

REPUBLIC OF RWANDA



MINISTRY OF HEALTH

Tuberculosis and Lung Diseases National Strategic Plan Mid 2019 - mid 2024



**INSTITUTE OF HIV/AIDS, DISEASE PREVENTION & CONTROL (IHDPIC)
TUBERCULOSIS & OTHER RESPIRATORY COMMUNICABLE DISEASES
DIVISION**

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ABBREVIATIONS

ACF	Active Case Finding
ACSM	Advocacy, Communication and Social Mobilization
aDSM	active Drug Safety Management & Monitoring
ART	Antiretroviral Therapy
BCC	Behavior Change Communication
BMI	Body Mass Index
CAD	Computer Aided Diagnosis (for TB)
CBHIP	Community Based Health insurance Program (Mutuelle de Sante)
CDT	Center of Diagnosis and Treatment of TB
CFR	Case Fatality Rate
CHU	Centre Hospitalier Universitaire
CHW	Community Health Worker
CNR	Case Notification Rate
CPDS	Coordinated procurement and distribution system
CSO	Civil Society Organization
CT	Center of Treatment of TB
CXR	Chest X-ray
DH	District Hospital
DHS	Demographic and Health Survey
DP	District Pharmacy
DQA	Data Quality Audit
DRS	Drug Resistance Survey
DR-TB	Drug-resistant TB
DS-TB	Drug-susceptible TB
DST	Drug Susceptibility Testing
ECSAHC	East, Central and Southern Africa Health Community
e-LMIS	Electronic Logistics Management Information System
e-TB	Electronic case-based TB register
EQA	External Quality Assurance
FLD	First Line TB Drugs
FNA	Fine Needle Aspiration
FY	Fiscal Year
GF	Global Fund to Fight AIDS, Tuberculosis and Malaria
GLC	Green Light Committee
GLI	Global Laboratory Initiative
GoR	Government of Rwanda
H	Isoniazid
HC	Health Center
HF	Health Facility
HFU	Health Financing Unit
HIV	Human Immunodeficiency Virus
HP	Isoniazid and Rifapentine
HR	Human Resources
HRG	High-Risk Group
HSSP	Health Sector Strategic Plan
ICCM	Integrated Community Case Management
IPC	Infection Prevention & Control
IHDPC	Institute of HIV/AIDS, Disease Prevention & Control
IMCI	Integrated Management of Children Illnesses
KAP	Knowledge, Attitude and Practices
KNCV	KNCV Tuberculosis Foundation
LIS	Laboratory Information System
LMIS	Laboratory management information system
LPA	Line Probe Assay
LQMS	Laboratory Quality Management System
LTBI	Latent TB Infection
MAF	Multisectoral Accountability Framework
MCH	Maternal and Child Health
MCCH	Mother Child and Community Health

MDG	Millennium Development Goal
MDR-TB	Multidrug-resistant Tuberculosis
M&E	Monitoring and Evaluation
MOH	Ministry of Health
MOTT	Mycobacteria Other Than Tuberculosis
MPPD	Medical Production and Procurement Division (RBC)
MTR	Mid-Term Review
MYICT	Ministry of Youth, Information & Communication
NCD	Non-Communicable Diseases
NGO	Non-Governmental Organization
NISR	National Institute of Statistics of Rwanda
NRL	National Referral Laboratory
NSP	National Strategic Plan
NST1	National Strategy for Transformation (2017-2024)
NTP	National Tuberculosis Program
OHT	One Health Tool
OPD	Outpatient Department
OSDV	On-site Data Verification
PAL	Practical Approach to Lung Health
PBF	Performance Based Financing
PCF	People Centered Framework
PCS	Patient Cost Survey
PEPFAR	President's Emergency Plan for AIDS Relief
PLHIV	People living with HIV
PMDT	Programmatic Management of Drug-resistant Tuberculosis
PMEBS	Planning, M&E, and Business Strategy / RBC
PPA	Patient Pathway Analysis
PTB	Pulmonary TB
QA	Quality Assurance
QC	Quality Control
QMS	Quality Management System
RBC	Rwanda Biomedical Center
RDB	Rwanda Development Board
RH	Referral Hospital
RHMIS	Rwanda Health Information System
RMNCAH	Reproductive, Maternal, Neonatal Child and Adolescent health
RRP+	Rwanda network of People living with HIV
RR-TB	Rifampicin resistant TB
R&R	Recording and Reporting
RSB	Rwanda Standards Board for drug quality assurance
RSQA	Rapid Service Quality Assessment
SDG	Sustainable Development Goal
SLD	Second Line TB Drugs
SOP	Standard Operating Procedures
SPH	School of Public Health
SPIU	Single Project Implementation Unit
SSM	Sputum Smear Microscopy
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAT	Turnaround Time
TB	Tuberculosis
TBD	To be determined
TB&ORD Division	Tuberculosis and Other Respiratory Communicable Diseases Division
TeAM	Technical Assistance for Management
The Union	International Union against Tuberculosis and Lung Diseases
TPT	Tuberculosis Preventive Treatment
TWG	Technical Working Group
TSR	Treatment Success Rate
TST	Tuberculin Skin Test
UHC	Universal Health Coverage
UNAIDS	Joint United Nations Programme on HIV/AIDS
USG	United States Government

VA	Verbal Autopsy
VRS	Vital Registration System
WHO	World Health Organization
WRD	WHO-recommended Rapid Diagnostics
Xpert MTB/RIF	Rapid TB and MDR-TB diagnostic test based on nucleic acid amplification

FOREWORD

Rwanda is making tremendous progress towards ensuring access to quality tuberculosis diagnosis, prevention and care. The Ministry of Health in collaboration with partners, developed a five year - 2019-2024 - Tuberculosis National Strategic Plan which illustrates the most pressing problems and their root causes based on evidence and data gathered in Rwanda and elsewhere.

The Patient-centered Framework was used to analyze data for decision-making along the continuum of care and to understand how to refine approaches to reach all people with diagnosis, prevention and care. This NSP was developed with participation from several key stakeholders, including partners and civil society organizations involved in fighting TB and HIV.

The 2019-2024 TB NSP is structured in line with the WHO End TB strategy and has 8 strategic objectives with the aim to accelerate the reduction of TB incidence and mortality. This will be achieved by expanding the GeneXpert network and use of Xpert testing as initial diagnosis among additional high risk groups as well as provision of providing tuberculosis preventative therapy to eligible People Living with HIV and all TB contacts with latent tuberculosis.

Achieving these goals will require long-term government and partner commitment to fund and implement these intensive efforts as the most resources are often needed to reach final milestones.

In this regards, I call upon the commitment and efforts of all stakeholders in the fight to end TB in Rwanda.



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We thank the Ministry of Health and RBC for their leadership and support during the NSP development process. Special thanks is extended to all TB&ORD staff for their tireless involvement in the development and editing of this document.

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EXECUTIVE SUMMARY

Overview

The TB National Strategic Plan (TB-NSP) July 2019- June 2024 gives a detailed view of the current state of TB control in Rwanda. The plan illustrates the most pressing problems and their root causes, based on evidence and data gathered in Rwanda and elsewhere. The plan also describes what we, the National Tuberculosis Program (NTP) and stakeholders, want to achieve by mid-2024 and our strategic and technical process for addressing identified gaps. Assuming funding gaps will be likely, the following three financing scenarios are presented in order to optimize resource allocation for epidemiological and economic impact: (1) a continuation of the current strategy (scenario 0), (2) a somewhat more ambitious version of the strategy (scenario 1), and (3) a comprehensive and ambitious strategy (scenario 2). At international level, the most important policies providing guidance and direction to this NSP are the Sustainable Development Goals (SDGs), the End TB strategy and the Africa Health Strategy 2016-2030. Rwanda's vision is to end TB in 2035 attaining a reduction of the estimated TB incidence by 90% and mortality by 95% compared to 2015 levels. This plan aims to achieve the End TB milestones for 2024, including reduction of TB incidence by 35%, reducing TB deaths by 57% as compared to 2015 and ensuring reduction of TB affected families are facing catastrophic costs based on the result of the survey. The NTP intends to achieve the 2022 UNHLM and the TB Global plan targets of more than 90% treatment coverage and more than 90% treatment success rate (TSR) for all TB patients by June 2024, at the latest.

The problem

Estimated TB incidence in Rwanda remains high with 59 (45-75) new and relapse patients per 100,000 population in 2017 (vs. 132 and 231, at global and (Africa) regional level, respectively¹). Incidence and mortality due to TB have steadily declined at an average rate of 4 and 5% per year, since 2010. In addition, during the 5 last years, Rwanda is focusing on TB screening among prioritized high risk groups (PLHIV, contacts of index patients with pulmonary TB, prisoners, people aged ≥ 55 years and children aged < 15 years) partnering with community health workers (CHWs) on community-level TB detection. As a result, the proportion of TB cases detected from these high risk groups (HGRs) increased from 15% (in FY13²) to 53% (in 2018/19) with CHWs responsible for referring 56% of all presumptive TB patients during FY18.

Despite the achievements mentioned above, the following challenges remain:

- People at risk of developing TB disease, asymptomatic and symptomatic patients who are missed by the healthcare system.
- TB diagnostics with higher sensitivity, to better identify patients.
- Treatment outcomes show higher death rates among those who are clinically diagnosed TB, TB/HIV patients, and those who are underweight (BMI < 18.5).

Development process

Following epi-review and regional Green Light Committee (rGLC) missions, an external desk review was conducted at the end of May 2019 before a kick-off partners

¹ World Health Organization. Global tuberculosis report 2019

² Fiscal Year (FY13 runs from July 2013 to June 2014)

workshop with more than 30 international, national and local stakeholders to review the evidence for each planning step: (1) Problem Prioritisation, (2) Root Cause Analysis and (3) Strategic Intervention optimisation. The NTP established a national writing committee composed of the NTP central unit team, Rwanda Biomedical Center (RBC) divisions and partners. The TB-NSP was validated through a stakeholders meeting and a data consolidation exercise using the data entry and visualization tool of the People Centered Framework (PCF) for TB planning and programming³.

Four priority gaps for action

Gap 1: TB treatment coverage

10-20% of estimated incident infections are not detected, nor treated. This plan aims to close the diagnostic gap through more sensitive diagnosis with expanded use of chest X-ray (CXR) for screening and Xpert as the initial diagnostic test for all persons with presumptive TB. To reduce the estimated number of missing TB patients, individuals self-presenting to health facilities (HF) (who represent 57% of TB patients) will be tested with Xpert as the initial diagnostic test in high TB notification districts (representing 15 districts and 54% of TB) and CXR. Case finding targets using TIME modeling were set during the NSP development process. Systematic TB screening of people among HRG will make use of digital CXR and Computer Aided Diagnosis through TB software (CAD4TB) followed by Xpert testing in 6 out of 10 HRGs (including prisoners, close contacts of bacteriologically confirmed TB patients, PLHIV, health staff, underground miners and construction laborers, persons living in slum settings) will be managed by mobile teams and will also include provisions for patient transport to come to centers for full diagnosis and treatment of TB. CDTs will be equipped with digital X-ray and GeneXpert machines.

Gap 2. TB treatment success

TSR for all forms of TB is below 90% (86%) due to a high case fatality rate (CFR) among those clinically diagnosed (16%) and HIV+ TB patients (15%). This CFR could be partly explained by false positive TB patients, however, this needs further investigation. More importantly, closing the treatment success gap in this NSP includes the following priority activities:

- Provision of nutritional support, not only for drug-resistant TB (DR-TB), as currently implemented, but also for drug-susceptible TB (DS-TB) patients who are moderately or severely malnourished (BMI \leq 18.5);
- Enhanced access to social protection;
- Strengthened aDSM among both DS-TB and DR-TB patients
- Strengthened collaboration between TB and non-communicable disease (NCD) services for TB screening, especially bilateral screening of TB patients for diabetes mellitus (DM) and DM patients for TB;
- Use of Xpert testing for stool as the initial diagnostic test for children with presumptive TB and urine TB LAM (ALERE) or another more sensitive LAM test that will become available for eligible PLHIV.

Gap 3. TB preventive treatment

TB Preventive Treatment (TPT) was successful for household contacts aged <5 years of bacteriologically confirmed index patients, but not among PLHIV. This NSP

³ WHO People centered framework User Guide. October 2019

presents an ambitious partnership with CHWs, schools and employers to enable contact tracing in workplace and school settings, and among household contacts aged 5 years and above residing with TB bacteriologically positive patients with a BMI ≤ 18.5 , as well as among PLHIV. The 2020-2022 UNHLM targets for children aged <5 ; those 5-14 years old, and adults with latent TB infection (LTBI). As well as eligible PLHIV after exclusion of active TB and will serve as indicative program targets. New shorter regimen (shorter Rifampicin and Isoniazid [RH] for three and four months or Rifapentine and Isoniazid [HP] based regimens for three and one month) will be pilot tested.

Gap 4. TB funding

There is over-reliance on donor funding and uncertainty about future funding levels while expansion and scale-up of active case finding (ACF) interventions among high risk groups, needed to find the missing patients, are more expensive. To sustain high-level performance in Rwanda's TB control, achieving the Sustainable Development Goals (SDGs) as well as the End TB strategy goals through Universal Health Coverage (UHC) requires implementation of innovative TB funding mechanisms for the progressive inclusion and scale-up of (new) TB services. Intervention packages implemented during the NSP timeline are essential including: TPT; systematic TB screening using CXR and CAD; scale-up of rapid WHO Recommended Diagnostics at initial diagnosis as well as pilot testing and uptake of new diagnostics; new treatment regimens for DR-TB; and differentiated care models in the community health insurance program (CHIP - Mutuelle de Santé). Also a Multisectoral Accountability Framework (MAF) on TB will be developed to monitor the availability and rational use of funds.

Prioritized resource allocation

Similar to 2018-2019 funding levels, it is estimated that \$22.7 million, including domestic (\$7.6 million) and donor (\$15 million) funds, will be available during the implementation of the NSP. Funding gaps of 37% and 56% are estimated for the two scenarios S1 and S2, respectively, but are both considered as improvements on the current TB program effort in terms of funding and impact levels. By comparing resource allocation to best-case epidemiological and economic impact estimates, intervention optimization, using a recalibrated TIME model and the One Health Tool, was performed during the development of this NSP to establish the most suitable policy scenario for successful NSP implementation. Key assumptions for deciding upon an optimal implementation TB-NSP pathway include the following:

- Scenario S0: representing the continuation of the current TB program; is estimated to cost US\$46.5 million for the 5 years of the plan. The most essential components of care were prioritized which include diagnostic commodities using the current diagnostic algorithm, medicines, salaries and core surveillance functions including expansion of eTB for TB cases and interoperability of platforms. Only essential capacity building and routine data quality monitoring and assurance activities, engagement of CHW with current performance based financing (PBF) support are kept in this scenario. The inclusion of additional TB services in the Mutuelle de Santé; enhanced access to social protection; improved patient centered care; and sustained domestic funding levels aiming at reaching the SDGs are also considered in this scenario.
- Scenario S1: representing an ambitious NSP, with 5% additional investments on Scenario S0; was estimated at US\$50 million for the 5 years of the TB NSP.

Under this scenario, the additional cost will support higher coverage of more sensitive and intensified diagnostic algorithms with CXR and Xpert use among the general population and 10 HRG; nutritional support for DS TB with BMI<18.5; higher TPT coverage with eventually shorter TPT regimen and OR.

- Scenario S2: representing a very ambitious NSP for a total of 5 years the TB NSP cost estimated at US\$ 53.5 million will even more increase the coverage of intensified and sensitive diagnosis among the general population and 10 HRG and more; nutritional support for all TB patients and expanded.

