Editable Annexes

Guidance for the surveillance of drug resistance

in tuberculosis, sixth edition

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**ANNEX 5 - TABLES FOR SUMMARIZING MAIN RESULTS**

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**PREVALENCE OF RESISTANCE TO RIFAMPICIN AND/OR ISONIAZID**

|  |  |  |
| --- | --- | --- |
|  | **New patients** | **Previously treated patients** |
|  | % (n/N) | 95% CI\* | % (n/N) | 95% CI\* |
| **RR-TB**+ |  |  |  |  |
| **Isoniazid-resistant TB** |  |  |  |  |
| **Hr-TB** |  |  |  |  |
| **MDR-TB** |  |  |  |  |
| **Other¥** |  |  |  |  |

**PREVALENCE OF RESISTANCE TO OTHER DRUGS AMONG DRUG-RESISTANT TB PATIENTS**

|  |  |  |
| --- | --- | --- |
|  | **RR-TB** | **Hr-TB** |
|  | % (n/N) | 95% CI\* | % (n/N) | 95% CI\* |
| **Levofloxacin** |  |  |  |  |
| **Moxifloxacin** |  |  |  |  |
| **Any fluoroquinolone**  | ***++*** | ***++*** |  |  |
| **Bedaquiline** |  |  |  |  |
| **Linezolid**  |  |  |  |  |
| **Any fluoroquinolone and at least one other Group A drug**  | ***\*\**** | ***\*\**** |  |  |
| **Other¥** |  |  |  |  |

CI - confidence interval; Hr-TB - rifampicin-susceptible, isoniazid-resistant TB; MDR-TB - multidrug-resistant TB; n - number of patients with resistance to a given drug; N - number of patients for whom a DST result is available for a given drug; RR-TB - rifampicin-resistant TB, including MDR-TB.

+ Multiple imputation of missing DST results among bacteriologically confirmed pulmonary TB cases may be required (see section 7.2: Data analysis).

\* The 95% confidence intervals should account for a clustered survey design, if relevant (see section 7.2: Data analysis).

*+* + This corresponds to the revised definition of pre-extensively drug-resistant (pre-XDR) TB from 2021.

*\*\** This corresponds to the revised definition of XDR-TB from 2021. The denominator should be restricted to patients for whom DST has been performed for all Group A drugs.

¥The prevalence of resistance should be calculated for each additional individual drug for which DST results are available. Any other drugs tested among new and previously treated patients or among drug-resistant TB patients can be added to the above tables, including those of first-line or second-line regimens.

**NUMBERS OF PATIENTS WITH RR-TB**

***Treatment history***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | **New** | **Previously treated** | **Unknown**  | *Total* |
| **RR-TB** |  |  |  |  |
| **Rifampicin-susceptible TB** |  |  |  |  |
| *Total* |  |  |  |  |
|  |  |  |  |  |
| ***HIV status*** |  |  |  |  |
|   | **HIV-positive** | **HIV-negative** | **Unknown**  | *Total* |
| **RR-TB** |   |   |   |   |
| **Rifampicin-susceptible TB** |   |   |   |   |
| *Total* |   |   |   |   |
|  |  |  |  |  |
| ***Sex*** |  |  |  |  |
|   | **Male** | **Female** | **Unknown** | *Total* |
| **RR-TB** |   |   |   |   |
| **Rifampicin-susceptible TB** |   |   |   |   |
| *Total* |   |   |   |   |

***Age (years)***

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | **0-4** | **5-14** | **15-24** | **25-34** | **35-44** | **45-55** | **55-64** | **≥65** | **Unknown** | *Total* |
| **RR-TB** |  |  |  |  |  |  |  |  |  |  |
| **Rifampicin-susceptible TB** |  |  |  |  |  |  |  |  |  |  |
| *Total* |  |  |  |  |  |  |  |  |  |  |

