The treatment of multidrug- and rifampin-resistant tuberculosis (MDR/RR TB) is complex. Treatment requires a combination of multiple agents and often needs to be individualized, taking numerous considerations into account (1,2). Patients may have different concurrent conditions, such as HIV infection or diabetes; furthermore, the disease may vary in terms of extent, both in the lungs themselves (i.e., through presence of lung cavitation, bilateral disease, or both) and in other extrapulmonary sites (2). The pattern of additional resistances to other key agents used in second-line TB regimens may differ, depending on previous treatment received by the individual patient (either first-line or second-line medicines) and the epidemiologic setting (3,4). In different centers, the protocol for microbiologic monitoring may vary from none to monthly sputum smear microscopy and cultures with periodic drug-susceptibility testing during treatment, which, at times, continues after successful treatment to detect recurrence (2). The treatment given may be affected by the experience and expertise of the healthcare providers, as well as the cost of medicines and their availability (5). The use of adjunct therapies such as surgery (6), hospitalization, and patient support for treatment adherence (7), such as patient-centered directly observed therapy (DOT), also varies by program. The occurrence of adverse drug reactions to second-line TB drugs is common (1,8) and may be managed differently in different settings, particularly the permanent withdrawal of certain agents. All those factors result in wide variation in patient management and outcomes. There is a shortage of high-quality randomized controlled trial (RCT) data for MDR/RR TB drugs (9), and currently available evidence is not adequately powered for patient outcomes (10–14). Although several notable RCTs evaluating standardized treatments are in the pipeline (15), no single regimen is likely to address the entire spectrum of clinical features that patients with MDR/RR TB have. This disease will largely require different treatment approaches individualized to the specific characteristics of the patient and the drug susceptibility profile of the strain.

Until the results of RCTs become available, new evidence for treatment of MDR/RR TB must be derived largely from observational studies. More than 150,000 MDR/RR TB patients initiate therapy each year worldwide, representing a wealth of potential data (16). These patients have an enormous diversity of clinical characteristics, many (e.g., pregnant women) are underrepresented in RCTs, and they are treated with widely varying regimens within health systems with different resources and capacities (17). This reflects the various scenarios in which global recommendations made by the World Health Orga-
nization (WHO) are expected to be applied and thus observational data can play a critical role in recommendation development.

Still, potential problems exist with use of observational data. The greatest are the potential for different forms of confounding and bias (18,19). This can be mitigated, at least partially, by careful adjustment for the many potential confounding factors, including age, prior treatment history, extent of drug resistance and disease, concurrent conditions, and treatment response (2). Adequate adjustment for confounders necessitates that information is accurately recorded for all patients treated, which is often not the case; missing data represents a second major potential limitation of observational data. Certain information may be missing for all patients in some centers, which could be the result of lack of capacity (e.g., radiography findings are missing because chest radiographs are not accessible) or the required information never being gathered or reported. Alternatively, other key data on determinants of patient outcomes, such as frequency and timing of regimen change, may be variably collected across studies. This may be caused by differences in the monitoring schedules, the data collection systems, and the medications used between studies and over time. At times, data collection may be directly related to determinants of outcome (e.g., length of QT-interval is more carefully measured and recorded in patients with multiple risks for cardiotoxicity) and can lead to measurement or ascertainment biases that are difficult to detect or mitigate appropriately.

Despite those problems, various studies have collected and pooled observational data, enabling individual patient meta-analyses (IPD-MAs). Since 2010, when WHO and other organizations started using GRADE for drug-resistant TB treatment guidelines (20), WHO recommendations on the type, composition, and duration of second-line TB regimens have been based largely on evidence from observational studies of patients treated under field conditions (21–25). Ahead of the WHO MDR/RR TB guideline update in 2018, a public call was made for contributors to report IPD conforming to certain criteria and a specific data dictionary (26). This call permitted including more recent programmatic data that may have never been published, increasing the breadth and relevance of the information available for study.

Overall, well-gathered, carefully documented, and complete observational datasets represent a valuable resource for assessing treatment regimens in MDR/RR TB. If efforts are made to safeguard the uniformity and quality of these data in terms of accuracy, consistency, and completeness, it is possible to accrue sufficient information for large numbers of patients treated for MDR/RR TB each year, and to generate evidence within 1–2 years to address critical questions, such as the optimal duration of the newly recommended all-oral MDR/RR TB regimen and the safety profile of new drugs (1). In response to our experiences with IPD management and analysis, most recently to update the WHO MDR/RR TB treatment recommendations in 2018 and 2019, and recognizing the urgent need for guidance, this article highlights how to improve the quality and completeness of future IPD for MDR/RR TB and provide guidance for researchers in other disease areas facing similar problems (27–30).

**Aim and Scope of Guidance**

Improving the completeness and quality of routinely collected data represents a relatively small marginal cost after all other expenditures incurred during care of patients with MDR/RR TB (31). Consolidating routinely reported data into high quality observational datasets and pooling these to perform multicentric IPD-MAs is a very attractive option to inform future MDR/RR TB treatment guidelines in the coming years, building on a proven track record (21–23,32–34).

The content of this guidance is meant for coordinators of MDR/RR TB treatment who intend to share their experience in patient care to the benefit of national and global treatment policy following several data-sharing principles (Table 1). This guidance is intended to instruct potential contributors on the utility of their potential observational IPD and aid them in subscribing to key quality and completeness measures to create a database with high quality IPD composed of key variables on patient demographics, clinical characteristics, treatment details and covariates, as well as treatment outcomes in MDR/RR TB patients, and contributing the IPD to a pooled data repository that can be shared internationally to allow for analysis that will inform future evidence-based treatment guidelines.

The guidance in this article was developed by 3 staff members of the WHO Global TB Programme (D.F., E.J., F.M.) involved in numerous iterations of the WHO MDR/RR TB guidelines and 5 methodologists, TB clinicians, and evidence reviewers (J.R.C., G.B.M., C.D.M., N.N., D.M.) involved in these and other guidelines. Four cycles of revisions took place, with successive discussions on key variables to collect, standardization of variable collection, and practical measures to suggest for completeness and quality. Although no one else was involved in writing the guidance, we acknowledge that we have benefited from the contribution and collective experience of...
Quality of Data for Multidrug-Resistant TB

Table 1. Data-sharing principles for contributors of IPD for MDR/RR TB*

| Principle                                                                 | Additional notes                                                                                                                                 |
|---------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Data contributed to the IPD should be coded to remove identifying          | • All names, the date of birth, address, telephone number, and other easily identifying personal information must be removed (e.g., national identification or health insurance numbers). |
| information.                                                              | • Each participant contributed should be recoded with a new IPD identification number that is mapped to the original identification number retained by the contributing investigator, group, or program. |
|                                                                           | • Dates of events (e.g., treatment start, cultures, medication changes) should be retained in the sent participant data file.                |
|                                                                           | • Other local rules for encoding and other data protection measures should be followed.                                                   |
| The contributing investigator, group, or program retains ownership of     | • The transfer of data for use in guideline development or other projects does not constitute transfer of ownership.                          |
| the data and should have permission to share them.                       | • Data contributors are free to withdraw their data at any time.                                                                             |
|                                                                           | • Data must be contributed only if they are permitted by programs or donor agencies.                                                       |
|                                                                           | • A data-sharing agreement will specify the details of the transfer of data; an example of a starting point for these data-sharing agreements is contained in the Appendix (https://wwwnc.cdc.gov/EID/article/26/3/19-0997-App1.pdf). |
| All transfers of data must clear ethics review.                          | • The institutional review board responsible for the bioethics of each contributed dataset should approve that the data can be shared.          |
|                                                                           | • All anticipated uses of the data should be reviewed and approved by the institutional review board.                                       |
| All uses of data are subject to oversight by the collaborative group.    | • Ideally 1 individual is designated to liaise with the rest of the contributors of IPD to approve or deny use of their data for current or future analyses and be part of the oversight committee. |
|                                                                           | • The oversight committee reviews proposals for data use and sharing of data.                                                                |
| All data are held centrally in a secure data repository.                 | • The IPD used for the development of MDR/RR TB treatment guidelines for the WHO and other entities has been held securely by the MUHC under Dick Menzies since 2010. |
|                                                                           | • The MUHC (now a WHO Collaborating Center) is expected to retain these responsibilities, pending approval of the oversight committee.         |
|                                                                           | • Use of data held in this repository follows these principles, with bioethics approval and conforming to the current data sharing agreements signed. |

*IPD, individual patient data; MDR, multidrug-resistant; MUHC, McGill University Health Centre; RR, rifampin-resistant; TB, tuberculosis; WHO, World Health Organization.

many data contributors who provided data in the past and are acknowledged in publications of IPD-MA (2,21–23,26,32–34).

The Requirements for Observational Data

Several requirements exist to contributions of patient data. The first requirement is that the data are collected at centers that have the capacity to adequately gather the key information on all patients treated for MDR/RR TB. Centers should also have access to quality-assured medications in sufficient variety that they can treat patients with different drug susceptibility patterns. The centers should have adequate laboratory facilities to enable repeated microbiological testing throughout treatment, including initial and repeated drug susceptibility testing (DST) for all second-line TB medicines used at that center. Center staff should develop internal quality assurance protocols and participate in external laboratory assessment programs to uphold the validity of their laboratory testing (35,36). These measures limit spurious conclusions being drawn about the influence of a medicine on outcomes resulting from exposure to ineffectual medication. The second requirement is that the program treats a relatively large number of patients with diverse demographic, clinical, and treatment characteristics. This policy avoids having patient series that are extreme outliers to the usual practice in a given setting. Nationwide representativeness is not to be expected, but reports of small patient series (e.g., <25) may be extreme outliers and may present challenges to pooling with other records for IPD-MA. However, we encourage reports of any size on subpopulations with limited available data, such as persons with extrapulmonary MDR/RR TB, pregnant women, children, and vulnerable populations. Finally, the
center must adopt a quality-assured methodology for the study parameters and organization of data and respect ethics norms and standards for data collection, management, and use of data for research. This necessitates that the clinical data be entered in electronic format. Infrastructure must be in place to support electronic data collection, and personnel who are motivated and trained in data collection must be available. When possible, cross-checks should be performed between this electronic system and national vital statistics and laboratory registries, which provide information on long-term patient disposition.