Vision, Goal, Milestones and Principles

The National strategic plan runs from July 2019 to June 2024

Vision	Rwanda free of tuberculosis – zero deaths, disease and suffering due to tuberculosis
Goal	End the tuberculosis epidemic in Rwanda by 2035 which means 10 incident cases per 100 000 population or less per year (new and relapses).
Milestones for 2024	57% reduction in TB deaths (compared with 2015) 35% reduction in TB incidence rate (compared with 2015) Reduction of TB-affected families facing catastrophic costs due to TB (to be determined (TBD) after the survey, end 2020)
Targets for 2035	95% reduction in TB deaths (compared with 2015) 90% reduction in TB incidence rate (less than 10 TB cases per 100 000 population) No affected families facing catastrophic costs due to tuberculosis
Principles	<ol style="list-style-type: none"> 1. Government stewardship and accountability, with monitoring and evaluation 2. Strong coalition with civil society organizations and communities 3. Protection and promotion of human rights, ethics and equity 4. Adaptation of the strategy and targets at country level, with global collaboration

PILLAR ONE. PATIENT-CENTRED CARE

STRATEGIC OBJECTIVE 1: CONSIDERING THE PATIENT PATHWAY FOR TUBERCULOSIS

- 1.1 Accelerating early screening and appropriate diagnosis of TB
- 1.2 Quality of care and ensuring a cure, including aDSM and patient support
- 1.3 Promoting care seeking and prevention through community engagement

STRATEGIC OBJECTIVE 2: TARGETED APPROACHES FOR KEY DRIVERS OF TB EPIDEMIC AMONG SELECTED POPULATIONS

- 2.1 Enhancing Programmatic Management of Drug – Resistant Tuberculosis
- 2.2 Ensuring prevention, diagnosis and treatment of Childhood Tuberculosis
- 2.3 Strengthening management of TB / HIV and other co-morbidities
- 2.4 Ensuring diagnosis and management of lung diseases
- 2.5 Promote intensified screening and diagnosis among high-risk group (HRG) populations

PILLAR TWO. BOLD POLICIES AND SUPPORTIVE SYSTEMS

STRATEGIC OBJECTIVE 3: PROGRAMMATIC MANAGEMENT, MULTI-SECTORAL COLLABORATION & ENGAGING ALL CARE PROVIDERS

- 3.1 Political commitment with adequate resources for tuberculosis care and prevention
- 3.2 Management of TB care and prevention
- 3.3 Engagement of civil society organizations, and public and private care providers
- 3.4 Migrant and cross border
- 3.5 TB infection control

STRATEGIC OBJECTIVE 4: UNIVERSAL HEALTH COVERAGE, SOCIAL PROTECTION, HUMAN RIGHTS & NUTRITION

- 4.1 Universal Health Coverage
- 4.2 Human rights and gender
- 4.3 Social protection and nutrition

STRATEGIC OBJECTIVE 5: STABLE AND QUALITY ASSURED SUPPLY OF DRUGS, DIAGNOSTIC AND COMMODITIES

- 5.1 Supply chain management
- 5.2 Rational use of medicine

STRATEGIC OBJECTIVE 6: M&E AND DATA QUALITY SYSTEM (E-TB HEALTH INFORMATION SYSTEM)

- 6.1 Surveillance system including mortality registration

PILLAR THREE. RESEARCH AND INNOVATION

STRATEGIC OBJECTIVE 7: DATA FOR PROGRAMMATIC, MONITORING, EVALUATION, LEARNING AND PLANNING

- 7.1 Evidence generation and use of electronic data systems

STRATEGIC OBJECTIVE 8: RESEARCH PRIORITIES

- 8.1 Research strengthening

I. EVIDENCE BASED APPROACH AND TB NSP DEVELOPMENT

This TB-NSP 2019 - 2024 lays out a strategic and technical path in order to achieve a Rwanda free of TB. It presents the full aspirations of the country, including outcome and impact targets that align with international goals, and a full portfolio of interventions needed to reach these goals. In acknowledgement of likely funding gaps, an evidence-based optimization of resource allocation using the WHO recommended PCF is presented alongside alternative impact targets given reduced funding scenarios.

At international level, the most important policies and commitments providing direction to this NSP are the SDGs, the End TB strategy and the Africa Health Strategy 2016-2030.

Rwanda's vision is to be free of TB and to attain the SDGs by reducing TB incidence and number of TB deaths by 80% and 90%, respectively, by 2030 (compared to 2015). This plan aims to achieve the 2025 End TB milestones of reducing TB incidence by 35% and the number of TB deaths by 55% (compared to 2015) and also to reduce catastrophic costs for TB affected patients and families based on the results of a patient cost survey (PCS) with a baseline scheduled for 2020. The NTP intends to reach the Stop TB Partnership's Global Plan to End TB targets of ensuring more than 90% treatment coverage and more than 90% treatment success rate for all TB patients by June 2024.

I.1. Evidence based approach and documentation

The TB-NSP 2019 - 2024 is guided by the Government's overall vision of development in the health sector, as set out in Rwanda's '7 Year Government Program (2017-2024): National strategy for transformation (NST1)' which was developed to achieve 'Vision 2020' and the 'Health Sector Strategic Plan (HSSP) IV July 2018 – June 2024'. The TB-NSP represents an evolution in the Government of Rwanda's response to the TB epidemic. New data is driving a targeted and prioritized approach. In addition, this NSP reflects a patient-centered approach to planning and evidence-based prioritization of programming and resource allocation to close identified gaps along the TB care continuum in order to achieve quality care. The activities embodied under this NSP are meant to address systemic and root causes of these gaps along the care continuum and will suggest complementary roles for districts and the National TB Program at central level, departments across the Ministry of Health, funding and implementing partners, civil society and other sectors, as well as Ministries, such as Finance and Local Administration.

The consolidated evidence used for this plan comes primarily from the results of the 2012 TB prevalence survey⁴, the HMIS/DHIS2, the 2020 Patient Pathway Analysis (PPA)⁵ and relevant studies guiding the country in how to better reach all people with TB prevention and care by building a refined approach. Between 2016-2019, the NTP coordinated more than 12 studies with the goal of better understanding the experience(s) and preferences of TB patients, including how they

⁴ The 1st national TB prevalence survey 2012 in Rwanda, Ministry of Health, Rwanda Biomedical Center (IHDP), September 2015 <http://ghdx.healthdata.org/record/rwanda-national-tuberculosis-prevalence-survey-2012>

⁵ Report PPA, 2020

experience systems-related barriers to quality TB care. During the development of the TB-NSP, this body of epidemiological, people- and systems-related evidence was applied along the TB care continuum to understand where people with TB may be missed or lost by the health system. Key findings from the TB prevalence survey, studies and routines data include the following:

- According to the TB prevalence survey
 - For those not seeking care, 62% of people with TB symptoms including cough more than 2 weeks, did not seek care because they felt the symptoms were not serious and did not feel it was necessary to report them.
 - The younger generation below 55 years were more reluctant to seek care than older age groups, 55 years and above.
 - Of those who sought care, only 48% of people accessed a HF with TB diagnostic services (or specimen transportation).
 - The survey also found that 57.2% of TB patients diagnosed through abnormal CXR would have been missed, if the survey would have applied the definition of a TB presumptive case as a person with cough for two weeks and more or any cough for PLHIV. As such, CXR was found to be a highly sensitive screening tool for identifying people with TB.
- A study on risk factors for death associated with TB analysed high death rates among clinically confirmed TB and TB patients co-infected with HIV. It showed that patients with TB may die in the course of treatment due to several factors including delayed and/or missed diagnosis and other comorbidities. Comorbidities majorly affecting TB patients include HIV, diabetes, and malnutrition. This shows a gap in the nutrition support care cascade for TB patients.
- The findings of a TB death audit report⁶ conducted by the NTP in Rwanda revealed that 62% of deaths occurred among underweight TB patients with a BMI of ≤ 18.5 and 65% had a high bacillary load (2+ and 3+). Hanrahan & al. found that BMI was a strong predictor of mortality. Incidence rates for mortality were 10.4/100 person-years among HIV-infected TB patients with a BMI of 18.5 or less compared to 3.6/100 person-years of those with a BMI of 18.6-25⁷.
- According to 2018 WHO data, out of 7,300 (100%) estimated incident cases (CI: 5,600-9,200), 5,820 (80%) patients were notified and 80% started on effective TB treatment.
- According to 2018 WHO data, out of 180 (100%) Rifampicin-/multidrug-resistant TB (RR/MDR-TB) estimated incident cases (CI:130-240), 98 (54%) patients were notified and all started on effective anti-TB treatment
- According to 2018 WHO data, out of 1,500 (100%) estimated incident cases (CI:1100-1,900), 1,192 (79%) patients were notified and 1,112 (74%) started antiretroviral treatment (ART).
- The 2020 Patient Pathway analysis indicated most people (79%) seek care for TB symptoms at public clinics where sample transportation is essential

⁶ Report of Tuberculosis death audit analysis for death of TB cases registered from April 2016 up to June 2019, August 2019

⁷ Body mass index and risk of tuberculosis and death. Colleen F. Hanrahan, AIDS. 2010 June 19; 24(10): 1501–1508. doi:10.1097/QAD.0b013e32833a2a4a
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3063388/pdf/nihms279591.pdf>

and available for diagnosis (71%). Men sought care more often in private facilities than females (20% vs. 10%) where diagnostic capacity is lacking. Second line treatment initiation is provided at two facilities due to low prevalence but ambulatory second-line treatment can be provided in all public health care level one and level two facilities.

- The UNHLM indicative target⁸ for 2018 on TPT initiation and LTBI treatment, for child contacts <5 years of age was 1,420, while the reported number of children <5 who were started on TPT was 1,423. As per national policy, children aged 5 years and above were not considered for TPT, therefore the UNHLM 2018 indicative target of 667 children initiated was not met.
- For PLHIV the 2018 UNHLM indicative target for TPT initiation was 8,125. However, the policy was only implemented in 2019, hence the reported number of PLHIV started on TPT in 2018 was 0.
- According to the 2018 UNHLM indicative targets \$20.3 million was needed for the 2018 TB program budget. The actual available total budget was \$7.4 million, leaving a gap of 63%. The total budget was derived from a combination of domestic funding \$2,429,165 (32.7%), GF \$4,634,363 (62.4%) and other donors \$365,409 (4.9%).

Rwanda's experience demonstrates that it is possible to achieve rapid and successful implementation of many TB/HIV collaborative activities as part of the Stop TB Strategy⁹, in particular, HIV testing and ART initiation among diagnosed TB patients. The second national TB Drug Resistance Survey (DRS)¹⁰ was conducted in 2015. Also, a study on the impact of PMDT interventions diagnostic- and treatment delays, and the resulting genotypic clustering of MDR-TB over a decade in Rwanda was conducted in 2016¹¹. A study of patient costs associated with seeking and receiving care for TB is planned in 2020. It will assess the proportion of DS-TB and DR-TB patients who experienced catastrophic expenditure. The study conducted in 2012¹² on knowledge, attitudes and practices (KAP) among TB patients suggested that comprehensive knowledge of TB improved from 40% in 2009 to 56% by the end 2012. Recent information on TB knowledge from the last Demographic and Health Survey (DHS) in 2014, found that the majority of participants heard about TB (99.4%) and knew that the disease is spread through the air while coughing or sneezing (72%). Finally, the Diagnostics for Multi-drug Resistant Tuberculosis in Africa (DIAMA) project, coordinated by Prof. Dissou Affolabi in Benin, in collaboration with the Antwerp Institute of Tropical Medicine considered optimization of TB molecular drug susceptibility testing, patient follow-up, and

⁸ http://www.stoptb.org/assets/documents/global/advocacy/unhlm/PTTargets_November_2019.pdf

⁹ Bulletin of the World Health Organization Past issues Volume 85: 2007 Volume 85, Number 5, May 2007, 325-420 <https://www.who.int/bulletin/volumes/85/5/06-036525/en/>

¹⁰ World Health Organization :Global tuberculosis report 2016. Page 192

¹¹Studies on multidrug resistance tuberculosis in Rwanda: Turning off the tap. Ngabonziza, Semuto Jean-Claude [https://pure.itg.be/en/projects/studies-on-multidrug-resistance-tuberculosis-in-rwanda-turning-off-the-tap\(8edb716b-9b40-45aa-8794-d224d7ee6ad9\).html](https://pure.itg.be/en/projects/studies-on-multidrug-resistance-tuberculosis-in-rwanda-turning-off-the-tap(8edb716b-9b40-45aa-8794-d224d7ee6ad9).html)

¹² National University of Rwanda, School of public health. Knowledge, Attitude and Practices study on TB in Rwanda

novel diagnosis approaches. Results of the project highlighted some possible new changes in DST such as the use of Xpert Second Line testing.

Other source documents include the National Tuberculosis Epidemiological Review conducted in 2018; the External Program Reviews of the 2013-2018 National Strategic Plan for TB (TB-NSP) conducted in 2016 and 2019. Other data sources used in this plan include the monitoring report on Programmatic Management of Drug-Resistant TB (PMDT) in Rwanda conducted in 2018, and the Rwanda National Tuberculosis and Other Respiratory Communicable Diseases Annual Report 2017-2018. Most of the data used in the NSP come from the Rwanda Health Information System (RHIS) using DHIS2 aggregated data, and the WHO Global TB Report 2018¹³.

I.2. NSP development process

The 2019-2024 TB-NSP is the successor to the last 2013-2021 TB-NSP aimed at implementing recommendations of the 2016, 2017 and 2018 reviews and aligned to the End TB Strategy of the World Health Organization (WHO). It was developed with active participation of TB stakeholders including civil society, national and international partners and various Health departments of the Government of Rwanda/Ministry of Health (RBC/IHDPC, RBC/NRL, RBC/MPPD, RBC/HIV, RBC/CS, RBC/SPIU, RBC/ NCD, RBC/PMEBS, DHs, CHUK , Rwanda NGO forum, RPP+, UNICEF, WHO, KNCV and CDC), through a series of events, workshops and consultative meetings led by the NTP using the national guide for health sector policy and strategic plan development issued by the Ministry of Health in April 2014¹⁴.

Following several external reviews including the last epi-review and Green Light Committee (GLC) missions at the end of 2018, an external desk review with the NTP central team was conducted from 27 May-1st June 2019 before a kick off partners workshop in which more than 30 international, national and local stakeholders reviewed and discussed relevant study results applied to three unique planning steps: (1) Problem Prioritisation; (2) Root Cause Analysis; and (3), Strategic Intervention Optimisation. The process nurtured country-level planning that centered on asking the following questions: (1) What are our biggest problems? (2) Why are they happening? and (3), What should we do about them? The NTP established a national writing committee composed of the NTP central unit team and other divisions within the Rwanda Biomedical Center (RBC) as well as other partners

Further, challenges and achievements from the last MTR 2016 were reviewed at the end of May 2019 through a desk review performed by the NTP central unit and Pierre Yves Norval from TeAM who was the external consultant (see Annexes 1, 2). The review team analyzed and prioritized challenges and gaps in view of the preparation of the new NSP 2019-2024. From 94 challenges identified in 2016 leading to recommendations and actions, the review team identified 55 remaining challenges including 9 new challenges (see Annex 1). The 50% reduction challenges was the result of good performance. However, the 9 new challenges (N^o 1, 6, 15, 17, 23, 32, 36, 37 and 51) guide the prioritization of the new NSP 2019-2024.

