WHO Guidance & Resources for TB Diagnostic Selection & Network Design

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TB Diagnosis & the End TB Strategy

[WHO End TB Strategy]

PILLARS AND COMPONENTS

WHO Recommends Universal Access to Needed TB Testing Services

1) All people with presumptive TB should be tested for TB disease with WHO-recommended rapid diagnostics

2) All people with confirmed TB disease should be tested for resistance to TB drugs (at least rifampicin) with molecular WHO-recommended rapid diagnostics

3) All people at increased risk of developing TB should be tested for TB infection

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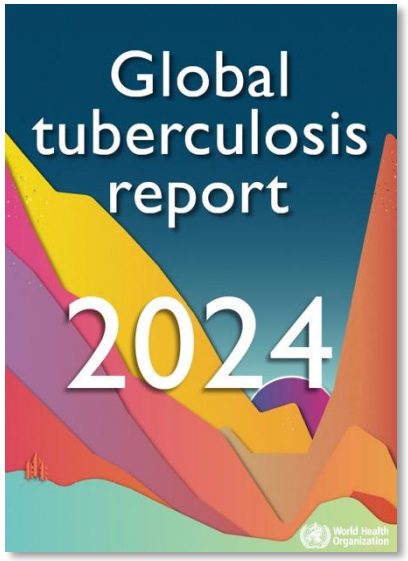
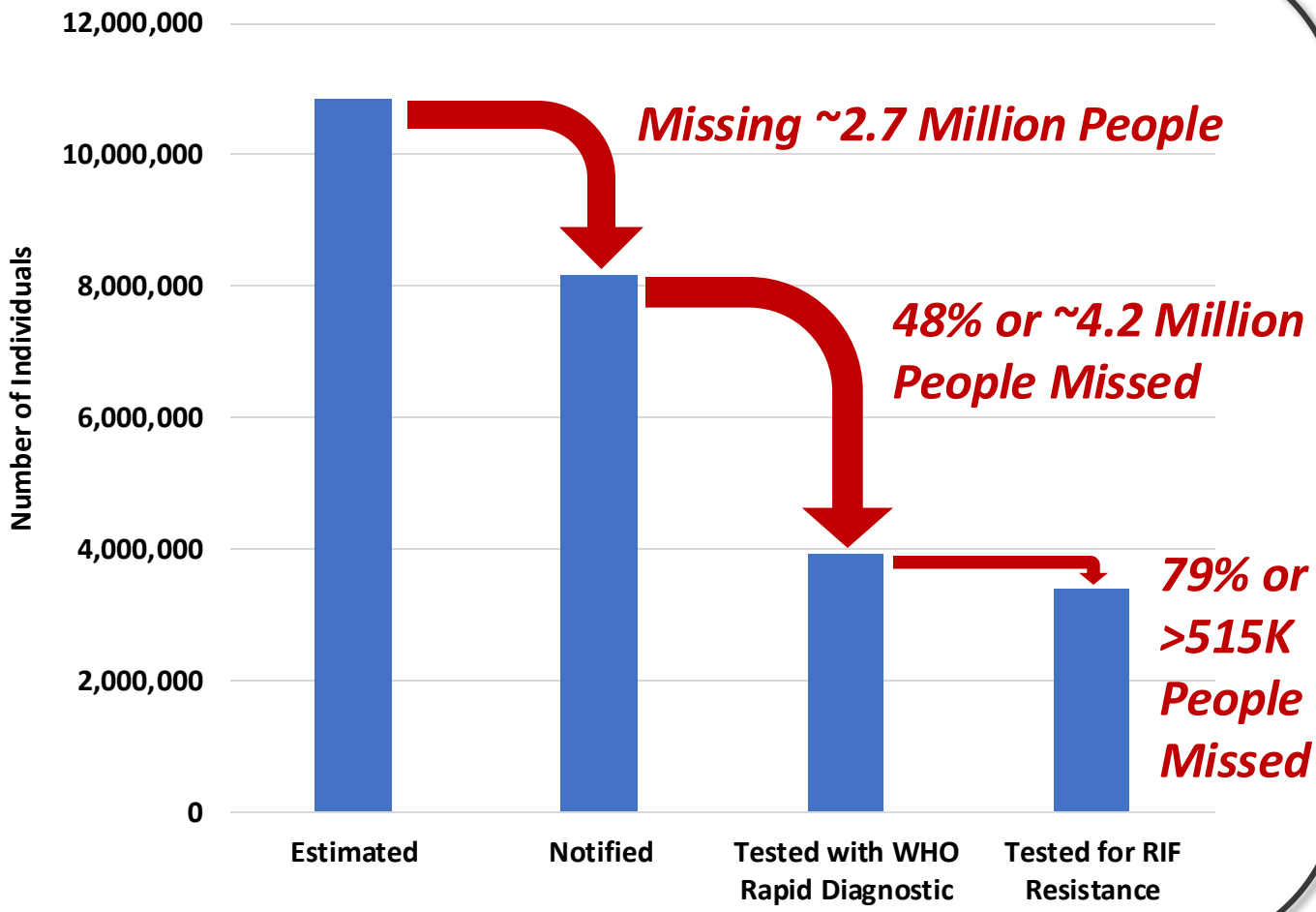
Global Data Highlight Continued Gaps in TB Diagnostics