**ANNEX 6 – TEMPLATE FOR SURVEY BUDGET**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This template is provided for guidance and will require modification for each survey. The components will differ according to the survey design and needs of each country.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Type of unit | Cost per unit | Number of units | Total |
| **Human resources** |
|  Principal investigator(s) |  |  |  |  |
|  Supervisor of laboratory activities |  |  |  |  |
|  Survey coordinator |  |  |  |  |
|  Database designer |  |  |  |  |
|  Data manager(s) |  |  |  |  |
|  Laboratory technician(s) |  |  |  |  |
|  Logistics staff (for example drivers, secretary) |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Coordination meetings (central and peripheral levels)** |
|  Per diem |  |  |  |  |
|  Transportation of participants |  |  |  |  |
|  Meeting room hire and catering |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Training courses** |
|  Per diem |  |  |  |  |
|  Transportation of participants |  |  |  |  |
|  Meeting room hire and catering |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Data management system** |
| Software |  |  |  |  |
| Servers and/or cloud hosting; back-up system |  |  |  |  |
| Internet connection |  |  |  |  |
| *Subtotal* |  |  |  |  |
| **Monitoring and supervision** |
|  Per diem  |  |  |  |  |
| Transportation of supervisors to survey sites |  |  |  |  |
| *Subtotal* |  |  |  |  |
| **Communication** |
|  General (for example stationery, printing) |  |  |  |  |
|  Computer(s) |  |  |  |  |
|  Mobile phone credit |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Laboratory** |
|  Sputum containers |  |  |  |  |
|  Safety cabinet, if required |  |  |  |  |
|  Centrifuge, if required |  |  |  |  |
|  Reagents, Xpert cartridges, etc. |  |  |  |  |
|  Other (for example refrigerators; materials and reagents for storage of specimens) |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Collection and domestic transport of specimens** |
|  Transport containers and packaging |  |  |  |  |
|  Transport costs  |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Collection and international transport of specimens to SRL** |  |
|  Transport containers and packaging |  |  |  |  |
|  Transport costs  |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **SRL technical assistance** |
|  Visits for survey planning and monitoring  |  |  |  |  |
|  Laboratory proficiency testing costs |  |  |  |  |
|  Sample transport and retesting for external quality assurance of results  |  |  |  |  |
|  Any other tests to be performed |  |  |  |  |
|  *Subtotal* |  |  |  |  |
| **Epidemiological technical assistance** |
|  Visits for survey planning and monitoring |  |  |  |  |
| *Subtotal* |  |  |  |  |
| **Finalization and dissemination of results** |
| Data cleaning and analysis |  |  |  |  |
| Report writing and publication |  |  |  |  |
| Dissemination meeting |  |  |  |  |
| *Subtotal* |  |  |  |  |
| **TOTAL** |  |

**ANNEX 7 - TEMPLATE FOR A CASE REPORT FORM**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Patient’s survey identification number: . . . . . . . . . . . . . . . . .

Heath facility name: . . . . . . . . . . . . Health facility code: . . . . . . . . . . . . . . .

Name of interviewer: . . .. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

If already registered, patient’s TB register number: . . . . . . . . . . . . . . . .

**A. IDENTIFICATION OF THE PATIENT**

1. Given name a : . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . Family name a : . . . . . . . . . . . . . . . . . . . . . . . . . . . .

2. Date of interview: |\_\_\_|\_\_\_||\_\_\_|\_\_\_||\_\_\_|\_\_\_|

 Day Month Year

3. Sex: |\_\_\_| Male |\_\_\_| Female

4. Date of birth: |\_\_\_|\_\_\_||\_\_\_|\_\_\_||\_\_\_|\_\_\_|

 Day Month Year

5. Age: . . . . . . . . . . . years

6. Date of sputum collection: sample 1 |\_\_\_|\_\_\_||\_\_\_|\_\_\_||\_\_\_|\_\_\_|

 Day Month Year

 sample 2 |\_\_\_|\_\_\_||\_\_\_|\_\_\_||\_\_\_|\_\_\_|

 Day Month Year

*Country-specific data (to be decided by the coordinating team), for example:*

7. HIV status: Negative |\_\_\_| Positive |\_\_\_| Unknown |\_\_\_|

*[Additional questions relating to other possible risk factors as described in the protocol (see section 2.2)]*

**B. HISTORY GIVEN BY THE PATIENT**

8.Previously treated for TB? No |\_\_\_| Yes |\_\_\_| Unknown |\_\_\_|

**If ‘No’ to Question 8, go to Question 9** b**. If ‘Yes’ to Question 8, go to Question 17.**

9. For how long have you been sick? . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

10. Did you have the same symptoms prior to this episode?

No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

11. Did you have other symptoms of lung disease prior to this episode

(haemoptysis, chest pain, cough)? No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

12. Did you have sputum examinations prior to this episode?

No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

13. Did you ever take tuberculosis drugs for more than one month?

No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

14. If yes, what was the name? . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .

15. Did you ever have injections for more than one month?

No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

16. Did the patient remember previous treatment for TB after these questions?

No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

**C. MEDICAL RECORDS**

17. After extensive checking through the medical files and other documents available in the health facility, have you discovered that the patient has been registered for tuberculosis treatment before?

No |\_\_\_| Yes |\_\_\_| Unknown|\_\_\_|

18. Previous TB registration number . . . . . . . . . . . . . . . . . . . . .

**D. FINAL DECISION**

19.Patient has been previously treated for TB for more than a month:

No |\_\_\_\_|

Yes |\_\_\_\_| (answer to Question 8, 16 and/or 17 was ‘Yes’)

Unknown |\_\_\_\_|

20.If ‘Yes’ to Question 19, what was the most recent type of regimen received and the date of treatment initiation?

