Strengthening Tuberculosis Control in Ukraine: Evaluation of the Impact of the TB-HIV Integration Strategy on Treatment Outcomes

This document is part of a series that describes how routine data were used in research and evaluations of health programs and projects. Data for Impact (D4I) has compiled these examples from its own work and the work of others found through a literature review—and consultation with the original authors—to compare ways routine data can be appropriate for evaluations and to shed light on its benefits and shortcomings for evaluation.

A companion guidance document compiling these lessons is available at the [D4I website](#). This suite of materials may be useful for others contemplating using available and routine data in their own work.

The report describes the effects of a program to integrate HIV care with care for patients co-infected with tuberculosis (TB). Read the report [here](#).

Program Description

Ukraine is one of 30 countries in the world that have a high TB burden and one of the 10 countries with the highest incidence of multidrug-resistant TB (World Health Organization [WHO], 2018). Strengthening Tuberculosis Control in Ukraine (STbCU)—a project funded by the United States Agency for International Development (USAID)—aimed to improve the delivery of TB and HIV services, with the goal of enhancing the timeliness of care and the life expectancy of patients with TB-HIV coinfection. In 2014, the USAID mission in Ukraine commissioned MEASURE Evaluation to conduct an impact evaluation of the STbCU project, examining the relationship among the strategy for the integration of TB and HIV services, the use of TB-HIV services, and mortality outcomes.

WHO policy on collaborative HIV-TB activities recommends that services for TB and HIV are integrated—that is, are available at the same time and in the same location (WHO, 2012). Integration involves the coordinated provision of services, with facilities serving as an entry point for early diagnosis and care for both HIV and TB. Joint care can improve clinical management and alleviate complications resulting from drug interactions for coinfected patients (Uyei, Coetzee, Macinko, & Guttmacher, 2011). The integration of services can also potentially offer opportunities for HIV and TB facilities to share scarce resources, improve the quality of care, and minimize redundancies in the system (Maher, 2010).

The impact evaluation described here employed a mixed-methods approach, with a quasi-experimental quantitative evaluation design, complemented by qualitative interviews to inform the findings.

Rationale for the Use of Routine Data

The primary data source was patient medical charts from which the data were abstracted retrospectively. Routine management information systems data from the TB and HIV treatment facilities follow the WHO-recommended Basic Management Unit TB Register. They record data on diagnostics, treatment prescribed and received, treatment outcomes, and HIV tests. Routine data were used because they were the only data source for collecting individual data on patient diagnosis, treatment, and treatment outcomes to answer the evaluation questions.

Evaluation Questions

The study used routine data to address the following questions:

1. **Completion of TB-HIV service cascade:** What proportion of TB and HIV/AIDS patients completed each step in the cascade of services, from screening to receiving treatment, per the national protocol?

2. **Impact of service integration:** Do service integration, training, and support between TB and HIV/AIDS services decrease the time lag between each step of service (i.e., screening, testing, and dispensing treatment) for TB and HIV/AIDS patients?

3. **Impact of service integration on all-cause mortality:** Do service integration, training, and support between TB and HIV/AIDS services decrease all-cause mortality among the TB-HIV coinfected patients?

A facility survey was used to collect information about services, volume, and externalities. Qualitative interviews with patients and providers were conducted to examine factors affecting the use of TB-HIV services, but those findings are not addressed here.

Data Description and Data Management

Data collection took place in six Ukraine oblasts (regions) purposively selected based on the incidence of TB, HIV, and HIV-TB coinfection. The data were obtained from the electronic registers and medical records via chart abstraction. The medical records were also used to collect data on confounding health factors, (e.g., injecting drug use [IDU], alcohol use, smoking, diabetes), and sociodemographic characteristics, (e.g., age, sex, education, marital status, and employment).

Data collection teams of nurses and doctors collected individual medical record data for two patient cohorts from each oblast. The existing data at the facilities did not allow for de-duplication of patients who were served by both types of facilities. The samples were therefore collected and analyzed separately based on each patient's point of service. The data collected included basic sociodemographic characteristics; TB diagnosis, treatment, and outcomes; and HIV diagnosis, treatment, and status. The dates of each diagnostic, treatment, and outcome event were recorded.

The completion of the data collection forms at the TB facilities was done based on the data from medical charts of patients at baseline and from both the electronic register and medical charts

of patients at end line. In certain cases, (e.g., missing information about HIV treatment for patients with HIV-positive status), data were requested from the regional AIDS centers. Similar to collecting TB data, the filling out of data collection forms at the AIDS centers was done based on data from medical charts of patients at baseline and from both the electronic register and medical charts of patients at end line.

Assessment of the Usability and Quality of the Data

The usability and quality of routine data were sufficient to address the evaluation questions. The data in the medical charts aligned well with the evaluation period. The evaluators were able to abstract data from the routine data sources in all six study oblasts. However, several challenges in the usability of routine data for the evaluation were encountered.

Data Captured in Electronic Registers

- Electronic registers contained information by case, not by patient. One patient could have several cases when being treated for TB at a facility. All data had to be de-duplicated and only the latest case included in the sampling frame.

- At the AIDS centers, the lists of patients contained information about all HIV patients registered in the region, irrespective of the place at which the patient was diagnosed with HIV. For example, patients who were diagnosed with HIV within the penitentiary system were included in the patient lists but were excluded from the study because they don't receive treatment in the AIDS centers.