Global TB Estimates in 2023

- *1/4 World Had Been Infected*
- *~10.8M Incident cases*
- *~400,000 Drug-Resistant cases*
- *1.25 Million Deaths*



World Health Organization *Global Tuberculosis Report 2024*

END TB

Cascade of Care for Universal Access to Rapid TB Diagnostics

Data Dashboard

STEP 1
Identifying presumptive TB

- Systematic screening of high-risk groups
- Chest X-ray for TB screening

STEP 2
Accessing testing

- Up-to-date diagnostic algorithms
- WRD access in primary health care
- Diagnostic coverage reaches all
- Testing capacity matches needs

STEP 3
Being tested

- Monitoring quality of testing
- All patients with presumptive TB tested with a WRD
- Universal DST provided

STEP 4
Receiving a diagnosis

- All pulmonary TB patients have a WRD result
- Test positivity rate monitored
- Timely delivery of results

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WHO Standard for universal access to rapid tuberculosis diagnostics

END TB

WHO Recommends Multiple Classes of TB Diagnostics

Technology class	Included products
Initial tests for TB diagnosis with drug-resistance detection	
NEW: Low-complexity automated nucleic acid amplification tests (NAATs) for detection of TB and resistance to rifampicin	Xpert® MTB/RIF and Xpert MTB/RIF Ultra (Cepheid) Truenat® MTB Plus and Truenat MTB-RIF Dx (Molbio)
Moderate-complexity automated NAATs for detection of TB and resistance to rifampicin and isoniazid	Abbott RealTi*m*e® MTB and Abbott RealTi*m*e MTB RIF/INH (Abbott) BD MAX™ MDR-TB (Becton Dickinson) cobas® MTB and cobas MTB-RIF/INH (Roche) FluoroType® MTB and FluoroType MTBDR (Hain Lifescience/Bruker)
Initial tests for TB diagnosis without drug-resistance detection	
NEW: Low-complexity manual NAATs for detection of TB	Loopamp™ MTBC Detection Kit (TB LAMP) (Eiken Chemical)
Antigen detection in a lateral flow format (biomarker-based detection) (LF-LAM) for detection of TB	Determine™ TB LAM Ag (Alere/Abbott)

Technology class	Included products
Follow-on tests for detection of TB drug resistance	
Low-complexity automated NAATs for detection of resistance to isoniazid and second-line anti-TB agents	Xpert® MTB/XDR (Cepheid)
Line probe assays (LPAs) for detection of TB drug resistance	GenoType® MTBDR*plus* v1 and v2; and GenoType MTBDRsl (Hain Lifescience/Bruker) Genoscholar™ NTM+MDRTB II and Genoscholar PZA-TB II (Nipro)
Targeted next-generation sequencing (NGS) tests for detection of TB drug resistance	Deeplex® Myc-TB (GenoScreen/Illumina) AmPORE-TB® (Oxford Nanopore Technologies) TBseq® (Shengting Medical Technology Company)
Tests for TB infection	
Mycobacterium tuberculosis antigen-based skin tests (TBSTs)	Diaskintest® (Generium) Siiltibcy™ (Serum Institute of India) C-TST (Anhui Zhifei Longcom)
Interferon-gamma release assays (IGRAs)	T-SPOT.TB (T-Spot) (Revvity) TB-IGRA (Wantai BioPharm) QuantiFERON-TB Gold Plus (QFT-Plus) (QIAGEN) STANDARD E TB-Feron ELISA (SD BIOSENSOR)[3] LIAISON QFT-Plus CLIA (Diasorin)[3]
Tuberculin skin tests	Tuberculin purified protein derivative (PPD) products

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WHO consolidated guidelines on tuberculosis. Module 3: diagnosis

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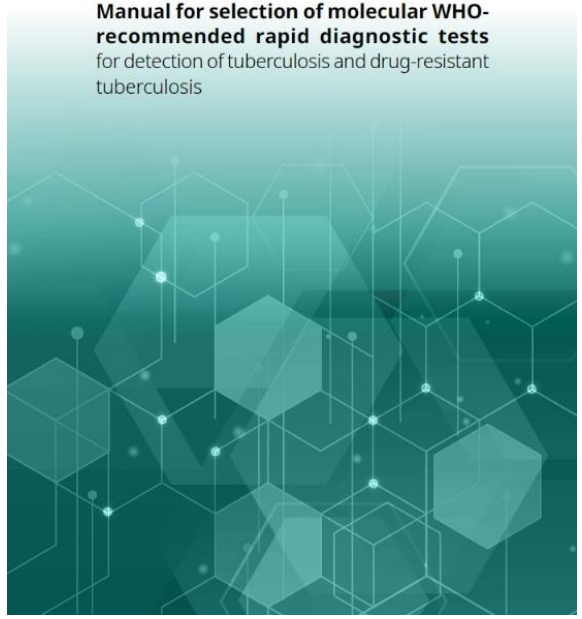
A Process for Data-Driven mWRD Selection for Local Settings