**Data Capture: Ensuring Accuracy and Completeness**

Several practical measures should be undertaken to ensure that data are captured optimally. Upstream of the collection of data, efforts should be made to ensure the quality of these data, including quality assurance of diagnostic work and verification of patient demographic and clinical information with medical histories.

Transcription of data between systems (e.g., from a paper treatment card to an electronic database) is an eminent source of error. Many settings now have the capability to create an electronic medical record at the first encounter with the patient and access it again to prospectively update the details, either at subsequent patient visits or directly from the laboratory. The widespread availability of internet and desktop computers, laptops, tablets, or smartphones makes this feasible in many settings. This practice would have the advantages of improved completeness of patient files and avoidance of transcription and recall errors.

**Table 2. Suggested steps to improve the accuracy and completeness of observational IPD**

| Suggested steps | Additional notes |
|-----------------|-----------------|
| Persons responsible for capture and entry of data into electronic databases should be appropriately trained. | • This includes obtaining a certificate in good clinical practice and training around the importance of confidentiality.  
• This also includes training on the basics of MDR/RR TB, relevant national guidelines, what to collect, how to collect it, and the importance of accuracy in the capture of data.  
• These principles can be reinforced with detailed guidance for data capture and the definitions of the variables collected at the point of capture (e.g., within the electronic system or within a document kept where data are captured). |
| Quality control measures (e.g., data safeguards) should be implemented to prevent implausible or “out-of-range” entries. | • A warning can be implemented for continuous variables falling outside plausible ranges (e.g., age outside 0–99 y).  
• Drop-down lists can be created to reduce/remove need for free form data entry (e.g., including the most common extrapulmonary TB sites within the dropdown or limiting responses for HIV co-infection status to positive, negative, or not tested).  
• Safeguards can be logical, which prevents certain data from being entered without a specific response in another section (e.g., CD4 and viral load cannot be filled in unless HIV co-infection status is positive). |
| Supervisors should have a standard quality assurance routine (e.g., perform routine follow-up for data accuracy of collected information). | • Supervisors should have simple algorithms developed to detect implausible information that defies inbuilt measures (e.g., patients reported to be receiving a medicine to which results from drug susceptibility testing show resistance).  
• Complete checks should be run on at least 10% of records independently via dual extraction. These checks should be performed regularly and assessed by a supervisor with the goal of 95% accuracy.  
• Corrective steps should be taken (e.g., further training, more comprehensive or routine checks of variables) when accuracy of data collection is an issue. |
| Concurrent checks for data completeness should be performed with assessments of accuracy. | • Reminders can be developed that automatically signal that certain variables are not completed each time a patient record is updated.  
• In addition, preventing the “finalization” of a patient file until all variables are entered can be implemented—however, files should still be permitted to be saved, and other files opened and populated while patient files await finalization.  
• Completeness of data is of utmost importance—high frequency of absence of certain information may necessitate exclusion of entire datasets from particular analyses for which these data are required. |

*IPD, individual patient data; MDR, multidrug-resistant; RR, rifampin-resistant; TB, tuberculosis.*
when compared with other retrospective practices in data collection, such as periodic transfer of data from a paper treatment record during treatment, or after the treatment episode is completed. Within the electronic record system, anonymization procedures to limit the accidental disclosure of sensitive data are necessary. Various quality control measures can be built in to alert the user when implausible, inconsistent, or “out-of-range”/nonstandardized values are entered, or if data are missing, prompting checks and corrections as necessary (Table 2). Finally, the database architecture of the health information system needs to allow for information from patient follow-up encounters to link up seamlessly to those of the initial record of the patient. A unique key in an electronic dataset limits the risk of duplicate records and avoids the need to re-enter identifiers of the patient and health center at each review. Many different packages have been successfully employed for this purpose, including open-source packages that bear no license fees for use and allow customization (37).

**Description of Data Elements**

This section highlights key items to capture within an electronic register (or database) for use in national or global analyses. The electronic medical record may contain other valuable information for programmatic management and policy making, such as health-related quality of life measurements, which may be of interest to programs, but which have not traditionally been used in analyses to date. The variables to be collected are those that are necessary to assess exposure (e.g., drugs, duration), potential confounders (e.g., concurrent conditions, resistance), response to treatment (e.g., microbiology, molecular biology, clinical signs and symptoms, and radiograph results), and adverse events (AEs). They also need to gather information that will be used to adjust observed effects by patient strata (e.g., by age, previous treatment history, or disease extent). A data dictionary defining variables and their preferred coding format is contained in the Appendix (http://wwwnc.cdc.gov/EID/article/26/3/19-0997-App1.pdf; the most up-to-date version of this data dictionary and accompanying tools and explanations are held at https://www.mcgill.ca/tb/projects/mdr-tb-upd-project). This list of variables is what is optimally preferred and what contributors should strive for; however, if certain data elements are missing from a patient series, the records may still be useful for specific analyses of safety or effectiveness. Further included in the Appendix are standard abbreviations for TB and antiretroviral drugs, standard system organ classes for AEs (38), and standardized definitions for patient outcomes (39,40). We discuss variables that require further elaboration in the subsequent sections.

**Initial (Baseline/Pretreatment)**

Several baseline/pre-treatment factors exist that affect the prognosis of patients with MDR/RR TB. Apart from typical demographic characteristics, complete collection of information on patients’ habits and concurrent conditions is essential, as the true effect that many of these factors have on treatment outcomes is uncertain. Collection of CD4 counts, viral load, and antiretroviral therapy regimens in HIV-infected persons is essential; additional information on hepatitis B/C status, diabetes mellitus, and mental health disorders may also be useful. Although universally accepted definitions for smoking exist (41), this is not the case for alcohol consumption; contributors are encouraged to closely collect the alcohol-related variables in the data dictionary. The occurrence of cavitation and bilateral pulmonary disease is key to a better understanding of their effect on patient outcomes and to the classification of extent of disease. However, recording of radiologic findings in pulmonary MDR/RR TB is not standardized between reporting centers and at times data are missing. For microbiological and DST results, several factors may compromise a program’s ability to collect a sample exactly at treatment start. We suggest that baseline tests should be included only if they are performed on samples collected within 3 months before, or 1 month after, start of treatment. DST results should be reported for rifampin and for every medicine used in the regimen for which a WHO-approved laboratory method exists.

**Treatment and Follow-Up Information**

All measures that are repeated throughout treatment to inform treatment decisions and those that could affect treatment outcomes should be collected. It is perhaps most crucial to completely and accurately collect information regarding treatment type, duration, and composition. According to current standards, shorter MDR/RR TB regimens are those intended to last for ≤12 months, whereas longer regimens are intended to last for ≥18 months (1). Details for patients who had to transition from shorter to longer regimens must be reported. For each drug used in the regimen, ideally the day the drug was introduced into the regimen and the day the drug was permanently withdrawn (e.g., because of provider or patient decision or an adverse event) should be recorded. In programs in which this is not possible, new data elements can be added to the dictionary that would capture the patient’s regimen
every 1–2 months, using standard abbreviations (Appendix). Adherence support, either in the form of in-person observation or with digital tools, is a common component of MDR/RR TB treatment. Data should be collected regarding its use and frequency. The data dictionary contains variables to record monthly follow-up sputum samples for smear microscopy and culture, with collection of culture results prioritized (1,42). Programs may also opt to simply report the date when each sputum sample was taken and the accompanying smear and culture result. Regardless of reporting choice, all results obtained should be recorded. Reporting of repeated DST is essential to detect acquired resistances; changes in the resistance patterns must be reported. Only thoracic surgery performed as an adjunctive therapy for MDR/RR TB should be reported.

The reporting of AEs in TB patients is highly valuable, but is often difficult to standardize. AEs of mild and moderate severity are very frequent in patients on TB treatment (1,8); including all of them in the IPD would be excessive. The AEs that should be entered and reported are drug-related AEs that are considered serious (43) or cases in which an agent is stopped for >48 hours by the provider because of a suspected or confirmed drug-related AE. In addition, information about whether the suspected or responsible agent is subsequently stopped permanently should be provided. Data in the “adverse event information” section should also be completed in the case of death that is suspected or confirmed to be drug-related. Characteristics of the AE that should be reported include the system or organ class affected, the agent(s) considered responsible, the severity, and the outcome. The severity should be graded using international standards, such as those of the National Cancer Institute (44) or other recommended scales (43,45). Centers may develop their own resources for the investigation and management of common AEs (e.g., by adapting the contents of manuals [46]).

### Treatment Outcomes

End-of-treatment outcomes must be specified according to WHO standards to ensure uniformity. The set of definitions used must be specified, with preference currently given to 2013 criteria (1). Ideally, endpoint assignment would be systematically verified. Culture conversion (defined as the date of the first negative culture, when ≥2 consecutive cultures, ≥28 days apart, are negative) and culture reversion (defined as the date of the first positive culture, when ≥2 consecutive cultures, ≥28 days apart, are positive after culture conversion) should be reported (1). Recurrence (because of true relapse or reinfection) information is valuable but scarce and difficult to collect because it requires follow-up after completion of treatment. The possibility to distinguish true relapses from a new infection among recurrences requires genotyping or sequencing that, to date, is done only in specialized laboratories, limiting its use in routine care (47). Monitoring patients for ≥12 months after successful completion of treatment would provide valuable information. If recurrence is monitored and reported, the exact duration of follow-up must be specified.

### Discussion

We present a framework for observational data collection outlining key variables to collect to ensure uniformity in global MDR/RR TB patient data and provide practical measures to be taken to ensure data quality and completeness. National or regional TB programs, as well as operational research projects, patient series from a tertiary hospital, and other projects, could contribute their observational data through adoption of this guidance. However, wholesale adoption, especially by underresourced programs, will require support, in the form of funding and training, from donors, funding agencies, national programs, and others. The demonstrable value of IPD for developing WHO MDR/RR TB treatment guidelines (1,48,49) and continued need for quality IPD to tackle the MDR/RR TB epidemic underscore the importance of providing this support.

