abstraction form was reviewed by a team supervisor for completeness and correctness. At the end of each week, the team supervisor transported the forms to the MaKSPH-METS offices in Kampala for data entry. Data entry was performed using the double entry approach using Windows-based EpiData software version 3.1., Odense Denmark, Epidata Association, 2010. The data entry was performed by research staff trained in data entry and database management. A range of data checks were set-up in the EpiData software including; *must enter variables, legal values, range checks, repeat variables and conditional jumps*. On-going consistency checks were performed. Any identified discrepancies

were resolved by self-evident correction or source document verification. Three separate databases were created using the EpiData software – one for the facility TB register, one for the facility ART register, and one for the facility survey tool.

Qualitative data: Interviews were audio-recorded using Sony voice recorders (model ICD PX333). At the end of each session in the field, the raw data (audio recordings, transcripts) were stored on a password-protected laptop computer and assigned an identification code with no names or other staff identifying information. On a weekly basis, the data was transferred from the field computer to another computer at the METS offices and backed up on an external drive. A detailed description of the computer software, data-flow-diagram and data security measures is provided in **Appendices 9, 10, and 11**.

4.10. Analysis

Quantitative data analysis was done using Stata software version 14.0 (StataCorp, College Station, Texas 77845 USA). Analysis was performed to provide national, regional and facility level impact of the TB/HIV collaborative policy. We generated descriptive statistics including frequencies and proportions for categorical variables and means, medians and interquartile ranges (IQRs) for continuous variables. Parametric and nonparametric statistical methods were used to analyze the data depending on the distribution of the data. The Chi square test (X^2) test was used to compare differences in proportions between groups and the Student t- test was used to compare differences in means between groups. Differences at 5% level ($p < 0.05$) were regarded as significant. To control for the background changes in outcomes which occurred with time during the review period, we performed the difference-in-difference analysis [35]. This involved computing the difference between outcomes in patients with TB only and patients with TB/HIV co-infection for the 2012-2013 cohort (baseline). This difference was then compared with the difference in the outcomes for patients with TB only and patients with TB/HIV co-infection for the 2015-2016 cohort. In regard to mortality, we performed sensitivity analysis involving patients recorded as died and patients recorded as lost to follow-up. This is because evidence suggests that 4-30% of HIV patients may be lost due to death [34].

Analysis of the **qualitative interview data** was done using the thematic content analysis approach. Atlas.ti - a qualitative data management software package was used for the analysis. The audio-recorded interviews were transcribed verbatim. The interview transcripts were read and re-read by two data analysts to identify emerging themes. Field notes were also analyzed for non-verbal communication and behaviors and compared to the interview data. Data were coded according to the topics and questions outlined in the guide, looking for the common themes across the interviews and categorize the sub-themes to derive overarching themes. Independent analysts reviewed a selection of transcripts to check for accuracy in coding of themes and

reliability of interpretation. Extracts of verbatim data were included to support interpretation of emergent themes.

4.11. Ethical and confidentiality considerations

The evaluation protocol was approved by Makerere University School of Public Health Higher Degrees, Research and Ethics Committee (# 484) and the Uganda National Council of Science and Technology (# SS 4326). In addition, the protocol was reviewed and approved by the CDC Center of Global Health ((# 2017-196). No personal identifier information was collected, and all the research assistants signed a data confidentiality form (**Appendix 12**). Permission to conduct the study in the health facilities was obtained from Ministry of Health, District Health officers and the in-charges of the selected health facilities. All participants in the qualitative interviews provided informed consent (**Appendix 13**). At both the METS offices and during the field, data was secured in computers with coded passwords, lockable file cabinets or metallic boxes with padlocks. A description of the measures to ensure data security and prevention against data breach is provided in **Appendix 10**.

SECTION 5: RESULTS

5.1. QUANTITATIVE RESULTS

Patient characteristics

Overall, we abstracted a total of 35,314 TB-patient records of which 18,139 records were abstracted from 2012/13 and 17,175 from 2015/16. The National Referral Hospital Clinics represented 21% of the total abstracted records, Regional Referral Hospitals 36%, General Hospitals 12.4% and Health Center IVs 33%. Males comprised majority of the total patients (62.5%). The overall median age was 32 years, new TB patients comprised 89% of total TB category, of which 86% had pulmonary forms of TB. However, more patients had laboratory confirmed pulmonary TB in 2015/16 (58.6%) compared to 2012/13 (51.7%). Overall, 45% of the TB patients were HIV positive status. More TB patients, however, were co-infected with HIV in 2012/13 (47.5%) compared to 2015/16 (42.3%). **Table 2** below, summarizes the patient characteristics in the review period.

Table 1: Health-Facility distribution and TB patient characteristics before (2012/13) and after (2015/16).

Variable	All TB patients (N=35,314)		TB patients 2012/13 (N= 18,139)		TB patients 2015/16 (N= 17,175)		p-value
	N	%	n	%	n	%	
Health facility							
National Referral Clinics	6,503	21.1	3,833	15.6	2,679	18.4	<0.001
Regional Referral Hospital	12,833	36.3	6,471	35.7	6,362	37	0.01
General Hospital	4,377	12.4	2,240	12.4	2,137	12.4	>0.999
Health Center IV	11,601	32.9	5,595	31	6,006	35	<0.001
Sex							
Male	22,055	62.5	11,005	60.7	11,050	64.3	<0.001
Female	13,039	36.9	7,039	38.8	6,000	34.9	<0.001
Age, years, median (IQR)	32 (25-43)		32 (25-42)		33 (25-44)		<0.001
TB category							
New	31,570	89.4	16,210	89.4	15,360	89.4	>0.999
Previous	3,326	9.4	1,753	9.7	1,573	9.2	0.1
Not recorded	418	1.2	176	1	242	1.4	
Type of TB							
PBC	19,449	55.0	9,382	51.7	10,067	58.6	<0.001
PCD	11,016	31.2	5,914	32.6	5,102	29.7	<0.001
EPTB	4,534	12.8	2,671	14.7	1,863	10.9	<0.001
HIV status							
Positive	15,936	45	8,622	47.5	7,314	42.3	<0.001
Negative	17,762	50.3	8,253	45.5	9,509	55.4	<0.001

Key: PBC: Pulmonary Bacteriologic Confirmed, PCD: Pulmonary Clinically Confirmed, EPTB: Extra Pulmonary TB.

Table 3 below summarizes the national-level changes in the TB treatment outcomes of patients in 2012/13 versus 2015/16. Favorable treatment outcomes defined by cure and treatment completion; increased in both TB/HIV negative and TB/HIV positive patients from 61.7% to 68.3% and 54.2% to 60.3% respectively. Unfavorable treatment outcomes defined by died, lost-to-follow-up (LTFU) and treatment failure, showed an increase in mortality in both patient-groups but more substantially among TB/HIV co-infected patients (12.5% to 15.5% versus 5.3% to 6.1%). There was a reduction in patients LTFU but more so in TB/HIV positive patients (11.8% versus 9.7%) compared to TB/HIV negative patients (11.1% versus 10.4%) Treatment failure in both patient-groups was below 1% and similar across the review period. Although transfer-out is not a “final” outcome in TB care, it reduced for both TB/HIV negative patients and TB/HIV positive patients from 21% to 14.3% and 20.9% to 13.6% respectively. There was no difference in the combined rates of mortality and LTFU for both TB/HIV negative patients (16.4% versus 16.5%) and TB/HIV positive patients (24.4% versus 25.2%) between the review period, although rates were higher among patients who were TB/HIV positive.

Table 2: National-level changes in TB treatment outcomes among TB/HIV negative and TB/HIV positive patients before (2012/13) and after (2015/16) policy implementation.

Type of outcome	TBHIV negative			TBHIV positive		
	2012/13 (N=7285)	2015/16 (N=8524)	p-value	2012/13 (N=7582)	2015/16 (N=6544)	p-value
Cured, n (%)	2094 (28.7)	2812 (33)	<0.001	1460 (19.3)	1596 (24.3)	<0.001
Completed, n (%)	2401 (33.0)	3010 (35.3)	0.002	2644 (34.9)	2356 (36)	0.177
Died, n (%)	383 (5.3)	521 (6.1)	<0.031	951 (12.5)	1014 (15.5)	<0.001
LTFU, n (%)	809 (11.1)	888 (10.4)	0.156	897 (11.8)	634 (9.7)	<0.001
Died and LTFU	1192 (16.4)	1409 (16.5)	0.866	1848 (24.4)	1648 (25.2)	0.272
Failure, n (%)	68 (0.9)	75 (0.9)	>0.999	43 (0.6)	53 (0.8)	<0.001
Transferred out, n (%)	1530 (21.0)	1218 (14.3)	<0.001	1587 (20.9)	891 (13.6)	<0.001

Table 4 below presents the results for the difference-in-differences analysis for the changes in TB treatment outcomes for 2012/13 versus 2015/16. Statistically significant differences were observed for only the lost-to-follow-up (LTFU) treatment outcome. Therefore, the only change in TB treatment outcomes attributable to the TB/HIV collaborative policy, was patient lost-to-follow-up ($p=0.043$). The improvement in TB cure could not conclusively be attributed to the TB/HIV collaborative policy ($p=0.055$).