STEP 1
Collect Data for Diagnostic Network Assessment

1. **National Strategic Plan, Guidance, and Policy Documents**
   - Strategic Plan Goals and Targets
   - TB and DR TB Testing Algorithms
   - TB and DR TB Treatment Regimens
2. **National TB and DR TB Epidemiology Records**
   - DS TB
   - RR/MDR TB
   - Hr TB
   - FQR TB
   - Pre-XDR/ XDR TB
   - HIV/TB and Pediatric TB
3. **National and Subnational Records and Master Lists for TB Patient, Testing, and Sample Referral Networks**
   - Number and location of persons needing testing
   - Number and location of testing sites, instruments and modules (as relevant)
   - Specimen Referral System Linkages
4. **Testing Site Infrastructure and Human Resource Records**
   - Physical facilities
   - Electrical supply
   - Environmental controls
   - Reagent storage capabilities
   - Diagnostics connectivity
   - Human resources

STEP 2
Analyze Collected Data

- **Identify the primary use(s) of mWRDs across all and priority patient populations**
- **Identify the types and distribution of TB and DR TB patients to be tested with mWRDs**
- **Measure the potential test demand at mWRD testing sites and identify opportunities to strengthen patient access to mWRD testing services**
- **Identify testing sites with adequate infrastructure and human resources**

STEP 3
Use Outputs to Inform mWRD Selection

- **Estimated Testing Demand at mWRD Sites and Availability of Specimen Referral System Linkages to Support Timely Referral of DS and DR TB Samples**
- **Identified mWRD Capabilities Required to Meet Patient and TB Program Needs for Detection of TB Across Resistance Types and Patient Populations**
- **Suitability of testing site infrastructure and human resources for mWRD:**
  - Low complexity testing
  - Moderate complexity testing
  - High complexity testing

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WHO/ GLI Manual for selection of mWRDs