The strengths of this guidance are that it draws from our extensive experience in guideline revisions, IPD collection, and IPD-MA. Furthermore, our first-hand experience receiving retrospectively collected data conforming to the data dictionary (26) issued during the 2018 revision of the WHO MDR/RR TB guidelines provided valuable insight into barriers to data contribution. These barriers ranged from absence of crucial clinical and patient characteristics that were never recorded (and thus could not be retrospectively obtained) to difficulty in transcribing paper records of already-collected patient data into an electronic format. This guidance should provide motivation to programs to begin prospective data collection in a standardized electronic format, which is conducive to improvements in data completeness and quality. In addition, our experiences during guideline development highlighted key areas in which data were not routinely being collected (e.g., recurrence, acquired drug resistance) and populations for whom data were scarce. This guidance should encourage the collection of such data to help answer pressing questions in these domains and populations.
The primary limitation of this guidance is that it is an initial attempt to improve practices based on experience accumulated for a very particular subtype of patients with TB. The contents of the guidance will necessarily need to evolve to the ever-changing nature of MDR/RR TB treatment and the capacities of programs to adhere to it. Successive revisions will be informed as national TB programs and other end users begin to adopt this guidance and we gain experience receiving the outputs. Finally, certain variables, such as out-of-pocket costs, lost wages, specific toxicity-related measurements (e.g., electrocardiogram, brief peripheral neuropathy screens, audiometry, liver enzymes), emergence of mental health disorders, improvement or deterioration of quality of life, and emergence of AE that are not serious or do not result in medication termination, are not listed within our list of data elements. This information could be useful to patients, clinicians, and programs for specific studies, and thus could be added to local databases with care to avoid overloading data management.

Observational data will continue to play a critical role in the development of global MDR/RR TB treatment guidelines for the foreseeable future. Coordinating efforts to maximize the utility of provider experiences in MDR/RR TB is vital to improve the currently suboptimal outcomes of MDR/RR TB patients. This guidance is one key element toward achieving high-quality, comprehensive observational IPD moving forward.

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- Enterovirus D68 Infection in Children with Acute Flaccid Myelitis, Colorado, USA, 2014
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Appendix

Data Dictionary for MDR/RR TB IPD

The tables within this section pertain to the data elements optimally preferred for collection during the conduct of observational studies or in routinely collected programmatic data, along with their requested coding to ensure uniformity across studies. Caveats and additional information on specific elements are contained within the main text of the online report.

| Field       | Variable         | Additional Information                          | Format | Category Coding | Category Labeling |
|-------------|------------------|-------------------------------------------------|--------|-----------------|-------------------|
| COUNTRY     | Country          | Country of the primary source                   | Char   |                 |                   |
| TREATING_SITE| Treating Site Name| Name of the primary source                      | Char   |                 |                   |
| SITE_ID     | Treating Site Identifier| Site ID number                                 | Char   |                 |                   |

| Field       | Variable         | Additional Information                          | Format | Category Coding | Category Labeling |
|-------------|------------------|-------------------------------------------------|--------|-----------------|-------------------|
| PATIENT_ID  | Patient Identifier| Patient ID number in country database          | Char   |                 |                   |
| YEAR        | Year             | Year of treatment start for this episode        | Num ###|                 |                   |
| AGE         | Age              | Age of the patient in years                     | Num ###|                 |                   |
| SEX         | Sex              | Patient's biologic sex at birth                 | Category| F Female        |                   |
|             |                  |                                                 |        | M Male          |                   |
|             |                  |                                                 |        | U Unknown       |                   |
| WEIGHT      | Weight           | Patient’s weight in kilograms                   | Num ###|                 |                   |
| HEIGHT      | Height           | Patient’s height in centimeters                 | Num ###|                 |                   |
| BMI         | Body Mass Index  | Patient’s body mass index in kilograms per meters-squared | Num ###|                 |                   |
| Field                  | Variable                      | Additional Information                                                                 | Format   | Category Coding | Category Labeling |
|-----------------------|-------------------------------|----------------------------------------------------------------------------------------|----------|-----------------|-------------------|
| SMOKINGSTATUS         | Smoking Status                | The patient’s smoking status at start of treatment                                      | Category | Current         | Current Smoker    |
|                       |                               |                                                                                        |          | Ex              | Ex-Smoker         |
|                       |                               |                                                                                        |          | Never           | Never Smoker      |
|                       |                               |                                                                                        |          | U               | Unknown           |
| SMOKINGPACKPERDAY     | Packs Smoked Per Day          | Total number of packs per day smoked at start of treatment (if current smoker)         | Num ### |                 |                   |
| SMOKINGTOTALPACKYEAR  | Total Pack Years              | Total number of pack years smoked (if current- or ex-smoker)                          | Num ### |                 |                   |
| ALCOHOL               | Alcohol Use                   | Does the patient drink (defined as ≥1 drink per week in men or women)                | Category | Y               | Yes               |
|                       |                               |                                                                                        |          | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| ALCOHOLABUSE          | Alcohol Abuse Disorder        | If the patient drinks, do they meet the definition of alcohol abuse (≥14 drinks per week in men or ≥7 drinks per week in women) | Category | Y               | Yes               |
|                       |                               |                                                                                        |          | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| DM                    | Diabetes Mellitus             | Is the patient diagnosed with diabetes?                                               | Category | Y               | Yes               |
|                       |                               |                                                                                        |          | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| INSULINDEPENDENT      | Type 1 Diabetes Mellitus      | Is the patient insulin dependent (if having diabetes)?                                | Category | Y               | Yes               |
|                       |                               |                                                                                        |          | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| HBA1C                 | Hemoglobin A1c Level          | Patients HbA1c measure defined in percent (%)                                         | Num ### |                 |                   |
| RENALFAILURE          | Presence of Renal Failure     | Does the patient have renal failure?                                                  | Category | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| HEPB                  | Hepatitis B                   | Does the patient have hepatitis B?                                                    | Category | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| HEPC                  | Hepatitis C                   | Does the patient have hepatitis C?                                                    | Category | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| OTHERLIVER            | Other Liver Condition         | Does the patient have liver conditions other than hepatitis B or hepatitis C?         | Category | Y               | Yes               |
|                       |                               |                                                                                        |          | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| HIV                   | HIV                           | What is the patient’s HIV status?                                                    | Category | Pos             | Positive          |
|                       |                               |                                                                                        |          | Neg             | Negative          |
|                       |                               |                                                                                        |          | U               | Unknown           |
| HIV_DIAGNOSISYEAR     | Year HIV Diagnosed           | If the patient is HIV-positive, the year HIV was diagnosed                             | Num ### |                 |                   |
| CD4                   | CD4 Count                     | If the patient is HIV-positive, what is their CD4 count at treatment start (cells/μL)? | Num ### |                 |                   |
| VIRALLOAD             | Viral Load                    | If the patient is HIV-positive, what is their viral load at treatment start (copies/ml) | Num ### |                 |                   |
| ART                   | Use of Antiretroviral Treatment| If the patient is HIV-positive, are they on antiretroviral treatment?                | Category | Y               | Yes               |
|                       |                               |                                                                                        |          | N               | No                |
|                       |                               |                                                                                        |          | U               | Unknown           |
| ART_STARTYEAR         | Year Antiretroviral Treatment Started | If the patient is on antiretroviral treatment, what year did they start? | Num ### |                 |                   |
| ART_REGIMEN           | Antiretroviral Treatment Regimen | What is the antiretroviral treatment regimen? List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char     |                 |                   |
| Field             | Variable                                         | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|------------------|--------------------------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| PASTTX           | Previous Treatment                                | Has the patient ever received tuberculosis treatment for >30 d?                        | Category | Y    | Yes             |
|                  |                                                  |                                                                                        |        | N    | No              |
| RECEIVEDFLD      | Previous Treatment with First-Line Drugs          | If the patient has received previous tuberculosis treatment, was treatment with first-line drugs given for >30 d? | Category | Y    | Yes             |
|                  |                                                  |                                                                                        |        | N    | No              |
| RECEIVEDSLD      | Previous Treatment with Second-Line Drugs         | If the patient has received previous tuberculosis treatment, was treatment with second-line drugs given for >30 d? | Category | Y    | Yes             |
|                  |                                                  |                                                                                        |        | N    | No              |
| YEARPASTTX1*     | Year of Most Recent Previous Treatment            | The year the patient most recently received previous tuberculosis treatment            | Num ### |      |                 |
| REGIMENPASTTX1*  | Regimen Used for Most Recent Previous Treatment   | The drug-regimen given to the patient during the most recent previous tuberculosis treatment. List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char   |      |                 |
| OUTPASTTX1*      | End-of-Treatment Outcome for Most Recent Previous Treatment | The end-of-treatment outcome recorded for the patient at the end of their most recent previous tuberculosis treatment. | Category |      |                 |
|                  |                                                  |                                                                                        |        | Cure | Cure             |
|                  |                                                  |                                                                                        |        | Complete | Completed Treatment |
|                  |                                                  |                                                                                        |        | Fail | Treatment Failure |
|                  |                                                  |                                                                                        |        | Lost | Lost to Follow-up |
|                  |                                                  |                                                                                        |        | U    | Unknown          |
| YEARPASTTX2*     | Year of Second-Most Recent Previous Treatment     | The year the patient received previous tuberculosis treatment for their second-most recent treatment episode. | Num ### |      |                 |
| REGIMENPASTTX2*  | Regimen Used for Second-Most Recent Previous Treatment | The drug-regimen given to the patient during the second-most recent previous tuberculosis treatment. List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char   |      |                 |
| OUTPASTTX2*      | End-of-Treatment Outcome for Second-Most Recent Previous Treatment | The end-of-treatment outcome recorded for the patient at the end of their second-most recent previous tuberculosis treatment. | Category |      |                 |
|                  |                                                  |                                                                                        |        | Cure | Cure             |
|                  |                                                  |                                                                                        |        | Complete | Completed Treatment |
|                  |                                                  |                                                                                        |        | Fail | Treatment Failure |
|                  |                                                  |                                                                                        |        | Lost | Lost to Follow-up |
|                  |                                                  |                                                                                        |        | U    | Unknown          |