Table 3: Results of Difference-in-Difference analysis for changes in treatment outcomes for TB/HIV negative patients and TB/HIV positive patients in the pre (2012/13) and post (2015/16) intervention period for the TB/HIV collaborative policy

	Baseline		% Diff BL	P-value	Post		% Diff Post	P-value	Diff in Diff	
	TBHIV Negative (n=7285)	TBHIV Positive (n=7582)			TBHIV Negative (n=8524)	TBHIV Positive (n=6544)			P-value	P-value
Treatment outcome, n (%)										
Favorable										
Cured	2094 (28.7)	1460 (19.2)	-9.5	<0.001	2812 (33.0)	1596 (24.4)	-8.6	<0.001	0.9	0.055
treatment completed	2401 (33.0)	2664 (34.9)	1.9	0.014	3010 (35.3)	2356 (36.0)	0.7	0.380	-1.2	0.257
Unfavorable										
Died	383 (5.3)	951 (12.5)	7.3	<0.001	521 (6.1)	1014 (15.5)	9.4	<0.001	2.1	0.310
LTFU/Defaulter	809 (11.1)	897 (11.8)	0.7	0.165	888 (10.4)	634 (9.7)	-0.7	0.141	-1.4	0.043
Failure	68 (0.9)	43 (0.6)	-0.4	0.009	75 (0.9)	53 (0.8)	-0.1	0.643	0.3	0.116
Transferred out	1530 (21.0)	1587 (20.9)	-0.1	0.915	1218 (14.3)	891 (13.6)	-0.7	0.238	-0.6	0.405

Table 5 below, presents the changes in treatment outcomes at regional-level. Cure and treatment completion outcomes improved across nearly all the regions. Mortality increased or remained similar across all regions except Arua and Moroto where it reduced. LTFU reduced across most regions except Jinja, Masaka, Kabale, Moroto and Soroti. Treatment failure remained similar in the two review periods across all regions. Transfer-out decreased across all regions except in Gulu and Mbale.

Table 4: Regional level changes in TB treatment outcomes before (2013) and after (2016) policy implementation.

Region	Cured, n (%)		Completed, n (%)		Died, n (%)		LTFU, n (%)		Failure, n (%)		Transfer out, n (%)	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
ARUA	105(18.5)	238 (26.2)	207(36.5)	338(37.1)	67(11.8)	86(9.5)	86(15.2)	126(13.8)	10(1.8)	5(0.5)	92(16.2)	117(12.9)
FORT PORTAL	126(14.7)	221(23.3)	259(30.2)	413(43.6)	64(7.5)	68(7.2)	122(14.2)	94(9.9)	3(0.3)	7(0.7)	285(33.2)	144(15.2)
GULU	294(41.5)	167(31.8)	69(9.7)	149(28.4)	55(7.8)	54(10.3)	155(21.9)	49(9.3)	6(0.8)	1(0.2)	130(18.3)	105(20)
Hoima	86(12.2)	187(25.7)	233(33.1)	269(36.9)	74(10.5)	87(11.9)	77(11)	16(2.2)	1(0.1)	9(1.2)	232(33)	161(22.1)
JINJA	343(23.5)	260(19.6)	528(36.2)	599(45.2)	168(11.5)	132(10)	143(9.8)	161(12.1)	12(0.8)	10(0.8)	266(18.2)	164(12.4)
KABALE	136(36.5)	188(39.6)	67(18)	114(24)	30(8)	42(8.8)	5(1.3)	21(4.4)	7(1.9)	1(0.2)	128(34.3)	109(22.9)
Kampala/Wakiso	1315(26.8)	1552(36.9)	1982(40.4)	1536(36.5)	341(6.9)	490(11.6)	856(17.4)	333(7.9)	37(0.8)	34(0.8)	377(7.7)	265(6.3)
LIRA	506(36)	404(36.3)	293(20.8)	380(34.1)	166(11.8)	126(11.3)	19(1.4)	22(2)	5(0.4)	8(0.7)	418(29.7)	174(15.6)
MASAKA	157(11.6)	124(10.6)	519(38.4)	510(43.5)	48(3.6)	81(6.9)	121(9)	232(19.8)	3(0.2)	3(0.3)	503(37.2)	222(18.9)
MBALE	337(23.7)	374(29.9)	491(34.5)	333(26.6)	136(9.6)	140(11.2)	187(13.1)	135(10.8)	17(1.2)	24(1.9)	255(17.9)	244(19.5)
MBARARA	131(10.7)	406(33.1)	469(38.3)	404(33)	182(14.8)	143(11.7)	62(5.1)	67(5.5)	6(0.5)	11(0.9)	376(30.7)	195(15.9)
MOROTO	95(25.3)	141(18.5)	81(21.6)	191(25)	21(5.6)	36(4.7)	116(30.9)	286(37.5)	0(0)	6(0.8)	62(16.5)	103(13.5)
SOROTI	46(8.2)	177(27.4)	269(48.2)	201(31.1)	43(7.7)	56(8.7)	26(4.7)	54(8.4)	8(1.4)	13(2)	166(29.7)	145(22.4)

Key: LTFU= Lost-to-follow-up

Table 6 below, presents the changes in treatment outcomes at health facility-level. In general, at all the health facility-levels, there was an increase in treatment cure and a decrease in patients transferred-out in 2016 compared to the status in 2013. At the National referral Hospital Clinics, treatment completion decreased, mortality increased by more than double, lost-to-follow-up decreased more than three-fold while treatment failure remained un-changed. At the Regional Referral Hospitals, treatment completion increased, while mortality, patients lost-to follow-up and treatment failure largely remained un-changed. At General Hospital level, treatment completion, mortality, and failure remained un-changed while patients lost-to-follow-up increased. At Health Center IV level, there was a decrease in treatment completion, an increase in mortality while patients lost-to follow-up or having treatment failure remained unchanged.

Table 5: Health-Facility level changes in TB treatment outcomes before (2013) and after (2016) policy implementation.

Health-Facility level	Cured, n (%)		Complete, n (%)		Died, n (%)		LTFU, n (%)		Failure, n (%)		Transfer-out, n (%)		p-value
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	
NRH clinics	939(25.2)	1007(39.4)	1620(43.5)	971(38)	253(6.8)	374(14.6)	674(18.1)	125(4.9)	22(0.6)	14(0.5)	218(5.9)	66(2.6)	<0.001
RRH	1085(18.6)	1357(23.9)	1416(24.3)	1847(32.6)	696(12)	627(11.1)	555(9.5)	569(10)	32(0.5)	54(1)	2035(35)	1220(21.5)	<0.001
Hospital	693(28.5)	735(30)	814(33.5)	833(34)	185(7.6)	190(7.7)	266(10.9)	308(12.6)	24(1)	17(0.7)	449(18.5)	369(15)	<0.001
HCIV	960(24.3)	1340(29.1)	1617(41)	1786(38.7)	261(6.6)	350(7.6)	480(12.2)	594(12.9)	37(0.9)	47(1)	588(14.9)	493(10.7)	<0.001

Key: **NRH**=National Referral Hospital. **RRH**=Regional Referral Hospital.

Table 7 below, presents the changes in treatment outcomes by age-group. In general, there was an increase in treatment cure across all age-groups in 2015/16 compared to 2012/13 except in those aged 0-4 years. Similarly, treatment completion increased across all age-groups except among those aged 0-4 years and 25-34 years. Lost-to-follow-up decreased across all age-groups except in those aged 0-4 years and 5-14 years. Treatment failure remained un-changed across all age-groups. There was an increase in mortality across all age-groups except those aged 0-4 years and 5-14 years. Mortality increased substantially especially in those 65 years and above. There was a decrease in transfer-out across all age-groups except in those aged 0-4 years and 5-14 years.

Table 6: TB Treatment outcomes by age-group before (2013) and after (2016) policy implementation.

Age Group	Cured, n (%)		Completed, n (%)		LTFU, n (%)		Died, n (%)		Failure, n (%)		Transfer-out, n (%)		P-value
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	
0-4 Years	40(6.2)	35(5.3)	365(56.7)	329(50)	103(16)	147(22.3)	48(7.5)	44(6.7)	2(0.3)	0(0)	86(13.4)	103(15.7)	<0.001
5-14 Years	107(14.9)	109(15.2)	315(43.9)	346(48.3)	116(16.2)	96(13.4)	51(7.1)	48(6.7)	2(0.3)	7(1)	126(17.6)	110(15.4)	<0.001
15-24 Years	717(28.5)	868(37.4)	820(32.6)	786(33.8)	335(13.3)	208(9)	139(5.5)	144(6.2)	16(0.6)	19(0.8)	485(19.3)	298(12.8)	<0.001
25-34 Years	1190(24)	1371(31.3)	1709(34.4)	1509(34.4)	636(12.8)	460(10.5)	409(8.2)	439(10)	35(0.7)	45(1)	984(19.8)	561(12.8)	0.002
35-44 Years	880(24)	1062(30.3)	1221(33.3)	1195(34.1)	402(11)	340(9.7)	361(9.8)	399(11.4)	27(0.7)	28(0.8)	775(21.1)	476(13.6)	<0.001
45-54 Years	436(23.5)	578(28)	603(32.5)	738(35.7)	217(11.7)	194(9.4)	193(10.4)	238(11.5)	21(1.1)	21(1)	387(20.8)	298(14.4)	<0.001
55-64 Years	191(23.2)	246(27.3)	225(27.3)	302(33.5)	91(11.1)	83(9.2)	101(12.3)	112(12.4)	5(0.6)	6(0.7)	210(25.5)	153(17)	<0.001
65+ Years	109(16.1)	164(23.2)	198(29.2)	213(30.1)	69(10.2)	65(9.2)	90(13.3)	114(16.1)	7(1)	6(0.8)	204(30.1)	145(20.5)	<0.001
Total	3670(23.1)	4433(29.1)	5456(34.4)	5418(35.5)	1969(12.4)	1593(10.4)	1392(8.8)	1538(10.1)	115(0.7)	132(0.9)	3257(20.5)	2144(14.1)	<0.001

Table 8 presents the characteristics of the HIV patients diagnosed with TB in the baseline and post-year periods. Most HIV/TB patients were male, but the proportion was higher in 2015/16 compared to 2012/13 (60.5% versus 53.2% respectively). HIV patients diagnosed with TB were older in 2015/16 compared to 2012/13 (38 years versus 35 years). There was generally no significant difference in age-category among the HIV/TB patients between the review periods except for the 0-4 years age-group. The out-patient department was the main entry point for the HIV patients diagnosed with TB before and after policy implementation, although there was a three-fold increase in entry point via the YCC clinics. In both 2012/13 and 2015/16 less than 60% of the HIV patients diagnosed with TB were on ART. Thus, a substantial proportion had not initiated ART treatment. Further, a significant proportion of HIV patients diagnosed with TB in 2015/16 had advanced HIV disease (clinical stage 3 or 4) compared to 2012/13. Concerning nutrition status, a higher proportion of HIV patients diagnosed with TB in 2015/16 were of normal nutrition status compared to 2012/13 (7.8% versus 4%). There was no significant difference in the proportions of HIV patients diagnosed with TB by Pregnancy status in 2012/13 and 2015/16.