¹³ <file:///C:/Users/PIERRE~1/AppData/Local/Temp/9789241565646-eng.pdf>

¹⁴ http://moh.gov.rw/fileadmin/templates/Docs/National_guide_for_HSP_Strategic_Plan_dvlpmt_.pdf

The plan was validated by national stakeholders during a national validation workshop and submitted to technical and funding partners for input and comments before finalizing the first version.

Lastly, in December-January 2020, the NTP central unit with assistance from KNCV consolidated core epidemiological and systems-related data which was then collated along the care continuum as described in the WHO People-Centered Framework for tuberculosis program planning and prioritization - User guide (2019) was organized using the KNCV data consolidation tool .

The TB-NSP July 2019- June 2024 gives a broad vision of where Rwanda is now in terms of TB control, what the biggest problems or gaps are including their root causes based on available evidence, and where the country wants to be by the end of this five-year plan and how it plans to get there.

The outline of the document is as follows: Chapter 1 presents the evidence-based methodology and source documents. Chapter 2 describes the situation analysis including the policy environment, guiding principles, epidemiological situation and national response. Chapter 3 presents the core TB NSP July 2019- June 2024 plan with a strategic framework of interventions answering gaps and problem analysis. This gives indications of where we want to go, and how we plan to get there. Chapter 4 details the M&E plan and targets. Chapter 5 presents the full cost of the TB-NSP and detailed cost by strategic intervention and detailed activities, which also acknowledges funding gaps and resource constraints. Mathematical modelling of impact by Avenir Health was applied in combination with cost evaluation models to consider the interventions through applying the One Health tool (OHT). A subset of interventions were selected to optimize the impact of available resources on the overall epidemic and for selected special populations, high risk groups (HRG) for TB, highlighting most cost-effective interventions. Impact targets for three different levels of effort are presented to develop a costing plan with evidence prioritization allocation scenarios.

II. SITUATION ANALYSIS

II.1. Context and Health Sector Policies

II.1.1. Demographic and politico-administrative environment

Rwanda is an East African country, bordered to the north by Uganda, to the south by Burundi, to the west by the Democratic Republic of Congo and to the east by Tanzania. Rwanda has a total surface area of 26,338 km² and is divided into five provinces which are sub-divided into 30 districts which are sub-divided again into 416 sectors and further divided into 2,148 cells with 14,837 villages (Umudugudu) designated.

The population projected in 2019 from a census conducted in 2012 was estimated at 12,374,398 inhabitants¹⁵ giving a population growth rate of 2.6% per year since the 2010 census. The poverty rate declined from 56.7% in 2005-2006 to 38.2% in the FY2016-2017¹⁶ and extreme poverty reduced from 35.8% to 16% over the same period. In 2017, the Gross Domestic Product per head per US dollar was 774, compared to 700 in 2012¹⁷. Life expectancy increased from 49 years in 2000 to 66.6 years in 2017¹⁸. Life expectancy in 2015 was 66.7 years.

II.1.2. Health policy environment

The overarching vision for the Government of Rwanda (GoR) is to guarantee the well-being of the entire population by increasing production, while decreasing poverty through good governance. In this context, the mission of the health sector is to provide and continually improve affordable, promotive, preventive, curative and rehabilitative health care services of the highest quality, thereby contributing to the reduction of poverty and enhancing the general well-being of the population¹⁹.

II.1.2.1. End TB strategy

In May 2014, the 67th World Health Assembly adopted the End TB Strategy which aims to end the global TB epidemic by 2035. This means reducing estimated TB mortality and incidence to 95% and 90%, respectively, by 2035 (as compared with 2015). The End TB Strategy builds on and significantly expands the scope of efforts in terms of United Nations Sustainable Development Goal 3.3 which is to end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and to combat hepatitis, water-borne diseases and other communicable diseases by 2030.

The Global (WHO) End TB Strategy comprises three pillars, namely:

- (1) Integrated, people-centered care and prevention – aimed at early and universal access to diagnosis and treatment of all forms of tuberculosis;
- (2) Bold policies and supportive systems – aimed at strengthened government leadership, civil society and private sector engagement, as well as universal health coverage, social protection, poverty alleviation and action on the social determinants of TB;

¹⁵ 2012 Population and Housing Census, **Population projection**, January 2014, National Institute of Statistics of Rwanda: Kigali-Rwanda.

¹⁶ The fifth integrated household living condition survey (EICV 5) 2016-2017 fiscal Year, December 2018, National Institute of statistics of Rwanda: Kigali-Rwanda

¹⁷ Rwanda Statistical YearBook 2018, December 2018, National Institute of Statistics of Rwanda (NISR)

¹⁸ Seven years government programme: National Strategy for transformation(NST1) 2017-2024

¹⁹ Rwanda Ministry of Health: fourth health sector strategic plan. July 2018-June 2024.

http://moh.gov.rw/fileadmin/templates/Docs/FINALH_2-1.pdf

(3) Intensified research and innovation – aimed at accelerating discovery, development and rapid uptake of new tools, interventions and strategies.

The strategy has specific indicators, milestones and targets for 2020, 2025, 2030 and 2035.

II.1.2.2. The Sustainable Development goals and TB

The GoR has committed itself to achieving the Sustainable Development Goals (SDGs) by 2030, which were adopted in 2015 by the United Nations (UN). The SDGs²⁰ have set the target of ending the TB epidemic by 2030. They are fully aligned with the WHO End TB Strategy.

Ending the TB epidemic by 2030 is one of the targets under goal 3, which is to “ensure healthy lives and promote well-being for all at all ages”. Other SDG targets related to health and/or social determinants of health, which have potential impact on TB include: End poverty in all its forms everywhere; End hunger (malnutrition); Reduce maternal mortality; End preventable deaths of newborns and children under 5 years of age; Reduce premature mortality from non-communicable diseases (diabetes); Achieve universal health coverage; in addition to, Reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination (household and ambient air pollution, unsafe water, unsafe sanitation and lack of hygiene).

II.1.2.3. The Africa Health Strategy 2016-2030

The goal of the Africa Health Strategy (AHS) 2016-2030 is to ensure healthy lives and promote well-being for all in Africa in the context of “Agenda 2063: The Africa We Want” and the Sustainable Development Goals. The overall objective is to strengthen health systems performance, increase investments in health, improve equity and address social determinants of health to reduce priority diseases by 2030.

II.1.2.4. The Rwanda 7 years government programme: National strategy for transformation (NST1)

In 2000, the Government of Rwanda developed “the Rwanda Vision 2020” that sets out a long-term vision for the country in terms of goals and objectives for development by the year 2020. The goal is for Rwanda to become a middle-income country, halving the percentage of people living in poverty, raising life expectancy to 55 years and reducing aid dependency.

Moreover, in 2017, the Government of Rwanda developed a National Strategy for Transformation (NST1) which is comprised of the Seven Year Government Programme (7YGP) 2018-2024. The NST1 will provide the foundation and act as the vehicle to reach Vision 2050 which aims to take Rwanda to higher living standards and higher-quality livelihoods. This strategy builds on previous plans to sustain growth and accelerate transformation towards achieving the 2050 vision. The NST1 also embraces the Sustainable Development Goals (SDGs), which consists of 17 Goals with 170 targets and indicators, across a range of economic, social, and environmental issues.

The National Strategy for Transformation is built on 3 pillars:

²⁰ Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2016/2/Rev.1), Annex IV

- Economic Transformation which aims to accelerate inclusive economic growth and development founded on the Private Sector, knowledge and Rwanda's natural resources;
- Social Transformation which aims to develop Rwandans into capable and skilled people with quality standards of living and a stable and secure society. This pillar has five objectives and the second one is to ensure quality for a healthy population;
- Transformational Governance which aims to consolidate Good Governance and Justice as building blocks for equitable and sustainable National Development.

The second pillar of NST1 will ensure access to quality healthcare for all by:

- increasing the health workforce capable of addressing the challenges and consequences of the epidemiological transition towards ending TB,
- establish model health centers of excellence through partnerships with private investors,
- identify innovative sources of finance for the health sector including public private partnerships, public community partnerships for health financing and a sustainable model for community-based health insurance,
- strengthen disease prevention awareness and reduce communicable and non-communicable diseases.

To achieve the NST1 targets, will require strengthening collaboration and partnership among all stakeholders and enhancing ownership at all levels.

II.1.2.5. The Health Sector Strategic Plan IV July 2018 – June 2024

The fourth health sector strategic plan (HSSP4) highlights commitments and priorities for the coming 5 years and is aligned to National Strategic Plan (NST1) with the overall objective to ensure universal accessibility (in geographical and financial terms) of equitable and affordable quality health services (preventative, curative, rehabilitative and promotional services) for all Rwandans. To attain this overall objective, four strategic sub-objectives were set:

- Full implementation of the various disease programs (improve demand, access, coverage and quality)
- Strengthening various health system components (e.g. strengthen policies, resources and management)
- Strengthening all levels of service delivery (organise services effectively at all levels)
- Ensure effective governance of the sector (strengthen decentralization, partnership, coordination, aid effectiveness and financial management).

The HSSP4 identified priorities in four broad result areas: increasing coverage of interventions along the life course; scaling-up coverage of essential services to combat communicable and non-communicable diseases; strengthening support for the Rwandan system and building health security and resilient systems.

The second priority of HSSP4 under infectious diseases includes TB as a priority, ensuring early detection and effective treatment of TB and other respiratory & lung diseases. The strategic direction is to reduce TB incidence by 45% in 2024. To achieve these targets, the following strategies were proposed:

- Improve case detection by conducting active case finding among high risk groups and in hotspots;

- Improve TB diagnosis across the laboratory network and progressively adopt the use of more sensitive molecular tests as initial diagnostic tests;
- Strengthen TB surveillance by adopting the use of an electronic individual record system and develop a data driven policy;
- Ensure access of first and second line anti-TB drugs at all levels;
- Ensure early detection and effective treatment of leprosy cases;
- Strengthen TB/HIV collaboration activities at all levels.

The HSSP4 will continue to ensure that all persons in Rwanda have access to equitable and quality services by ensuring universal health coverage and that no one is left behind.

II.1.2.6. The National Tuberculosis Control Strategic Plan July 2013 - June 2018

With the 2013-2018 TB-NSP, Rwanda's TB control strategy was clearly reformulated. While maintaining TB control activities in the general population, new and more sensitive screening and diagnostic strategies were introduced to target prioritized high risk groups and maintaining involvement of community health workers to ensure equity in TB control activities. It has four objectives:

- 1) Provide early TB detection in the general population and intensify case-finding in prioritized high-risk groups so that the proportion of TB cases (all forms) identified among HRGs increases from 14% to at least 24% by mid-2018,
- 2) Increase the TSR from 88% to 90% for bacteriologically confirmed TB cases and maintain this rate at 87% for MDR-TB,
- 3) Improve TB prevention (TB infection control in health facilities, behavioural change in the general population and prevention through medication) so that the percentage of the population with adequate knowledge on TB increases from 56% to 75% by 2018,
- 4) Improve managerial capacities of the TB program; enhance monitoring and evaluation systems and operational research, by implementing and increasing the functionality* of an electronic TB register in all CDTs.

The NSP includes two impact indicators, seven outcome indicators, eight output indicators and four process indicators to monitor the achievement of the interventions. At the end of the last NSP, the program exceeded its targets in 6 (29%) of the 21 indicators, while 9 (43%) were achieved, 3 (14%) were on track, while only 2 (10%) are facing some challenges and 1 (5%) is not applicable because the KAP survey completed as of June 2018. Table 1 presents the performance of the key indicators for the TB NSP 2013-2018

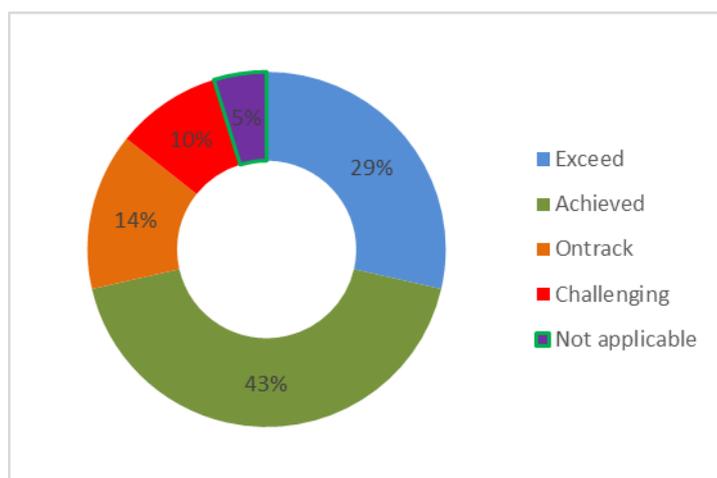


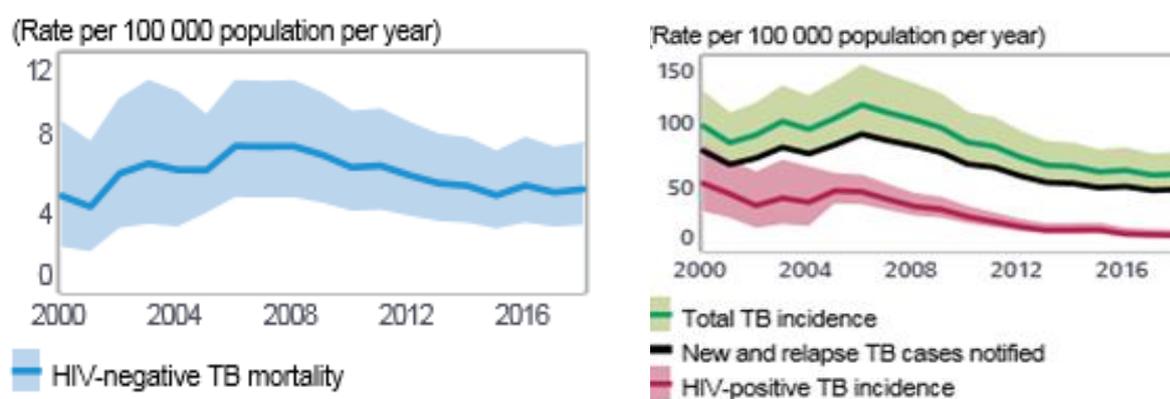
Figure 1: Achievement of NSP 2013-2018 indicators

Table 1: The TB 2013-2018 NSP targets versus achievements

No	Indicators	Target	Result	Achievement
	Reduce mortality rate	37.0%	46.6%	126%
	Reduce TB incidence	23.0%	21.0%	91%
1	Case Notification Rate (all forms)	50.1	48	96%
2	Case Notification Rate of TB Bac+	26.3	30.5	116%
3	% TB cases by CHWs	21.0%	19.3%	92%
4	% Labs with high performance in External Quality Assurance (EQA)	96.0%	84.5%	88%
5	% of TB Bac+ tested for DST	70.0%	85.6%	122%
6	% previously treated cases tested for DST	90.0%	85.9%	95%
7	% cases from HRGs	24.0%	47.1%	196%
8	TSR for TB Bac+ New & Relapse	90.0%	88.2%	98%
9	TSR for CD	79.0%	79.3%	100%
10	Cure rate TB Bac+ New & Relapse	84.0%	81.1%	97%
11	% TB cases tested for HIV	99.0%	99.9%	101%
12	Proportion of presumptive TB cases with a documented HIV test result	99.0%	99.1%	100%
13	% TB/HIV cases receiving ART during TB treatment	90.0%	92.2%	102%
14	TSR for TB cases by CHWs	95.0%	94.9%	100%
15	% RR/MDR-TB cases on 2nd line treatment	100.0%	98.8%	99%
16	TSR RR/MDR-TB	87.0%	83.0%	95%
17	Interim results at six months	91.0%	75.3%	83%
18	Timeliness of reporting	97.0%	84.0%	87%
19	KAP on tuberculosis completed	75%	No	

II.2. TB epidemiology in Rwanda

WHO estimates of Rwanda TB burden were reduced in 2017 after the national TB prevalence survey of 2012 found a lower TB prevalence than previously estimated²¹. Estimated TB incidence rates in Rwanda are lower than the Global and AFRO Regional average but the 2018 incidence rate remains high with 59 (45-75) incident TB cases - new and relapse - per 100,000 habitants vs. 132 and 231, at global and AFRO Region level, respectively²². Rwanda achieved the Millennium Development Goal (MDG) target of halting TB incidence in 2006. Incidence is now on a steady decline at an average rate of 4% per year between 2010 and 2018 (Figure 2). Similarly, after an initial increase between 2006 and 2010, mortality (among those who are HIV-negative) is consistently declining with a level of 5.2 per 100,000 population in 2018.