Drug-susceptible TB regimen: New |\_\_\_| Previously treated |\_\_\_|

Drug-resistant TB regimen: New |\_\_\_| Previously treated |\_\_\_|

Date |\_\_\_|\_\_\_||\_\_\_|\_\_\_||\_\_\_|\_\_\_|

 Day Month Year

21.If ‘Yes’ to Question 19, what was the outcome of previous treatment?

Cured |\_\_\_|

Treatment completed |\_\_\_|

Treatment failed |\_\_\_|

Lost to follow-up |\_\_\_|

Not evaluated |\_\_\_|

a Depending on the country, it may be appropriate for the case report form to contain patient identifying information to ensure traceability of clinical records. Identifiable data must never be shared outside the programmatic and clinical teams and must be securely stored. Its inclusion in the case report form should be clearly justified as essential, and is subject to the approval of the relevant ethics committee.

b Some patients may not immediately recall past treatment for TB or may not be aware that previous treatment was for TB. Questions 9-15 can be used by the investigator to assist the patient in recalling past treatment. Positive responses should prompt the investigator to follow up on questions to determine whether past treatment could have been for TB. For more information, see section 6.2.1: Case report form. Only the final decision of treatment history (Questions 18-19) needs to be entered into the electronic survey database.

**ANNEX 10 – TEMPLATE FOR ASSESSMENT OF SURVEY PREPAREDNESS AND MONITORING**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This annex primarily addresses high-level governance aspects that should be assessed prior to the start of the survey. Selected items may also be monitored regularly during the survey (for more detailed guidance on field monitoring, see Annex 12). The form may be used by the survey coordination and field teams for self-assessment or for external monitoring purposes. Generic checklists are also available from WHO’s  *Guidance for ensuring good clinical and data management practices for national TB surveys (1)*. Selected elements may be adapted to complement the tool presented here. This form should be adapted to the specific context of the survey and may be re-formatted to capture closed answers (“yes”, “no”, “not applicable”) in addition to narrative summaries of findings.

|  |  |
| --- | --- |
| 1. **Survey management**
 | **Comments** |
| Have the protocol, data collection tools and other survey documents been presented and discussed with the survey team (coordination team and field team)? |  |
| Is there a human resources management plan and documentation detailing potential delegation of roles and responsibilities of staff? Document any deviations from the plan. |  |
| Is there an itemized budget and financial management plan? Document any deviations from the plan. |  |
| Is there a risk management plan? Document any deviations from the plan. |  |
| Is there a plan addressing quality management aspects for the survey, including management and version control of survey documents as well as roles of staff in relation to assuring quality? |  |
| Is there a system for tracking incidents or deviations from the protocol and informing the relevant ethics committee? Have any protocol deviations been identified? If yes, verify the reasons and the actions taken. |  |
| Is there a communication plan detailing the strategies for communication between the survey coordination team, the field team, the health facilities, the Central Reference Laboratory and the SRL? |  |
| Are work phones and/or mobile phone credit provided? |  |
| Does the survey coordination team hold regular meetings? Review the minutes of recent meetings and actions thereof. |  |
| Where applicable, are there documented policies for ownership, access to and re-use of samples and data? |  |
| 1. **Informed consent/assent process**
 | **Comments** |
| Is the design and contents of the participant information sheet and the assent/consent form adequate? |  |
| Is the informed consent/assent procedure appropriate, including training? How will potential participants will be approached? Who will inform participants and obtain consent? |  |
| 1. **Selection of health facilities**
 | **Comments** |
| Has the selection of health facilities been conducted appropriately? |  |
| How is the training of the health facilities and the laboratories organized? Are curricula, training materials and trainers available?  |  |
| Have any infrastructure gaps been identified, and is there a plan for addressing these?  |  |
| 1. **Supervision and monitoring**
 | **Comments** |
| Is there a monitoring plan for site visits and remote assessments, including roles of different teams, quality indicators, checklists/guides?  |  |
| Are financial and human resources sufficient to perform the required monitoring tasks? |  |
| Is there a system for regular reporting on monitoring activities (for instance regular meetings)? |  |
| Are there training materials and activities for those conducting monitoring?  |  |
| 1. **Data management and analysis**
 | **Comments** |
| Are data, samples and participants traceable to source documents (such as clinical notes and health facility registers)? Can data, samples and participants be correctly linked though a unique identifier? |  |
| Are dedicated staff assigned for the data management, with clear roles and responsibilities?  |  |
| Is there a qualified and trained data manager? |  |
| Is the electronic database appropriate? Are there built-in skip patterns, range and validation checks to ensure high-quality data? Have these been pilot tested to assess performance and validate the database structure? |  |
| Is a clear data management plan documented and adhered to? |  |
| Are the data protected by a password with access limited to a few authorized survey team members? |  |
| Are there alternative solutions for electricity and internet shortage when using electronic systems? Is there a policy for back-up copies of electronic data? |  |
| What quality control measures are in place to ensure data quality from collection until the preparation of the dataset for analysis?  |  |
| Do physical and electronic archives ensure secure and safe archiving conditions?  |  |
| 1. **Reporting and publication**
 | **Comments** |
| Is there a detailed dissemination strategy, with sufficient allocation of resources?  |  |
| 1. **Additional comments / remarks**
 | **Comments** |
| Is there any other problem identified and escalated by the survey team? Collect comments and feedback.  |  |