Table 7: Patient variables among HIV/TB patients before (2012/13) and after (2015/16) policy implementation.

	Total HIV/TB 2013 (N=3932)	Total HIV/TB 2016 (N=2641)	p value
Sex, n (%)			
Male, n (%)	2021 (51)	1564 (59)	<0.001
Female, n (%)	1762 (45)	1018 (39)	<0.001
Not recorded	19 (0.5)	4 (0.2)	
Age, years, mean	35	38	<0.001
Age-category, years n (%)			
0-4 years	76 (2.0)	49 (1.9)	<0.001
5-14 years	59 (1.5)	67 (2.5)	0.003
15-24 years	340 (8.6)	228 (8.6)	0.899
25-34 years	1441 (37)	941 (35.6)	0.265
35-44 years	1246 (32)	823 (31.2)	0.489
45-54 years	489 (12.4)	339 (12.8)	0.729
5-64 years	131 (3.3)	81 (3)	0.51
65+ years	29 (0.7)	9 (0.3)	0.35
Not recorded	18 (0.5)	22 (0.8)	
Entry point			
Inpatient	51 (1.3)	22 (0.8)	0.06
Outpatient	1609 (40.9)	1167 (44.2)	0.046
PITC	0 (0.0)	10 (0.4)	<0.001
SMC	1 (0.0)	0 (0.0)	0.406
STI	7 (0.2)	23 (0.9)	<0.001
TB	126 (3.2)	35 (1.3)	<0.001
VCT	9 (0.2)	0 (0.0)	0.013

YCC	54 (1.4)	123 (4.7)	<0.001
eMTCT	37 (1.0)	23 (0.9)	0.688
Other	822 (21)	474 (17.9)	<0.001
Not recorded	1086 (27.6)	709 (26.8)	
Patient Type			
On ART	2204 (56.1)	1528 (57.8)	0.154
Pre-Art	1591 (40.5)	1024 (38.7)	0.154
Years in HIV care	5.61	2.75	
Years on ART	5.21	2.91	
Clinical stage			
1	183 (4.7)	116 (4.4)	0.384
2	383 (9.7)	184 (7)	<0.001
3	2306 (58.7)	1655 (62.7)	0.211
4	647 (16.5)	512 (19.4)	0.022
Not recorded	283 (7.2)	119 (4.6)	
Nutrition status			
MAM	38 (1)	25 (1)	0.024
SAM	36 (1)	28 (1)	0.114
Normal	158 (4)	206 (7.8)	0.006
SAMO	0 (0.0)	2(0.8)	0.186
Pregnant status			
Pregnant	40 (1)	19(0.7)	0.343
Not Pregnant	590 (15)	213 (8)	0.343

Key: **PITC**=Provider Initiated HIV Testing and Counseling. **SMC**=Safe Male Circumcision. **TB**=Tuberculosis. **VCT**=Voluntary HIV Counselling and Testing. **YCC**=Young Child Clinic. **eMTCT**=Elimination of Mother-to-Child HIV Transmission Clinic. **ART**=Anti-Retroviral Treatment. **MAM**=Moderate Acute Malnutrition. **SAM**=Severe Acute Malnutrition. **SAMO**=Severe Acute Malnutrition with Oedema.

Table 9 below, presents the changes in the proportions of HIV patients diagnosed with TB in the review period at national and health facility-level. A total of 6573 HIV patients were diagnosed with TB in the review period, of which 3932 were diagnosed in 2012/13 and 2641 in 2015/16. Overall, 1.6% of the HIV patients were diagnosed with TB in 2012/13 compared to 0.8% in 2015/16. There was a significant general decrease in the proportions of HIV patients diagnosed with TB before and after the implementation of the TB/HIV collaborative policy at all health-facility levels and at national-level.

Table 8: National-level changes in the proportions of HIV patients diagnosed with TB among those enrolled in HIV care before (2013) and after (2016) policy implementation.

Level	2012/13		2015/16		p-value
	Total in HIV care	Number HIV/TB (%)	Total in HIV care	Total HIV/TB	
NRH	28588	1758 (6.1)	53683	1479 (2.8)	<0.001
RRH	66114	1152 (1.7)	94282	509 (0.5)	<0.001
General Hosp	35085	298 (0.8)	42551	146 (0.3)	<0.002
HCIV	109256	724 (0.7)	124921	507 (0.4)	<0.004
National	239043	3932 (1.6)	315437	2641 (0.8)	<0.001

Key: **NRH**=National Referral Hospital; **RRH**=Regional Referral Hospital, **HCIV**=Health Center IV

Table 10 below, presents the changes in the proportions of HIV patients diagnosed with TB in the review period at regional-level. There was a significant general decrease in the proportions of HIV patients diagnosed with TB across all regions in the review period, except for the Arua and Lira regions.

Table 9: Regional-level changes in the proportions of HIV patients diagnosed with TB among total enrolled in HIV care before (2013) and after (2016) policy implementation

Region	2012/13		2015/16		p-value
	Total in HIV care	Number HIV/TB (%)	Total in HIV care	Number HIV/TB (%)	
ARUA	11696	196 (1.7)	15264	72 (0.5)	0.505
FORT PORTAL	16084	92 (0.6)	18224	50 (0.3)	<0.001
GULU	9548	126 (1.3)	12442	74 (0.6)	<0.001
HOIMA	14407	167 (1.2)	15390	81 (0.5)	<0.001
JINJA	11030	135 (1.2)	16759	97 (0.6)	<0.001
KABALE	9840	45 (0.5)	10692	44 (0.4)	<0.001
KAMPALA	54507	2082 (3.8)	95851	1657 (1.7)	<0.001
LIRA	30651	73 (0.2)	28423	88 (0.3)	0.289
MASAKA	17801	452 (2.5)	26117	219 (0.8)	<0.001
MBALE	14486	130 (0.9)	18951	42 (0.2)	<0.001
MBARARA	36107	313 (0.9)	40128	181 (0.5)	<0.001
MOROTO	2517	64 (2.5)	6632	27 (0.4)	<0.001
SOROTI	10369	57 (0.5)	10564	9 (0.1)	<0.001
ALL REGIONS	239043	3932 (1.6)	315437	2641 (0.8)	<0.001

Table 11 below, summarizes the survey results for the models of TB/HIV integration implemented at the respective health facilities. A substantial proportion of HCIVs, Hospitals and National Referral Hospital clinics implemented the full-integration model (61.7%, 59.1%, and 83.3% respectively). Less than 50% of the Regional Referral Hospitals implemented the full-integration model. A substantial number of HCIVs, Hospitals, and Regional Referral Hospitals had no clear model of TB/HIV integration.

Table 10: Models of TB/HIV integration by health-facility level.

Model	Health-facility level and total number			
	HCIV (N=116)	Hospital (N=22)	RRH (N=14)	NRH clinics (N=6)
Fully integrated, n (%)	71 (61.7)	13 (59.1)	6 (42.9)	5 (83.3)
Entry via TB service, n (%)	1 (0)	0 (0)	1 (7.1)	0 (0)
Entry via HIV service, n (%)	7 (6.1)	1 (4.6)	2 (14.3)	1 (16.7)
No-integration, n (%)	37 (32.2)	8 (36.4)	5 (35.7)	0 (0)

Key: **NRH**=National Referral Hospital; **RRH**=Regional Referral Hospital, **HCIV**=Health Center IV

Table 12 below summarizes treatment outcome by model of TB/HIV integration. The full integration model had better outcomes for cure and LTFU when compared to entry via TB or HIV service and for all treatment outcomes except for failure when compared to facilities without a clear model of integration.

Table 11: Comparison of treatment outcomes among TB/HIV co-infected patients by model of integration of TB/HIV services.

Outcomes	Full integration vs Integration in TB or HIV clinic			Full integration vs no-integration		
	Full integration (N=9170)	Entry via TB or HIV service (N=2212)	p-value	Full integration (N=9170)	No-integration (N=3911)	p-value
Cured, n (%)	2923 (31.8)	359 (16.2)	<0.001	2923 (31.8)	1157 (29)	0.009
Completed, n (%)	3423 (37.3)	798 (36)	0.273	3423 (37.3)	1216 (31.1)	<0.001
Died, n (%)	1011 (11)	220 (10)	0.142	1011 (11)	310 (7.9)	<0.001
LTFU, n (%)	730 (8)	355 (16)	<0.001	730 (8)	511 (13.1)	<0.001
Failure, n (%)	72 (0.8)	24 (1)	0.166	72 (0.8)	36 (0.9)	0.433
Transfer-out, n (%)	1011 (11)	456 (20.6)	<0.001	1011 (11)	681 (17.4)	<0.001

5.2: QUALITATIVE RESULTS

Table 13 below, summarizes the characteristics of the participants in the qualitative interviews. A total of 121 medical providers participated in the interviews. Majority were clinical officers or nurse-counselors from referral and general hospitals. Further, majority of the participants were from one-stop TB/HIV clinics with work experience of 2-5 years or more.

Table 12: Participant characteristics

Characteristic	Number (N=121)	%
Sex		
Female	59	49
Male	62	51
Professional cadre		
Medical Doctor	8	7
Non-doctor clinicians	28	23
Nurse-counselors	47	39
Laboratory technician	26	21
Pharmacy technician	12	10
Health-Facility type		
Hospital	84	69
HCIV	37	31
Work place		
TB clinic	21	17
HIV clinic	24	20
HIV/TB clinic	76	63
Work experience as TB or HIV provider		
<=1 year	10	8
2-5 years	75	62
> 5 years	36	30

Most of the interviewed health providers (100/121) were aware about the TB/HIV collaborative policy-guidelines. Higher-level cadres exhibited deeper understanding about the content of the guidelines compared to lower level cadres. The latter highlighted that most of them had never had an opportunity to attend trainings on the policy-guidelines and mainly obtained information about the guidelines through secondary or tertiary sources such as CMEs and mentorships from senior cadres. However, these were reported not to be comprehensive enough. Most of the trainings about the policy were attended by TB/HIV focal persons, whose composition was mainly of higher level health workers.