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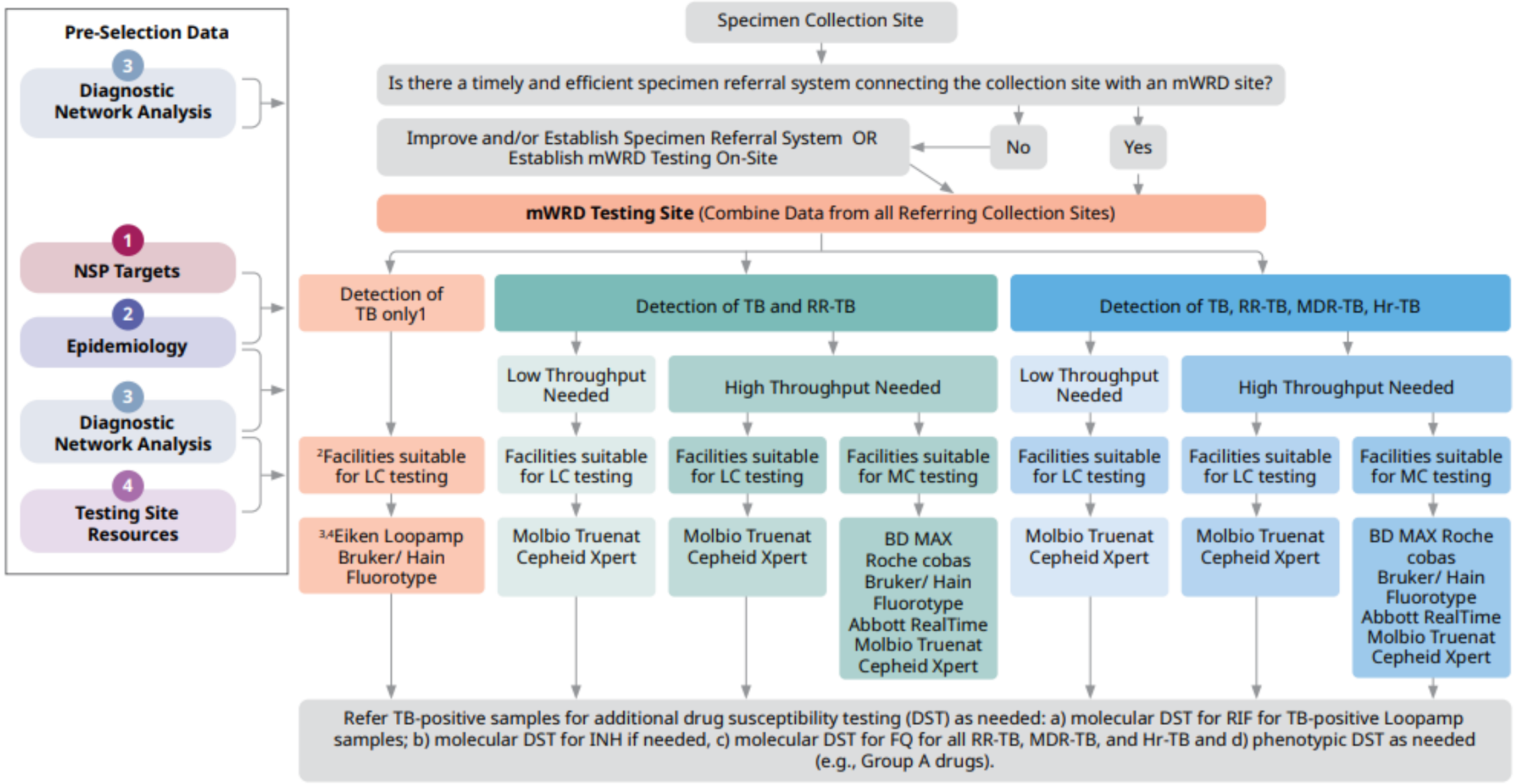
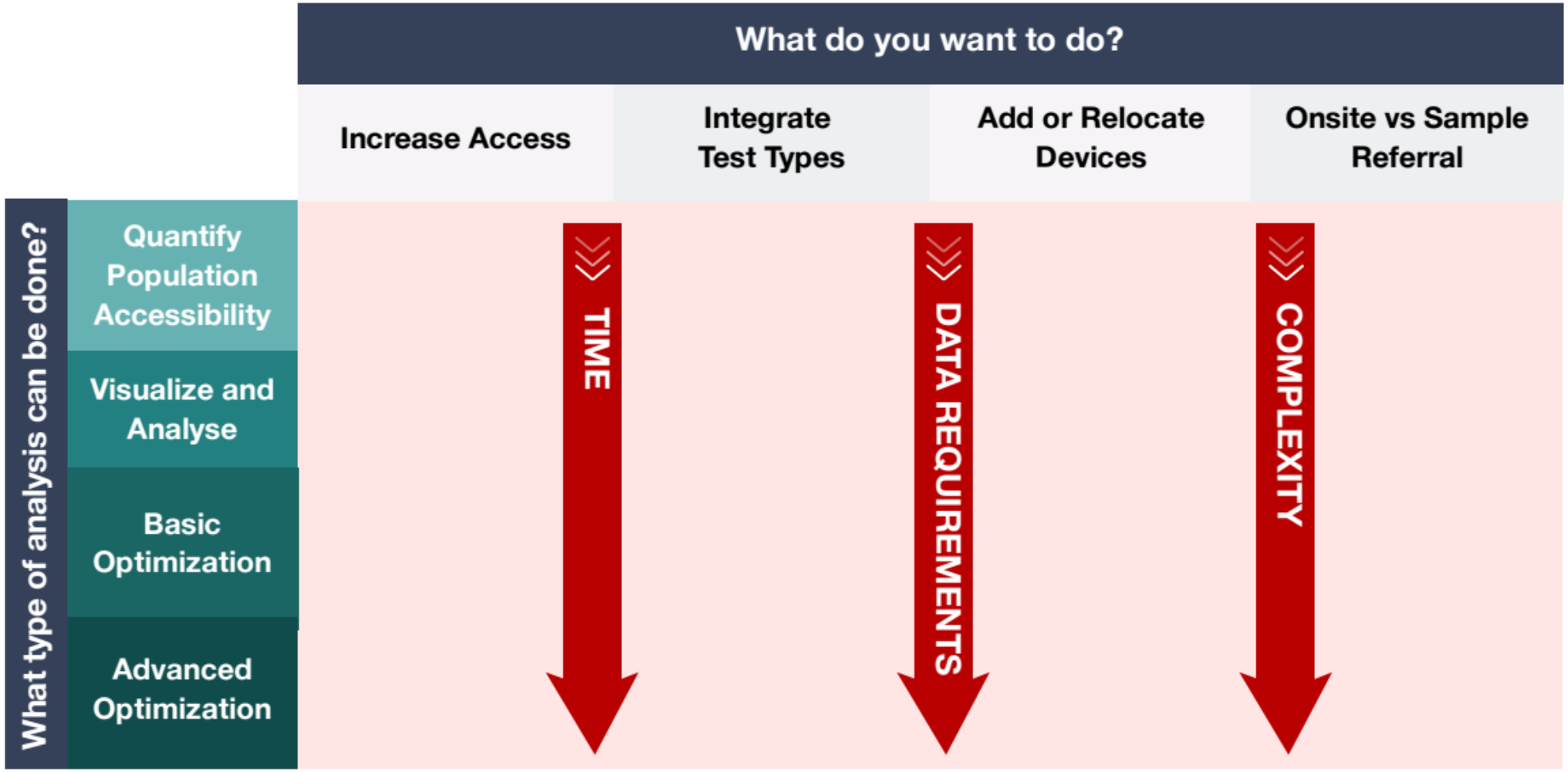
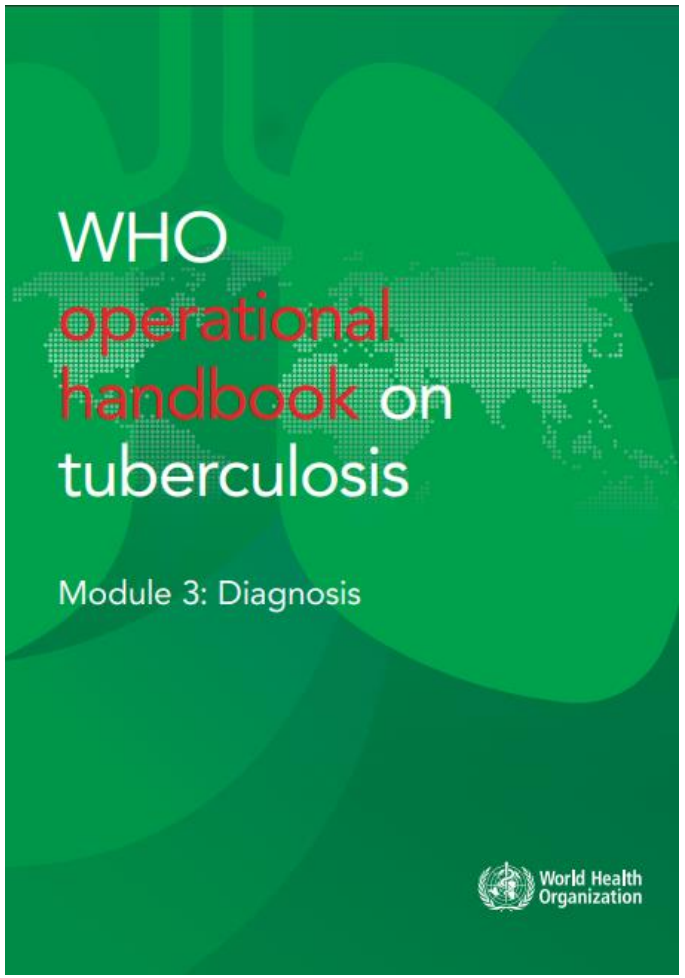
Network & Site-Level Data Guide mWRD Selection