Data Availability

- The data for several HIV disease characteristics were either not recorded at the TB facilities, or if recorded, were categorized differently and could not be compared with the data collected at the AIDS centers. These included characteristics such as the number of patient visits for HIV treatment, HIV clinical stage, and CD4 count. Similarly, the data for several TB disease characteristics—such as TB classification, TB clinical form, and TB treatment category—were either not recorded at the AIDS centers or were categorized differently. At the AIDS centers in the intervention group, more than 50 percent of the coinfected patients had data missing on the numbers of visits, clinical stage, and CD4 count at the most recent visit at baseline. At end line, the amount of missing data on all disease characteristics was substantially less—about five percent for all variables, except for CD4 count and TB outcome status.

But, because both baseline and end line data were needed for the analysis, the evaluators could not include some strong predictors of survival in coinfected patients in the model.

- Some data needed for the analysis of IDU status were not collected by the facilities. IDU status was recorded only if the patient self-reported this information.

Data Accuracy

- Much of the data on diagnosis, treatment, and outcome for clients were needed to analyze the time lag between each step of service. However, evaluators encountered instances where dates of service were incorrectly recorded according to the expected time sequence. For example, the date of an outcome in a routine data source preceded the date of diagnosis—this error meaning the data needed to be cleaned for the analysis.

- At the TB facilities, information on the number of planned and received doses of treatment was the same for most patients. However, these numbers did not always correspond with the duration of treatment for a particular client. It is possible that when filling in the forms, the doctors retrospectively recorded the number of doses planned for that client to be equal to the number of doses actually received. As a result, there was low variation in the variable on the proportion of doses completed.

Inconsistency in the Use of Data Collection Tools Across Health Facilities

- One of the study's data collection tools, the HIV control card, was modified in 2012, before the baseline data collection. However, some health facilities still used the old form and it was difficult to find out which facilities used the old form to document patient data versus the new form. This was a challenge because the fields in the two forms meant different things and we had to develop techniques to deal with the discrepancies. For example, the code (T6) for "Treatment completed" in the first version of the form was changed to "Requires preventive treatment." To determine what the correct notation should be, we reviewed the patient's previous clinical visits and if the previous records indicated that a patient had been diagnosed with TB, then we documented the case as "treatment completed" rather than "requires preventive treatment."

Missing Data

- There were missing and inconsistent data in the medical charts and electronic registers. The evaluators developed and documented imputation rules and other decisions on how to handle missing and inconsistent data. However, data cleaning was time consuming.

Data Analysis Methods Used

To evaluate TB-HIV service integration, patient treatment cascades were created to illustrate the series of tests and services that the patients were offered at the facilities. Survival analyses of coinfected patients were used to assess the time between screening and receiving treatment, using data collected separately from the TB dispensaries and AIDS centers. The survival analyses were conducted using Cox proportional hazards models with a difference-in-differences approach to model the impact of the program on all-cause mortality separately for data from the TB facilities and from AIDS centers during this program.

Limitations in Using Routine Data for Evaluation

The analysis was constrained to the variables that were available from the records. In general, data from the records were better suited for the analysis of service cascades than for the effect of services on survival. The quality of the routinely collected data used for this evaluation improved between baseline and end line; however, the evaluators were not able to control for disease severity variables in the impact models, such as CD4 count or TB disease stage (both are strong predictors of survival in coinfected patients) because of the large amount of missing disease characteristic data at baseline, especially at the AIDS centers.

The data collection teams had to make extra efforts to obtain data for the evaluation. At baseline, the teams only worked with the medical records. The fieldwork was quite challenging and time consuming in terms of: (1) finding the necessary medical records in the archives (some were kept in an archive cabinet at another facility or at the rayon [sub-district] level; (2) TB forms were not always kept with the forms containing HIV-related information because of confidentiality considerations; and (3) intensive and follow-up TB treatment were usually provided at different facilities, which meant that in some cases the teams needed to visit both facilities to complete a form for one patient.

At the end line, some data were available in the electronic registers and some data were available in the medical charts at a facility. In most cases, the data collectors had to work with the

medical charts to obtain the information that was missing in the electronic data. Because a lot of the information in the medical charts was handwritten and was not clear, the data collectors had to spend extra time abstracting the data from these charts, which lengthened the timeframe for data collection. Moreover, the data needed for the evaluation were not available at one health facility and detailed patient information had to be requested from the rayon-level facilities.

Further, HIV-related data were not available at the TB facilities and vice versa. Patients could appear in both the TB and HIV systems and there was no way to de-duplicate patients who were served by both types of facilities. These samples were therefore collected and analyzed separately based on each patient's point of service. Therefore, data collectors had to work with both facilities to complete the data collection forms and these essential activities required additional time and labor.

What Worked Well

Most data needed for the evaluation were available and accessible at the health facilities. The data collection and data management challenges were expected, and therefore sufficient time and financial resources were planned to complete the work. Imputation rules and other decisions were developed and documented on how to handle missing and inconsistent data, and these rules and decisions were applied during the baseline and end line evaluation phases.

Conclusion

Routine data were successfully used to address the evaluation questions. Good planning, detailed documentation, and flexibility were important. The development and documentation of imputation rules and other decisions on how to handle missing and inconsistent data were essential components. The use of routine data worked better for some questions, (e.g., service cascades), than for others, (e.g., the effect of services on survival).

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