“...the guidelines were focusing on those 12 TB/HIV collaborative activities... their focus was mainly on the three I’s; intensified case findings, isoniazid prophylaxis, infection control, both in patients with TB emphasizing to screen for HIV, and even in patients who have HIV, to screen for TB.” (MJAP -doctor Kampala)

“In the training it was basically TB-HIV co-infection, so they were telling us if somebody is HIV positive there’s a likelihood that 50% of those people are likely to develop TB because their immunity is very low. So that one was basically the package.” (clinical officer Kamwenge Rukunyu HCIV)

“Theoretically I have heard about the guideline but not yet seen a print out, I know the policy and the guidelines... we were just informed about them (2013 guidelines) by the hospital through CMEs.” (senior lab tech Soroti RRH)

“I have not seen the policy personally, but I know it is there and we do what is in the policy. I don’t know if you have copy and you give me one.” (Hospital lab personnel Mbarara Kitagata)

“The TB/HIV guidelines says when you get an HIV positive person make sure you go deep and screen for TB and also when you get a TB person you go ahead and screen for HIV” (Enrolled nurse Mbale Bufumbo HCIV)

Health providers generally viewed the TB/HIV collaborative policy positively. They perceived the policy to have resulted in improved quality of care for patients with TB/HIV co-infection - in terms of reduced time spent by patients in health facilities, reduced costs involved on care seeking and better treatment outcomes for TB/HIV co-infected patients.

“The policy mainly saved the patients from dual visits for both TB and HIV treatments. Time wasting at the facility was also eliminated with this approach.” (Nurse Mbarara RRH)

“Death rate had been high... 20% of patients who are co-infected used to die but now death rate has decreased. In-fact it has improved the life of TB positive patients”. (TB focal person Kiboga Hospital)

“The mortality and morbidity has reduced especially those people who are co-infected with TB and HIV because the people here are equipped to handle both HIV and TB...” (Medical officer Arua RRH)

“Patients outcome is good because when you look at most of our patients they are doing well. At least that one I must say. At first very many TB-HIV patients would die. But when they are given the drugs, they improve. You see the patients improving very first.” (clinical officer Kabarole RRH)

“It has reduced on the number of deaths. People are identified in time and started on treatment in time and things work well and it makes us happy...” (Nursing officer Mubende RRH).

Despite the positive perceptions about the policy, however, health providers expressed major implementation gaps arising from limited knowledge about TB/HIV co-treatment and low staffing levels.

“Here we receive some patients and when we link them to ART, they give them drugs, but some of them react and we don’t know what to do. So far, we have transferred two to three patients to Nsambya hospital who have all jaundiced. Now most of our drugs are combined in one, you find in one tablet, there are many of them, so we don’t know which one reacts with the other.” (TB Clinic in charge Jinja Hospital)

“Most of the staff in the general pharmacy are more knowledgeable about HIV than TB.” (Nurse Tuberculosis center Mulago)

“No, the health workers are not knowledgeable, even me myself I still have some challenges like in the TB.” (Nurse Yumbe hospital).

“We are not well conversant with this TB treatment because we have not been doing it.” (Nursing officer Mubende RRH)

“Personally, I still lack knowledge as far as TB/HIV co-treatment is concerned especially when it comes to non-susceptible TB. Most of our knowledge ends around the susceptible TB. But what happens when someone has MDR, I don’t know much because even when I go to the TB/HIV clinic and I have...and am seeing an MDR patient who has HIV, I also concentrate on my part for HIV...” (MJAP -doctor Kampala)

“No, TB has a lot of books for data. Like I have been seeing those books, but I have failed to fill those books because am not guided on how to fill them. And you don’t know who is trained to fill them. (HIV focal person Arua Hospital)

Low staffing levels contributed to workload. Most of the implementing partners that had been supporting on improving the staffing levels had pulled out their support and there had been no recruitment done to fill the staffing gap. Furthermore, data revealed that health facilities lacked specific cadres necessary to support the provision of HIV/TB collaborative services, thus affecting service delivery.

“Technically, we are supposed to be 3 medical workers but now I am alone. It takes me more time working on the TB/HIV co-infected patients. As a lot of counseling is needed for these patients since they take a lot of drugs and enough time is needed to be given to them to feel encouraged and supported...” (Clinical officer TB/HIV Mbarara Hospital).

“Caring for patients with TB/HIV co-infection has increased our workload (tripled) and more extra working hours in the laboratory as many different tests like CBC, CD4, VIRAL LOAD, CHEMISTRIES are carried out on one person.” (Lab technologist Mulago Tuberculosis center).

“You can be one nurse and you have to file, to prescribe, dispense drugs and counsel patients during the clinic days.” (Nurse Soroti Princess Diana HC/IV).

“The patient comes, and they test for TB and if they are TB positive, you escort them to the TB ward. You do it for whoever is TB positive. Every coughing patient is checked for TB at the ART clinic.” (Nurse HIV/TB clinic Hoima Hospital).

“The workload is tedious because we have to handle both side of the ART clinic and come this way. Even those from the ART clinic they have to run to ward and check on their clients. because of the human resource we are not be able to observe these patients when they are taking their medication because you find when the person is taking their medication at night here we don't have the night nurse because we are only two we cannot run the unit 2 of us 24hours”. (TB focal person Moroto RRH).

“The paper works, it's too much. When you leave here trust me if you came on a Wednesday you would really sympathize. As you are stuck you miss lunch you have to leave at 6pm. Because like now these are the files so on Wednesday they are over 50” (clinician Mbale HCIV).

“Let me say since 2013 we have been operating without a clinical officer, it is only nurses managing” (Midwife Adjumani hospital)

“There is a heavy work load due to the low staffing otherwise we would be running smoothly. Sometimes the sample rider delays to pick samples which delays the investigation.” (Medical officer Bushenyi hospital)

Rotations of health workers who had received trainings to other departments or facilities in exchange with those who have not received any trainings in management of HIV/TB, or understaffing in units that handle HIV/TB cases, were highlighted as having substantially affected service delivery. In some health facilities quality of care was affected by the facility health workers being shifted to other clinics and new ones coming to provide services to these TB/HIV co-infected clients and low level of staffing affected the quality. The effect of rotating health workers to manage TB/HIV clients was clearly emphasized by health worker *who* clearly indicated the need for training.

“Most of the health workers who have been newly recruited in service don't know these things and they have not been mentored” (Lab technician Ntara HCIV Kamwenge).

“I came from another lab where refresher training and orientation of TB was not done so the knowledge I have is not updated” (HCIV Lab technologist Kasangati Wakiso).

“All the health workers who have been working in TB/HIV have been trained but one big problem is that all of them have been taken away from the clinic to other units like us we are now remaining 2, me and the other nurse” (mid wife Adjumani Hospital).

“The turnover of the nurses they also keep on changing like currently the nurses we have on the ward are new so that person who is brought in doesn’t have the new knowledge and because these days it involves a lot of register, a lot of recording so you find it takes a lot of time for the new nurses to get used.” (Clinical officer Fort portal RRH)

“Yeah like me, as am just new in this TB service, I needed training at least they should train me in TB and at the same time the new guidelines, we have not been updated on it we also needed to be updated on those new guidelines so that we handle these people well” (Nursing assistant Arua RRH)

“Ideally we would like also to know some things at least about the ARVs because there is a new guideline they have brought but much as they have brought for us here we don’t know it into details what we know much about is only anti TB. So, how it works together with ARVs we have that gap, and that’s why we are not giving those medicines here we refer them to the ART clinic.” (TB focal person Moroto RRH)

“In our TB unit here, the quality keeps on fluctuating depending on what I have told you the staffing challenges; when they get used it improves when another team comes then we go back so that is how it is” (Clinician Arua RRH)

“my personal experience is that quality needs a lot of input and when there are few staff in the facility and they have very many samples to work on, the accuracy of the results is always compromised”. (lab technician Moroto RRH)

Health providers also expressed fear to contract TB was one of the major difficulties concerning implementation of the TB/HIV collaborative policy. This was also emphasized by the fact that very few health workers were willing to work with co-infected TB/HIV clients or at the TB clinic.

“Most of us don’t wish to work in the TB clinic because we fear to contract TB. We usually don’t have TB protection gadgets” (Clinician Kaberamaido HCIV)

“Nurses were refusing to come to this ward. You know health workers fear TB” (clinical officer Kabarole RRH)

“As I told you in TB we are not safe, we need biosafety, we are actually here but not protected first of all the design of this (lab), do you see it qualifying to be a TB processing centre?” (Lab manager Yumbe hospital)

“For TB I am having an issue with it, I personally want to be protected. Even other patients we have kids, we don’t have isolation rooms. We have an MDR case. Come to the lab, we are just processing sputum in a corner we have no respirators. We may get infected” (Lab assistant Itojo Ntugamo)

“We leave in fear of one day we will wake up coughing and it will be TB, it happened to my colleagues here whenever one gets a cough they do not want to do a GeneXpert because they know it could be TB (Nurse Mulago Hospital).

“We had times when health workers are referred to here they refuse to show up they say they can’t work in a TB environment. (Doctor Mulago Hospital)

Stock out of drugs and equipment was another major challenge from our interviews. In nearly all facilities visited, the TB treatment for continuing phase drugs (RH) were out of stock, and so was Isoniazid for TB prevention (IPT). Other equipment that were said to be out of stock were respirators and facemasks for Health workers and TB patients respectively. Break down of the GeneXpert machines and stock-out of GeneXpert cartridges was also reported as a challenge for implementing the policy.