Stepwise Diagnostic Network Optimization Tailors Networks



WHO Guidance on New Test Implementation



5. Steps and processes for implementing a new diagnostic test

- Area 1 – Policies, budgeting and planning
- Area 2 – Regulatory issues
- Area 3 – Equipment
- Area 4 – Supply chain
- Area 5 – Procedures
- Area 6 – Digital data
- Area 7 – Quality assurance, control and assessment
- Area 8 – Recording and reporting
- Area 9 – Human resource training and competency assessment
- Area 10 – Monitoring and evaluation

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WHO operational handbook on tuberculosis. Module 3: diagnosis

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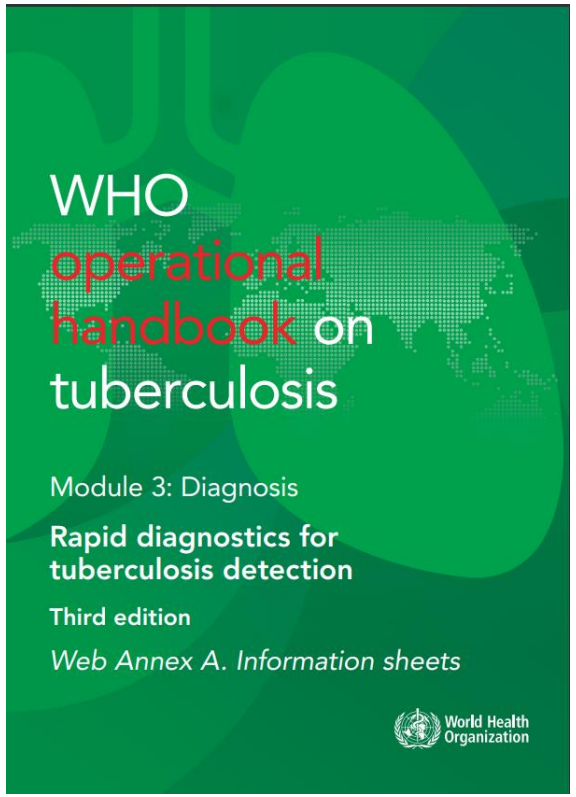
WHO Information Notes: Practical Considerations



