TABLE 6.3: NEW DIAGNOSTICS STRATEGIC FRAMEWORK 2018–2022

Vision:

To achieve early and universal diagnosis of all people with all forms of TB to foster progress towards TB elimination, by making appropriate and affordable diagnostic solutions available in the right setting and ensuring that diagnostic results are linked to treatment, and provide the basis for continuous drug resistance surveillance

Goals:

Development of new diagnostic tools and accompanying solutions to:

1. Improve TB case detection through accurate tests, enabling patient-centred use at all levels of the health care system, for all populations, including children and those living with HIV, key populations including vulnerable groups, migrants, underserved groups, and develop innovative diagnostic strategies that ensure better outreach to people with TB.
2. Enable timely and effective treatment to reduce mortality and ongoing transmission, and prevent antimicrobial resistance by rapidly and simply detecting resistance to existing and future drugs.
3. Develop novel tests to enable rapid DST and treatment monitoring/test of cure to detect insufficient treatment sooner.
4. Reliably identify individuals at risk of progression from latent TB infection to active TB disease in order to introduce targeted preventive therapy and cut transmission.

Objective	Milestone	Major Activities	Funding Required 2018–2022 (US$ Millions)
Ensuring the availability of critical knowledge to enable the development of new diagnostic tools and solutions	Undertake discovery science and build/improve capacity for such discovery research to identify and validate new markers	Support consortia on biomarker discovery using different platforms and approaches targeting: a. detection of active TB at point of care b. identification and characterization of mutations c. progression to active disease d. treatment monitoring e. validation of promising biomarkers f. maintenance of a biomarker database	194.5
	Ensure increased access to clinical reference materials that are critical for the development and validation of new TB diagnostics	Engage in specimen collection, maintenance and expansion of repositories, data management and quality assurance/quality control for: a. specimen bank b. strain bank c. paediatric specimen bank d. extrapulmonary TB specimen bank e. specimen bank for treatment monitoring f. data repository for chest X-ray images	32
	Support assessment of M. tuberculosis genetic variants and their clinical relevance to inform the development of molecular tests for the detection of DR-TB	Develop and maintain a centralized repository of global genomic and clinically relevant data; review for quality and standardization. a. Develop a database housing sequence and associated metadata from M. tuberculosis complex and use the data to validate mutations associated with resistance to TB medicines. b. Support contribution of relevant sequencing data by a large number of groups to ensure geographical diversity. c. Maintain the database to sustain efforts.	31.5

Objective	Milestone	Major Activities	Funding Required 2018–2022 (US$ Millions)
	Increase efficiency of the early development pipeline and support decisions before large-scale trials	Conduct studies for evaluation/demonstration studies planned under objective 3 in order to assess potential impact and help plan those studies in the most effective way	25
	Undertake research and consultations to support development of eHealth solutions	Define patient charter/ethical criteria, and build consensus on patient identifiers	1.5
Total Objective 1 – Addressing knowledge gaps			**284.5**
Developing a portfolio of new diagnostic tools coupled with a package of accompanying solutions to ensure that results translate into patient treatment	Develop tests and solutions for the diagnosis of active TB at the point of care in all patient populations, including children and people living with HIV	Support test development, technical and clinical validation during development of: a. smear-replacement tests and solutions b. biomarker-based non-sputum tests and solutions c. triage referral tests and solutions	142.5
	Develop tests and solutions for detection of drug resistance	Support test development, technical and clinical validation during development of: a. next-generation DST at peripheral levels b. DST for new and repurposed medicines and new drug regimens including MIC testing where relevant c. next-generation sequencing (NGS) directly from sputum	60.5
	Develop tests and solutions for predicting the risk of disease progression	Endorse and revise target product profiles (TPPs). Conduct test development, and technical and clinical validation during development, including validation and qualification of immune activation biomarkers	33
	Develop tests to support syndromic approaches to help differentiate between pathogens and reduce antibiotic overtreatment	Validate and qualify suitable biomarkers for syndromic tests for patients with respiratory symptoms on first visit to primary health care services in order to help differentiate between pathogens, providing a clinically actionable answer	29
	Develop tests and solutions for treatment monitoring/ test of cure	Develop a TPP. Conduct test development, and technical and clinical validation during development, including molecular candidates, and validate and qualify suitable biomarkers	9
	Develop eHealth and connectivity solutions to facilitate patient access to tests listed above	Endorse and revise TPPs. Integrate connectivity in diagnostic technologies, and develop eHealth applications and aggregation platforms	8
Total Objective 2 – Development of a portfolio of new tests and solutions			**282**