*Fields need to be completed only if previous treatment has been administered.*
| Field       | Variable                                      | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|------------|-----------------------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|------------------|
| DISEASE_SITE | Site of Tuberculosis Disease                  | The site of tuberculosis disease diagnosed in the patient                                | Category | PTB Pulmonary TB | EPTB Extrapulmonary TB |
| EXTRAPULM_SITE | Primary Site of Extrapulmonary Tuberculosis | If extrapulmonary tuberculosis is diagnosed, the primary site affected                  | Category | Miliary Miliary TB | Genital Genitourinary TB |
|            |                                               |                                                                                        |        | CNS Central Nervous System TB | Periton TB Peritonitis |
|            |                                               |                                                                                        |        | Pericar TB Pericarditis     | Lymph TB Lymphadenitis |
|            |                                               |                                                                                        |        | Pleural Pleural TB          | GI Gastrointestinal TB |
|            |                                               |                                                                                        |        | Bone Bone TB               | Bone Bone TB |
|            |                                               |                                                                                        |        | Joint Joint TB             | Joint Joint TB |
| CAVITATION_BASE* | Lung Cavitation               | Was there presence of lung cavitation on chest x-ray at treatment start?               | Category | Y Yes | N No | U Unknown |
| BILATERAL_BASE* | Bilateral Disease        | Was there presence of bilateral disease on chest X-ray at treatment start?              | Category | Y Yes | N No | U Unknown |
| AFB_BASE    | Acid-Fast Bacilli Smear Result               | What was the patient’s acid-fast bacilli smear result (taken ≤1 mo after treatment start)? Consider all samples taken over this time frame and consider positive if any were positive (i.e., scanty or greater). | Category | Pos Positive | Neg Negative | Contam Contaminated | ND Not Done |
| CULTURE_BASE | Sputum Culture Result                       | What was the patient’s sputum culture result (taken ≤1 mo after treatment start)? Consider all samples taken over this frame and consider positive if any were positive. | Category | Pos Positive | Neg Negative | Contam Contaminated | ND Not Done |
| CULTUREMEDIA | Culture Media Used                          | If culture was done, what media was used for the result reported?                       | Category | Solid Solid Media | Liquid Liquid Media |

*Baseline refers to any evidence of cavitation or bilateral disease within 30 d of treatment start.
| Field* | Variable | Additional Information | Format | Category Coding | Category Labeling |
|--------|----------|------------------------|--------|-----------------|-------------------|
| GENOTYPIC_USED | Genotypic DST Used | Were genotypic DST techniques used? | Category | Y | Yes |
| | | | | N | No |
| XPERT_BASE | Gene Xpert Used | Was Gene Xpert used for diagnosis? | Category | Y | Yes |
| | | | | N | No |
| DATE_XPERT | Date of Gene Xpert | Date of Gene Xpert used for diagnosis <mm/dd/yy> | Date | | |
| XPERT_MTRESULT_BASE | Gene Xpert MTB Result | What was the result for MTB on Gene Xpert? | Category | | |
| XPERT_RIFRESULT_BASE | Gene Xpert Rifampin Resistance Result | What was the result for rifampin resistance on Gene Xpert? | Category | | |
| FIRSTLINE_LPA_BASE | First-Line LPA Used | Was first-line LPA used after TB diagnosis? | Category | Y | Yes |
| | | | | N | No |
| DATE_FIRSTLINE_LPA | Date of First-Line LPA | Date of first-line LPA used after TB diagnosis <mm/dd/yy> | Date | | |
| FIRSTLINE_LPA_MTB_BASE | First-Line LPA MTB Result | What was the result for MTB on first-line LPA? | Category | Pos | Positive |
| | | | | Neg | Negative |
| | | | | Contam | Contaminated |
| FIRSTLINE_LPA_H_BASE | First-Line LPA Isoniazid Resistance Result | What was the result for isoniazid resistance on first-line LPA? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| FIRSTLINE_LPA_R_BASE | First-Line LPA Rifampin Resistance Result | What was the result for rifampin resistance on first-line LPA? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| SECONDLINE_LPA_BASE | Second-Line LPA Used | Was second-line LPA performed after TB diagnosis? | Category | Y | Yes |
| | | | | N | No |
| DATE_SECONDLINE_LPA | Date of Second-Line LPA | Date of second-line LPA used after TB diagnosis <mm/dd/yy> | Date | | |
| SECONDLINE_LPA_MTB_BASE | Second-Line LPA MTB Result | What was the result for MTB on second-line LPA? | Category | Pos | Positive |
| | | | | Neg | Negative |
| | | | | Contam | Contaminated |
| SECONDLINE_LPA_SLI_BASE | Second-Line LPA Second-Line Injectable Resistance Result | What was the result for second-line injectable resistance on second-line LPA? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| SECONDLINE_LPA_FQ_BASE | Second-Line LPA Fluoroquinolone Resistance Result | What was the result for fluoroquinolone resistance on second-line LPA? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |

*Baseline DST refers to any sample taken within 90 d of treatment start, up to 30 d after treatment start. Every effort should be made to have reliable DST results; if genotypic tests are not used, phenotypic tests should be performed. If genotypic techniques for detection other than those listed in this table are in use (e.g., pncA for pyrazinamide), they may be appended to this section in a similar format (e.g., Test Done, Date of Test, Results of Test).
| Field* | Variable | Additional Information | Format | Category Coding | Category Labeling |
|--------|----------|------------------------|--------|-----------------|------------------|
| PHENODST | Phenotypic DST Done | Was phenotypic DST performed? | Category | Y | Yes |
| DATE_PHENODST | Date of Phenotypic DST | Date of phenotypic DST done after TB diagnosis <mm/dd/yy> | Date |
| DST_H_BASE | Isoniazid Resistance Result | What was the result for isoniazid resistance (MIC >0.1–0.2 μg/ml on MGIT) on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_HIGHH_BASE | High-Level Isoniazid Resistance Result | What was the result for high-level isoniazid resistance (MIC >1–2 μg/ml on MGIT) on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_R_BASE | Rifampin Resistance Result | What was the result for rifampin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_E_BASE | Ethambutol Resistance Result | What was the result for ethambutol resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_Z_BASE | Pyrazinamide Resistance Result | What was the result for pyrazinamide resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_AM_BASE | Amikacin Resistance Result | What was the result for amikacin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_KM_BASE | Kanamycin Resistance Result | What was the result for kanamycin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_CM_BASE | Capreomycin Resistance Result | What was the result for capreomycin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_OFX_BASE | Ofloxacin Resistance Result | What was the result for ofloxacin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_CFX_BASE | Ciprofloxacin Resistance Result | What was the result for ciprofloxacin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_MFX_BASE | Moxifloxacin Resistance Result | What was the result for moxifloxacin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_LFX_BASE | Levofloxacin Resistance Result | What was the result for levofloxacin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_S_BASE | Streptomycin Resistance Result | What was the result for streptomycin resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_ETO_BASE | Ethionamide Resistance Result | What was the result for ethionamide resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| | | | | ND | Not Done |
| DST_PTO_BASE | Prothionamide Resistance Result | What was the result for prothionamide resistance on phenotypic DST? | Category | R | Resistant |
| | | | | S | Susceptible |
| | | | | Contam | Contaminated |
| Field* | Variable                        | Additional Information                                      | Format | Category Coding | Category Labeling |
|--------|---------------------------------|-------------------------------------------------------------|--------|-----------------|-------------------|
| DST_CS_BASE | Cycloserine Resistance Result | What was the result for cycloserine resistance on phenotypic DST? | Category | ND | Not Done |
| DST_TRD_BASE | Terizidone Resistance Result | What was the result for terizidone resistance on phenotypic DST? | Category | R | Resistant |
| DST_PAS_BASE | Para-Amino-Salicylic Acid Resistance Result | What was the result for para-aminosalicylic acid resistance on phenotypic DST? | Category | S | Susceptible |
| DST_LZD_BASE | Linezolid Resistance Result | What was the result for linezolid resistance on phenotypic DST? | Category | Contam | Contaminated |
| DST_CFZ_BASE | Clofazimine Resistance Result | What was the result for clofazimine resistance on phenotypic DST? | Category | R | Resistant |
| DST_BDQ_BASE | Bedaquiline Resistance Result | What was the result for bedaquiline resistance on phenotypic DST? | Category | S | Susceptible |
| DST_DLM_BASE | Delamanid Resistance Result | What was the result for delamanid resistance on phenotypic DST? | Category | Contam | Contaminated |

*Baseline DST refers to any sample taken within 90 d of treatment start, up to 30 d after treatment start. Additional drugs for which phenotypic DST is available can be reported (e.g., Pretomanid). Within all shared data, the method and critical concentration used for each drug must be recorded.
| Field                | Variable                        | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|----------------------|---------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| FOLLOWUP_DST         | Follow-up DST Performed         | Was there follow-up DST performed?                                                      | Category | Y               | Yes               |
| FOLLOWUPDST1_DATE*   | Date of First Follow-up DST     | Date of first follow-up DST <mm/dd/yy>                                                | Date   | N               | No                |
| FOLLOWUPDST_RES1     | Resistant Isolates on First     | List newly discovered resistances not found on baseline DST, due to missingness or     | Char   |                 |                   |
|                      | Follow-up DST                   | baseline susceptibility. If none discovered, list "no change in DST." List each drug, |        |                 |                   |
|                      |                                 | separated by a comma, using the provided abbreviations with this dictionary.          |        |                 |                   |
| FOLLOWUPDST_SUS1     | Susceptible Isolates on First   | List newly discovered susceptible drugs not found on baseline DST, due to missingness | Char   |                 |                   |
|                      | Follow-up DST                   | or baseline resistance. If none discovered, list "no change in DST." List each drug, |        |                 |                   |
|                      |                                 | separated by a comma, using the provided abbreviations with this dictionary.          |        |                 |                   |
| ACQUIRED_RESISTANCE† | Acquired Drug Resistance        | List the drugs that the strain was shown to acquire resistance to during any follow-up | Char   |                 |                   |
|                      |                                 | DST (defined as previously identified susceptibility and subsequent resistance on    |        |                 |                   |
|                      |                                 | follow-up DST). List each drug, separated by a comma, using the provided              |        |                 |                   |
|                      |                                 | abbreviations with this dictionary.                                                    |        |                 |                   |