**References**

1. Guidance for ensuring good clinical and data management practices for national TB surveys. Geneva: World Health Organization; 2021.

**ANNEX 11 – TEMPLATE FOR ASSESSMENT OF THE PREPAREDNESS AND MONITORING OF THE CENTRAL REFERENCE LABORATORY**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The core elements that need to be in place at the Central Reference Laboratory before the start of the drug resistance survey include the commitment to and, and capacity for, undertaking the survey, the existence of a quality assurance programme and a functional sample referral system. Assessors should be experienced staff from an SRL with a specific understanding of surveys. They should be familiar with and ideally should have contributed to the development of the country’s survey protocol and diagnostic algorithm.

This annex provides a minimum set of questions to support the assessors in the evaluation of the laboratory preparedness for each of the core elements described above. Selected items may also be monitored regularly during the survey. The assessors should check different sources of information during the review, including laboratory documents, direct observation of laboratory procedures and open questions to laboratory staff. In its current format, this tool captures a short fact-based answer for each item in the column “Assessment”, plus additional comments to help contextualise and interpret the findings. Generic checklists are also available from WHO’s  *Guidance for ensuring good clinical and data management practices for national TB surveys (1)*. Selected elements may be adapted to complement the tool presented here. The form should be adapted to the specific context of the survey and may be re-formatted to capture closed answers (“yes”, “no”, “not applicable”) in addition to narrative summaries of findings.