Objective	Milestone	Major Activities	Funding Required 2018–2022 (US$ Millions)
Evaluating the portfolio of new diagnostic tools and solutions, including new detection strategies, as well as alternative approaches to case finding, optimized use, and innovative delivery mechanisms; demonstrating patient benefit and predicting likely impact within the entire health system	Conduct evaluation in clinical trials and demonstration studies for new tests and solutions identified above, as well as for syndromic approaches	Carry out the following: a. Evaluation tests for active TB and for DST (MDR-/XDR-TB) b. Demonstration studies of TB tests and DST c. Demonstration studies of tests targeting paediatric TB d. Demonstration studies of tests targeting extrapulmonary TB e. Evaluation and demonstration of syndromic approaches f. Demonstration studies of eHealth solutions and platform for connected diagnostics	94.5
	Predict patient impact from the use of improved diagnostics on TB detection rate, transmission and mortality	a. Develop mathematical modelling b. Conduct impact and cost-effectiveness studies to evaluate new technologies and innovative strategies/approaches	70
	Conduct market analysis and estimate potential for new diagnostics	Update and expand existing market assessments	2
Total Objective 3 – Evaluation, demonstration and impact			**166.5**
Ensuring that fully validated new diagnostic tools and solutions are widely available and appropriately used in endemic countries	Roll out new tools and solutions	Procure devices and consumables for the roll-out of at least one new technology to support the detection of active TB in 90% of new cases and drug resistance in 100% of cases in high-risk groups	2,300
	Strengthen laboratory capacity for appropriate scale-up of new tools	a. Training (coordination, development of tools, sessions, training supervisors, specimen transfer) b. Quality assurance and accompanying measures c. Ongoing assistance d. Training assistance for supply management aspects	228
	Ensure patient-centred diagnosis and decentralization of testing	a. Diagnostic referral system (sample transportation, results delivery to patients/clinic, follow-up with patients) b. m/eHealth solutions/transmission of results c. Incentive systems for patients to compensate for time required for diagnosis	77
	Integrate TB/HIV laboratory services (TB testing in HIV settings), as well as screening for comorbidities such as hepatitis	Conduct demonstration projects and operational research on how the viral load test could be used as a predictor to screen for TB	24

Objective	Milestone	Major Activities	Funding Required 2018–2022 (US$ Millions)
	Ensure private sector integration	a. Incentives for the private sector to use endorsed tools b. Laboratory strengthening and external quality assurance for tools in use in the private sector c. Scale-up of models such as IPAQT and JEET	23
	Maintain speed of national policy change and in-country regulation processes	a. Harmonize regulatory processes in problematic countries: China, Russian Federation, Brazil to some extent b. Support national policy change and adoption (local cost-effectiveness and validation studies)	33
	Sensitize stakeholders (NTPs, ministries of health, technical, procurement and funding agencies, patient community representatives)	Coordinate with advocacy groups; organize workshops with NTPs, ministries of health, technical procurement and funding agencies, and patient representatives	10
	Conduct operational research on how best to deliver diagnostic services in routine programmatic settings to ensure a patient-centred approach, and to estimate costs and resources used by NTPs	Conduct studies covering different test categories and scenarios, as well as different settings, i.e., low/high MDR, low/high HIV, different geographies, TB infection test & treat target groups, strategies for contact-tracing	30
	Scale up manufacturing and other market interventions to bring price down	Invest in commercialization and successful scale-up	75
	Introduce new drug DST and DST for additional group C drugs in countries	Introduce appropriate testing strategies and protocols, and external quality assurance for phenotypic testing and molecular detection, including DST for new drugs, revision of critical concentration when necessary, and gathering the necessary knowledge to design and implement next-generation targeted sequencing	34
	Expand sequencing capacity in countries as of 2022	Implement capacity to perform NGS at reference laboratory level, and provide training and support in data analysis. Establish a mechanism to use the supranational reference laboratory capacity as the main driver to provide this training and long-term support	20
Total Objective 4 – Availability and appropriate use of new tests (inc. roll-out)			**2,854**
Without roll-out			**73**
TOTAL FUNDING REQUIRED			**3,587** (with roll-out) **806** (without roll-out)