*Additional follow-up DST results can be entered following a similar format.
†Acquired resistance can be reported in a separate row but is not necessary as it can be calculated by the data analyst with the above collected data.
| Field                      | Variable                      | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|----------------------------|-------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|------------------|
| STARTINGREGIMENTYPE        | Regimen Type at Start of Treatment | List the starting regimen type: short (intended duration ≤12 mo) or long (intended duration ≥18 mo) | Category | Short           | Short Regimen    |
|                            |                               |                                                                                        |        | Long            | Long Regimen     |
| TXSTART_DATE               | Treatment Start Date          | Date of second-line drug initiation in this treatment episode <mm/dd/yy>                | Date   |                 |                  |
| INITIAL_REGIMEN            | Starting Treatment Regimen    | List the drugs the patient is on at the start of treatment. List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char   |                 |                  |
| H_START                    | Isoniazid Start Date          | Date standard-dose isoniazid was introduced into the patient’s regimen. <mm/dd/yy>          | Date   |                 |                  |
| H_STOP                     | Isoniazid End Date            | Date standard-dose isoniazid was permanently removed from the patient’s regimen <mm/dd/yy>    | Date   |                 |                  |
| HIGHH_START                | High-Dose Isoniazid Start Date | Date high-dose isoniazid was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                  |
| HIGHH_STOP                 | High-Dose Isoniazid End Date  | Date high-dose isoniazid was permanently removed from the patient’s regimen <mm/dd/yy>       | Date   |                 |                  |
| E_START                    | Ethambutol Start Date         | Date ethambutol was introduced into the patient’s regimen. <mm/dd/yy>                       | Date   |                 |                  |
| E_STOP                     | Ethambutol End Date           | Date ethambutol was permanently removed from the patient’s regimen <mm/dd/yy>               | Date   |                 |                  |
| Z_START                    | Pyrazinamide Start Date       | Date pyrazinamide was introduced into the patient’s regimen. <mm/dd/yy>                    | Date   |                 |                  |
| Z_STOP                     | Pyrazinamide End Date         | Date pyrazinamide was permanently removed from the patient’s regimen <mm/dd/yy>             | Date   |                 |                  |
| S_START                    | Streptomycin Start Date       | Date streptomycin isoniazid was introduced into the patient’s regimen. <mm/dd/yy>           | Date   |                 |                  |
| S_STOP                     | Streptomycin End Date         | Date streptomycin was permanently removed from the patient’s regimen <mm/dd/yy>             | Date   |                 |                  |
| RFB_START                  | Rifabutin Start Date          | Date rifabutin was introduced into the patient’s regimen. <mm/dd/yy>                       | Date   |                 |                  |
| RFB_STOP                   | Rifabutin End Date            | Date rifabutin was permanently removed from the patient’s regimen <mm/dd/yy>               | Date   |                 |                  |
| AM_START                   | Amikacin Start Date           | Date amikacin was introduced into the patient’s regimen. <mm/dd/yy>                        | Date   |                 |                  |
| AM_STOP                    | Amikacin End Date             | Date amikacin was permanently removed from the patient’s regimen <mm/dd/yy>                | Date   |                 |                  |
| KM_START                   | Kanamycin Start Date          | Date kanamycin was introduced into the patient’s regimen. <mm/dd/yy>                       | Date   |                 |                  |
| KM_STOP                    | Kanamycin End Date            | Date kanamycin was permanently removed from the patient’s regimen <mm/dd/yy>               | Date   |                 |                  |
| Field     | Variable                      | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|-----------|-------------------------------|---------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| CM_START  | Capreomycin Start Date        | Date capreomycin was introduced into the patient’s regimen. <mm/dd/yy>                | Date   |                 |                   |
| CM_STOP   | Capreomycin End Date          | Date capreomycin was permanently removed from the patient’s regimen <mm/dd/yy>        | Date   |                 |                   |
| OFX_START | Ofloxacin Start Date          | Date ofloxacin was introduced into the patient’s regimen. <mm/dd/yy>                 | Date   |                 |                   |
| OFX_STOP  | Ofloxacin End Date            | Date ofloxacin was permanently removed from the patient’s regimen <mm/dd/yy>         | Date   |                 |                   |
| CFX_START | Ciprofloxacin Start Date      | Date ciprofloxacin was introduced into the patient’s regimen. <mm/dd/yy>             | Date   |                 |                   |
| CFX_STOP  | Ciprofloxacin End Date        | Date ciprofloxacin was permanently removed from the patient’s regimen <mm/dd/yy>     | Date   |                 |                   |
| MFX_START | Moxifloxacin Start Date       | Date moxifloxacin was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                   |
| MFX_STOP  | Moxifloxacin End Date         | Date moxifloxacin was permanently removed from the patient’s regimen <mm/dd/yy>      | Date   |                 |                   |
| LFX_START | Levofloxacin Start Date       | Date levofloxacin was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                   |
| LFX_STOP  | Levofloxacin End Date         | Date levofloxacin was permanently removed from the patient’s regimen <mm/dd/yy>      | Date   |                 |                   |
| GFX_START | Gatifloxacin Start Date       | Date gatifloxacin was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                   |
| GFX_STOP  | Gatifloxacin End Date         | Date gatifloxacin was permanently removed from the patient’s regimen <mm/dd/yy>      | Date   |                 |                   |
| SFX_START | Sparfloxacin Start Date       | Date sparfloxacin was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                   |
| SFX_STOP  | Sparfloxacin End Date         | Date sparfloxacin was permanently removed from the patient’s regimen <mm/dd/yy>      | Date   |                 |                   |
| ETO_START | Ethionamide Start Date        | Date ethionamide was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                   |
| ETO_STOP  | Ethionamide End Date          | Date ethionamide was permanently removed from the patient’s regimen <mm/dd/yy>      | Date   |                 |                   |
| PTO_START | Prothionamide Start Date      | Date prothionamide was introduced into the patient’s regimen. <mm/dd/yy>            | Date   |                 |                   |
| PTO_STOP  | Prothionamide End Date        | Date prothionamide was permanently removed from the patient’s regimen <mm/dd/yy>    | Date   |                 |                   |
| CS_START  | Cycloserine Start Date        | Date cycloserine was introduced into the patient’s regimen. <mm/dd/yy>              | Date   |                 |                   |
| CS_STOP   | Cycloserine End Date          | Date cycloserine was permanently removed from the patient’s regimen <mm/dd/yy>      | Date   |                 |                   |
| TRD_START | Terizidone Start Date         | Date terizidone was introduced into the patient’s regimen. <mm/dd/yy>               | Date   |                 |                   |
| Field      | Variable                                    | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|------------|---------------------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| TRD_STOP   | Terizidone End Date                         | Date terizidone was permanently removed from the patient’s regimen.                   | Date   | Date            | Date              |
| PAS_START  | Para-Aminosalicylic Acid Start Date         | Date para-aminosalicylic acid was introduced into the patient’s regimen.              | Date   | Date            | Date              |
| PAS_STOP   | Para-Aminosalicylic Acid End Date           | Date para-aminosalicylic acid was permanently removed from the patient’s regimen.     | Date   | Date            | Date              |
| LZD_START  | Linezolid Start Date                        | Date linezolid was introduced into the patient’s regimen.                              | Date   | Date            | Date              |
| LZD_STOP   | Linezolid End Date                          | Date linezolid was permanently removed from the patient’s regimen.                    | Date   | Date            | Date              |
| CFZ_START  | Clofazimine Start Date                      | Date clofazimine was introduced into the patient’s regimen.                            | Date   | Date            | Date              |
| CFZ_STOP   | Clofazimine End Date                        | Date clofazimine was permanently removed from the patient’s regimen.                  | Date   | Date            | Date              |
| AMXCLV_START | Amoxicillin and Clavulanic Acid Start Date    | Date amoxicillin and clavulanic acid was introduced into the patient’s regimen.       | Date   | Date            | Date              |
| AMXCLV_STOP | Amoxicillin and Clavulanic Acid End Date     | Date amoxicillin and clavulanic acid was permanently removed from the patient’s regimen | Date   | Date            | Date              |
| IPM_START  | Imipenem-Cilastatin Start Date              | Date imipenem-cilastatin was introduced into the patient’s regimen.                   | Date   | Date            | Date              |
| IPM_STOP   | Imipenem-Cilastatin End Date                | Date imipenem-cilastatin was permanently removed from the patient’s regimen.          | Date   | Date            | Date              |
| MPM_START  | Meropenem Start Date                         | Date meropenem was introduced into the patient’s regimen.                              | Date   | Date            | Date              |
| MPM_STOP   | Meropenem End Date                          | Date meropenem was permanently removed from the patient’s regimen.                    | Date   | Date            | Date              |
| BDQ_START  | Bedaquiline Start Date                      | Date bedaquiline was introduced into the patient’s regimen.                            | Date   | Date            | Date              |
| BDQ_STOP   | Bedaquiline End Date                        | Date bedaquiline was permanently removed from the patient’s regimen.                  | Date   | Date            | Date              |
| DLM_START  | Delamanid Start Date                        | Date delamanid was introduced into the patient’s regimen.                              | Date   | Date            | Date              |
| DLM_STOP   | Delamanid End Date                          | Date delamanid was permanently removed from the patient’s regimen.                    | Date   | Date            | Date              |
| PA_START   | Pretomanid Start Date                       | Date pretomanid was introduced into the patient’s regimen.                             | Date   | Date            | Date              |
| PA_STOP    | Pretomanid End Date                         | Date pretomanid was permanently removed from the patient’s regimen.                   | Date   | Date            | Date              |
| PCZ_START  | Perchlorzone Start Date                     | Date perchlozone was introduced into the patient’s regimen.                            | Date   | Date            | Date              |
### Regimen Information*