“Stock out of masks and respirators we have coughing patients so our lives seem to be at risk. We also don’t have a good waiting area where we could triage out some patients not to be close to other general cases” (Clinician Hoima RRH)

“So stock out of drugs and supplies is still a challenge” (Pharmacist Kampala Mulago)

“So, we have problems there and with the stocking drugs. At the moment we have problems with the continuation phase for children. We have children who have been diagnosed and we want to initiate them but there are no drugs. We try to look around the other districts no drugs, and last week we even lost one child the mother could not even afford to move to MATANY, we lost the child” (Enrolled nurse Eastern Kotido)

“We order for 30 test kits, those are 30 x 100. They send only 1 kit. What about the testing sites, the wards. The NMS, the general hospital even if you’re limiting how we can be given one only” (lab assistant Itojo Ntugamo)

“...We also have a challenge of TB results delaying because the sample rider reports to our facility twice a week and this delays TB treatment hence a risk to infection of one TB patient to other non TB patients”(Clinician Bushenyi Kyabugimbi HCIV)

“TB drugs have been lacking since last month” (Drugs and stores Soroti Princess Diana HC/IV)

“stock out of drugs mainly the ARV drugs am not so sure of TB drugs but usually we have stock outs imagine you start on a client on INH preventive drugs and before the six months the drugs are out of stock when the person has adhered well but we run out of stock which is a great challenge”(Counsellor Mubende RRH)

“TB prevention treatment it has been there but with challenges the drugs are not enough because you begin a client it should be a six months treatment if he has completed like three, you find when you don’t have another drug to complete his prophylaxis so we have tried it but it is challenging the drugs are not consistently supplied”. (Clinical officer Kamwenge Rukunyu HCIV).

“TB prevention treatment is Isoniazid treatment you should be assured of constant supply of drugs for 6 months so this does not happen so they bring a supply today and when you have done with a particular group within two months when the supplies are over and yet they are supposed to be continuous” (Counselor Bwera hospital Kasese).

“Now they say HIV patients you have been exposed to TB patients are given isoniazid for 6 months but isoniazid supply for adults is not there we have never received it” (In-charge ART clinic Mubende Hospital).

“Some of the things you and I as a person can’t handle, for example GeneXpert cartridges come from outside the country. One is approximately \$100 for one test. At times you get stock outs” (lab manager Kabale hospital)

In Karamoja region, implementation of the policy was challenging because of poor compliance to TB/ART co-treatment due to lack of food. In other facilities, non-adherence was attributed to patients not complying with health workers instructions whenever patients noticed an improvement in their health.

“They don't take the medicine and they complain, the moment they (patients) start complaining that you know I have not eaten, that there is no food, that's the end. They will not take the medicine. Either they will take the TB medicines and leave the other one of ARVs or they take one of the ARVs and leave the one of TB.” (TB focal person Moroto RRH)

“We deal with very sick clients with social issues they do not listen to our instruction like when we request them to take samples to lab they end up going home so when you want results they are not available” (Pharmacist Mulago RRH)

Concerning medical providers’ recommendations to improve delivery of TB/HIV collaborative services, all most all medical providers recommended for redistribution of guidelines and comprehensive training/mentorship of the health workers given the fact the way facilities allocate their staff on the daily basis requires all staff to have knowledge in offering care to all patients they are faced with. More so there was a need to improve on the supplies and equipment for TB/HIV management as inadequate stock compromised the quality of care that was to be provided to clients, improve functionality of the GeneXpert machine through service contracts as part of procurement. In addition, stop supplying medicines with short expiry date. Improving on the staffing levels since TB/HIV services involved several activities, requiring intensive staff involvement. Improve on the existing infrastructure space to allow creation of one stop clinic, isolation centers.

SECTION 6: DISCUSSION AND CONCLUSIONS

6.1. DISCUSSION

We set out to evaluate the impact of the second edition of the TB/HIV collaborative policy for Uganda on the treatment outcomes in patients co-infected with TB and HIV, and to explore health provider views and experiences concerning implementation of the policy for the period 2012/13-2015/16.

The evaluation showed that there was an improvement in TB cure and TB treatment completion before and after implementation of the policy. This could be attributed to a reduction in TB/HIV co-infected patients lost-to-follow-up because of the policy. However, the policy did not have impact on mortality associated with TB/HIV co-infection. Indeed, mortality in TB/HIV co-infected patients increased during the three-year review period. This could possibly be due to delayed diagnosis of TB in these patients since mortality was highest in the National Referral Hospital Clinics and majority of HIV/TB patients had advanced HIV disease (clinical stage 3 or 4).

There were substantial regional, facility and age-group differences in the treatment outcomes before and after the implementation of the policy. For example, mortality increased or remained similar across all regions except Arua and Moroto where it reduced. At health-facility level, patients lost-to-follow-up decreased more than three-fold in the National-Referral Hospital clinics while mortality increased by more than double. This was remarkably different from other health-facility levels where the proportion of patients lost-to follow-up and mortality remained largely un-changed in the Regional Referral Hospitals. In the General Hospitals, the proportion of patients lost-to-follow-up increased while mortality rates remained un-changed. At Health Center IV level, patients lost-to follow-up remained unchanged while mortality increased marginally. Treatment outcomes generally remained adverse before and after the policy was developed and implemented among the 0-4 years age-group and individuals aged 65 years and above-who experienced a substantial increase in mortality compared to other age-groups in the review period.

Overall, the proportion of HIV patients diagnosed with TB remained very low in relation to the expected levels (1.6% versus 0.8%). Indeed, there was a significant decrease in the proportions of HIV patients diagnosed with TB before and after the implementation of the TB/HIV collaborative policy at national-level and at all health-facility levels. Patients diagnosed with TB following the policy were typically those with advanced HIV disease (clinical stage 3 or 4). The possible cause of ART as the reason for the low detection of TB is questionable as only 60% of the HIV patients were on ART. Thus, ART did not appear to influence the rates of TB diagnosis

among HIV patients in care. The commonest entry point for the HIV/TB patients was the hospital out-patient clinics possibly because of the large numbers of patients seen at these clinics. Other clinics particularly the YCC and eMTCT continued to diagnose few HIV/TB patients perhaps seen diagnosed TB among HIV patients.

Although the TB/HIV collaborative policy recommended provision of integrated TB and HIV services through a “one-stop” only the National Referral Hospital Clinics implemented this model to a high degree. Only a modest majority of Health Center IVs and Hospitals implemented the model. The remaining health-facility levels implemented a mixture of the models to varying degrees. Our evaluation found that the one-stop model was associated with higher cure and treatment completion rates compared to the rest. Further, Loss-to-Follow-up and transfer-out were lower in facilities implementing full-integration model. The data showed a higher percentage of deaths with the one-stop model. This could be a result of the tertiary nature of the National-Referral Hospital clinics where seriously ill HIV patients are referred to.

The limited positive impact of the policy, especially on mortality among the TB/HIV co-infected patient was corroborated by the qualitative findings during the evaluation. Front-line health providers cited several implementation gaps related to the policy despite their positive views of the policy. There were knowledge gaps in TB especially among the lower-level cadres who typically run the TB and HIV clinics. This was attributed to exclusion of the lower-level in most of the formal trainings in TB and HIV. Trainings were attended by TB and HIV focal persons who were of high-level cadre. The facility-level mentorships and meetings arranged organized for the lower-level cadre were viewed as not comprehensive in relation to knowledge transfer. Further, health-facilities experienced staff shortage considering the work load arising from provision of integrated TB and HIV services. The shortages in staffing were worsened by the inevitable changes in staff deployment within and outside the health facilities. This requires constant passage of knowledge about TB and HIV care to the newly deployed staff. Other implementation gaps for the policy arose from fear of medical staff to contract TB from patients. The TB clinics were viewed as un-safe work environments by some medical workers. They therefore resisted deployment to clinics providing TB care.

Stock out of TB medicines and supplies was a common experience by many medical providers concerning the TB/HIV collaborative policy guidelines. Further, there were wide-spread concerns about short expiry dates of the TB medicines provided to the health facilities. Relatedly, the functionality and accessibility of the newly recommended TB GeneXpert test was a common challenge for implementing the policy. Shortages of GeneXpert cartridges was commonly mentioned in our interviews. The turn-around-time of GeneXpert results through the bike-rider

sample referral system was reported so long to promote prompt initiation of TB/HIV care among patients.

In Karamoja region, shortage of food was considered a major implementation gap for the TB/HIV collaborative policy. Patients either did not take their prescribed medicines or adhered poorly to TB and HIV treatment due to food shortage.

6.2. Limitations

Our evaluation relied on facility records which are often poorly completed. The findings of the evaluation could therefore underestimate the actual impact of the TB/HIV collaborative policy because patient treatment outcomes are not reported back to the health facilities especially when death occurs.

We did not track patients' pathways through the diagnostic process for TB/HIV co-infection. We therefore did not establish if the diagnosis of TB/HIV co-infection was made either from the TB clinics or the HIV clinics, and whether this influenced treatment outcomes among the patients. Tracking patients' pathways for diagnosis of TB/HIV co-infection would however require patient identifier information which would breach our protocol.

A substantial proportion of patients in our evaluation had a transfer-out outcome. However, this is not a true treatment outcome. Rather, it is a process outcome during treatment for TB. Establishing the true outcome of patients transferred-out from the respective health facilities would require obtaining patient identifier information to enable tracking in other registries such as the district or zonal TB registries or home visits or telephone interviews.

For the qualitative data, we interviewed medical providers who were present at the time when our evaluation staff were at the facility. It is possible that the views of the staffs we found onsite could differ from those off-site on the given day.

6.3. Conclusions

- The 2013 TB/HIV collaborative policy mainly resulted in improved TB treatment success rate (cure and treatment completion) due to reduced patients Lost-to-follow-up (LTFU). The policy did not have impact on the mortality which is the most useful indicator for monitoring TB/HIV collaborative activities
- The 2013 TB/HIV policy did not result in increased diagnosis of TB among patients in HIV care at national and facility-levels.
- The one-stop model of TB/HIV integration is mainly implemented at the national referral hospital clinics and in a modest majority of Health Center IVs and hospitals. Health

facilities implementing the one-stop model have higher levels of cure and treatment completion and lower levels of LTFU and transfer-out compared to other models.

- Medical providers of TB/HIV services had a positive view about the TB/HIV collaborative policy-guidelines. But implementation of policy was hampered by gaps in knowledge gaps among the lower-level cadre, low staffing levels and shortage of specific TB medicines such as isoniazid and laboratory supplies such as GeneXpert cartridges.