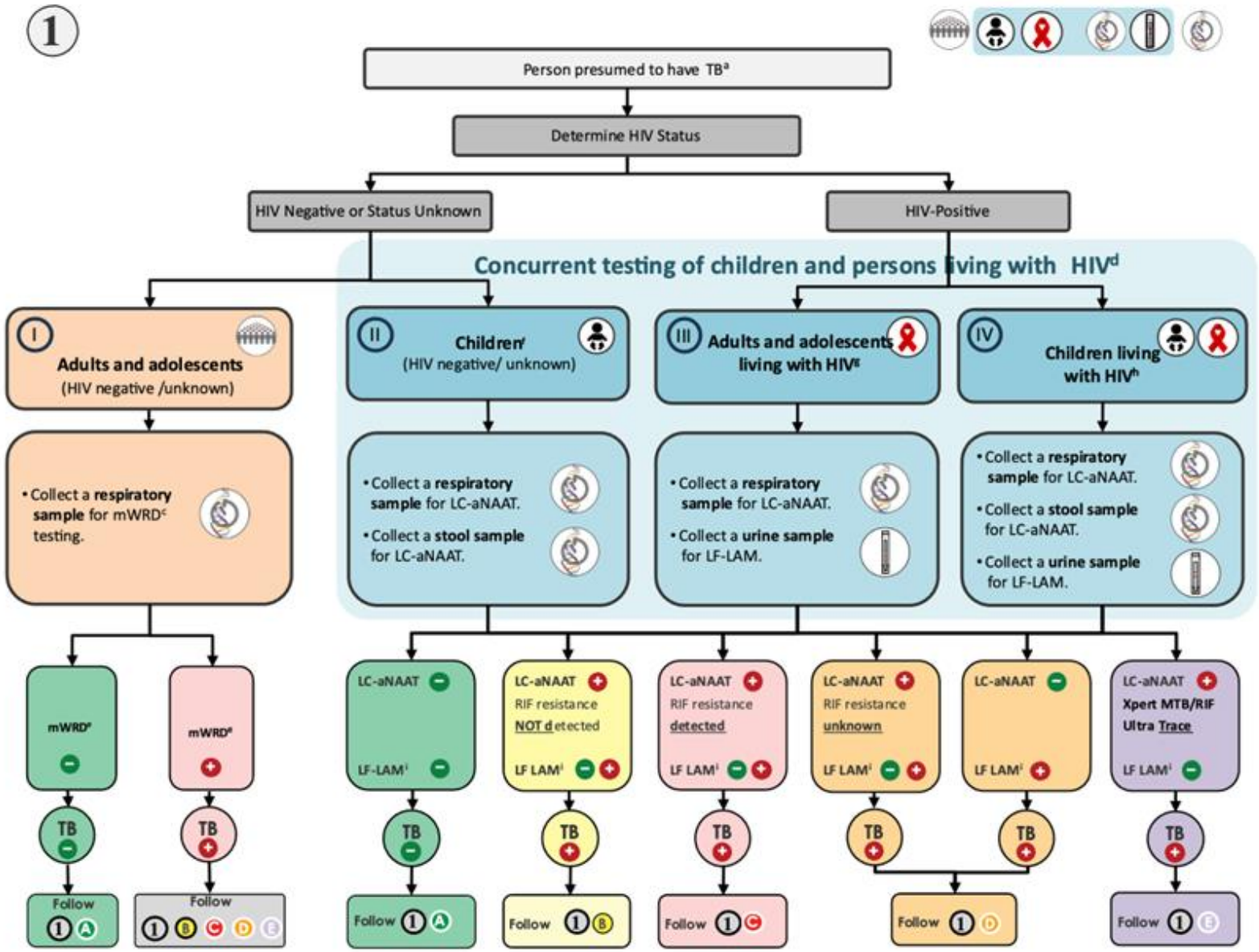
Currently available for:

- ❖ Moderate-Complexity NAATs
- ❖ Low-Complexity NAATs for follow-on drug resistance detection
- ❖ Targeted Next Generation Sequencing End-to-End Solutions

Each Information Note includes:

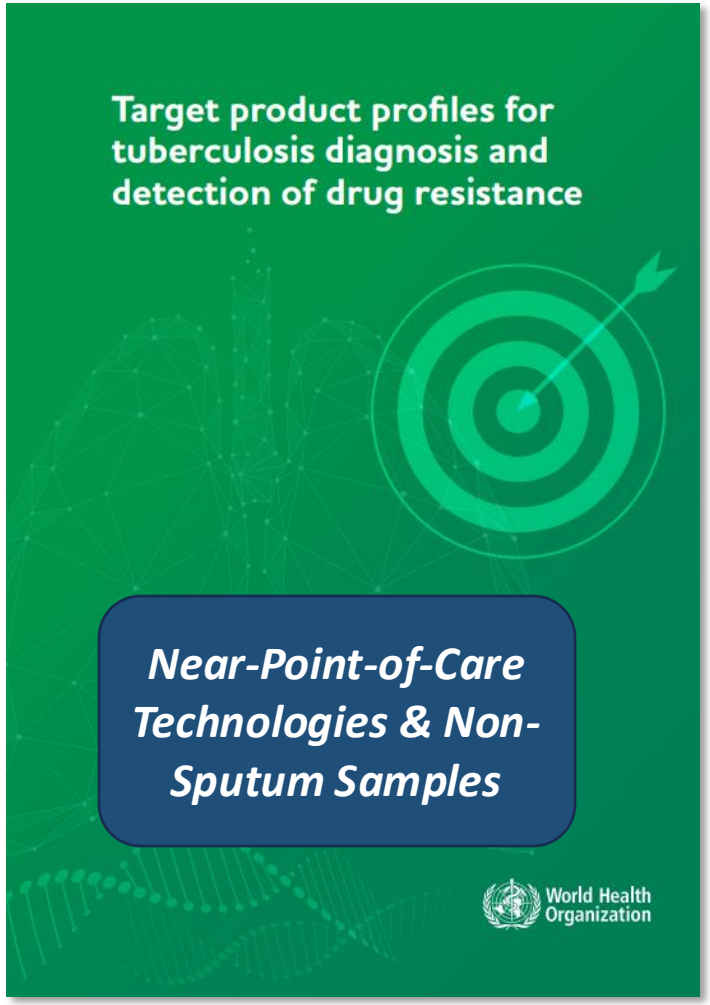
- ✓ WHO Recommendations for Use
- ✓ Key Performance Conclusions
- ✓ Test Procedure At-a-Glance
- ✓ Equipment, Supplies, and Reagents
- ✓ Operational Considerations
- ✓ Implementation Considerations for Relevant Op Handbook Areas