| Field                               | Variable                        | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|-------------------------------------|---------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| PCZ_STOP                            | Perchlozone End Date            | Date perchlozone was permanently removed from the patient’s regimen <mm/dd/yy>          | Date   |                 |                   |
| TXEND_DATE                          | Treatment End Date              | Date treatment ended in this treatment episode <mm/dd/yy>                              | Date   |                 |                   |
| DURATION_CHANGE                     | Intended Duration of Regimen Changed | If the patient started on a short regimen, did they switch to a long regimen?   | Y      | Yes             |                   |
|                                    |                                 |                                                                                        | N      | No              |                   |
| CHANGE_DATE                         | Date of Regimen Duration Change | The date the patient changed from a short regimen to a long regimen <mm/dd/yy>    | Date   |                 |                   |
| CHANGE_REASON                       | Reason the Regimen Duration Changed | What was the reason the regimen duration changed? This may include: in response to drug susceptibility testing, treatment non-response, drug availability, drug tolerability, or other. | DST    | Drug Resistance |                   |
|                                    |                                 |                                                                                        | NoResp | Non-Response    |                   |
|                                    |                                 |                                                                                        | AE     | Tolerability     |                   |
|                                    |                                 |                                                                                        | Avail  | Drug Availability |                   |
|                                    |                                 |                                                                                        | Other  | Other           |                   |

*For drugs not used in the regimen, their coding can remain blank. Stop dates must refer to the date that the drug was permanently withdrawn from the regimen. New rows can be added to accommodate drugs not contained in this table.

### Treatment Information

| Field         | Variable                        | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|---------------|---------------------------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| TXDUR_DAYS    | Treatment Duration              | Total number of days of treatment, from first to last dose taken                        | Num###|                 |                   |
| DOT           | Directly Observed Therapy       | Was directly observed therapy used?                                                    | Category | Y     | Yes             |
|               |                                 |                                                                                        |        | N     | No              |
| DOT_TYPE      | Type of Directly Observed Therapy | State the type of directly observed therapy used. Virtual includes methods such as video, mobile text, or medication monitoring, among others. | Category | Comm | Community        |
|               |                                 |                                                                                        |        | Hosp | Hospital        |
|               |                                 |                                                                                        |        | Pharm | Pharmacy        |
|               |                                 |                                                                                        |        | Virtual | Virtual |
| DOT_FREQUENCY | Frequency of DOT Visits         | How many days per week is DOT provided to the patient (range 0–7 d)                   | Num###|                 |                   |
| SUPPORT       | Patient Support Provided        | What form of patient support was provided to patients? This may include support from employers (job security), nutritional support, financial support, or others. If more than one form, please select multiple. | Category | Employ | Employment     |
|               |                                 |                                                                                        |        | Nutri | Nutritional     |
|               |                                 |                                                                                        |        | Finance | Financial      |
|               |                                 |                                                                                        |        | Other | Other           |
|               |                                 |                                                                                        |        | Multi | Multiple        |
|               |                                 |                                                                                        |        | None | None            |
| Field         | Variable                  | Additional Information                                      | Format | Category Coding | Category Labeling |
|--------------|---------------------------|-------------------------------------------------------------|--------|-----------------|-------------------|
| SURGERY      | Lung Resection Surgery    | Did the patient have lung resection surgery related to MDR/RR-TB? | Category | Y Yes            |                   |
|              |                           |                                                             |        | N No             |                   |
|              |                           |                                                             |        | U Unknown        |                   |
| SURGTYPE     | Type of Lung Resection Surgery | What was the type of lung resection surgery? | Lobe   | Lobectomy       |                   |
|              |                           |                                                             | Pneu   | Pneumonectomy    |                   |
|              |                           |                                                             | Wedge  | Wedge Resection  |                   |
|              |                           |                                                             | Other   | Other            |                   |
|              |                           |                                                             | U       | Unknown          |                   |
| SURG_DATE    | Date of Surgery           | What was the date of surgery?                              | Date   |                 |                   |
| HOSP         | Hospitalization           | Was the patient hospitalized at any point during treatment? | Category | Y Yes            |                   |
|              |                           |                                                             |        | N No             |                   |
|              |                           |                                                             |        | U Unknown        |                   |
| HOSPEPISODES | Number of Hospitalization Episodes | What is the total number of hospitalization episodes during treatment? | Num ### |                 |                   |
| HOSPDUR_DAYS | Total Hospitalization Duration | What is the total duration of hospitalization during treatment? | Num ### |                 |                   |
| Field* | Variable | Additional Information | Format | Category Coding | Category Labeling |
|--------|----------|-------------------------|--------|-----------------|------------------|
| AE1    | First Adverse Event | Did the patient experience a serious adverse event and/or permanently stop the drug | Category | SAE | Serious Adverse Event |
|        |          |                         | Perm   | Permanently Stop |
|        |          |                         | Both   | Both            |
| AE1_DATE | Date of First Adverse event | What was the date of the permanent discontinuation of the drug(s)? | Date |
| AE1_DRUG | Drug Responsible for First Adverse Event | List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char |
| AE1_GRADE | Grade of First Adverse Event | What was the grade of the first adverse event? | Num ### |
| AE1_SYSTEMORGAN | System / Organ Class Affected by First Adverse Event | Which system / organ classes were affected by the first adverse event? List each system / organ class, separated by a comma, using the list provided with this dictionary. | Char |
| AE1_OUTCOME | Outcome of First Adverse Event | What was the outcome of the first adverse event? | Category | Recov | Recovered |
|        |          |                         | NoRecov | Not Recovered |
|        |          |                         | Died    | Died            |
|        |          |                         | U       | Unknown         |
| AE2    | Second Adverse Event | Did the patient experience a serious adverse event and/or permanently stop the drug | Category | SAE | Serious Adverse Event |
|        |          |                         | Perm    | Permanently Stop |
|        |          |                         | Both    | Both            |
| AE2_DATE | Date of Second Adverse event | What was the date of the permanent discontinuation of the drug(s)? | Date |
| AE2_DRUG | Drug Responsible for Second Adverse Event | List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char |
| AE2_GRADE | Grade of Second Adverse Event | What was the grade of the second adverse event? | Num ### |
| AE2_SYSTEMORGAN | System / Organ Class Affected by Second Adverse Event | Which system / organ classes were affected by the second adverse event? List each system / organ class, separated by a comma, using the list provided with this dictionary. | Char |
| AE2_OUTCOME | Outcome of Second Adverse Event | What was the outcome of the second adverse event? | Category | Recov | Recovered |
|        |          |                         | NoRecov | Not Recovered |
|        |          |                         | Died    | Died            |
|        |          |                         | U       | Unknown         |
| AE3    | Third Adverse Event | Did the patient experience a serious adverse event and/or permanently stop the drug | Category | SAE | Serious Adverse Event |
|        |          |                         | Perm    | Permanently Stop |
|        |          |                         | Both    | Both            |
| AE3_DATE | Date of Third Adverse event | What was the date of the permanent discontinuation of the drug(s)? | Date |
| AE3_DRUG | Drug Responsible for Third Adverse Event | List each drug, separated by a comma, using the provided abbreviations with this dictionary. | Char |
| AE3_GRADE | Grade of Third Adverse Event | What was the grade of the third adverse event? | Num ### |
| AE3_SYSTEMORGAN | System / Organ Class Affected by Third Adverse Event | Which system / organ classes were affected by the third adverse event? List each system / organ class, separated by a comma, using the list provided with this dictionary. | Char |
| AE3_OUTCOME | Outcome of Third Adverse Event | What was the outcome of the third adverse event? | Category | Recov | Recovered |
|        |          |                         | NoRecov | Not Recovered |
|        |          |                         | Died    | Died            |
|        |          |                         | U       | Unknown         |

*Additional adverse event entries can be entered following the same format.*
| Field          | Variable                          | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|---------------|-----------------------------------|-----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| CULTURE_MONTH1| Culture Result Month 1            | What is the culture result for the sputum sample tested during month 1?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH2| Culture Result Month 2            | What is the culture result for the sputum sample tested during month 2?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH3| Culture Result Month 3            | What is the culture result for the sputum sample tested during month 3?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH4| Culture Result Month 4            | What is the culture result for the sputum sample tested during month 4?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH5| Culture Result Month 5            | What is the culture result for the sputum sample tested during month 5?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH6| Culture Result Month 6            | What is the culture result for the sputum sample tested during month 6?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH7| Culture Result Month 7            | What is the culture result for the sputum sample tested during month 7?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH8| Culture Result Month 8            | What is the culture result for the sputum sample tested during month 8?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH9| Culture Result Month 9            | What is the culture result for the sputum sample tested during month 9?                  | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH10| Culture Result Month 10          | What is the culture result for the sputum sample tested during month 10?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH11| Culture Result Month 11          | What is the culture result for the sputum sample tested during month 11?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH12| Culture Result Month 12          | What is the culture result for the sputum sample tested during month 12?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH13| Culture Result Month 13          | What is the culture result for the sputum sample tested during month 13?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH14| Culture Result Month 14          | What is the culture result for the sputum sample tested during month 14?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH15| Culture Result Month 15          | What is the culture result for the sputum sample tested during month 15?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
|               |                                   |                                                                                        |        | ND              | Not Done          |
| CULTURE_MONTH16| Culture Result Month 16          | What is the culture result for the sputum sample tested during month 16?                 | Category | Pos             | Positive          |
|               |                                   |                                                                                        |        | Neg             | Negative          |
|               |                                   |                                                                                        |        | Contam          | Contaminated      |
| Field          | Variable          | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|---------------|-------------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| CULTURE_MONTH17 | Culture Result    | What is the culture result for the sputum sample tested during month 17?                | Category | ND | Not Done         |
| CULTURE_MONTH18 | Month 18          |                                                                                       | Category | Pos | Positive         |
| CULTURE_MONTH19 | Culture Result    | What is the culture result for the sputum sample tested during month 18?                | Category | Neg | Negative         |
| CULTURE_MONTH20 | Month 19          |                                                                                       | Category | Contam | Contaminated    |
| CULTURE_MONTH21 | Culture Result    | What is the culture result for the sputum sample tested during month 20?                | Category | ND | Not Done         |
| CULTURE_MONTH22 | Month 21          |                                                                                       | Category | Pos | Positive         |
| CULTURE_MONTH23 | Culture Result    | What is the culture result for the sputum sample tested during month 21?                | Category | Neg | Negative         |
| CULTURE_MONTH24 | Month 22          |                                                                                       | Category | Contam | Contaminated    |
| CULTURE_MONTH25 | Culture Result    | What is the culture result for the sputum sample tested during month 23?                | Category | ND | Not Done         |
| CULTURE_MONTH26 | Month 23          |                                                                                       | Category | Pos | Positive         |
| CULTURE_MONTH27 | Culture Result    | What is the culture result for the sputum sample tested during month 24?                | Category | Neg | Negative         |
| CULTURE_MONTH28 | Month 24          |                                                                                       | Category | Contam | Contaminated    |