|  |
| --- |
| 1. **Commitment to conducting the survey**
 |
| **Question** | **Assessment** | **Comments, including source of information** |
| If appropriate, has a Memorandum of Understanding (MoU) been signed between the national TB programme and the Central Reference Laboratory?  |  |  |
| Are the role and responsibilities of the Central Reference Laboratory clearly outlined in the MoU or survey protocol? |  |  |
| If samples will be referred outside the country for further testing, is there a draft of the Material Transfer Agreement (MTA) available or under discussion? |  |  |
| If samples will be referred outside the country for further testing, was it budgeted?  |  |  |
| If samples will be referred outside the country for further testing, were courier(s) selected for the shipment of the specimens to the SRL? |  |  |
| 1. **Capacity to undertake the survey**
 |
| **Question** | **Assessment** | **Comments, including source of information** |
| **Human resources capacity and competency**  |
| Role and number of staff at the Central Reference Laboratory conducting sample testing (disaggregate by type of testing, for example molecular testing, culture and phenotypic testing) |  |  |
| Role and number of staff at the Central Reference Laboratory performing other survey activities (disaggregated by type of activity, for example data management, quality assurance monitoring, training, on-site visits of peripheral laboratories) |  |  |
| Role and number of staff that are newly hired for the survey versus those previously working at the Central Reference Laboratory |  |  |
| Were competency assessments conducted for all the staff involved in the survey according to defined criteria? |  |  |
| Was a training conducted to familiarise staff with the survey protocol? |  |  |
| Are the staff involved in the survey knowledgeable regarding the survey diagnostic algorithm? |  |  |
| **Laboratory infrastructure and space**  |
| Is the laboratory design and size adequate for the estimated additional workload? |  |  |
| Is the laboratory infrastructure aligned with phenotypic/molecular DST requirements? |  |  |
| **Equipment availability**  |
| Is the essential equipment for sample processing and testing available and sufficient in number to avoid disruption to routine activities? |  |  |
| Is the laboratory equipment validated and regularly maintained? |  |  |
| Is there a contingency plan to ensure continuous testing of survey samples in the event of an essential equipment breakdown? |  |  |
| 1. **Quality assurance programme**
 |
| **Question** | **Assessment** | **Comments, including source of information** |
| **Standard Operating Procedures (SOPs)** |
| Are SOPs covering all TB diagnostic technologies used in the survey algorithm available and consistent with international practice? |  |  |
| **Performance indicators**  |
| Are quality indicators and performance measures monitored and evaluated for all TB tests? (see Annex 14) |  |  |
| If performance indicators are below pre-set targets, have reasons been identified and corrective measures put in place? |  |  |
| **Internal quality controls**  |
| Are internal quality controls in place for all TB tests included in the survey algorithm? |  |  |
| **Proficiency testing results and reports of on-site visits** |
| Does the laboratory participate in an international external quality assessment program to assess proficiency of phenotypic and molecular-based DST? |  |  |
| Has the laboratory received an on-site visit by SRL staff within the last 12 months, and were any recommendations adequately addressed? |  |  |
| **Biosafety and safe working practices** |
| Does the laboratory undergo regular maintenance and is there an uninterrupted availability of general utilities (that is, stable, reliable, and adequate supply of electricity and water; stable communication lines)? |  |  |
| Are biosafety and biosecurity requirements incorporated into SOPs according to international standards? |  |  |
| Is there an adequate number of certified biosafety cabinets?  |  |  |
| If in place, is the air-handling system annually maintained including high-efficiency particulate air (HEPA) filter? |  |  |
| Is safety equipment available for safely manipulating samples and culture isolates (for example personal protective equipment)? |  |  |
| **Consumables and reagents** |
| Is the forecasting of required laboratory supplies adequate? (including 10-15% additional repeated tests) |  |  |
| Is there a contingency plan to ensure continuous testing of samples in case of unforeseen events affecting the procurement of laboratory supplies? |  |  |
| **Data management** |
| Is there an adequately trained data manager responsible for the collection, analysis and reporting of laboratory data generated during the survey? |  |  |
| Is there a system in place that allows the real-time monitoring of survey progress (for example number of RR-TB cases diagnosed) and the performance of the diagnostic network (for example number of RR-TB tested for second-line drugs at the Central Reference Laboratory)? |  |  |
| Is there a system in place that allows for a sample to be tracked from the referring laboratory to the referral laboratory for further testing, and for sharing of results? |  |  |
| Are there procedures in place to ensure the security of laboratory data and the confidentiality of patient data? |  |  |
| 1. **Functional sample referral system**
 |
| **Question** | **Assessment** | **Comments, including source of information** |
| Are SOPs covering the collection, storage and referral of samples available and consistent with international standards in terms of biosafety and biosecurity measures, packaging, and transportation? |  |  |
| Do the required referral forms, registers, transport logs and tracing slips exist?  |  |  |
| Is there a system in place for monitoring key performance indicators for the sample referral system? For example, i) number of referred samples tested at the Central Reference Laboratory; ii) proportion of shipments that arrive within the specified transport time; iii) proportion of samples rejected due to inadequate or improper transport, packaging or documentation (disaggregated by referring site); iv) proportion of results that were transmitted to the referring laboratory within the specified turnaround time (TAT) after becoming available. |  |  |

**References**

1. Guidance for ensuring good clinical and data management practices for national TB surveys. Geneva: World Health Organization; 2021.

**ANNEX 12 – TEMPLATE FOR ON-SITE ASSESSMENT OF THE PREPAREDNESS AND MONITORING OF HEALTH FACILITIES**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

This annex provides a form for assessing the preparedness or conducting a monitoring visit to a participating health facility. Some questions in the form are not applicable during the initial assessment and are only relevant to monitoring survey implementation, such as those relating to patient enrolment or the review of survey records. Generic checklists are also available from WHO’s

 *Guidance for ensuring good clinical and data management practices for national TB surveys (1)*. Selected elements may be adapted to complement the tool presented here. The form should be adapted to the specific context of the survey and may be reformatted to capture closed answers (“yes”, “no”, “not applicable”) in addition to narrative summaries of findings.