6.4. Recommendations

- The NTLP and partners need to reinforce the implementation of the TB/HIV collaborative policy beyond the performance against the TB/HIV indicators with focus on reducing the high mortality in TB/HIV co-infected patients.
- The NTLP and partners need to explore performance of TB screening using laboratory or radiologic tests instead of symptom screening; to increase detection of TB among patients in HIV care at all health-facility levels.
- The NTLP and partners need to enhance the capacity of health facilities to provide integrated TB/HIV services using the one-stop model initially targeting Regional Referral Hospitals and General Hospitals.
- The NTLP and partners need to address the gaps that currently hamper the implementation of the TB/HIV collaborative policy through a corrective package comprising of improved staffing, improved supply of TB commodities, and increased knowledge about TB/HIV co-management particularly among the lower-level cadres.
- In Karamoja region the NTLP and partners need to incorporate food commodity in programming for TB and HIV services. Similarly, in the refugee districts and regions of Uganda, support to improve staffing of higher-level cadre is recommended.

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SECTION 8: APPENDICES

Appendix 8.1: List of names of the field team

No.	Names	Gender	Responsibility
1.	Lutalo Ashraf	Male	Research Assistant
2.	Akandwanaho Jacob	Male	Research Assistant
3.	Bitambara Peter	Male	Research Assistant
4.	Nahamya Micheal	Male	Research Assistant
5.	Nabalwany Zam	Female	Research Assistant
6.	Bukiina Cuthbert	Male	Research Assistant
7.	Phiona Makuru	Female	Research Assistant
8.	Turyamuhebwa Rhonas	Female	Research Assistant
9.	Aboda Yvone	Female	Research Assistant
10.	Asiimwe Thompson	Male	Research Assistant
11.	Nyakato Mary	Female	Research Assistant
12.	Nyangoma Elizabeth	Female	Research Assistant
13.	Phiona Kekimuri	Female	Research Assistant
14.	Racheal Arinattwe	Female	Research Assistant
15.	Cleopatra Yoti	Female	Research Assistant
16.	Lubwama Hassan	Male	Research Assistant
17.	Namembwa Brenda	Female	Research Assistant
18.	Eric Tugume	Male	Research Assistant
19.	Twesigye Jemima	Female	Research Assistant
20.	Enid Mugoya	Female	Research Assistant
21.	Nsubuga Bayron	Male	Research Assistant
22.	Turyamureeba Vincent	Male	Research Assistant
23.	Alubi Gloria	Female	Research Assistant
24.	Ngole Mark Anthony	Male	Research Assistant
25.	Apendo Moses	Male	Research Assistant

26.	Tindyebwa Elizabeth	Female	Research Assistant
27.	Tusiime Generous	Female	Research Assistant
28.	Nambatya Grace	Female	Research Assistant
29.	Nanono Jackline	Female	Research Assistant
30.	Kyamulambi Dorothy	Female	Research Assistant
31.	Grace Akello	Female	Research Assistant
32.	Asasira Eunice	Female	Research Assistant
33.	Dr. Kavuma Fauz	Male	Research Assistant
34.	Moses Karongo	Male	Research Assistant
35.	Mable Sheila Kyakunzire	Female	Research Assistant
36.	Irene Najjingo	Female	Research Assistant
37.	Andrew Tayebwa	Male	Research Assistant
38.	Kabano Susan	Female	Research Assistant
39.	Nicholas Ndyatunga	Male	Research Assistant
40.	Kayemba Livingstone	Male	Research Assistant
41.	Lule Gloria	Male	Research Assistant
42.	Tugume Andrew	Male	Research Assistant
43.	Bob Biryabarema	Male	Research Assistant
44.	Nakitende Kezia	Female	Research Assistant
45.	Anthony Nuwagira	Male	Research Assistant
46.	Muhanguzi Kenneth	Male	Research Assistant
47.	Lumula Cherop	Female	Research Assistant
48.	Solomon Tsebeni	Male	Research Assistant
49.	Pheobe Topacho	Female	Research Assistant
50.	Asingili Esther	Female	Research Assistant
51.	Patricia Katusiime	Female	Research Assistant
52.	Billy Piwang	Male	Research Assistant
53.	Doreen Katusiime Rukundo	Female	Research Assistant

54.	Asimo Sheila	Female	Research Assistant
55.	Happy Walusagga	Female	Research Assistant
56.	Kansiime Jackline	Female	Research Assistant
57.	Willy Kansimbi	Male	Research Assistant
58.	Kurama Joseph Wee	Male	Research Assistant
59.	Tumusiime Tadeo	Male	Research Assistant
60.	Mathias Sekitoleko	Male	Research Assistant
61.	Tusiime Phionah	Female	Research Assistant
62.	Ojera Alex Dick	Male	Research Assistant
63.	Sarah Assimwe	Female	Research Assistant
64.	Namale Marjorie	Female	Research Assistant
65.	Atukunda Mildred	Female	Research Assistant
66.	Namara Keziah	Female	Research Assistant
67.	Immaculate Namutebi	Female	Research Assistant
68.	Josephine Nakamya	Female	Research Assistant
69.	Precious Birungi	Female	Research Assistant
70.	Carl Ayesiga kabirisi	Male	Research Assistant
71.	Mukama Brandon	Male	Research Assistant
72.	Carol Kiconco	Female	Research Assistant
73.	Anyuru Ivy	Female	Research Assistant
74.	Micheal Makuba	Male	Research Assistant
75.	Lordin Abaho	Male	Research Assistant
76.	Ayesiga Nicolus	Male	Research Assistant
77.	Sarah Auma Sempebwa	Female	Research Assistant

Appendix 8.2: List of selected Health Facilities

No	Region	District	Level of care	Facility
1	Arua	Adjumani	General Hospital	Adjumani HOSPITAL
2	Arua	Arua	General Hospital	Kuluva HOSPITAL
3	Arua	Arua	General Hospital	Oriajini HOSPITAL
4	Arua	Koboko	General Hospital	Koboko Hospital
5	Arua	Maracha	General Hospital	Maracha HOSPITAL
6	Arua	Adjumani	HC IV	Mungula HC IV
7	Arua	Arua	HC IV	Omugo HC IV
8	Arua	Arua	HC IV	Adumi HC IV
9	Arua	Arua	HC IV	Rhino Camp HC IV
10	Arua	Arua	Regional Hospital	Arua REGIONAL REF HOSPITAL
11	Fort Portal	Bundibugyo	General Hospital	Bundibugyo Hospital
12	Fort Portal	Kabarole	General Hospital	Kabarole HOSPITAL
13	Fort Portal	Kabarole	General Hospital	Kida HOSPITAL
14	Fort Portal	Kasese	General Hospital	Kilembe HOSPITAL
15	Fort Portal	Kasese	General Hospital	Kagando HOSPITAL
16	Fort Portal	Bundibugyo	HC IV	Kikyo HC IV
17	Fort Portal	Bundibugyo	HC IV	Nyahuka HC IV
18	Fort Portal	Kamwenge	HC IV	Ntara HC IV
19	Fort Portal	Kamwenge	HC IV	Rukunyu HC IV
20	Fort Portal	Kasese	HC IV	Rwesande HC IV
21	Fort Portal	Kasese	HC IV	Nyamirami HC IV
22	Fort Portal	Kyegegwa	HC IV	Kyegegwa HC IV
23	Fort Portal	Ntoroko	HC IV	Karugutu HC IV
24	Fort Portal	Kabarole	Regional Hospital	Fort Portal Regional Referral Hospital
25	Gulu	Gulu	General Hospital	Gulu Independent Hospital
26	Gulu	Kitgum	General Hospital	Kitgum HOSPITAL
27	Gulu	Gulu	HC IV	Awach HC IV
28	Gulu	Kitgum	HC IV	Naam Okora HC IV
29	Gulu	Lamwo	HC IV	Madi-Opei HC IV
30	Gulu	Pader	HC IV	Pajule HC IV
31	Gulu	Gulu	Regional Hospital	Gulu Regional Referral Hospital
32	Hoima	Kiboga	General Hospital	Kiboga HOSPITAL
33	Hoima	Kiryandongo	General Hospital	Kiryandongo HOSPITAL
34	Hoima	Buliisa	HC IV	Buliisa HC IV
35	Hoima	Hoima	HC IV	Kikuube HC IV
36	Hoima	Kakumiro	HC IV	Kakumiro HC IV
37	Hoima	Kyankwanzi	HC IV	Ntwetwe HC IV
38	Hoima	Rubanda	HC IV	Hamurwa HC IV
39	Hoima	Rubanda	HC IV	Muko HC IV
40	Hoima	Hoima	Regional Hospital	Hoima REGIONAL REF HOSPITAL
41	Jinja	Jinja	General Hospital	Buwenge General Hospital
42	Jinja	Kamuli	General Hospital	Kamuli Mission Hospital
43	Jinja	Kamuli	General Hospital	Kamuli HOSPITAL
44	Jinja	Mayuge	General Hospital	Buluba HOSPITAL
45	Jinja	Iganga	HC IV	Bugono HC IV
46	Jinja	Jinja	HC IV	Walukuba HC IV