*Month 1 refers to the result of the sample taken between day 31 and 60 that is closest to day 31 and valid (i.e., Positive or Negative); Month 2 refers to the sample taken between day 61 and 90 that is closest to day 61 and valid (i.e., Positive or Negative); the remaining months follow the same pattern. Any MTB colonies seen should be considered positive. If multiple samples are taken on a given day, a positive-dominant approach should be taken, whereby a patient is positive if a single positive sample is found. A patient sample should only be classified as contaminated if all samples from that month were contaminated.
| Field          | Variable             | Additional Information                                                                 | Format  | Category Coding | Category Labeling |
|---------------|----------------------|--------------------------------------------------------------------------------------------|---------|-----------------|-------------------|
| SMEAR_MONTH1  | Smear Result Month 1 | What is the smear result for the sputum sample tested during month 1?                    | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH2  | Smear Result Month 2 | What is the smear result for the sputum sample tested during month 2?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH3  | Smear Result Month 3 | What is the smear result for the sputum sample tested during month 3?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH4  | Smear Result Month 4 | What is the smear result for the sputum sample tested during month 4?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH5  | Smear Result Month 5 | What is the smear result for the sputum sample tested during month 5?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH6  | Smear Result Month 6 | What is the smear result for the sputum sample tested during month 6?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH7  | Smear Result Month 7 | What is the smear result for the sputum sample tested during month 7?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH8  | Smear Result Month 8 | What is the smear result for the sputum sample tested during month 8?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH9  | Smear Result Month 9 | What is the smear result for the sputum sample tested during month 9?                   | Category| Pos             | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH10 | Smear Result Month 10| What is the smear result for the sputum sample tested during month 10?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH11 | Smear Result Month 11| What is the smear result for the sputum sample tested during month 11?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH12 | Smear Result Month 12| What is the smear result for the sputum sample tested during month 12?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH13 | Smear Result Month 13| What is the smear result for the sputum sample tested during month 13?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH14 | Smear Result Month 14| What is the smear result for the sputum sample tested during month 14?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH15 | Smear Result Month 15| What is the smear result for the sputum sample tested during month 15?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
|               |                      |                                                                             |         | Contam           | Contaminated      |
|               |                      |                                                                             |         | ND              | Not Done          |
| SMEAR_MONTH16 | Smear Result Month 16| What is the smear result for the sputum sample tested during month 16?                  | Category| Pos            | Positive          |
|               |                      |                                                                             |         | Neg             | Negative          |
### Follow-Up Smear Microscopy Results*

| Field         | Variable       | Additional Information                                                                 | Format | Category Coding | Category Labeling |
|---------------|----------------|----------------------------------------------------------------------------------------|--------|-----------------|-------------------|
| SMEAR_MONTH17 | Smear Result Month 17 | What is the smear result for the sputum sample tested during month 1??                  | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH18 | Smear Result Month 18 | What is the smear result for the sputum sample tested during month 1??                  | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH19 | Smear Result Month 19 | What is the smear result for the sputum sample tested during month 1??                  | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH20 | Smear Result Month 20 | What is the smear result for the sputum sample tested during month 20??                 | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH21 | Smear Result Month 21 | What is the smear result for the sputum sample tested during month 21??                 | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH22 | Smear Result Month 22 | What is the smear result for the sputum sample tested during month 22??                 | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH23 | Smear Result Month 23 | What is the smear result for the sputum sample tested during month 23??                 | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |
| SMEAR_MONTH24 | Smear Result Month 24 | What is the smear result for the sputum sample tested during month 24??                 | Category | Pos Positive |                  |
|               |                |                                                                                        |        | Neg Negative    |                  |
|               |                |                                                                                        |        | Contam Contaminated |                  |
|               |                |                                                                                        |        | ND Not Done     |                  |

*Any acid-fast bacilli seen should be considered positive. Month 1 refers to the result of the sample taken between day 31 and 60 that is closest to day 31 and valid (i.e., Positive or Negative); Month 2 refers to the sample taken between day 61 and 90 that is closest to day 61 and valid (i.e., Positive or Negative); the remaining months follow the same pattern. If multiple samples are taken within a given day, a positive-dominant approach should be taken, whereby a patient is positive if a single positive sample is found. A patient sample should be classified as contaminated only if all samples from that month were contaminated.
| Field            | Variable                           | Additional Information                                                                                                                                                                                                 | Format      | Category Coding | Category Labeling                  |
|------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------|------------------------------------|
| OUTCOME_DEFINITION | End-of-Treatment Outcome Definition | Specify the guideline year the outcome definition follows—this is preferably the 2013 guidelines but can follow 2005 guidelines if not available.                                                                                           |             | WHO2013         | 2013 Definitions                   |
|                  |                                    |                                                                                             |             | WHO2005         | 2005 Definitions                   |
| OUTCOME          | End-of-Treatment Outcome           | End of treatment outcome assigned to the patient, following the outcome year specified above.                                                                                                                                   |             | Cure            | Cure                               |
|                  |                                    |                                                                                             |             | Complete        | Complete                           |
|                  |                                    |                                                                                             |             | Fail            | Treatment Failure                  |
|                  |                                    |                                                                                             |             | Death           | Death                              |
|                  |                                    |                                                                                             |             | LTFU            | Loss to Follow-Up                  |
| CULTURECONV*     | Culture Conversion                 | Did the patient culture convert (defined as two consecutive negative cultures taken at least 28 d apart)? If the patient was culture negative at baseline, list as BaseNeg.                                                                                   |             | Y               | Yes                                |
|                  |                                    |                                                                                             |             | N               | No                                 |
|                  |                                    |                                                                                             |             | BaseNeg         | Baseline Negative                  |
| CULTURECONV_DATE | Date of Culture Conversion         | If the patient culture converted, what was the date of conversion (defined as the date of the first of the two consecutive negative cultures)?                                                                                | Date        |                 |                                     |
| TWOCONV          | Culture Conversion by Month Two    | If exact date of conversion is unknown, did culture conversion occur before the end of month two?                                                                                                                                       |             | Y               | Yes                                |
|                  |                                    |                                                                                             |             | N               | No                                 |
|                  |                                    |                                                                                             |             | U               | Unknown                            |
| SIXCONV          | Culture Conversion by Month Six    | If exact date of conversion is unknown, did culture conversion occur before the end of month six?                                                                                                                                       |             | Y               | Yes                                |
|                  |                                    |                                                                                             |             | N               | No                                 |
|                  |                                    |                                                                                             |             | U               | Unknown                            |
| CULTUREREV*      | Culture Reversion                  | If patient converted or was culture negative at baseline, was there culture reversion (defined as two consecutive positive cultures taken at least 28 d apart)?                                                                                     |             | Y               | Yes                                |
|                  |                                    |                                                                                             |             | N               | No                                 |
|                  |                                    |                                                                                             |             | U               | Unknown                            |
| CULTUREREV_DATE | Date of Culture Reversion          | If patient had culture reversion, what was the date of reversion (defined as the date of the first of the two consecutive positive cultures)?                                                                                     | Date        |                 |                                     |
| RECURRENCE_MONITORING | Post-Treatment Recurrence Monitoring | Was post-treatment monitoring for recurrence performed?                                                                                     |             | Y               | Yes                                |
|                  |                                    |                                                                                             |             | N               | No                                 |
| RECURRENCE_FOLLOWUP_DUR | Duration of Recurrence Monitoring | What was the duration of recurrence monitoring, in months?                                                                                                           | Num ###     |                 |                                     |
| RECURRENCE_OUTCOME | Occurrence of Recurrence            | Did the patient experience recurrence?                                                                                                                 |             | Y               | Yes                                |
|                  |                                    |                                                                                             |             | N               | No                                 |
| RECURRENCE_DATE  | Date of Recurrence                 | What was the date of the recurrence episode?                                                                                                            | Date        |                 |                                     |
| RELAPSE_REINFECT | Relapse or Reinfection             | If resources permitted, was the recurrence classified as a true relapse or as a reinfection?                                                                                                                                   |             | Relapse         | Relapse                            |
|                  |                                    |                                                                                             |             | Reinfect        | Reinfection                        |
|                  |                                    |                                                                                             |             | U               | Unknown                            |

*These can be reported by the individual providing data or calculated by an analyst. In the instance of multiple cultures taken at the same time, a positive dominant approach should be taken, i.e., the result should be considered positive if any of the samples are positive. In the case of contaminated results, these should be discarded when calculating time to culture conversion or reversion.
Drug Abbreviations, System/Organ Classes, and End-of-Treatment Outcome Definitions