Updated Model Algorithm Guides Product-Inclusive WRD Testing



[WHO operational handbook on tuberculosis. Module 3: diagnosis]

Continued TB Diagnostic Development & Diversification



Evidence is now available on new swab-based tests for detection of TB at peripheral levels of the health system (i.e., microscopy centers) and pooling of sputum for LC-aNAATs

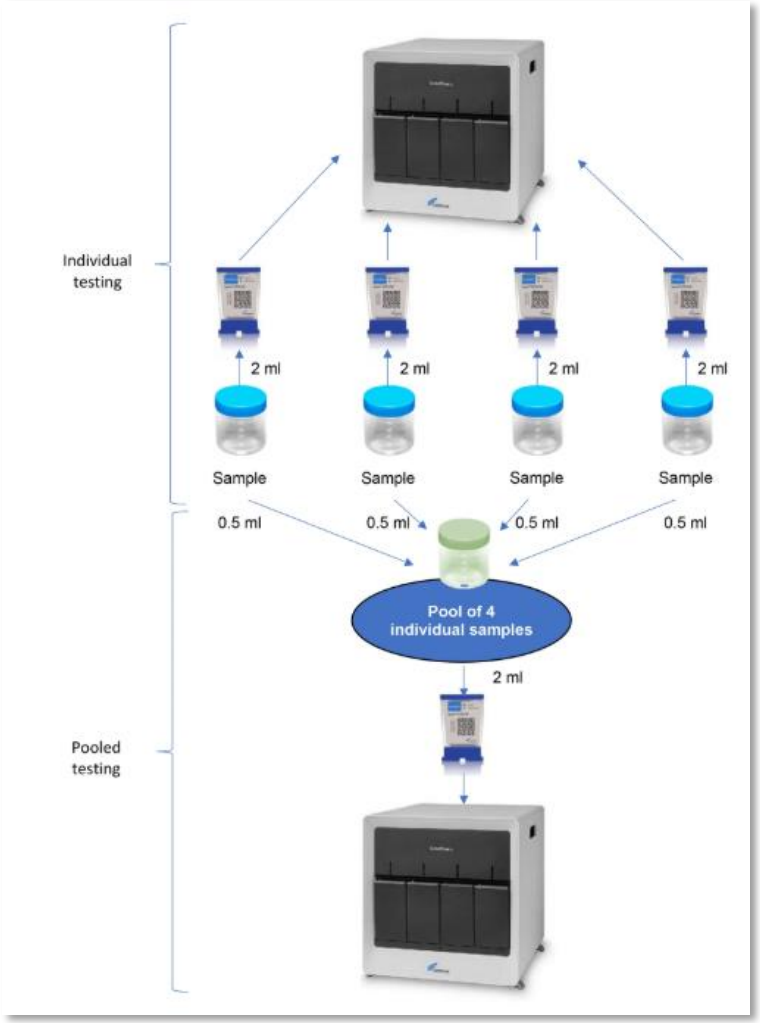


Figure credit: BMC Infect Dis 2023 Iem et al.

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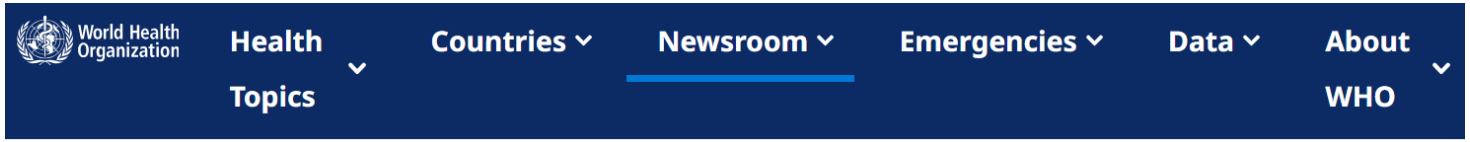
Call for Data Complete & Reviews Underway



Public call for data to inform WHO policy updates on new TB diagnostic samples, tests, and testing strategies

29 May 2025 | Call for data | Geneva

Closed: July 15th

Annexes

- ❑ PICO questions
- ❑ NPOC-NAAT class criteria table
- ❑ Costing and qualitative data parameters