|  |  |
| --- | --- |
| 1. **Training**
 | **Comments** |
|  How many survey focal points that attended training are still occupying their post and are currently in charge of survey procedures? |  |
| Do new staff receive on-site survey training?  |  |
| Are back-up trained staff available who can undertake survey tasks if focal points are unavailable? |  |
| 1. **Understanding of procedures and availability of SOPs**
 | **Comments** |
| Can relevant staff correctly describe case definitions?  |  |
| Can relevant staff correctly describe the inclusion and exclusion criteria? |  |
| Can relevant staff correctly describe the enrolment and laboratory workflow? |  |
| Are SOPs available and accessible to relevant staff? |  |
| 1. **Informed consent/assent process**
 | **Comments** |
| Is the process acceptable as per WHO ethical principles? |  |
| If children were enrolled, has the assent process been followed correctly (assent form signed by minor and consent form signed by parent/legal guardian)? |  |
| If illiterate participants were enrolled, was a witness present and did he/she sign the consent form? |  |
| Upon verification of a subset of forms, are forms signed or thumb-printed by all relevant parties? Was a witness signature obtained where applicable? Do participant details match those in the enrolment log? Was consent obtained by authorised trained staff? Do dates of participant and staff signatures match?  |  |
| 1. **Transport of samples**
 | **Comments** |
| Can relevant staff correctly describe the processes to store, package and transport samples? |  |
| Do laboratory technicians know the shipment addresses and relevant contact points at referral laboratories? |  |
| Is a clear and adequate sample shipment schedule available and adhered to? |  |
| Are sample transport arrangements well established and reliable? |  |
| 1. **Equipment and power supply**
 | **Comments** |
| Is necessary functional and reliable diagnostic equipment available on-site? |  |
| Is the maintenance and calibration of equipment adequate and is the equipment housed appropriately (for example ventilation, temperature, other requirements)? |  |
| Are functional and reliable cold-chain equipment available on-site (where applicable)? |  |
| What are the provisions to cope with power cuts? |  |
| 1. **Inventory**
 | **Comments** |
| Have there been any stock-out of reagents or consumables since the start of the survey? This includes those required for sputum sample collection, laboratory testing for TB and HIV, preservation and transportation of samples. |  |
| Are the required survey forms and registers available, and in use on-site (for example consent forms, case report forms, other)? |  |
| 1. **Communications plan and strategy**
 | **Comments** |
| Are communication channels in place between health facilities and regional and central survey focal points? |  |
| Do staff know who to contact in case of concerns or questions? |  |
| Is there a clear task delegation log in the event of the absence of the survey focal points? |  |
| Are work phones and mobile phone credit available? |  |
| 1. **Enrolment**
 | **New patients** | **Previously treated patients** | **Total** |
| Number of bacteriologically confirmed pulmonary TB patients that have been eligible for enrolment since survey start date, according to routine registers |  |  |  |
| Number of patients enrolled in the survey |  |  |  |
| 1. **Feedback of laboratory results**
 | **Comments** |
| Is there timely feedback of laboratory results to the health facility and to the patient from referral laboratories? |  |
| 1. **Inspection of registers and forms**
 | **Comments** |
| Is the record-keeping adequate and up-to-date in routine and survey registers? |  |
| Is the identification of survey participants adequate in all relevant forms and registers, and is there consistency when cross-referenced? |  |
| Are the reasons for missed enrolment systematically documented? |  |
| Is the record-keeping of laboratory results adequate? |  |
| Is there an appropriate filing system for survey forms and registers, in agreement with the survey protocol? |  |
| On a subset of randomly selected survey patients, are the data complete, accurate and consistent (for example through in-depth inspection of consent forms, case report forms, test results, shipment forms)?  |  |
| 1. **Classification of patients by treatment history**
 | **Comments** |
| Are RR-TB patients re-interviewed to ensure correct classification? Is there a good level of agreement between the two interviews? |  |
| 1. **Additional comments / remarks**
 |
|  |

**References**

1. Guidance for ensuring good clinical and data management practices for national TB surveys. Geneva: World Health Organization; 2021.

**ANNEX 13 – TEMPLATE FOR REMOTE MONITORING OF HEALTH FACILITIES**

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This annex provides a form for systematically conducting remote monitoring of performance and progress of health facilities from the central or regional level by phone. The form should be adapted to the specific context of the survey.

**Remote Monitoring Form**

|  |  |
| --- | --- |
| **Date:**  | **Name of person conducting the monitoring:** |
| **Name of health facility:** |
|  |
|  | **New** | **Previously treated** | **Total** |  |
| Number of bacteriologically confirmed pulmonary TB patients that have been eligible for enrolment since survey start date, according to routine registers  |  |  |  |  |
| Number of patients enrolled in the survey |  |  |  |  |
|  |  |  |  |  |
|  |
| If applicable, main reasons for missed enrolment: *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***Additional comments on any concerns raised which may include (but is not limited to): supplies; downtime of diagnostic equipment; staff availability, training and turn-over; sample transport. It is assumed that all people with presumptive pulmonary TB are tested bacteriologically to obtain confirmation of pulmonary TB.** *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*Where appropriate, refresher training can be provided on key concepts such as case definitions, inclusion and exclusion criteria, or any other aspects. |
|  |

**ANNEX 14 – EXAMPLES OF QUALITY AND PROGRESS INDICATORS**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The following is a list of indicators related to the progress and quality of the survey that should be monitored at least monthly. These indicators could be presented during regular meetings by the survey coordination team to guide decision-making. Most can be obtained from the electronic survey database if this has been appropriately designed and is kept up-to-date. The indicator list should be adapted to the specific context, particularly the survey laboratory algorithm. Not all indicators may be relevant.