The tables contained within this section are intended to promote standardization in coding of drugs, outcomes, and adverse events.

| Tuberculosis Drug Name / Drug Class                  | Abbreviation |
|------------------------------------------------------|--------------|
| Isoniazid                                            | H            |
| Rifampin                                             | R            |
| Ethambutol                                           | E            |
| Pyrazinamide                                         | Z            |
| High Dose Isoniazid                                  | HighH        |
| Streptomycin                                         | S            |
| Rifabutin                                            | Rfb          |
| Amikacin                                             | Am           |
| Capreomycin                                          | Cm           |
| Kanamycin                                            | Km           |
| Ofloxacin                                            | Ofx          |
| Ciprofloxacin                                        | Cfx          |
| Moxifloxacin                                         | Mfx          |
| Levofloxacin                                         | Lfx          |
| Gatifloxacin                                         | Gfx          |
| Sparfloxacin                                         | Sfx          |
| Ethionamide                                          | Eto          |
| Prothionamide                                        | Ptx          |
| Cycloserine                                          | Cs           |
| Terizidone                                           | Trd          |
| Para-Aminosalicylic Acid                            | PAS          |
| Linezolid                                            | Lzd          |
| Clofazimine                                          | Cfz          |
| Amoxicillin and Clavulanic Acid                      | AmxClv       |
| Imipenem-Cilastatin                                  | Ipm          |
| Meropenem                                            | Mpm          |
| Bedaquiline                                          | Bdq          |
| Delamanid                                            | Dtm          |
| Pretomanid                                           | Pa           |
| Perchlozone                                          | Pcz          |
| Thioacetazone                                        | T            |
| Rifapentine                                          | Rpt          |
| Second Line Injectables                               | SLI          |
| Fluoroquinolones                                     | FQ           |
| Drug Name / Drug Class of Antiretroviral Therapy | Abbreviation |
|-----------------------------------------------|--------------|
| Nucleoside/Nucleotide Reverse transcription Inhibitor | NRTI |
| Abacavir | ABC |
| Didanosine | ddl |
| Emtricitabine | FTC |
| Lamivudine | 3TC |
| Stavudine | d4T |
| Tenofovir alafenamide | TAF |
| Tenofovir disoproxil fumarate | TDF |
| Zidovudine | AZT or ZDV |
| Non-nucleoside Reverse transcription Inhibitor | NNRTI |
| Delavirdine | DLV |
| Efavirenz | EFV |
| Etavirine | ETR |
| Nevirapine | NVP |
| Rilpivirine | RPV |
| Protease Inhibitor | PI |
| Amprenavir | AMV |
| Atazanavir | ATV |
| Darunavir | DRV |
| Fosamprenavir | FPV |
| Indinavir | IDV |
| Lopinavir + ritonavir | LPV/r |
| Nelfinavir | NFV |
| Saquinavir | SQV |
| Tipranavir | TPV |
| Fusion Inhibitor | FI |
| Enfuviritide | ENF or T-20 |
| CCR5 Antagonist | CCR5 |
| Maraviroc | MVC |
| Integrase Inhibitor | II |
| Bictegravir | BIC |
| Dolutegravir | DTG |
| Elvitegravir | EVG |
| Raltegravir | RAL |
### SYSTEM/ORGAN CLASS

| Blood and lymphatic system disorders |
|------------------------------------|
| Cardiac disorders                  |
| Congenital, familial and genetic disorders |
| Ear and labyrinth disorders       |
| Endocrine disorders               |
| Eye disorders                      |
| Gastrointestinal disorders        |
| General disorders and administration site conditions |
| Hepatobiliary disorders           |
| Immune system disorders           |
| Infections and infestations       |
| Injury, poisoning and procedural complications |
| Investigations                    |
| Metabolism and nutrition disorders |
| Musculoskeletal and connective tissue disorders |
| Neoplasms benign, malignant and unspecified (incl cysts and polyps) |
| Nervous system disorders          |
| Pregnancy, puerperium and perinatal conditions |
| Psychiatric disorders             |
| Renal and urinary disorders       |
| Reproductive system and breast disorders |
| Respiratory, thoracic and mediastinal disorders |
| Skin and subcutaneous tissue disorders |
| Social circumstances              |
| Surgical and medical procedures   |
| Vascular disorders                |

### WHO 2013 Outcome Definitions (Preferred)

| Outcome      | Definition                                                                                                                                 |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Cure         | Treatment completed as recommended by the national policy without evidence of failure AND three or more consecutive cultures taken at least 30 d apart are negative after the intensive phase (or Month 8 if no intensive phase). |
| Complete     | Treatment completed as recommended by the national policy without evidence of failure BUT no record that three or more consecutive cultures taken at least 30 d apart are negative after the intensive phase (or Month 8 if no intensive phase). |
| Failure*     | Treatment terminated or need for permanent regimen change of at least two anti-TB drugs because of: (1) lack of conversion by the end of the intensive phase, or (2) bacteriological reversion in the continuation phase after conversion to negative, or (3) evidence of additional acquired resistance to fluoroquinolones or second-line injectable drugs, or (4) adverse drug reactions. |
| Death        | A patient who dies for any reason during the course of treatment.                                                                           |
| Lost to Follow-up | A patient whose treatment was interrupted for 2 consecutive months or more.                                                                |

### WHO 2005 (Laserson) Outcome Definitions (if 2013 not possible)

| Outcome        | Definition                                                                                                                                 |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Cure           | Completed treatment according to program protocol and has at least five consecutive negative cultures from samples collected at least 30 d apart in the final 12 mo of treatment. If only one positive culture is reported during that time, and there is no concomitant clinical evidence of deterioration, a patient may still be considered cured, provided that this positive culture is followed by a minimum of three consecutive negative cultures taken at least 30 d apart. |
| Complete       | Completed treatment according to program protocol but does not meet the definition for cure because of lack of bacteriological results (i.e., fewer than five cultures were performed in the final 12 mo of treatment). |
| Failure        | Treatment will be considered to have failed if two or more of the five cultures recorded in the final 12 mo of therapy are positive, or if any one of the final three cultures is positive. (Treatment will also be considered to have failed if a clinical decision has been made to terminate treatment early because of poor clinical or radiological response or adverse events). |
| Death          | A patient who dies for any reason during the course of MDR/RR-TB treatment.                                                               |
| Lost to Follow-up | A patient whose treatment was interrupted for two or more consecutive months for any reason without medical approval.                |
Example of an Initial Data Sharing Agreement (Can Be Modified on a Case-By-Case Basis)

LETTER OF AGREEMENT for IPD in MDR/RR TB

This letter of agreement is between the McGill University group (hereafter referred to as the McGill group) for an Individual Patient Data (IPD) meta-analysis in multidrug-resistant tuberculosis TB (MDR-TB), and [INSERT NAME OF INVESTIGATOR AND INSTITUTION] (hereafter referred to as the investigator), regarding the transfer and use of data collected by the investigator. The McGill group and the investigator agree to collaborate on [INSERT NAME OF PROJECT] according to the terms in this letter and those set out in the full project protocol, which is attached as Annex 1.

The McGill group agrees to:

• Obtain approval from the Research Ethics Board of the Montreal Chest Institute, McGill University Health Center for this research.

• Respect the confidentiality of all data received. They will not attempt to identify patients, nor contact patients directly.

• Respect the principle that the investigator continues to ‘own’ the data sent for inclusion in this analysis. When the data set is “cleaned” and preliminary analyses completed, a copy of the data set will be returned to the investigator.

• Perform data analysis that addresses the objectives specified in the attached study protocol only. Any additional analysis will be performed only after it has been approved by the investigator. For additional analyses that are closely related to these objectives, the investigator will be informed; approval will be assumed if the investigator does not reply within a specified interval. If the investigator has concerns or objections to any new analyses, these will be addressed and resolved before proceeding. Analyses to address completely novel objectives that have not been foreseen in the current study protocol must be actively approved by the investigator before these analyses are undertaken.

• Finish analyses and return the data to the investigator by the sunset date. This date will be the date by which the analyses must be completed, and any manuscript(s)
prepared. The tentative sunset date to complete analyses, and prepare related manuscripts is [INSERT DATE]. If a manuscript is submitted, the data must be held until peer review is completed, and then up to 1 year after publication – to allow time for responses to the findings (e.g., letters to the editor). However, after the sunset date no further new analysis can begin without agreement to the extension of the sunset date by the investigator.

• Share results of analyses with the investigator, and all members of the IPD group at intervals described in the study protocol.

• Prepare draft and final reports of results for the project and prepare manuscript(s) of results for publication. All draft reports and manuscripts will be reviewed and approved by the investigator, and all members of the IPD group before submission. The authorship of these reports will be “The Collaborative Group for Meta-Analysis of Updated Individual Patient Data in MDR-TB”, followed by a listing of all members – in alphabetic order. The corresponding author will be Dr. Menzies of McGill.

The investigator agrees to:

• Verify whether they require approval from their local Research Ethics Board, depending on their institution’s policy. If so, the investigator will obtain this approval before sending the data to the McGill group. No additional data will be collected from the patients, thus investigator will not need to obtain patients’ consent for this analysis.

• Transfer a data file of information on all patients who were members of a cohort of MDR-TB patients which the investigator reported in earlier publications. This patient dataset will be rendered completely anonymous before forwarding this to the Montreal Chest Institute by removing all personal identifiers.

• Become a member of The Collaborative Group for Meta-Analysis of Updated Individual Patient Data in MDR-TB. This Collaborative Group will review all preliminary and final results of analyses performed by the McGill group, as well
as all reports of results – for the guideline groups, for public presentation, and for publication.

• Treat these preliminary results confidentially. The investigator will not publish (including posting on the Internet), present in any public forum, nor disseminate through any media these results without approval from the McGill Group and other members of the IPD Collaborative Group.

___________________________________________________ __________________
Dr. Dick Menzies (for the McGill University Group)         Date

___________________________________________________ __________________
[Insert name and institution]       Date