Source: WHO Global TB report 2019.

Figure 2 : Trends of WHO estimates of mortality and incidence rates, 2000 to 2018 in Rwanda

TB burden the countries neighbouring Rwanda is high, with 3 (DR Congo, Kenya and Tanzania) among the 30 highest TB burden countries (table 1).

²¹ The prevalence of all forms of TB in the total population of Rwanda was re-estimated by WHO to be 95 (95% CI 69-125) for 2012.

²² World Health Organization. Global tuberculosis report 2019

Table 2 : TB burden in Rwanda and neighbouring countries, WHO data 2018

	DRC	Uganda	Tanzania	Burundi	Kenya	Rwanda
Incidence rate per 100,000	321	200	253	111	292	59
Notification rate per 100,000	202	131	133	64	184	47
TB Mortality rate (HIV- and HIV+ TB cases) per 100,000	63	45	69	24	64	7.7
Is the country among the 30 high burden countries?	Yes	No	Yes	No	Yes	No

Source: WHO Global TB 2019.

The case notification rate (CNR) decreased between 2006 and 2013, and then increased slightly in 2015/16; with a CNR of 50 per 100,000 in 2015 (figure 3). This increase is attributed to increased screening activities, in part due to ACF.

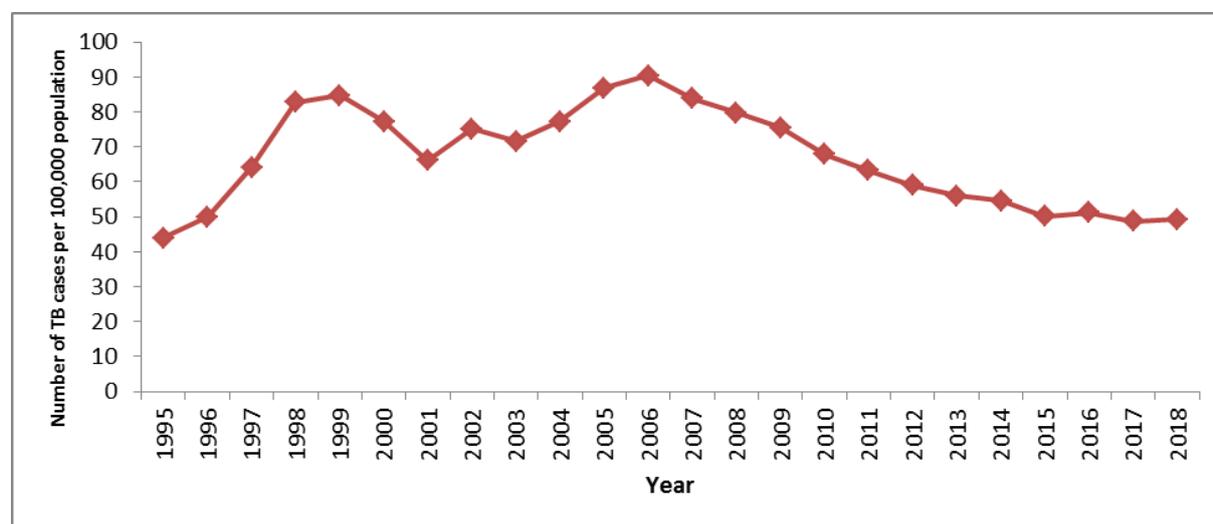
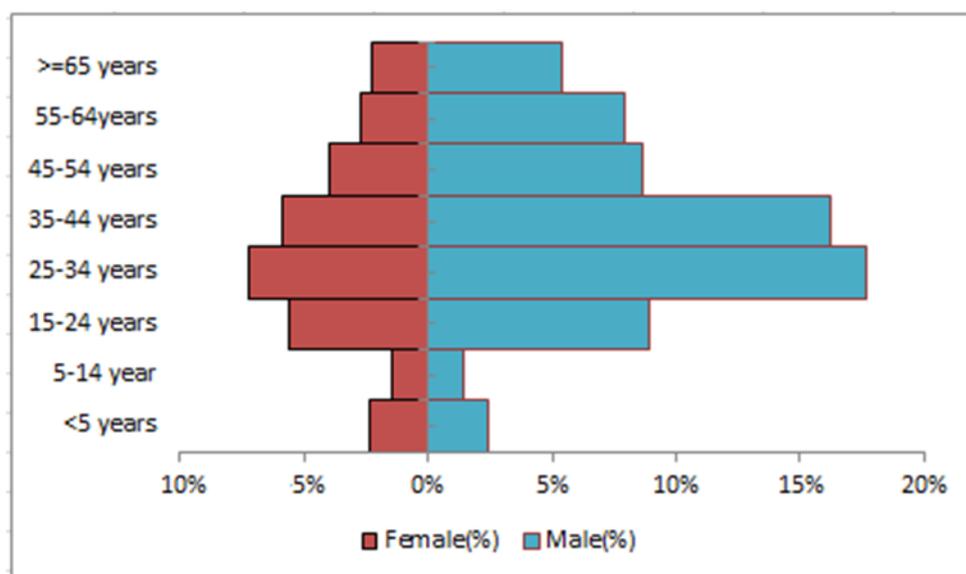


Figure 3: Trend in TB case notification rate, 1995-2018

In 2018/19, a total of 5,949 TB patients were notified. The proportion of TB patients infected with HIV remains stable each year, between 21-25%. The highest proportion of TB patients were aged between 25 and 44 (46.9%) years while children (<15) and elderly (> 55) represented 7.6% and 18.2%, respectively. The majority of known TB patients are male (male to female ratio of 2.0) (figure 4).



Source: TB&ORD annual report July 2018-June 19

Figure 4. Age pyramid of TB cases all forms by sex, Rwanda, Jul 2018-Jun 2019

During the same FY, newly treated TB cases represented 90.8% (5399/5,949) and 9.2% (550/5,949) were previously treated. Overall, pulmonary localisations represented 84.5% (5,025/5,949). As noted previously, TB was more commonly diagnosed among men. The male:female ratio for all-forms TB cases was 2. CHWs contributed to patient referrals for 25.2% (1,502/5,949) of TB diagnoses, all forms, including 1,454 patients who were bacteriologically confirmed, which exceeded the target ($\geq 21\%$).

Table 3: Registration of TB Cases by Case category, Site and Treatment History, 2018/19

	All forms	Classification based on bacteriological status		Classification based of history of previously treated		Overall pulmonary	Bacteriologically confirmed (New and Relapse)	TB cases initiated to the 1 st line treatment	Cases brought by CHWs
		Bacteriologically confirmed	Clinically Diagnosed	Newly treated	Previously treated				
N	5,94	4,443	1,506	5,399	550	5,025	4,334	5,797	1502

%	9	74.70%	25.30%	90.80%	9.20%	84.50%	72.90%	99.20%	25.20%
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Source: TB&ORD annual report July 2018-June 19

For 2018/2019, 187,867 presumptive TB persons were tested by microscopy or Xpert; the positivity rate was 2.3%, against 2.4% in the previous year. The positivity rate was higher in Kigali districts (15.3% at Nyarugenge, 8.5% at Kicukiro and 9.8% at Gasabo). These urban districts accounted for 33% of patients in 2018 and tend to report the highest annual case notification rates (Figure 5).

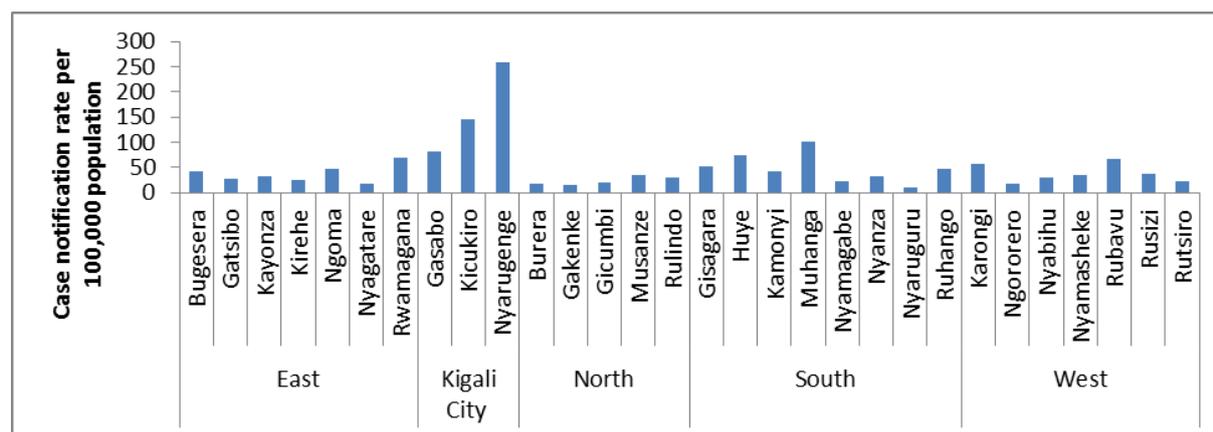


Figure 5. TB case notification rate for new and relapse bacteriologically confirmed TB patients by district, 2018 Rwanda.

50% of all presumptive TB persons and 52% of all TB patients (3,119/5949) notified represented one of the five prioritized high risk-groups (table 3). CHWs contributed referrals for 47.3% of all presumptive TB persons and to 19.3% of all TB patients.

Table 4: Screening, number of presumptive and diagnosed TB cases among high risk groups, 2018/19

Risk group	Screened	Presumptive TB		TB cases
	# of episodes	N	%	
Prisoners	163,523	12,679	7.8%	477
Contacts	13,920	3,626	26.0%	151
HIV+ (excludes prisoners, contacts, children <15 years, elderly ≥55 years)	567,826	16,959	3.0%	997
Children <15 years (excludes child prisoners, child contacts)	1,704,073	19,030	1.1%	439
Elderly ≥55 years (excludes prisoners ≥55 years and contacts ≥55 years)	1,270,984	50,507	4.0%	1,055
Total	3,768,138	93,710	2.5%	3,119

II.3. Drug-resistant Tuberculosis in Rwanda

Rwanda has a relatively low MDR-TB burden. The main factor driving MDR-TB appears to be transmission by infected individuals not yet detected. Findings from the TB Drug Resistance Survey conducted in 2015/2016 revealed low levels of drug resistance to first line drugs (1.5% in new cases; 10.7% in previously treated cases) and no established resistance to any second line TB agents. However, one patient was diagnosed with resistance to fluoroquinolone in 2017.

In 2018, Rwanda notified 98 laboratory-confirmed RR/MDR-TB patients compared to the 180 (95% CI 130-240) estimated by WHO in the same reporting period. Out of the 109 patients notified in 2018/19, 105 (98%) were initiated on the shorter 9-month MDR-TB treatment²³ while two were initiated on the longer standard 18-month regimen because they were previously treated for MDR/RR-TB .

Table 5: DR-TB WHO estimate and Rwanda notification*. 2018 (calendar year)

	New cases	Previously treated cases	Total number
Estimated number TB patients with MDR/RR-TB	81	100	180 (130-240)
Estimated % of TB patients with MDR/RR-TB	2.2% (1.7–2.7)	5.2% (3.3–7.7)	
Notified laboratory-confirmed cases			97
Patients started on treatment			98

Source. WHO Rwanda Country profile 2019.

There have been consistently less than 100 patients notified countrywide on an annual basis over the last 15 years. The gap between DR-TB notification and WHO estimated number of RR-TB cases among notified pulmonary TB patients was gradually decreasing to 11% in 2018, but it is still huge (46% in 2018) compared to the WHO estimated incidence of rifampicin resistant TB (absolute number) in the general population of Rwanda.

²³ In July 2014, Rwanda participated in the multi-country study led by the UNION with the aim to evaluate the “effectiveness and tolerance to a short course MDR-TB treatment”. Study results revealed higher cure rate with the shorter (9 month) regimen compared to the conventional one (20-24 months). Based on these findings, WHO recommends the use of this regimen under specific conditions and in 2016 Rwanda has adopted the shorter treatment regimen under programmatic conditions.

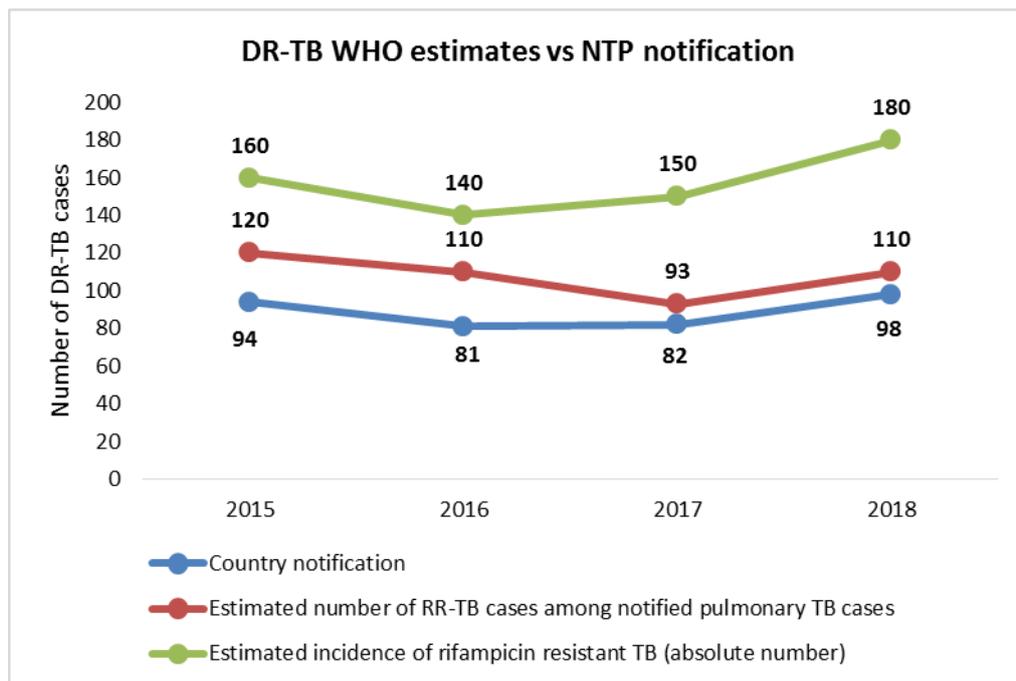


Figure 6: DR-TB estimates and notification 2015-2018

II.4. National response

II.4.1. TB case finding

The NTP has invested in a lot of interventions towards increasing early and accurate TB case finding among prioritized HRGs including active case finding among prisoners, intensification of TB screening among PLHIV, at the beginning and end of treatment of the index patient, as well as screening of children and elderly patients presenting at the health facilities. Two screening approaches were used: a) symptom screening followed by X-pert MTB/RIF for those presenting any of the 5 symptoms screened (cough for two weeks, fever for more than 4 weeks, weight loss, night sweats) plus known contact with a TB case; b) CXR and symptom screening followed by X-pert MTB/RIF for those who have a CXR with abnormalities suggestive of TB and/or symptoms suggestive of TB.