Importantly, it should be noted that these indicators capture progress of the survey in terms of meeting its planned objectives and achieving its expected outcomes. The indicators are therefore mostly considered at the patient level, rather than by each individual laboratory test performed. Some patients may have the same test performed multiple times. Therefore, to monitoring laboratory performance, both routinely as well as during the survey, these indicators should be adapted to capture information about each individual test performed where appropriate. Further information can be found in the Global Laboratory Initiative (GLI) *Practical guide to TB laboratory strengthening* *(1)*, the *Practical guide to implementing a quality assurance system for Xpert MTB/RIF testing* *(2)* and the upcoming guide from WHO and FIND on *Practical considerations for implementing next-generation sequencing for drug resistance surveillance in national TB programmes (3).*

Testing dates should be systematically recorded, regardless of the availability of test results, because the latter may not be available for days or weeks, depending on the method considered. In contrast, to monitor testing outcomes, the number of patients with a final result is a better indicator. The dates of testing and final result are usually the same for molecular tests (XpertMTB/RIF, Xpert Ultra, Truenat MTB-RIF Dx and LPA).

**Notes:** For each group of indicators, required indicators are listed first, followed by additional desirable indicators. The survey coordination team should define acceptable thresholds or TAT for relevant indicators before the start of the survey, guided by technical assistance from topic experts as needed. Deviations from the thresholds or TATs should trigger targeted action to improve performance and/or quality. it should be noted that this is a rolling report. All numerators and denominators should include all cases since the start of the patient enrolment period.