47	Jinja	Jinja	HC IV	Budondo HC IV
48	Jinja	Jinja	HC IV	Bugembe HC IV
49	Jinja	Kaliro	HC IV	Bumanya HC IV
50	Jinja	Kamuli	HC IV	Namwendwa HC IV
51	Jinja	Kamuli	HC IV	Nankandulo HC IV
52	Jinja	Mayuge	HC IV	Kigandalo HC IV
53	Jinja	Namayingo	HC IV	Buyinja HC IV
54	Jinja	Namutumba	HC IV	Nsinze HC IV
55	Jinja	Jinja	Regional Hospital	Jinja Regional Ref HOSPITAL
56	Kampala	Kampala	General Hospital	Murchison Bay HOSPITAL
57	Kampala	Kampala	General Hospital	Ntinda HOSPITAL
58	Kampala	Mityana	General Hospital	Mityana HOSPITAL
59	Kampala	Nakasongola	General Hospital	Nakasongola Military HOSPITAL
60	Kampala	Wakiso	General Hospital	Entebbe HOSPITAL
61	Kampala	Buvuma	HC IV	Buvuma HC IV
62	Kampala	Gomba	HC IV	Maddu HC IV
63	Kampala	Kampala	HC IV	Kawempe HC IV
64	Kampala	Kayunga	HC IV	Kangulumira HC IV
65	Kampala	Kayunga	HC IV	Bbaale HC IV
66	Kampala	Luwero	HC IV	Luwero HC IV
67	Kampala	Luwero	HC IV	Nyimbwa HC IV
68	Kampala	Mubende	HC IV	Kiganda HC IV
69	Kampala	Mukono	HC IV	Mukono CoU HC IV
70	Kampala	Nakaseke	HC IV	Semuto HC IV
71	Kampala	Nakaseke	HC IV	Ngoma HC IV
72	Kampala	Wakiso	HC IV	Wagagai HC IV
73	Kampala	Wakiso	HC IV	Buwambo HC IV
74	Kampala	Wakiso	HC IV	Namayumba HC IV
75	Kampala	Wakiso	HC IV	Ndejeje HC IV
76	Kampala	Wakiso	HC IV	Kasangati HC IV
77	Kampala	Capital City	Regional Hospital	Mulago National Referral Hospital
78	Kampala	Kampala	Regional Hospital	Naguru Hospital - China Uganda Friendship
79	Kampala	Mubende	Regional Hospital	Mubende RR HOSPITAL
80	Lira	Apac	General Hospital	Apac HOSPITAL
81	Lira	Oyam	General Hospital	Aber Ngo HOSPITAL
82	Lira	Alebtong	HC IV	Alebtong HC IV
83	Lira	Amolatar	HC IV	Amolatar HC IV
84	Lira	Kole	HC IV	Aboke HC IV
85	Lira	Lira	HC IV	Ogur HC IV
86	Lira	Lira	HC IV	Amach HC IV
87	Lira	Lira	Regional Hospital	Lira REGIONAL REF HOSPITAL
88	Masaka	Rakai	General Hospital	Rakai HOSPITAL
89	Masaka	Bukomansimbi	HC IV	Butenga HC IV
90	Masaka	Kalangala	HC IV	Kalangala HC IV
91	Masaka	Lwengo	HC IV	Lwengo HC IV
92	Masaka	Lwengo	HC IV	Kiwangala HC IV
93	Masaka	Lwengo	HC IV	Kyazanga HC IV
94	Masaka	Masaka	HC IV	Kyannamukaaka HC IV

95	Masaka	Sembabule	HC IV	Ssembabule HC IV
96	Masaka	Masaka	Regional Hospital	Masaka REGIONAL REF HOSPITAL
97	Mbale	Bududa	General Hospital	Bududa HOSPITAL
98	Mbale	Bukwo	General Hospital	Bukwo General HOSPITAL
99	Mbale	Busia	General Hospital	Masafu General Hospital
100	Mbale	Kapchorwa	General Hospital	Kapchorwa HOSPITAL
101	Mbale	Mbale	General Hospital	Mount Elgon Hospital
102	Mbale	Tororo	General Hospital	Rubongi Military HOSPITAL
103	Mbale	Bulambuli	HC IV	Muyembe HC IV
104	Mbale	Busia	HC IV	Busia HC IV
105	Mbale	Kibuku	HC IV	Kibuku HC IV
106	Mbale	Kween	HC IV	Kaproron HC IV
107	Mbale	Manafwa	HC IV	Bugobero HC IV
108	Mbale	Manafwa	HC IV	Bubulo HC IV
109	Mbale	Mbale	HC IV	Namatala HC IV
110	Mbale	Pallisa	HC IV	Butebo HC IV
111	Mbale	Tororo	HC IV	Mukuju HC IV
112	Mbale	Tororo	HC IV	Mulanda HC IV
113	Mbale	Mbale	Regional Hospital	Mbale REGIONAL REF HOSPITAL
114	Mbarara	Buhweju	General Hospital	Tumu HOSPITAL
115	Mbarara	Ibanda	General Hospital	Ibanda HOSPITAL
116	Mbarara	Kabale	General Hospital	Rugarama HOSPITAL
117	Mbarara	Kanungu	General Hospital	Kambuga HOSPITAL
118	Mbarara	Ntungamo	General Hospital	Itojo HOSPITAL
119	Mbarara	Sheema	General Hospital	Kitagata HOSPITAL
120	Mbarara	Bushenyi	HC IV	Bushenyi HC IV
121	Mbarara	Bushenyi	HC IV	Kyabugimbi HC IV
122	Mbarara	Ibanda	HC IV	Ishongororo HC IV
123	Mbarara	Ibanda	HC IV	Ruhoko HC IV
124	Mbarara	Isingiro	HC IV	Kabuyanda HC IV
125	Mbarara	Isingiro	HC IV	Rugaaga HC IV
126	Mbarara	Kabale	HC IV	Maziba Gvt HC IV
127	Mbarara	Kabale	HC IV	Mparo HC IV
128	Mbarara	Kabale	HC IV	Kamukira HC IV
129	Mbarara	Kanungu	HC IV	Kanungu HC IV
130	Mbarara	Kiruhura	HC IV	Kazo HC IV
131	Mbarara	Kisoro	HC IV	Rubuguri HC IV
132	Mbarara	Mbarara	HC IV	Mbarara Municipal HC IV
133	Mbarara	Mbarara	HC IV	Bugamba HC IV
134	Mbarara	Mbarara	HC IV	Bwizibwera HC IV
135	Mbarara	Ntungamo	HC IV	Rwashamaire HC IV
136	Mbarara	Ntungamo	HC IV	Ntungamo HC IV
137	Mbarara	Ntungamo	HC IV	Rubaare HC IV
138	Mbarara	Rukungiri	HC IV	Kebisoni HC IV
139	Mbarara	Rukungiri	HC IV	Buhunga HC IV
140	Mbarara	Rukungiri	HC IV	Rukungiri HC IV
141	Mbarara	Sheema	HC IV	Shuuku HC IV
142	Mbarara	Kabale	Regional Hospital	Kabale REGIONAL REF HOSPITAL

143	Mbarara	Mbarara	Regional Hospital	Mbarara REGIONAL REF HOSPITAL
144	Moroto	Abim	General Hospital	Abim HOSPITAL
145	Moroto	Amudat	General Hospital	Amudat HOSPITAL
146	Moroto	Kotido	HC IV	Kotido HC IV
147	Moroto	Nakapiripirit	HC IV	Tokora HC IV
148	Moroto	Moroto	Regional Hospital	Moroto Regional Refferal HOSPITAL
149	Soroti	Kaberamaido	General Hospital	Lwala HOSPITAL
150	Soroti	Katakwi	General Hospital	Katakwi General Hospital
151	Soroti	Kumi	General Hospital	Kumi NGO HOSPITAL
152	Soroti	Amuria	HC IV	Amuria HC IV
153	Soroti	Amuria	HC IV	Kapelebyong HC IV
154	Soroti	Bukedea	HC IV	Bukedea HC IV
155	Soroti	Kaberamaido	HC IV	Kaberamaido HC IV
156	Soroti	Katakwi	HC IV	Toroma HC IV
157	Soroti	Kumi	HC IV	Kumi HC IV
158	Soroti	Ngora	HC IV	Ngora Gvt HC IV
159	Soroti	Soroti	Regional Hospital	Soroti REGIONAL REF HOSPITAL

TB Treatment outcome data abstraction form. Form Number: 	
Treatment Outcome Evaluation Period	
1) Cohort: <input type="checkbox"/> 2012 – 2013 <input type="checkbox"/> 2015 – 2016	Quarter: <input type="checkbox"/> Jan – Mar <input type="checkbox"/> Apr – Jun <input type="checkbox"/> Jul – Sep <input type="checkbox"/> Oct - Dec
Health Facility Details	
2) District Name: _____	3) Region: _____
4) Health Facility Name: _____	5) Level of Care: _____
Patient Details	
6) Age in years (<i>write age in months if ≤ 2 years</i>): _____	7) Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female
8) Patient type: <input type="checkbox"/> New <input type="checkbox"/> Previously (<i>Relapse, Failure, Lost to Follow up, unknown</i>)	9) Disease Classification: <input type="checkbox"/> Pulmonary Bacteriologically Confirmed <input type="checkbox"/> Pulmonary- Clinically Diagnosed <input type="checkbox"/> Extra-Pulmonary
10) HIV Status: <input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Unknown	11) If Positive, Cotrimoxazole Given? <input type="checkbox"/> Yes <input type="checkbox"/> No
12) If Positive, ART Given? <input type="checkbox"/> Yes <input type="checkbox"/> No	
13) Treatment Outcome: <input type="checkbox"/> Cured <input type="checkbox"/> Treatment Completed <input type="checkbox"/> Died <input type="checkbox"/> Failure <input type="checkbox"/> Lost to Follow Up <input type="checkbox"/> Transferred out/Not evaluated	

Appendix 8.4: Patient data abstraction form for HIV patients diagnosed with TB

Patient data abstraction form for HIV client with TB (Pre-ART & ART register)	
Health facility details	
1) District name: _____	2) Region: _____
3) Health facility name: _____	4) Level: _____
Review period	
1) Cohort: <input type="checkbox"/> July 2012 – June 2013	<input type="checkbox"/> July 2015 – June 2016
Patient details	
6) Patient type: <input type="checkbox"/> Pre-ART: <input type="checkbox"/> ART: _____	Patient clinic no. _____
7) Age in years (<i>write age in months if ≤ 2 years</i>): <input style="width: 80px;" type="text"/>	8) Gender: <input type="checkbox"/> Male <input type="checkbox"/> Female
9) Date enrolled in chronic HIV care: _____	10) Entry point: _____
11) On Cotrimoxazole/ Dapsone: Yes <input type="checkbox"/> No <input type="checkbox"/>	12) Date ART started: _____
13) Date TB treatment started: _____	14) Regimen at start of ART: <input style="width: 50px;" type="text"/>
15) Clinical Stage at enrollment: <input style="width: 150px;" type="text"/>	
16) Nutritional status: <input style="width: 80px;" type="text"/>	17) Pregnancy status if female: <input type="checkbox"/>