Most of the HRGs received the screening and diagnostic algorithm a) symptoms followed by Xpert, such as PLHIV-in care during follow-up visits in pre-ART and ART cohorts, all children under fifteen years of age, especially malnourished and HIV infected children, at any visit at the health facility, new prison inmates entering prisons, every six months after sensitization in prison and at discharge, all elderly with ≥ 55 years in the community during household visits and at any visit at health facility. For some risk groups the other screening and diagnostic algorithm was used b) CXR and symptom screening followed by Xpert, such as new PLHIV at enrollment, active campaigns in prisons. Other HRG such as people living with diabetes mellitus (PLDM) and underground miners, have not yet been systematically targeted in TB case finding interventions.

The NTP interventions increased TB case finding and presumptive TB persons identified from 28,637 in 2005 to 199,384 in 2018, of whom community health

workers (CHWs) have contributed in identifying 111,665 (56%) of all presumptive TB persons. The TB diagnostic algorithm for passive case finding among the general population was revised to include Xpert MTB/RIF in addition to microscopy for all smear positive TB cases. The capacity for WHO recommended rapid molecular diagnostic tests expanded and by the end of 2018, Xpert was accessible in 47 hospitals and 12 health centers with high TB notification rates. In 2018/19, 53.4% out of 5,949 TB cases were bacteriologically confirmed, of whom 3,174 were detected among HRGs. The proportion of children is below the expected norm of 10%, which may be a reflection of low detection levels for childhood TB. In order to improve TB detection and management in children, the NTP in collaboration with stakeholders developed childhood TB guidelines and a TB diagnostic algorithm specific to children including Xpert MTB/RIF as initial diagnostic test for all children presumptive for TB. Systematic TB screening is also incorporated into Integrated Management Childhood Illness and Integrated Community Childhood Management tools and guidelines. The NTP in collaboration with Rwanda Pediatric Association conducted mentorship on the management of childhood TB at health facilities using a checklist developed by pediatricians.

II.4.2. TB treatment outcomes

Over the past 20 years, the NTP has demonstrated increasing success on treatment outcomes for bacteriologically confirmed new and relapse TB patients (86.4%) and clinically diagnosed patients (82.7%) for TB cases registered in 2017/18. The most common unfavourable TB treatment outcome was “TB death” which represented 6.6% (271/4,083) for bacteriologically confirmed patients, new and relapse, and 15% (232/1,545), for clinically diagnosed patients. Patients who were not evaluated represented 1.3% for both bacteriologically confirmed new and relapse (55/4,083) as well as clinically diagnosed (20/1,545) during the same period as reported above. Excellent treatment outcomes were noted for TB patients managed with the support of CHWs reaching a TSR of 94.5% (2364/2501) for TB patients registered in 2017/18. In July 2017, Rwanda started to implement the WHO recommended newly optimized child-friendly TB formulations and phased out of streptomycin and RHE (150/75/400)

II.4.3. TB/HIV collaborative activities

Rwanda was one of the first African countries implementing TB/HIV collaborative activities. The country rapidly reached impressive results on HIV testing. More than 99% of presumptive and TB patients were tested for HIV and 21% (1,245/5,924) among those tested were identified as HIV infected 2018/19. Since 2010, a decrease in HIV positivity among TB patients was observed. For the cohort of HIV+ TB patients registered during July 2017 to June 2018, the proportion of HIV+ TB patients on antiretroviral therapy (ART) by the end of TB treatment reached 94.7%. According to 2017 WHO data, out of 1,500 (100%) estimated incident cases (CI:980-2,200), 1,207 (80%) patients were notified and 1,186 (79%) started on effective anti TB treatment and antiretroviral treatment (ART) and 904 (60%) were successfully treated. Integrated care and treatment are offered in all 561 CDT and CTs through the “One-stop TB/HIV service” approach. Since July 2016, Rwanda implemented the “Treat all” policy, meaning that all PLHIV are enrolled on ART whatever their CD4 count or clinical stage in less than two weeks of testing. This policy is expected to

introduce early treatment to healthier individuals and further reduce TB morbidity and mortality associated with TB/HIV coinfection.

Since 2011, Rwanda selected 3 health facilities to start a TB Preventive Therapy (TPT) program as piloting sites. In 2016, the TB/HIV TWG meeting decided to stop new enrolment on TPT due to low sensitivity of the 5 questions used in routine screening. In addition, the group determined that current TB diagnostic tools sensitive enough and available at all hospitals as the impact of TPT in high risk groups after six months of treatment was not clear. Recently, the TB/HIV TWG held in September 2018, recommended to re-implement the TPT program among recently diagnosed PLHIV starting with small scale (implementation in 5 hospitals with their 73 HCs). This program will help to evaluate the workload and potential geographical access barriers for the clients who will be transferred to the hospital for CXR.

II.4.4. Management of Drug Resistant TB

Rwanda started PMDT using the 20 month-treatment regimen in July 2005. Nine years later, starting in July 2014, a shorter treatment regimen was introduced and successfully implemented under coordination of The Union's study on evaluation of the shorter nine-months regimen for rifampicin resistant tuberculosis in nine African countries. A health facility centred treatment mode was used, hospitalizing all RR/MDR-TB patients to initiate treatment in one of the two MDR-TB centers (Kabutare and Kibagabaga) until they converted to culture negative. Once clinically stable, patients were sent back for ambulatory follow up and daily supervised treatment administration, ensured by nurses from a health facility near the patients' residence. Patients received psychological, nutritional and transportation support during their treatment.

New and repurposed TB drugs, including Bedaquiline, Delamanid, Linezolid and Clofazimine, are being used in DR-TB management in Rwanda and treatment regimens are designed according to the WHO guidelines. In order to strengthen DR-TB management, the DR-TB program is annually assessed by WHO through the Green Light Committee (GLC) evaluation missions.

The number of patient categories to be tested for TB drug resistance increased with the introduction of Xpert MTB/Rif and includes all retreatment cases (failures, relapses, return to treatment after interruption, etc.), contacts of MDR-TB, any smear positive diagnosed TB patients and smear positive during treatment follow up of susceptible TB patents. In 2018, 64% of new and 76% of previously treated TB patients had a drug susceptibility test (Xpert MTB/Rif, Line Probe Assay (LPA) and/or phenotypic test for the first line treatment), which reach the TB program target (90%) for DST coverage among previously treated TB patients. In addition to the three reference laboratories in Rwanda (National Reference Laboratory (NRL), Kigali and Butare University Teaching Hospitals) which are providing Xpert MTB/Rif, LPA 1st line in all and 2nd line only at the NRL, culture on solid and liquid media and phenotypic DST, Xpert MTB/Rif is performed in all 48 public hospitals countrywide and in some 18 health centers for all eligible patients. One case with resistance to fluoroquinolones was detected in 2017 and linked to an individualized DR-TB treatment regimen.

All patients diagnosed with RR/MDR-TB are linked to care; no waiting list exists. Treatment success has consistently been high, at 91% for RR/MDR TB cases registered in 2016.

II.4.5. TB monitoring, evaluation and learning

During the past years, the following main activities were implemented in the area of TB monitoring and evaluation, to ensure the quality of TB surveillance data. These include:

- developing and update of TB M&E policies/guidelines/tools and SOPs (using standardized reporting tools and WHO definitions);
- capacity building of concerned staff involved in TB data management at all levels of the health system;
- quarterly or biannual Data Quality Audit (DQA);
- Rapid Service Quality Audit (RSQA) visits at intermediate and peripheral levels;
- regular evaluation meetings (quarterly and annual) with HFs and Districts to discuss TB program performance;
- Periodic TB program reviews (WHO surveillance checklist and Epi-assessment); and
- annual data verification by the Local Fund Agent of Global Fund.

The TB Epidemiological review conducted in September 2018 revealed that Rwanda has a well-established TB program with a surveillance system that houses high quality data and facilitates effective monitoring of HIV-TB co-infection and DR-TB. The external evaluation concluded that- “the TB surveillance system in Rwanda seems to accurately capture TB cases detected and TB control program efforts”^{24,25,26} and could reach the WHO certification if the following standards are met:

- establishing TB notification as a legal requirement;
- developing a functioning vital registration system; and
- conduct inventory study/studies to determine whether there’s possibly under-reporting of TB.

In 2013, the Rwanda TB surveillance system (i.e. aggregated data entered in RHMIS is considered the formal system) met 6 of the 13 standards of the TB Standards & Benchmarks Checklist, partially met 4 and did not meet 2. In 2018, 8 standards were met, 2 partially met and 2 not met (see Annex 4 for more detail).

Significant progress was made in monitoring and evaluation since the development of the 2013-2018 TB NSP. The country is progressively transitioning from paper to a case-based electronic surveillance system. Since January 2014, all HFs are reporting quarterly aggregated data into RHMIS. The electronic web based individual patient registration named eTB is an extension of the aggregated DHIS2 using DHIS2 tracker application. ETB is already incorporated in RHMIS and reached 70% coverage of confirmed TB cases notified in the aggregated DHIS2. The NTP has identified and fixed bugs/unfavourable setups in the electronic reporting systems in eTB. The lack of interoperability between several electronic health information systems (e.g. eTB, the laboratory information systems, Data-To-Care, CRVS and LMIS) is a new challenge to address. The Civil Registration and Vital Statistics systems (CRVS) has increasing coverage of hospital/health facility deaths and a new system is being piloted to capture community deaths. Finally, the TB&ORD publishes an annual report on National Strategic Plan progress and the TB epidemiology situation including notification, prevention and treatment based on data from eTB and

²⁴ 2013 Evaluation of the Rwanda TB surveillance system using the WHO Checklist for standards and benchmarks for tuberculosis surveillance and vital registration systems

²⁵ Eveline Klinkenberg. Epidemiological review and impact analysis of tuberculosis in Rwanda. Rwanda 21-25 July 2014

²⁶ National tuberculosis epidemiological review, Rwanda. September 2018

RHMIS. In addition to epidemiological data, the annual report will also include people-centered and systems-related data generated, consolidated and mapped along the TB care continuum per the People Centered Framework.

II.4.6. Community engagement

Community DOTS was initiated in 2005 and reached national coverage in 2010. The role of CHWs includes:

- a) Community sensitization for awareness of tuberculosis disease;
- b) Identification and early referral of people with cough to the HC;
- c) Administration of DOT to patients;
- d) Referral of household contacts with cough to the HC;
- e) Home visit and recuperation of TB patients who do not adhere to treatment regimen.

Currently, CHWs play a crucial role in bringing TB care close to the people. In 2018/19, CHWs contributed to referral of 56% of all presumptive patients and to 25.2% of all TB patients. The TSR for patients receiving community DOT is excellent at 95%.

II.4.7 Engagement of the private sector

The private sector is composed of formal and informal health service providers. Formal private providers include not-for-profit institutions such as faith-based organizations (FBOs) and non-governmental organizations (NGOs) as well as for-profit providers including private self-financing institutions, individual private providers, retail pharmacies, chemists, laboratories, corporate and non-qualified or informal providers. Private institutions, which mainly serve the affluent or those covered under corporate insurance, mostly provide tertiary health care services.

The engaged private facilities in TB control, i.e. the private CDT clinics are limited to 3 CDT in Kigali. They use national policies and guidelines, monitoring and evaluation tools, and the NTP provides medicines and other essential commodities for diagnosis and treatment.

Orientation and referral of presumptive TB persons to the nearest CDT from a private facility is not reported in routine paper-based registers. The TB prevalence survey revealed that for those who sought care for chronic cough, 16% consulted informal private providers and 84 consulted formal private facilities²⁷ A study to assess the number of (presumptive) TB patients seeking care from the private health sector is needed.

In 2017, the 3 engaged private diagnostic and treatment centers (CDT) contributed only 0.6% of the national TB case notification numbers. The National TB Prevalence Survey showed that none of the prevalent TB cases were treated in the private sector. Private sector health facilities, other than the three mentioned above, once they have a suspicion of TB, they refer patients to public health facilities or the three private CDTs. If a clinically TB diagnosis is made, they also transfer the patient to their nearest public health facility for treatment initiation.

Treatment outcomes as well as data on TB/HIV outcome indicators in the engaged CDTs from the private sector are similar to the national average.

²⁷ 2012 TB prevalence Survey report

II.4.8 TB prevention and TB infection prevention & control

Strong emphasis was put on TB infection prevention & control (IPC) within the last NSP, the focus included administrative, environmental and personnel protection measures. A minimum package of six basic measures for TB IPC was defined which includes: the existence of the IPC plan; appointment of the TB focal point; health workers trained on TB; cough triage system and separation of coughers; health education on cough hygiene; and, optimization of natural ventilation by maintaining opened doors and windows in all services. According to the 2018/19 annual report, 82.7% (465/562) of health facilities are applying all six basic measures.

Surveillance of TB disease among health care workers (HCWs) and CHWs, was initiated in July 2015 and July 2017, respectively. This surveillance is conducted once a year. A specific register was developed and distributed to all health facilities. Twenty-three thousand five hundred and sixty-eight (23,568) HCWs were sensitized on the importance of annual TB screening in 2018/19. Among them 18,601 (78.9%) were screened, 351 presumptive TB patients were identified and 10 were diagnosed with active TB (all forms) (NNS: 1,860; 54 TB cases per 100,000). Regarding TB surveillance among CHWs, 50,276 were sensitized and among them 42,465 (84.5%) were screened, 924 presumptive TB patients found and 8 were confirmed with active TB (NNS: 5,147; 19 TB cases per 100,000).

With regard to Isoniazid Preventive Therapy (IPT), in 2018/19 fiscal year, 99% (1,429/1,443) of all children under 5 years who were contacts of bacteriologically confirmed TB cases were screened for TB. Of these 10.5% (150/1,429) were identified with presumptive TB and 18.6% (28/150) were diagnosed with active TB (all forms). Among the 1,415 children who screened negative, 97.7% (1,383/1,415) were enrolled on IPT. As explained above (in section II.4.3 on TB/HIV collaborative activities) IPT for PLHIV was piloted in 3 HIV clinics during the previous NSP period but stopped in August 2016. This intervention is planned for restart per this NSP.

II.4.9. Knowledge and health seeking behavior

The KAP study on TB literacy and health seeking behaviour conducted in 2012²⁸ showed that comprehensive knowledge of TB improved from 40% in 2009 to 56% by the end 2012.

Recent information on TB knowledge from a secondary analysis of the last DHS (2014), suggests that the majority of participants heard about TB (99.4%) and know that TB spreads through air while coughing or sneezing (72%). Only 5% of participants did not have any idea on how TB is transmitted.

The TB prevalence survey revealed that health seeking behaviour was poor. Only 40% of the survey participants reporting cough >2 weeks sought care. Among them, only 48% were asked to provide a sputum sample while 15% were referred for CXR. Although men are more prone to TB, women showed greater health seeking behavior.

²⁸ National University of Rwanda, School of public health. Knowledge, Attitude and Practices study on Tuberculosis in Rwanda

A previous study²⁹ suggests that late health seeking behaviour might be due to stigma or self-stigmatisation since TB is perceived as an HIV-related disease.