|  |  |  |  |
| --- | --- | --- | --- |
| **INDICATOR** | **MEASURE** | **DATA SOURCE** | **REQUIREMENT** |
| 1. **PROGRESS OF ENROLMENT**
 |
| Proportion of eligible bacteriologically confirmed pulmonary TB patients in routine registers at health facilities that were enrolled in the survey1,2 | **Numerator**: Number of enrolled patients. **Denominator:** Total number of eligible bacteriologically confirmed pulmonary TB patients in routine registers of the health facility | **Numerator:** Survey database cross-validated against monitoring forms (remote or site visit) **Denominator:** Monitoring forms | Required |
| Proportion of expected patients based on routine TB surveillance data that wereenrolled in the survey1,2 | **Numerator**: Number of enrolled patients **Denominator:** Total number of bacteriologically confirmed pulmonary TB patients notified to national TB programme for the same period in the same or previous comparable year(s)  | **Numerator:** Survey database**Denominator:** Routine surveillance data | Desirable |
| 1. **COMPLETENESS OF CLINICAL AND DEMOGRAPHIC DATA**
 |
| Proportion of enrolled patients for whom the final treatment history classification is missing2 | **Numerator**: Number of enrolled patients for whom the final treatment history classification is unknown**Denominator:** Total number of enrolled patients | **Numerator:** Survey database **Denominator:** Survey database  | Required |
| Proportion of enrolled patients for whom data are missing for a key clinical or demographic variable2 | **Numerator**: Number of enrolled patients with missing data for a given variable (for example age, sex, HIV status)**Denominator:** Total number of enrolled patientsProportions should be calculated separately for each key variable | **Numerator:** Survey database**Denominator:** Survey database  | Required |
| 1. **TURNAROUND TIME (TAT) FOR SAMPLE TRANSPORT AND PROCESSING**
 |
| TAT from collection of samples at health facilities to arrival of samples at Central Reference Laboratory2 | **Histogram** showing days from date of sample collection to date of sample arrival at Central Reference Laboratory. The mean and median time should be shown. **Table** showing the cumulative percentage of samples arriving at day 0, 1, 2, etc. after sample collection. | **Histogram:** Survey database**Cumulative percentage table:** Survey database | Required |
| TAT from collection of samples at health facilities to testing of samples at the Central Reference Laboratory2 | **Histogram** showing days from date of sample collection at peripheral health facilities to date of sample testing at the Central Reference Laboratory. Histograms are shown separately for each test (for example MTB/RIF Xpert; LPA; initial culture inoculation in solid or liquid media; other). The mean and median time should be shown. **Table** showing the cumulative percentage of samples being processed at day 0, 1, 2, etc. after sample collection. | **Histogram:** Survey database**Cumulative percentage table:** Survey database | Required |
| TAT from collection of samples at health facilities to shipment of samples to the Central Reference Laboratory2   | **Histogram** and **Table** as above.  | **Histogram:** Survey database**Cumulative percentage table:** Survey database  | Desirable |
| 1. **PROCESSING OF SAMPLES AT THE CENTRAL REFERENCE LABORATORY**
 |
| Proportion of total samples received at the Central Reference Laboratory that were rejected2 | **Numerator**: Number of sputum samples rejected on arrival **Denominator:** Number of samples received at the Central Reference Laboratory | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients from whom samples were received at the Central Reference Laboratory which were tested1 | **Numerator**: Number of enrolled patients with a documented testing date (for example Xpert MTB/RIF, LPA, inoculation date in culture media and for phenotypic DST)**Denominator:** Number of enrolled patients with date of sample receipt at the Central Reference Laboratory and who are eligible for the test, according to the survey algorithm.Proportions should be calculated separately for each test type. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| 1. **COMPLETENESS AND AVAILABILITY OF TESTING RESULTS**
 |
| Proportion of enrolled patients with either no result, an invalid result, or an error for Xpert MTB/RIF or Ultra1,3 | **Numerator**: Number of enrolled patients with either no result, an invalid result or an error. **Denominator:** Number of enrolled patients with a testing date for Xpert.Proportions should be calculated separately for each classification. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients with *M. tuberculosis* complex detected at trace levels by Xpert Ultra1,3 | **Numerator**: Number of enrolled patients with MTB detected at trace levels. **Denominator:** Number of enrolled patients with a testing date for Xpert Ultra. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients with an invalid result for Truenat MTB or MTB Plus, and an indeterminate or error result for Truenat MTB-RIF Dx1,3 | **Numerator**: Number of enrolled patients with either an invalid result, an indeterminate result or an error. **Denominator:** Number of enrolled patients with a testing date for Truenat.Proportions should be calculated separately for each classification. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients with no interpretable result for LPA1,3 | **Numerator**: Number of enrolled patients with no interpretable LPA result.**Denominator:** Number of enrolled patients with a testing date for LPA. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients with either no culture growth or a contaminated culture result1,3 | **Numerator**: Number of enrolled patients with either no growth or a contaminated culture result. **Denominator:** Number of enrolled patients with a date for final culture result Proportions should be calculated separately for each classification. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients with contaminated or uninterpretable phenotypic DST due to lack of growth of control (drug-free) tubes/plates1,3 | **Numerator:** Number of enrolled patients with either a contaminated or uninterpretable phenotypic DST result. **Denominator:** Number of enrolled patients with a date for final phenotypic DST results.Proportions should be calculated separately for each classification. | **Numerator:** Survey database**Denominator:** Survey database | Required |
| Proportion of enrolled patients for whom NGS failed quality control1,3 | **Numerator:** Number of enrolled patients that failed NGS quality control criteria at any stage of the process.**Denominator:** Number of enrolled patients with a result date for NGS.Proportions should be calculated separately for each stage of protocol where failure occurred. | **Numerator:** Survey database and laboratory registers**Denominator:** Survey database and laboratory registers | Required |
| Proportion of enrolled patients with no result or an invalid result from NGS1,3 | **Numerator:** Number of enrolled patients with either no result or an invalid NGS result. **Denominator:** Number of enrolled patients with a result date for NGS.Proportions should be calculated separately for each drug. | **Numerator:** Survey database**Denominator:** Survey database |  |
| 1. **AGREEMENT OF TEST RESULTS**
 |
| Cross-tabulation of test results from different tests1,3 | Grid showing count of patients in each outcome result combination from two or more tests. | **Grid:** Survey database | Required |
| 1. **TAT FOR REPORTING OF CRITICAL OR FINAL TEST RESULTS TO HEALTH FACILITIES**
 |
| TAT for reporting of a critical or final testing result from the Central Reference Laboratory to referring facilities1 | **Histogram** showing days between obtaining test result at Central Reference Laboratories to reporting to the referring facility. Histograms are shown separately for the various test outcomes depending on the report timing requirements. **Table** showing the cumulative percentage of test results being reported at day 0, 1, 2, etc. from the date of the test result. | **Histogram:** Survey database**Cumulative percentage table:** Survey database | Required |

1 The indicator should be calculated separately for new and previously treated patients in the survey.

2 The indicator should be calculated for each cluster (cluster sampling) or health facility (exhaustive sampling of all health facilities), and overall.

3 The indicator should be calculated per patient (for monitoring survey progress) and/or per individual test (for monitoring laboratory performance) as appropriate.

**References**

1. Global Laboratory Initiative. GLI Practical guide to TB laboratory strengthening [Internet]. Geneva: GLI Working Group Secretariat; 2017. Available from: http://stoptb.org/wg/gli/assets/documents/GLI\_practical\_guide.pdf
2. Global Laboratory Initiative. Practical guide to implementing a quality assurance system for Xpert MTB/RIF testing (“Xpert QA Guide”) [Internet]. Geneva: GLI Working Group Secretariat; 2019. Available from: http://www.stoptb.org/wg/gli/assets/documents/Xpert-QA-guide-2019.pdf
3. Practical considerations for implementing next-generation sequencing for drug resistance surveillance in national TB programmes. Geneva: World Health Organisation and FIND; in press.