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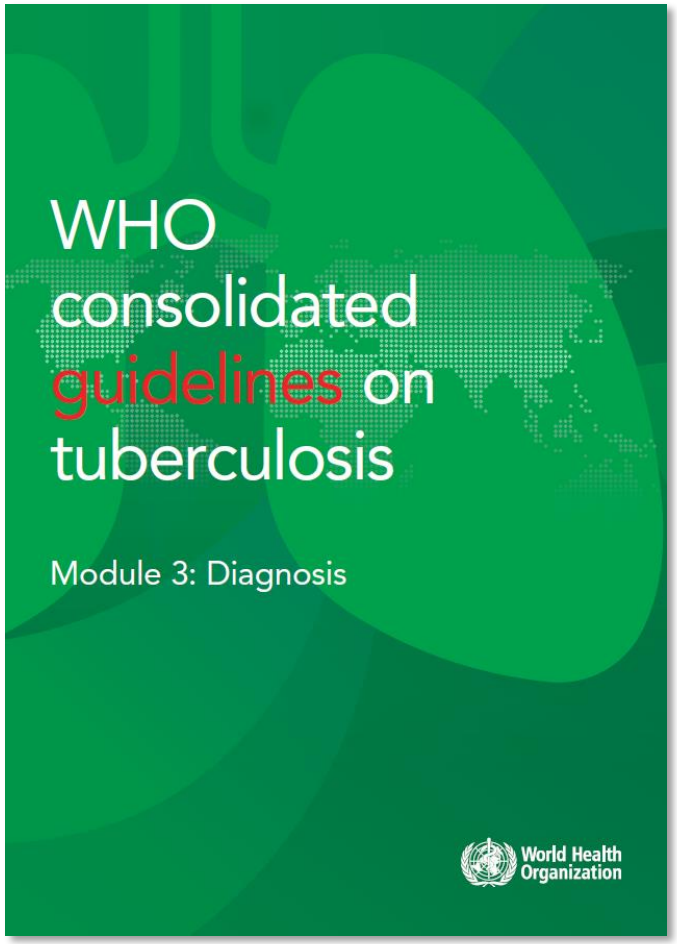
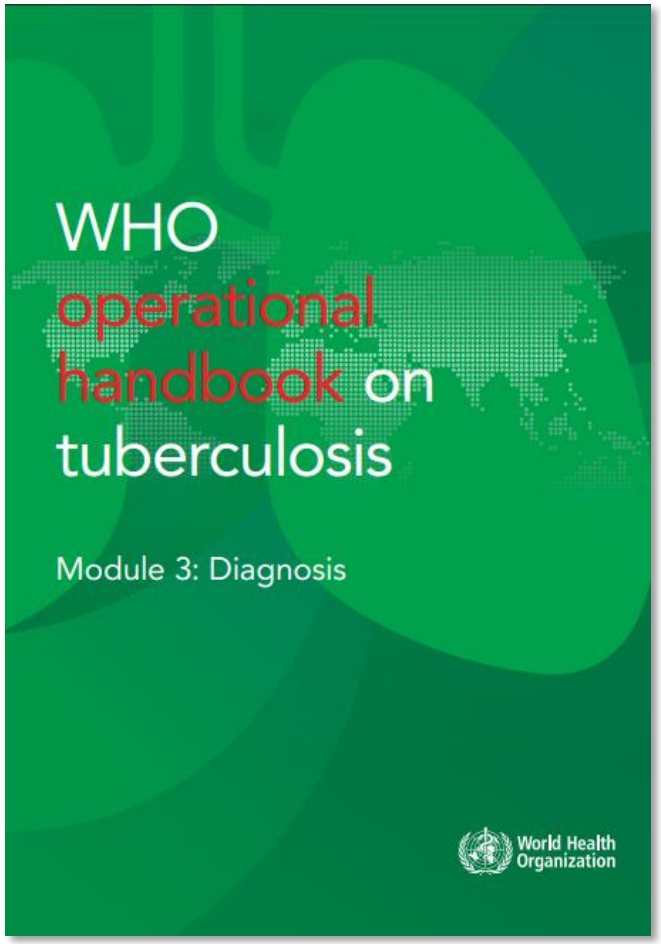
WHO Policy & Operational Guidance to be Updated in Parallel





Implementation Manuals & Toolkits

Near Point-of-Care, Sputum & Tongue Swabs, Sputum Pooling

- ❑ Readiness Assessments
- ❑ Capacity Calculation Tool
- ❑ Standard Operating Procedures
- ❑ Job Aids
- ❑ Training Materials
- ❑ Monitoring & Evaluation Tools

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Summary & Key Messages

- To End TB individuals with the disease must be diagnosed and placed on effective treatment as early as possible
- Recognizing continued gaps in services, country programs should continue working toward universal access to:
  - WRD testing for individuals with signs and symptoms of, or who screen positive for, TB
  - Drug susceptibility testing for individuals with bacteriologically-confirmed TB
- Recognizing advances in testing technology development and assessment, introducing new tests takes time - optimization of existing networks should not be delayed
- WRDs should be selected and diagnostic algorithms customized using setting-specific data to ensure effective strategies are identified early, optimally used to meet local testing needs, and applied for funding advocacy and near-term budgeting
- Opportunities to identify multi-disease integration can strengthen the health system and allow for cost-sharing while providing opportunities for TB/ DR-TB diagnosis

Thank You!

Contributors & Supporters

TB Patients & Affected Persons
National TB Programmes
Guideline Development Groups
Technical Advisory & Expert Group
Gates Foundation & Unitaid

WHO Colleagues

Alexei Korobitsyn
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