II.4.10. TB control program coordination/management and financing in Rwanda

The country's vision includes ending priority SDG targeted diseases using well-established and focused structures to coordinate an integrated national response; There is a long-standing history of partnership and support available for TB control from international and national non-governmental organizations (INGOs and NGOs), bilateral and multilateral agencies, research institutes and universities in Rwanda. This collaboration includes financial assistance, technical assistance, materials in-kind, diagnostic and treatment services, research, and management support. External partners firmly line up their aid behind the priorities outlined in the National Strategic Plan. Indeed, activities of donors, since the initiation of the program, are guided by the National Strategy Plan, and the vast majority of aid for tuberculosis is channeled through the government account.

A number of mechanisms exist for health sector coordination of partners in Rwanda. These include the MoH/Health Sector Working Group (HSWG) whose members comprise MoH, Development Partners (DP) and other Ministries and Civil society representatives. Under the leadership of the Permanent Secretary, the HSWG meets quarterly to discuss the implementation of the HSSP IV, topical sector issues and to share information. As policies and strategies are usually discussed, TB control implementation is discussed to understand progress and suggest remedies to improve performance.

Also, at the central level is the Country Coordination Mechanism (CCM) which covers all disease conditions, including TB. The members include the Permanent Secretary and program heads, District Pharmacies (DPs) and NGOs. The CCM plays a leadership role, effectively participating in discussions around the NSP such as its development and performance. It participates in and coordinates the development and submission of national proposals for GF grants, oversees implementation of the approved grant and submits requests for continued funding as well as approving any reprogramming and submission of requests for continued funding.

At the peripheral levels there is the Joint Action Development Forum (Health Commission) in each of the 30 Districts and 416 Sectors. The Forum is used for planning and monitoring, promoting cooperation between the private sector, civil society and the public sector to advance development at the local level. The health component includes TB control. As integration is the preferred option for service delivery in Rwanda, there is limited scope for vertical program coordination including TB.

In order to increase ownership over programs, Rwanda is using the PBF mechanism to improve the involvement of health providers in the implementation of the TB program at all levels of the health system. Funding for TB interventions is declining, which drives a very effective prioritization and optimization process for interventions planned in this NSP, in order to maximise (epidemiological and economical) impact with limited resources.

²⁹ Ngang, P. N., Ntaganira, J., Kalk, a, Wolter, S. & Ecks, S. Perceptions and beliefs about cough and tuberculosis and implications for TB control in rural Rwanda. *Int. J. Tuberc. Lung Dis.* 11, 1108–13 (2007).

In line with the MOH policy, the PBF for TB control activities was introduced in 2010. The system includes more than 20 TB-related indicators and led to substantial improvements such as broad awareness on TB at community-level, increasing easy access to TB services through involvement of CHWs (about 40% of all presumptive TB persons are brought by CHWs and half of TB patients are managed through community DOT) as well as improved TB TSR for patients managed by CHWs. TB case finding and the quality of TB services improved as a result of implementation of the PBF among HFs. The PBF scheme is also applied as a part of salary and as policy of MoH, aiming at improving staff performance; its payment is based on achievement of fixed targets and ratified in contracts between the two parties.

Capacity building for personnel involved in TB control activities has been one of the key interventions to strengthen policies and guidelines, as well as training for newly enrolled staff (e.g. an introductory TB course). Examples of training provided include TB and TB/HIV, MDR-TB, TB infection control, TB laboratory, TB data management, and CXR interpretation for MDs and radiology technicians.

PAL was introduced during the 2009-2012 NSP with the objective to increase TB detection and improve the quality of TB case finding and diagnosis by health services, in particular follow-up of sputum smear-negative HIV-positive TB presumptive cases; and to improve the management of patients with chronic respiratory diseases. Guidelines for the practical approach to lung health (PAL) were developed both for health centers and district hospitals. PAL materials (peak flow meters for all health centers, pulse oxymeters, handheld portable spirometers for all district hospitals and oxygen concentrators for some hospitals) and products (Salbutamol and beclomethazone for all HF) are procured and distributed. This approach was implemented in all health facilities. The TB and ORD Division continued to expand the PAL strategy through training to strengthen health care provider capacity, procurement of essential equipment and medicine and printing information material for health care staff. An assessment to evaluate the relevance, effectiveness, efficiency and sustainability of the PAL approach at PHC level was carried out in 2017.

In Rwanda, there is a policy and a legal framework including registration and limiting use/sale of TB drugs only by approved TB programs, in place since 1990. The procurement system for TB drugs, consumables and laboratory reagents is centralized where the Medical Production and Procurement Division (MPPD) conducts all health commodity procurement through WHO pre-qualified suppliers. The MPPD is responsible for storage and distribution of health commodities to all health facilities through the district pharmacies. A robust drug management system through paper based and an Electronic Logistics Management Information System (e-LMIS) has been implemented at different levels of the supply chain. Currently, the management of the drug information system is fully computer-based at central level (MPPD). District Pharmacies (DP) and health facilities (HF) are using e-LMIS mostly for ordering and distribution but warehouse management is still using a paper-based system in DPs and HFs.

III. PRIORITY GAPS IN TB CONTROL IN RWANDA FOR THE TB NSP 2019-2024

Challenges and achievement from the last MTR 2016 were reviewed at the end of May 2019 through a desk review performed by the central NTP unit and an external consultant (see Annexes 2 and 3). The review team analyzed and prioritized challenges and gaps with an eye towards preparation of the new NSP 2019-2024. From 94 challenges identified in 2016, which led to recommendations and actions, the 2019 review team identified a remaining 55 challenges including 9 new challenges guiding the prioritization of the new NSP 2019-2024.

Although TB control in Rwanda has made substantial progress over the last decade, there are still priority gaps and significant challenges to the program. Nonetheless, there are also new opportunities to improve control and to move progressively towards ending TB. The priority gaps are described in the following section.

With the 2019-2024 TB NSP, TB control strategies will be reformulated: while maintaining TB control activities in the general population, new and more sensitive screening and diagnostic strategies will be introduced to target prioritized high risk groups and maintaining the level of involvement of community health workers to ensure equity in TB control activities. **This NSP addresses 4 priorities gaps and 10 other gaps** identified by partners, through ambitious new operational policies.

III.1. Priority gap 1: TB treatment coverage

TB treatment coverage is not at desired level (about 20% of the estimated incident cases are not detected or treated) despite ongoing efforts to increase TB detection among HRGs and to increase diagnostic capacities.

According to the WHO Global Report 2019, treatment coverage³⁰ in 2018 was 80% meaning that about 1,000 active TB cases were not diagnosed. TB treatment coverage among children is even lower and estimated at 62% (367/590) below the 82% (5226/6400) coverage among adults. The epi-review in 2018, the desk review in 2019 and the 2016 mid-term review of the 2013-2018 TB NSP highlighted several weaknesses that may lead to under-detection of TB cases. These include the following: a) sub-optimal quality of TB screening and inadequate screening tools that do not capture all the 5 screening symptoms and do not allow analysis of this step of the cascade of care; b) under-utilization of Xpert and CXR in the diagnostic process; c) constraints related to the patient transport for CXR and sample transportation systems for Xpert; d) delayed transmission of culture/Xpert results back to the requesting HF due to limited connectivity systems; e) insufficient awareness on TB and patient delay due to poor health seeking behaviour was also highlighted through the national TB prevalence survey conducted in 2012; and f) and insufficient on-site support through supervision and mentorship.

Possible low detection of children with TB may be due to limited health care worker knowledge, skills, and confidence to establish clinical diagnosis; compounded by the absence of mentorship and high staff turnover. Sample collection techniques (sputum induction, naso-gastric aspiration, fine needle aspiration [FNA] are not routinely

³⁰ Treatment coverage is the proportion of notified cases among the estimated incident cases

used which may be limiting bacteriological confirmation of diagnosis in children. Naso-pharyngeal aspiration or Xpert testing on stools (as a painless alternative) is not yet implemented. There are missed opportunities such as using a family-centred approach and limited inter-program collaboration.

Closing the diagnostic gap in this NSP is to operationalize new national policies in support of appropriate and timely diagnosis, namely: 1) expanded use of CXR for screening for TB or as a triage tool; 2) Xpert as the initial confirmatory test for all TB presumptive cases; 3) increasing additional high risk groups to cover more of the high risk population for TB and 4) all bacteriologically confirmed TB patients to receive drug- sensitivity testing (DST). Additionally, encouraging health seeking behaviour among high risk groups by a patient-centered approach or enhancing efforts to attract them to seek care will also assist in answering this priority gap. Furthermore, this NSP will generate additional data for a more detailed cascade analysis and a repeat PPA is foreseen to also provide evidence on initial TB care seeking and possible subnational variations.

III.2. Priority gap 2. TB treatment success

The TSR for all forms of TB is at 86.5%, below the 90% global target; no aDSM system is in place for both drug-susceptible and drug-resistant TB cases; and no support is provided to vulnerable drug-susceptible patients (especially those malnourished, diabetics, and hospitalized)

The TSR for bacteriologically confirmed TB patients reached 88%³¹. However the treatment success rate for all forms at 85.9% is associated with a high case fatality rate among those clinically diagnosed (16%) and HIV+ TB patients (15%). These deaths analysed in a death audit are attributed firstly to malnutrition as demonstrated in a study conducted in Taiwan/Taipei during 2011 to 2012.³² The study indicated that TB patients with a BMI below 18.5 have a higher death rate than TB patients with a higher BMI. Malnutrition among TB patients should be considered as the main risk factor of death as its role on immunity impacts logically health recovery. Other death factors are late diagnosis due to use of less sensitive screening and diagnostic strategies, low TB awareness among the general population to seek care earlier, low skills among health facility staff to investigate patients with TB symptoms for TB and limited access to Xpert testing and chest radiography, low skills among health facility staff to investigate TB patients for other diseases/ comorbidities, such as diabetes etc.

Drug-susceptible patients do not receive nutritional support, even if they are hospitalized, which may impede or slow recovery. Payment is required for the management of co-morbidities like diabetes and others; therefore, these comorbidities may not be treated and hamper TB cure. TB treatment education materials and pamphlets for the patient and their families are not available to foster adherence, regular control and general awareness during treatment.

Closing the treatment gap in this NSP is to operationalize new national policies in support of nutrition for Drug Sensitive TB cases with BMI of ≤ 18.5 identified as death risk factor together with early diagnosis addressed in priority gap 1.

³¹ The last report 2017-2018

³² Yen et al. Association of Body Mass Index With Tuberculosis Mortality A Population-Based Follow-Up Study. *Medicine* _ Volume 95, Number 1, January 2016. DOI: 10.1097/MD.0000000000002300

III.3. Priority gap 3: TB preventive treatment

TB preventive treatment (TPT) for eligible PLHIV and children needs to meet the ambitious indicative 2022 UNHLM targets for Rwanda. New WHO Guidelines on TPT must be adopted and rolled out rapidly introducing shorter TPT courses and the new drug Rifapentine that will replace the six months of Isoniazid, and considering other people at risk with lowered immunity or living in crowded settings.

According to the 2019 desk review, the 2018 epi-review and Mid Term Review (MTR) of the TB NSP 2013-2018, inception of TB Preventive Therapy (TPT before TB patients and TB infected persons seek care is considered a priority. TPT was successful in the previous NSP for contacts of 0-5 years reaching 90% coverage with good adherence and completion, however TPT is far from satisfactory among PLHIV after its discontinuation and recent restart.

Closing the prevention gap represents an ambitious new policy in this NSP. Identifying people with TB infection and disease before they seek care to reduce the risk of developing TB disease, scaling-up of contact tracing for TB screening and LTBI management among all close contacts of bacteriologically positive index patients regardless of age, and all PLHIV will be the main intervention in this NSP. Moreover, this NSP embraces the piloting and the adoption of new, shorter preventive regimens such as weekly Rifapentine and Isoniazid for three months (3HP), for the treatment of latent TB infection. It presents an ambitious partnership with community health volunteers and large companies, to enable contact tracing of household and workplace contacts of TB bacteriologically positive index patients, as well as among PLHIV. Other eligible groups per the latest WHO Guidelines on TPT³³ released on 24 March 2020 will be considered in the future for operational research such as other people at risk with lowered immunity (PLDM) or living in crowded settings (prisoners).

III.4. Priority Gap 4: TB funding

Over-reliance on donor funding and uncertainty around funding in the near future are limitations. More funding is necessary to find the missing cases which is expected to be more expensive

To sustain the good achievement of TB control in Rwanda in the future and to ensure achieving the SDGs and the relevant milestones of 2025 for the priority diseases such as TB, innovative funding mechanisms are needed.

Closing the funding gap to ensure complete national funding for TB is not possible during the timeline of this NSP, however progressively including all elements of TB care in the Rwanda 'Mutuelle de Santé' should urgently start during this NSP. The TB care and prevention package should include a TB diagnostic package that covers CXR, CAD and WHO recommended rapid diagnostic (WRD) tests, patient and nutrition support, contact investigation and new (preventive) drugs and regimens as the way forward to ensuring UHC for TB,

³³ <https://www.who.int/publications-detail/who-consolidated-guidelines-on-tuberculosis-module-1-prevention-tuberculosis-preventive-treatment>

achieving the SDG milestones and mobilizing increased domestic funds for TB control.

III.5. Other Gaps to end TB

Other managerial gaps identified during previous reviews (epi-review and desk review) and data consolidation per the WHO recommended People Centered Framework (PCF) are also addressed in this NSP, such as:

1. Weaknesses of the current M&E system which include a) insufficient coverage of TB patient monitoring with eTB (on DHIS2 tracker), b) absence of interoperability between relevant web-based platforms on laboratory, drug management, HIV and other diseases, c) paper-based registration system which needs to transition to a fully electronic case-based registration, and lastly d) the absence of reliable data to analyze causes of death because the vital registration system implementation is still at an early stage;
2. Delays in conducting operational research on catastrophic costs did not take place, due to a funding gap in the previous NSP, and an anthropological study on obstacles for seeking care complementing the PPA conducted as part of the NSP development process;
3. Delay in upgrading the NRL into an accredited Supranational TB Laboratory (SNRL) previously discussed and planned by 2019. However, this process needs intense mentorship, technical assistance and a comprehensive roadmap with budgeted activities and timelines for accreditation.
4. Rwanda faces a challenge of maintaining sufficiently skilled human resources. While capacity building for personnel involved in TB control activities has been strengthened, the NTP still faces high turnover of trained personnel calling for repetitive refresher trainings, the need for integrated training for cost-effectiveness and the lack of an online interactive training system using WHO recommended online training materials based on latest global guidelines.
5. There is particular threat to community based TB care due to potential demotivation of CHWs resulting from the reduction of the CHW stipend in the last 2 years. This is coupled with gaps in their TB knowledge which are not addressed since there was no refresher training nor sensitization for CHWs in recent years. As a consequence, it is difficult to maintain the high quality of community-based care standards.
6. Only three private clinics are currently engaged in TB diagnosis and treatment; there is no guidance to assist NGOs/CSOs to gradually scale up engagement of the private sector in TB care and prevention.
7. The PAL strategy introduced during the past NSP needs to be strengthened in all health facilities, and tracking of its outcomes improved. Standardized M&E indicators and tools are not yet defined. A program evaluation is necessary to identify bottlenecks in the implementation process as well as results. This PAL strategy follow up could further strengthen collaboration between the NTP, NCD Division and other health partners with regards to respiratory diseases.
8. The data consolidation exercise that was conducted with technical assistance by KNCV as part of the NSP development process, revealed the following additional (evidence) gaps that need to be addressed through research activities under Pillar 3: a) a series of inventory studies to validate subnational RHMIS data and look for different drivers at subnational level; b) refinement of the RHMIS to monitor and analyse why and where exactly losses take place

in the TB care cascade; c) need to conduct LTBI test surveys to estimate the proportion of eligible individuals in at-risk sub-populations (per national guidelines) tested for TB infection.

