

Vision: Achieve early and universal diagnosis of all patients 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.

- Goals:
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, as well as innovative diagnostic strategies that will ensure better outreach to patients.
  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. Reliably identify individuals at risk of progression from latent infection to active TB disease in order to introduce targeted preventive therapy and cut transmission.

Objective	Milestone(s)	Major Activities	Funding Required 2016–2020 (US\$ millions)
Ensure that the critical knowledge enabling the development of new diagnostic tools and solutions is available and explore alternative approaches for case finding	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: <ol style="list-style-type: none"> <li>a. Detection of active TB at POC</li> <li>b. Identification and characterization of mutations</li> <li>c. Progression to active disease</li> <li>d. Treatment monitoring</li> <li>e. Validation of promising biomarkers</li> <li>f. Development of a biomarker database</li> </ol>	134.5
	Ensure increased access to clinical reference materials that are critical for the development and validation of new TB diagnostics	Specimen collection, maintenance and expansion of repositories, data management and QA/QC for: <ol style="list-style-type: none"> <li>a. Specimen bank</li> <li>b. Strain bank</li> <li>c. Paediatric specimen bank</li> <li>d. Extrapulmonary TB specimen bank</li> <li>e. Specimen bank for treatment monitoring</li> </ol>	31
	Support assessment of MTB genetic variants to inform the development of molecular tests for the detection of DR TB	Development and maintenance of a centralized repository of global genomic and clinically relevant data, review for quality and standardization	110
	Increase efficiency of early development pipeline and support decisions before large-scale trials	Conduct studies for evaluation/ demonstration studies planned under objective 3 to assess potential impact and help plan those studies in the most effective way	5
	Undertake research and consultations to support development of e-health solutions	Definition of patient charter/ethical criteria, and consensus-building on patient identifier	0.7
Total Objective 1 – Addressing knowledge gaps			281.2

Objective	Milestone(s)	Major Activities	Funding Required 2016–2020 (US\$ millions)
Develop 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 level in all patient populations, including children and people living with HIV	Support test development and technical and clinical validation during development for: a. Smear-replacement tests and solutions b. Biomarker-based non-sputum-based tests and solutions c. Triage referral tests and solutions	75
	Develop tests and solutions for rapid and simple detection of resistance to existing and future drugs	Support test development and technical and clinical validation during development for: a. Next-generation DST at peripheral levels b. DST for new drugs and new drug regimens c. Next-generation sequencing directly from sputum	36
	Develop tests and solutions for predicting the risk of disease progression	Development, endorsement and revision of TPPs; test development, and technical and clinical validation during development, including validation and qualification of immune activation biomarkers	20.2
	Develop tests to support syndromic approaches to help differentiate between pathogens and reduce antibiotic overtreatment	Validation and qualification of suitable biomarkers for syndromic tests for patients with respiratory symptoms on first visit to primary health care services providing a clinically actionable answer	16
	Develop tests and solutions for treatment monitoring/test of cure	Test development, and technical and clinical validation during development, including molecular candidate as well as validation and qualification of suitable biomarkers	6
	Develop e-health and connectivity solutions to facilitate access by patients to tests listed above	Development, endorsement and revision of TPPs; integration of connectivity in diagnostic technologies; development of e-health applications and aggregation platforms	4.3
<b>Total Objective 2 – Development of a portfolio of new tests and solutions</b>			<b>157.5</b>

Objective	Milestone(s)	Major Activities	Funding Required 2016–2020 (US\$ millions)
Evaluate the portfolio of new diagnostic tools and solutions, including new detection strategies, approaches for optimized use, and innovative delivery mechanisms; demonstrate patient benefits and predict 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	<ul style="list-style-type: none"> <li>a. Evaluation of tests for active TB and for drug-susceptibility testing (MDR/XDR TB)</li> <li>b. Demonstration studies of TB tests and DST</li> <li>c. Demonstration studies of tests targeting paediatric TB</li> <li>d. Demonstration studies of tests targeting extrapulmonary TB</li> <li>e. Evaluation and demonstration of syndromic approaches</li> <li>f. Demonstration studies of e-health solutions and platforms for connected diagnostics</li> </ul>	92.5
	Predict patient impact from the use of improved diagnostics on TB detection rate, transmission and mortality	<ul style="list-style-type: none"> <li>a. Develop mathematical modelling</li> <li>b. Conduct impact and cost–effectiveness studies to evaluate new technologies and innovative strategy/approach</li> </ul>	70
	Conduct market analysis and estimate potential for new diagnostics	Update and expand existing market assessments	2
<b>Total Objective 3 – Evaluation, demonstration and impact</b>			<b>164.5</b>

Objective	Milestone(s)	Major Activities	Funding Required 2016–2020 (US\$ millions)
Ensure that fully validated new diagnostic tools and solutions are widely available and appropriately used in endemic countries	Roll-out of new tools and solutions	Procurement of 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	2300
	Strengthening laboratory capacity for appropriate scale-up of new tools	Training; QA and accompanying measures; ongoing assistance; training assistance for supply management aspects	224.2
	Patient-centred diagnosis and decentralization of testing	<ul style="list-style-type: none"> <li>a. Xpert referral system (sample transportation, results delivery to patients/clinic, follow-up with patients)</li> <li>b. m/e-health solutions / transmission of results</li> <li>c. Incentive systems for patients to compensate for time required for diagnosis</li> </ul>	76.7
	TB/HIV laboratory integration (TB testing in HIV settings)	Demonstration projects and operational research on how the new Viral Load test could be used as a predictor to screen for TB	24
	Private sector integration	<ul style="list-style-type: none"> <li>a. Incentives for private sector to use endorsed new tools</li> <li>b. Laboratory strengthening and EQA for tools in use in the private sector</li> </ul>	8
	Maintain speed of national policy change and in-country regulation processes	<ul style="list-style-type: none"> <li>a. Harmonize regulatory processes in countries with problematic mechanisms: China, Russia, and Brazil to some extent</li> <li>b. Support national policy change and adoption (local cost-effectiveness and validation studies)</li> </ul>	33
	Sensitize stakeholders	Coordinate with advocacy groups; organize workshops with NTPs, MoHs, 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	30
	Scale up manufacturing and other market interventions	Investment in commercialization and successful scale-up	75
	Introduction in countries of DST for new drugs and for additional group V drugs as of 2017	Introduction of appropriate testing strategies and protocols, and EQA for phenotypic testing and molecular detection	33.9
Expanded sequencing capacity in countries as of 2017	Training and support in sequencing analysis at reference laboratory level	12.5	
Total Objective 4 – Availability and appropriate use of new tests (incl. roll-out)			2827.3 without roll-out 73

Strategic framework for research and development for new TB diagnostics  
2016-2020

	<b>Funding Required 2016–2020 (US\$ millions)</b>
<b>Grand Total</b>	<b>3430.5 (with roll-out) 676.2 (without roll-out)</b>