Health Facility survey form. Form Number:

Health facility Characteristics

1) Name of health facility: _____ 2) District: _____

3) Level of Care: _____

4) Number of TB patients treated in 2016:

Staffing Level

5) Insert number of the following cadre:

Specialists Medical Officers Clinical Officers Nurses/Mid Wives

Types of TB/HIV Collaborative Services Provided

6) Services provided in HIV clinic

- Intensified TB case finding
- Treatment of latent TB infection (preventive treatment)
- TB infection control practices

7) Services provided in TB clinic

- HIV testing and counseling
- HIV prevention methods (e.g. info about SMC, Condoms distribution)
- Cotrimoxazole preventive treatment
- HIV/AIDS care and support
- Antiretroviral treatment

8) Model of Integration:

- Fully integrated clinic (TB and HIV Services provided at one stop center)
- Entry via TB service and referral for HIV care after HIV testing and CPT
- Entry via HIV service and referral for TB diagnosis and treatment after TB screening

9) Available TB diagnostic tests

- Microscopy
- Chest X-Ray
- GeneXpert
- TB Culture
- Ultra-Sound
- Histology

TB Diagnosis in the ART Clinic

10) Number of HIV positive patients newly diagnosed with TB in July 2012-June 2013

11) Number of HIV positive patients newly diagnosed with TB in July 2015-June 2016

Appendix 8.6: Confidentiality and data use agreement

In consideration of my access to the records and information described below and maintained during the course of this study, I agree as follows:

1. "Confidential Information" means the following records, data and information:
 - a. A client or participant's, name, unique ID number, or contact information
 - b. Protocols, consent forms, and protocol-specific forms
2. I agree not to make use of, disseminate, disclose or in any way circulate any Confidential Information except as necessary to conduct this project, including compliance with applicable laws and regulations that may require disclosure of Confidential Information.
3. I agree not to disclose any computer password or otherwise provide access to Confidential Information to any unauthorized person.
4. I agree to maintain appropriate procedures to ensure that Confidential Information remains confidential.
5. The obligations of confidentiality imposed on me by this Confidentiality Agreement do not apply to any information that is now in or hereafter comes into the public domain through no improper action or inaction by me.
6. I agree to comply with all applicable laws and regulations regarding the confidentiality of individually identifiable health care information.
7. I agree to notify my supervisor immediately should I become aware of an actual breach of confidentiality or a situation which could potentially result in a breach, whether this is on my part or on the part of another person.
8. I recognize that the data collected in the course of this evaluation is owned by the Ministry of Health, Uganda, and, therefore, agree to comply with any data use agreements developed regarding the use of this data.
9. I understand that a breach of confidentiality, or use of data without expressed permission, may be grounds for disciplinary action or termination of employment.

Name _____

Date _____

Appendix 8.7: Interview topic guide

Interviewer notes

This document contains the main topics and questions to be covered during the course of the interview with the selected health worker. Questions can be administered in a modified fashion and followed up in detail as appropriate. During the interview, get examples of the views and experiences of the health providers in implementation of the TB/HIV collaborative policy.

Health Region _____ Health Facility Name _____

Level of Health Facility _____

Date of interview (DD/MM/YYYY) ____/____/____

Name of interviewer _____

Section I: Setting in

In 2013, the Ministry of Health developed a second edition of the TB/HIV collaborative policy-guidelines. However, the extent to which health workers are aware about the guidelines is not fully known. In addition, the views and experiences of facility-level health workers in implementation of the policy-policy is not fully known. We are therefore, exploring the extent to which health providers are aware about the guidelines, the views and experiences in implementation of the guidelines. The purpose is to establish what's changed for the better or what's changed for the worse from the perspective of facility-level health providers. This could improve what happens in the future. The style of the interview will be open ended so you may find some of the questions quite broad and possibly hard to answer. But there are no right or wrong answers. We are interested in what you think and your experiences.

Section II: Biography

Type of cadre _____ Designation _____

Gender: Male Female. Work place: TB clinic HIV clinic. Other (specify)

Total years of practice at this facility as TB or HIV clinician, or nurse-counsellor or (other cadre) _____

Section III: Personal experience in implementing the TB/HIV policy

- Can you tell me/us how you came to be a TB or HIV clinician, nurse-counselor, other cadre
- Did you work in HIV/TB clinic in another hospital of HC IV before?
- If yes, how long did you work in HIV/TB clinic at the other facility?

<ul style="list-style-type: none"> - Share with me/us your experience in providing treatment for TB/HIV co-infected patients at this facility. (probe for; workload, knowledge gaps, quality of care issues, data collection and use, support to health workers providing TB/HIV services)
<p>Section IV: Preparations ahead of implementing the policy</p> <ul style="list-style-type: none"> - Have you have you heard about the 2013 guidelines”? If yes, what can you tell me about them? - What preparations preceded provision of TB/HIV collaborative services at the facility (probe for training of health workers, distribution of guidelines, supply of relevant medicines and commodities, remodeling of existing space, changes in staffing levels, mapping client flow etc.)
<p>Section V: Description of TB/HIV collaborative services at facility</p> <ul style="list-style-type: none"> - How are the TB and HIV services at this facility run? Probe and document patient flow for the following: - TB services for HIV patients (Intensified TB case finding, TB preventive treatment, TB infection control) provided to HIV patients. - HIV services for TB patients (HIV testing and counseling, HIV prevention methods e.g. SMC, Condom distribution, Co-trimoxazole preventive treatment, Antiretroviral treatment) - Treatment for patients diagnosed with both TB and HIV (e.g. TB and HIV treatment provided at one-stop clinic, referral to HIV or TB clinic same day or separate day)
<p>Section VI: Enablers in implementing the TB/HIV policy</p> <ul style="list-style-type: none"> - What’s changed for the better during implementation of the TB/HIV collaborative policy at your facility? Give some examples. - We are interested in knowing from your own experience what has enabled implementation of TB/HIV collaborative policy at your facility. (Probe for examples of enablers observed with regard to providing TB/HIV services in an integrated manner)
<p>Section VII: Challenges in implementing the TB/HIV policy</p> <ul style="list-style-type: none"> - What’s changed for the worse? Give some examples. - What personal difficulties have you experienced at your facility/clinic with regard to providing TB/HIV services? - What do you think are the most important aspects of what you’ve identified? - Why have you chosen these ones?
<p>Section VIII: Recommendations to improve TB/HIV services</p> <ul style="list-style-type: none"> - What would be your recommendations to improve provision of TB/HIV at your facility? Give some illustrations.
<p>Section IX: Closure</p> <p>Thank you for agreeing to participate in this study. I’d just like to reiterate that everything you have said is confidential to me and the study investigators only. Even the quotes from this interview that could possibly be used in publications will be anonymous - they won’t identify you or the facility by name. Do you have any question or feedback for me/us?</p>

Appendix 8.8: Interview consent form

Introduction: The Makerere University School of Public Health and the Ministry of Health are conducting an evaluation of the impact of the 2013 Uganda TB/HIV collaborative policy. The official name of the study is: **Evaluation of the impact of the Uganda TB/HIV collaborative policy on TB Treatment Outcomes in Patients with TB/HIV Co-infection: An analysis of routine programmatic data and qualitative interviews on provider experiences**

We, the interviewers, are called (Names)

Purpose of the study: The aim of this study to find out the views and experiences of facility-level medical providers regarding the implementation the 2013 Uganda TB/HIV collaborative policy. The information we find out will be used to improve the delivery of TB/HIV integrated services in Uganda in the future. You have been identified to participate in the study because you are a medical provider involved in treatment of TB or HIV patients. About 50 individuals will be interviewed in this study.

What do we want you to do in this study? We want to assess the knowledge and familiarity of health providers about the guidelines: Whether you have heard of them? We also want to ask you some questions about your views and experience in implementation of the TB/HIV collaborative policy. We would like to tape record the discussion so that we don't miss any information. If you don't want to us to tape-record, let us know, and we will not do it. One of us will also be taking notes on paper during the interview. We will keep the records of this interview in a locked file cabinet up to 5 years after the end of the study, at which time they will be destroyed.

How long will you need me? The discussion should take about 1.5 hours.

Are there any risks to me if I decide to be in the study? Although we will ask all participants to keep the discussion confidential, we cannot guarantee this, because this will be a group interview, and there is a risk that comments could get back to supervisors and negatively affect your employment. However, we have got administrative clearance from the district health office and the management of the health facility management to conduct the interviews.

Are there any benefits from being in this study? There is no direct benefit to you personally from being in this study. However, your answers may help improve delivery of TB/HIV integrated services. We will give you 20,000 Uganda Shillings to compensate for your time.

Will the information I give you be kept private? We will not use your full name during the discussion, or write down or record your name or any personal information that could identify you. We will not use your name in any reports that come out of the study.

Who should I call if I have questions about this study or think I may have been harmed by the study? If you have questions or think you might have been harmed by the study, please call the Research Team Leader on 07555553808 or write an email to swalusimbi@musph.ac.ug

Who should I call if I have a question about my rights as a research volunteer? If you have questions about being in this study, please call the head of the local human subjects' ethics committee, at the Makerere University School of Public Health, Dr. Suzanne Kiwanuka, telephone: 256-718-060-387 or 256-312-291-397 or email her at skiwanka@musph.ac.ug.

Do I have to be in this study? You do not have to be in this study. Your response to all questions is voluntary and not part of your work duties. Not participating will not impact your employment. You are free to stop the discussion and leave at any time. You can also refuse to answer any specific questions if they make you uncomfortable.

I have been told about the study and have either read the consent form, or it has been read to me. I have received a copy of this consent form, if I want one. I have been allowed to ask questions and have had all my questions answered. I would like to be in the study. By signing this form, I agree to be in the study.

Signature or thumbprint of participant	Date/Time
I agree to be tape-recorded during this interview	

Signature or thumbprint of participant	Date/time
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Witness to signatures	Date /time
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Witness to signatures	Date /time
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