III.6. Principle of the prioritization: 3 scenarios developed using the One Health Tool

The NSP describes to what extent the 4 priority gaps and other gaps will be addressed by 3 intervention scenarios for three funding levels and their respective impact.

There are 3 main factors influencing the 3 intervention scenarios namely:

- The application of different more sensitive case finding approaches (diagnostic algorithms) in the general population and targeted high risk groups is the main factor influencing cost and impact of the 3 scenarios,
- The treatment outcomes resulting from the introduction and scale-up of different diagnostic algorithms influencing early case detection and universal drug susceptibility testing, as well as coverage of nutrition support for DR-TB and DS- TB
- The different aspired levels of population coverage for TB preventive treatment and introduction and use of (child-friendly) new drugs and preventive regimens.

These 3 factors are presented in this NSP with their respective projected cost and impact using mathematical modelling for the 3 following intervention scenarios: the continuation of the current intervention package and approaches as well as coverage (scenario 0), the ambitious but realistic scenario 1 and a very ambitious scenario 2 with increased coverage and accelerated uptake and use of more sensitive diagnostics and patient support.

The One Health Tool was used to cost the TB NSP in alignment with the health sector strategic plan budget and other disease programs that are using this tool in Rwanda. The One Health Tool is also compatible with and used for TB impact modelling and evaluation (TIME) and economic evaluation (TIME ECON) and also includes health systems related programmatic costs for commodities and health products and human resources.

To take into account the funding uncertainty on the national budget for TB, the support from Mutuelle de santé on TB services and the external funding sources (mainly from the Global Fund), several activities are classified in priority 1 and 2 leaving the possibility to adjust the NSP budget costing to available funding along the timeline of this plan.

IV. THE NATIONAL STRATEGIC PLAN 2019-2024 IN RWANDA

Vision	Rwanda free of tuberculosis – zero deaths, disease and suffering due to tuberculosis
Goal	End the tuberculosis epidemic in Rwanda by 2035 which means 10 incident cases per 100 000 population or less per year (new and relapses).
Milestones for 2024	57% reduction in TB deaths (compared with 2015) 35% reduction in TB incidence rate (compared with 2015) Reduction of TB-affected families facing catastrophic costs due to TB (to be determined (TBD) after the survey, end 2020)
Targets for 2035	95% reduction in TB deaths (compared with 2015) 90% reduction in TB incidence rate (less than 10 TB cases per 100 000 population) No affected families facing catastrophic costs due to tuberculosis
Principles	5. Government stewardship and accountability, with monitoring and evaluation 6. Strong coalition with civil society organizations and communities 7. Protection and promotion of human rights, ethics and equity 8. Adaptation of the strategy and targets at country level, with global collaboration

PILLAR ONE. PATIENT-CENTRED CARE

STRATEGIC OBJECTIVE 1: CONSIDERING THE PATIENT PATHWAY FOR TUBERCULOSIS

- 1.4 Accelerating early screening and appropriate diagnosis of TB
- 1.5 Quality of care and ensuring a cure, including aDSM and patient support
- 1.6 Promoting care seeking and prevention through community engagement

STRATEGIC OBJECTIVE 2: TARGETED APPROACHES FOR KEY DRIVERS OF TB EPIDEMIC AMONG SELECTED POPULATIONS

- 2.6 Enhancing Programmatic Management of Drug – Resistant Tuberculosis
- 2.7 Ensuring prevention, diagnosis and treatment of Childhood Tuberculosis
- 2.8 Strengthening management of TB / HIV and other co-morbidities
- 2.9 Ensuring diagnosis and management of lung diseases
- 2.10 Promote intensified screening and diagnosis among high-risk group (HRG) populations

PILLAR TWO. BOLD POLICIES AND SUPPORTIVE SYSTEMS

STRATEGIC OBJECTIVE 3: PROGRAMMATIC MANAGEMENT, MULTI-SECTORAL COLLABORATION & ENGAGING ALL CARE PROVIDERS

- 3.6 Political commitment with adequate resources for tuberculosis care and prevention
- 3.7 Management of TB care and prevention
- 3.8 Engagement of civil society organizations, and public and private care providers
- 3.9 Migrant and cross border
- 3.10 TB infection control

STRATEGIC OBJECTIVE 4: UNIVERSAL HEALTH COVERAGE, SOCIAL PROTECTION, HUMAN RIGHTS & NUTRITION

- 4.4 Universal Health Coverage
- 4.5 Human rights and gender
- 4.6 Social protection and nutrition

STRATEGIC OBJECTIVE 5: STABLE AND QUALITY ASSURED SUPPLY OF DRUGS, DIAGNOSTIC AND COMMODITIES

- 5.3 Supply chain management
- 5.4 Rational use of medicine

STRATEGIC OBJECTIVE 6: M&E AND DATA QUALITY SYSTEM (E-TB HEALTH INFORMATION SYSTEM)

- 6.2 Surveillance system including mortality registration

PILLAR THREE. RESEARCH AND INNOVATION

STRATEGIC OBJECTIVE 7: DATA FOR PROGRAMMATIC, MONITORING, EVALUATION, LEARNING AND PLANNING

- 7.2 Evidence generation and use of electronic data systems

STRATEGIC OBJECTIVE 8: RESEARCH PRIORITIES

- 8.1 Research strengthening

IV.1. Vision- Mission, Goals and Guiding Principles

IV.1.1 VISION

Rwanda free of tuberculosis, with zero deaths, disease and suffering due to TB.

IV.1.2. MISSION

To contribute to ending the global tuberculosis epidemic by promoting universal and equitable access to quality diagnosis and effective treatment of TB, MDR-TB, and TB/HIV for patients and by enhancing prevention of the disease.

IV.1.3. GOALS

The NTP goal is to end the TB epidemic in Rwanda by 2035 (10 or less incident cases per 100 000 population per year - new and relapses).

The following targets are set for mid-2024 as compared to 2015:

- 35% reduction of the TB incidence rate
- 57% reduction of the TB death rate
- reduction of TB-affected families facing catastrophic costs due to TB (to be determined after survey results by the end of 2020)

IV.1.4. GUIDING PRINCIPLES

- Governance stewardship and accountability with adequate resources use as well as monitoring and evaluation.
- Strong coalitions with civil society organizations and communities
- Protection and promotion of human rights, ethics, equity and gender equality
- Adaptation of the strategy and targets tailored to the Rwanda context, with global collaboration

IV.2 Comprehensive Strategic Framework

This chapter describes the gaps, the available evidence and corresponding strategic interventions. It also describes the main activities to close these gaps, as well as expected outcomes and outputs to achieve results.

IV.2.1. Pillar 1: patient-centered care

The first pillar aims to find people with TB disease or latent TB infection, as early as possible and treat them. This would contribute to addressing priority gap 1 on TB treatment coverage, priority gap 2 on TB treatment success and priority gap 3 on TB preventive treatment and requires comprehensive intervention packages.

IV.2.1.1. STRATEGIC OBJECTIVE 1: Considering the Patient Pathway for Tuberculosis

IV.2.1.1.1 KEY INTERVENTION 1.1.: Accelerating early screening and appropriate diagnosis

Addressing Priority gap 1 - of this NSP is to detect more people with TB and thus close the case finding gap. Out of all TB notifications, 57% are identified through passive case finding and diagnosis among symptomatic persons self-presenting at health care facilities. Passive TB case finding therefore remains an important source of TB patients diagnosed. However, systematic TB screening among people with TB infection and/ or higher risk of progressing to TB diseases is one of the main strategies to accelerate early detection and initiation of treatment of people with active TB as presented in chapter 1.2.5. Early detection of active TB and initiation of effective treatment also reduces transmission, the risk of poor treatment outcomes, health sequelae post-TB treatment, and adverse social and economic consequences of TB; and last but not least, reduces future incidence.

Challenges

- symptom screening often misses TB patients, while CXR is a useful tool for TB screening due to higher sensitivity;
- Low access to CXR and WHO recommended rapid molecular tests at time of diagnosis;
- Sub-optimal use of existing GeneXpert MTB/RIF equipment;
- Inadequate human resource capacity with regards to regular TB training, mentoring, monitoring and supervision.
- Inadequate quality assurance of TB diagnostics
- Limited use of CXR for TB diagnosis.
- Insufficient engagement of private laboratories in TB care.

Evidence

- 20% of TB cases remain undetected and untreated;
- The secondary analysis on R-DHS found that only 35% of participants with symptoms suggestive of TB sought care. Of them, 92% consulted health facilities³⁴ (unpublished).
- Only 40% of people with cough more than 2 weeks sought care.
- The Patient Pathway Analysis (see Annex 5) showed 81% of the persons seeking care for TB symptoms accessed facilities with TB diagnostic services (25%) or specimen transport in place (56%).
- 45% of all TB presumptive persons were tested using rapid molecular test recommended by WHO during 2018/19
- 11% of health facilities have a molecular diagnostic platform available

Main activities and sub-activities

- **Increase early identification and screening of TB in the general population**
 - Promote community awareness (M-health messages, Umuganda monthly programs, through CHW engagement to refer persons with presumptive TB through better PBF (activities developed in pillar 1, chapter 1.1.3)
 - Outreach activities in slums, hotspots where HRGs congregate

³⁴ Assessment of TB related knowledge and care seeking behavior among Rwandan Population: Secondary Analysis of Rwanda DHS, 2014-2015.

- Conduct contact tracing of TB index cases
- Avail M&E tools for screening and diagnostics
- **Improve TB diagnosis and ensure universal DST coverage for all bacteriologically positive TB patients**
 - Use GeneXpert MTB/RIF as initial TB diagnostic test (Xpert Ultra) for ALL adults and children using 3 different diagnostic algorithms that will be implemented according to the local situation, cost and funding availability. These algorithms consist of implementing symptom and/ or CXR screening before Xpert diagnostic testing. Algorithms for the general population will use symptoms then smear microscopy and HRGs will use symptom and/or chest x-ray as screening tools then Xpert for diagnostic.
 - Optimize the GeneXpert platform for TB specimens by adding HIV viral load testing, HIV Qual testing for early infant diagnosis (EID) and viral Hepatitis tests in settings where sample referral across diseases is cost-effective and presents an added value compared with maintaining separate transport systems and separate equipment. Develop mapping of current Xpert machines to optimize use, access and turnaround times. This optimization will probably be most applicable in peripheral districts.
 - Use WHO endorsed rapid DST tools such as the Line Probe Assay for 2nd line DST for all rifampicin resistant TB patients failing or relapsing from 1st line TB treatment. Use liquid culture for isolation of TB bacilli for drug resistance surveillance and implement targeted gene sequencing at the NRL-TB laboratory for rapid identification of mycobacteria including non-tuberculous and detection of drug resistance conferring mutations.
 - Establish drug susceptibility testing at the NRL for new drugs such as Bedaquiline, Delamanid and Linezolid.
 - Establish the measurement of Minimal Inhibitory Concentration to be interpreted together with specific drug plasmatic level (therapeutic drug monitoring)
 - Ensure procurement of laboratory equipment and supplies
 - Ensure appropriate Human Resource with regular training on CXR reading and laboratory skills as well as adequate mentoring, and supervision.
 - Enhance public private partnership with large clinics including HF with more paediatric cases (activities developed in pillar 2, chapter 2.1.2)
 - Support the NRL –TB laboratory to serve as SRL for TB and MDR-TB in the AFRO sub-region including as a support NRL particularly for francophone countries
 - Support the NRL–TB laboratory unit for acquisition of the ISO 15189 KENES application which is ongoing but needs continuous support especially for sustainability of the QMS requirement
 - Support the NRL –TB laboratory for piloting and scaling up innovative molecular diagnostic techniques currently studied in the DIAMA study such as FluoroType MTBDR, TrueNat TB tests, GX SLD, GX for follow up, and target deep sequencing (Deeplex-MycTB) as alternative for culture-based DST, particularly for rifampicin resistant and difficult cases with recurrent tuberculosis. Pilot novel diagnostics tools such as Abbot’s m2000 molecular platform.
 - Implement urine TB LAM Ag for TB diagnosis among severely sick HIV positive patients with suspicion of disseminated and or extra pulmonary TB

- Enhance GeneXpert connectivity and interoperability with other databases (LIS, eTB, etc..) to reduce the turnaround time (TAT) for treatment and Preventive Therapy.
- **Enhance the use of CXR as screening tool and foster diagnostic techniques for EP**
 - Increase the uptake of digital chest radiography with telemedicine for reading
 - Purchase digital x-ray machines
 - Procure CAD4TB software
 - Procure mobile diagnostic units with digital X-ray and CAD4TB
 - Enhance human resource capacity building on CXR reading
 - Implement a quality control system for digital CXR through re-reading similar to smear examination re-reading sampling technique
 - Increase the uptake of FNA and abdominal ultra-sound for diagnosis of extra-pulmonary TB
 - Increase the use of Xpert for EP samples (lymph nodes aspirate, pleural fluids, and others body fluids except blood)

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Proportion of newly notified TB patients tested using WHO-recommended rapid molecular test at the time of diagnosis	N/A	80%
DST coverage for TB patients.	67%	≥85%
Proportion of diagnostic sites enrolled in an EQA system for all diagnostic methods including smear microscopy and Xpert MTB/RIF	0%	100%
Proportion of diagnostic sites achieving a passing score in EQA for all diagnostic methods including smear microscopy and Xpert MTB/RIF	0%	90%

IV.2.1.1.2 KEY INTERVENTION 1.2: Quality of care and ensuring cure and patient support

In order to close Priority gap 2 of this NSP we must improve treatment outcomes for TB (all forms) by reducing the death rate, especially in HIV-positive TB patients and clinically diagnosed TB patients. Analysis of death audit data helps to identify specific interventions that are likely to reduce causal factors of high death rates. Among these, malnutrition is likely to contribute significantly to deaths since it impedes the absorption of drugs. This plan foresees, the provision of nutritional support, not only for drug-resistant TB patients, as currently done, but also for drug-susceptible TB patients who are moderately or severely malnourished (activities in chapters 1.1.2 and 2.2.3).

Challenges

- root causes that affect the quality of TB care and loss to follow-up are:

malnutrition and death during treatment; adverse drug reactions; self- stigma; inadequate patient-centered care; probable high transportation costs; time for seeking care which interferes with source of income; and long duration of TB treatment.

- Key information is not consistently transmitted to patients, such as the need of sputum tests during treatment, information on when patients stop spreading TB to others and side effects.
- Inadequate TB patient knowledge may also impact early care seeking when symptoms appear.
- Suboptimal patient-centered care is described in urban settings, with many patients from the lower economic bracket. This means that hours spent seeking care translate to lost income. Tuberculosis care is mostly provided during day time working hours with poor flexibility to cater for those seeking care outside the specified hours.
- Although NCD services are available in all health facilities, collaboration between TB and NCD services or staff are found insufficient to properly address NCD among TB (and TB/HIV) presumptive and notified patients.
- Patients with TB may die in the course of treatment due to several factors including delayed or missed diagnosis and comorbidities. Comorbidities and drivers majorly affecting TB patients include HIV, diabetes, and malnutrition.

Evidence

- Prevalence of undernourishment (% of Population) for Rwanda was estimated at 37% by the World Bank in 2017. [We are waiting for the report on food security & vulnerability]. Rwanda's Fifth Integrated Household Living conditions survey conducted in November 2018 shows that the poverty in the general population was estimated at 38.2%.
- The report on the Tuberculosis death audit (August 2019) for TB cases registered from April 2016 up to June 2019, showed that comorbidities are often behind TB deaths; e.g. 43% and 62% of TB death were identified as having HIV and malnutrition, respectively.

Main activity and sub-activities

- **Improve quality of care to reduce poor outcome of tuberculosis**
 - Ensure nutritional support to DS TB patients with BMI of ≤ 18.5 and all DR TB for the entire duration of treatment (purchase & distribute)
 - Develop an electronic pharmacovigilance monitoring system (aDSM)
 - Train health facilities on the use of electronic pharmacovigilance monitoring systems
 - Ensure mentorship / supervision to HFs on the implementation of electronic pharmacovigilance monitoring systems
 - Promote the use of digital solutions such as Video Observed Treatment (VOT) for for ambulatory DS- and DR TB patients,
 - Ensure uninterrupted supply of quality TB medicine and related commodities at all levels
 - Conduct quantification sessions through integrated coordinated procurement and distribution system (CPDS)

- Ensure management fees related to TB drugs and commodities (e.g. importation license, clearance, warehousing, distribution, etc...)
- Ensure mentorship/supervision from CHUs to health facilities for quality TB care management (TB and comorbidities)
- Conduct TB mortality audits in all district hospitals

Intervention indicator, baseline and target

Indicator	Baseline	Target
Treatment success rate for all forms of TB cases (DS & DR-TB cases)	85%	So : 87% S1 : ≥89% S2 : ≥90%

IV.2.1.1.3 KEY INTERVENTION 1.3: Promote care seeking and TB prevention through community engagement

TPT for eligible people with TB infection is considered the third priority gap of this NSP. Closing the preventive gap represents an ambitious new policy. The approach is partnership with community health volunteers and large companies, to enable contact tracing for household contacts and workplace contacts of TB bacteriologically positive patients regardless of age, as well as among people with HIV and possibly other people at risk (e.g. those with lowered immune response or living in crowded settings). Operational research activities will be considered to pilot new, shorter regimen (Rifapentine and Isoniazid for three months and in the future most likely for 1 month) for the treatment of TB infection. TPT should be prioritized for contacts with additional risk factors such as low BMI, PLHIV, and contacts with positive TST or IGRA.

Challenges

- Limited TB awareness and updated information levels in communities;
- Lack of differentiated advocacy and communication;
- TB symptoms not perceived as serious;
- Lack of information about TB related stigma;
- Inadequate community health worker engagement after reduction of stipends and increasing workload;
- Inadequate implementation of TPT provision to PLHIV, and contacts of bacteriological confirmed TB patients aged 5 years and above.
- There is no routine mechanism to measure TB knowledge among communities
- Lack of refresher trainings for old and new CHWs or sensitization on TB new CHWs. As a consequence, CHWs have gaps in their basic knowledge of TB and it is difficult to ascertain the quality of messages they are transmitting to the community. Inadequate IEC/BCC materials to improve TB awareness for families, close contacts, and TB patients themselves.
- Although strategic documents acknowledge the importance of public-private partnership, there is no guidance to assist NGOs/CSOs in engaging the corporate sector for scale-up of TB prevention, treatment and care to the workplace.

Evidence

- The reduction in CHW stipends in the last 2 years appears to be a major factor in indicator results which show a plateau in patients diagnosed with TB after CHW referral (20.3% in 2016-2017 FY and 19.3% in 2017-2018 FY, while the target was 21%).
- TPT initiation among child contacts of BC index TB patients aged <5 was 90% in 2018, with a range of 75%-95% from 2014 to 2018.

Main activities and sub-activities

- **Improve TB knowledge in general population**
 - Ensure communication to the general population about TB through mass media platforms: radio talk shows, TV talk shows, documentary films, newspaper articles
 - Develop TB Behavior Change Communication strategies
 - Train existing CHW (45,516) and HIV Peer Educators on TB prevention, care and treatment through e-learning
 - Develop digital application on TB key messages relating to screening, prevention and treatment – adherence
 - Produce radio, TV spot - documentaries/film
 - Empower community actors and stakeholders: create champions of former TB patients to increase community TB awareness.
 - Ensure availability of posters and brochures on TB awareness and prevention at workplace
 - Conduct outreach activities through existing community forums (Umuganda, Itorero)
 - Conduct TB KAP survey on the current population knowledge on TB disease
 - Commemorate WTBD at national, regional and district levels
- **Strengthen engagement of community and stakeholders in the control of tuberculosis**
 - Ensure community supervision by CSOs to monitor engagement of the community
 - Provide financial and technical support for activities for TB survivors to sensitize the population on TB care and prevention;
 - Organize quarterly coordination meetings with fora of TB survivors
 - Enhance the commitment of CHWs in management of TB: Increase the incentive (for PBF) of CHWs
 - Data sharing with CHWs to share results on their efforts
 - Develop a mentorship approach to improve the knowledge of HCWs;
 - Develop and avail online training apps and training materials for CHWs in Kinyarwanda
 - Build capacity for mass media (journalists) to disseminate TB and TB/HIV messages
 - Provide support to national TB advocates to champion TB issues
 - Mobilise community and civil society to undertake community outreach through contracts with NGOs and civil society

- **Strengthen management of latent TB infection for household contacts (5 years and above) of pulmonary bacteriologically confirmed TB index patients.**
 - Develop guidelines on latent TB infection management
 - Print and distribute TPT guidelines in all health facilities
 - Adopt the recently released WHO Guidelines on TPT and update the national guidelines accordingly.
 - Train health facility staff on the updated TPT guidelines
 - Purchase and distribute TPT drugs to all health facilities
 - Mentor the implementation of the TPT guidelines.
 - Add TPT completion as care cascade indicator in the RHMIS recording and reporting tools.
 - Purchase TPT drugs for Contact
 - Build capacity of health care provider on TPT implementation
 - Develop TPT data elements within existing e-TB platforms

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Proportion of people with TB referred by community health volunteers	25 %	≥25%
Contact investigation coverage	78%	≥90%
Proportion of eligible household contacts under 5 years who are contacts of bacteriologically confirmed index patients, who are started on TB preventive therapy	90%	≥ 95%
Proportion of eligible household contacts 5 years and older who are contacts of bacteriologically confirmed index patients, who are started on TB preventive therapy	NA	50%

IV.2.1.2. STRATEGIC OBJECTIVE 2 : Targeted approaches for key drivers of TB epidemic and selected populations

IV.2.1.2.1. KEY INTERVENTION 2.1: Enhancing Programmatic Management of Drug – Resistant Tuberculosis

Challenges

- The program helps patients to access the health insurance scheme for their families. One main barrier is the requirement to pay 10% of all costs for the management of co-morbidities such as diabetes;
- TB treatment materials and pamphlets for patients and their families are not available;
- Insufficient motivation among medical doctors and nurses and high turnover;
- Lack of knowledge to identify and manage (serious) adverse events of SLD and poor reporting of aDSM, specifically for ambulatory patients;
- Insufficient funds to support MDR- TB patients during the ambulatory phase

Evidence

- 36% of new TB cases and 24% of previously treated TB cases are not tested for first line DST.
- 46% of MDR-TB cases are not notified

Main activity and sub-activities

- **Improve the quality of care of MDR TB patient management**
 - Train clinicians to improve skills on DR-TB management with emphasis on DR-TB among children (expert training on pediatric DR-TB)
 - Rehabilitate MDR-TB clinic to improve infection control measures and patient friendly conditions (including leisure and entertainment options during admission)
 - Introduction and implementation of new WHO-recommended DR-TB guidelines and treatment regimens
 - Increase skills of clinicians and nurses on management of MDR-TB particularly for ambulatory patients through trainings and mentorship
 - Reinforce best practice of aDSM within MDR-TB clinics and for ambulatory treatment
 - Adopt new technologies (VOT) to use in ambulatory patient follow up
 - Develop a practical handbook on pharmacovigilance of TB medicines
 - Train health facilities staff on use of pharmacovigilance M&E tools
 - Post treatment follow up program to improve quality of life of patient and ensure early detection of TB recurrence.
 - Avail TB treatment materials and pamphlets for patients and their families

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Proportion of notified patients with rifampicin resistant (RR) or MDR who receive second line DST	76%	100%
Proportion of RR/MDR TB followed one year after treatment	NA	80%
Proportion of DR-TB patient with treatment card where aDSM section is completed	NA	100%

IV.2.1.2.2. KEY INTERVENTION 2.2: Ensuring prevention, diagnosis and treatment of Childhood Tuberculosis

In this plan, the NTP has set up an ambitious target related to childhood TB detection answering priority gap 1 of this NSP on closing the case finding gap especially among children. Increasing the coverage and the sensitivity of screening among TB contacts, as mentioned in intervention IV.1.1.1, is essential to ensure early identification of childhood TB. In addition, the NTP will put strong effort on all activities aimed at

building knowledge, skills and confidence of health workers to screen and diagnose TB in children.

Challenges

- The WHO estimates that 10 to 15 percent of notified TB cases should be children. In 2018, children aged 0-14 years comprised 6% of notified TB cases in Rwanda. Childhood treatment coverage is low compared to adults, however, the ratio 0-5 yr/6-10 yr ratio is high (60%)
- Naso Gastric Aspirate (NGA) is not broadly implemented because the procedure is invasive and not child-friendly; Naso Pharyngeal Aspirate (NPA) is not yet implemented in Rwanda
- Pediatric CXR not properly interpreted
- Treatment of latent TB among 5 to 14 not yet implemented
- Insufficient of knowledge and skills of health care providers to diagnose among children
- Low TB notification among children in Kigali City compare to other provinces; Kigali City notified 1/3 of TB cases.

Evidence

- 61% of estimated children under five years of age who are household contacts of bacteriological TB cases, started TPT in 2018 according to the 2019 GTB report.
- Current childhood treatment coverage is at 59% (391/660) compared to 82.2% (5431/6600) in adults (new & relapse) according to the GTB report 2019.

Main activities and sub-activities

- **Enhance and scale up latent TB management among children**
 - Integrate TB contact tracing into CHW guidelines and tools
 - Build capacity of CHW in childhood TB contact tracing
 - Provide support on CXR as a TB screening tool among TB contacts
 - Purchase tuberculin skin test and IGRA test
 - Engage CHWs and mothers/care givers in TB screening among children through awareness raising
 - Develop an electronic tools for contact screening to be used by CHWs (hiring, training, etc...)
- **Strengthen TB diagnosis, treatment in children**
 - Update training materials, job aids and algorithms on childhood TB diagnosis
 - Ensure trainings & mentorship of HCW in public and private facilities in collaboration with the Rwanda Pediatric Association including training on the use of alternative, less invasive specimens for diagnosis of TB in children, clinical diagnosis and on CXR reading.

- Collaborate with the HIV program, private sector, medical institutions, CBO/NGOs, community leaders and CHW antenatal care (ANC), EPI and schools on childhood TB
- Collaborate with the society of pediatricians to reinforce the capacity of HCWs on prevention of TB among children and on diagnosis and treatment of TB among children through a mentorship approach
- Train staff on diagnosis of TB using Xpert stool testing
- Develop collaborative mechanism with pediatric private clinics to improve management of childhood TB (e.g. meetings, session to develop tools, etc.)
- Integrate childhood TB screening in Early Childhood Development Program (ECDP) tool (through CHWs)

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Proportion of estimated number of children with TB who are detected	59%	80%
Proportion of children with TB successful treated	85%	90%
Proportion of eligible children aged 0 to 4 years who are contacts of bacteriologically confirmed index patients started on TB preventive treatment (treatment for LTBI) who completed TPT	97%	≥97%
Proportion of eligible children aged 5 to 14 years who are contacts of bacteriologically confirmed index patients started on TB preventive treatment (treatment for LTBI) who completed TPT	N/A	90%

IV.2.1.2.3 KEY INTERVENTION 2.3: Strengthening management of TB / HIV and other co-morbidities

Rwanda has made substantial and remarkable progress towards implementing TB/HIV collaborative activities in a relatively short period of time. Rwanda is quite advanced in establishing “One stop TB and ART services.” Even though results are pending on the implementation of TB/HIV collaborative activities, more efforts are needed to reach all WHO targets. In the coming five years, we will continue to maintain our gains/successes focusing on early detection in order to reduce TB/HIV related mortality and the implementation of tuberculosis preventive therapy.

Diabetes triples the risk of developing TB and its burden is likely increasing with Rwanda’s economic growth. The current prevalence among the population aged 15-64 is estimated at 3%.³⁵ During this NSP, the NTP plans to develop a TB-diabetes collaborative framework in collaboration with the RBC/NCD Division and implement systematic TB screening among diabetics in a limited number of HFs with proper monitoring to evaluate the yield of the strategy before scale-up.

In addition to diabetes, several other medical conditions are risk factors for TB and for poor TB treatment results, while TB can complicate the disease course of some

³⁵ Rwanda STEPS Survey 2012, 2013. RBC

diseases. It is therefore important to identify these comorbidities in people diagnosed with TB in order to ensure early diagnosis and improve co-management.

This NSP represents a shift in TB/HIV programming following operationalization of new national TB policy that recommends progressive reintroduction and scale up of TPT among PLHIV with shorter TPT regimen and development of a strong monitoring tool to measure the cascade. In addition, the focus will be on the integration of TB with other co-morbidities and drivers.

Challenges

- Delayed publishing of the updated TB/HIV guiding policy and restarting TPT. This may affect the quality of service delivery in the course of implementing the new global guidance
- Though the scope of the HIV clinical mentorship program at district level has been expanded to integrate TB and malaria, the coverage of TB activities is inadequate and not consistent.
- There are still significant gaps in TB/HIV capacity building for frontline health care workers, especially due to the turnover of staff.
- Provision of HIV preventive services among TB patients and their household members was sub-optimal.
- Absence of a joint TB/HIV research agenda as envisaged by the NSP.
- Lack of information and management of TB with other comorbidities than HIV
- Case fatality rate of co-infected TB/HIV is high compare to TB all forms
- Use of TB symptom screening only among PLHIV has an impact on TB diagnosis due to low sensitivity. This was also shown during ACF conducted by NTP

Evidence

- 15% of co-infected TB/HIV among cohort notified 2017/18 died while the death rate among TB all forms was 9% in the same cohort.
- 4.8% of PLHIV screened were presumptive TB based on symptom screening only while 9.3% and 9.6% were presumptive based on CXR only and both (symptom and CXR), respectively

Main activities and sub-activities

- **Enhance the implementation of case finding and provision of Tuberculosis preventive therapy (TPT) among PLHIV**
 - Use of Chest X-ray as screening tool for PLHIV
 - Introduce the use of LAM testing among PLHIV
 - Ensure mentorship of HCW at all levels (health facilities and communities)
 - Develop TB/HIV courses/webinars and share twice a year
 - Build capacity of health care providers using video conference approaches
 - Ensure scale up Tuberculosis Preventive Therapy (TPT) nationwide

- Involve peer-educators in TB/HIV case finding to improve linkages between communities and health systems
 - Update guideline and tools on TPT implementation
 - Ensure provision of TPT drugs
 - Strengthen TB-HIV coordination bodies to support TB-HIV interventions (TWG),
 - Organize a technical working group for TB/HIV
- **Enhance the collaboration of TB and other co-morbidities/ diseases**
 - Integrate TB screening in existing NCDs tools on management and evaluation
 - Ensure joint supervision on TB Diabetes activities
 - Strengthen TB and NCDs coordination bodies to support TB-NCDs interventions (TWG),
 - Build capacity of Nurses working in NCDs services on TB and other co-morbidities diseases
 - Initiate operational research on TB-Diabetics in collaboration with CHUs as teaching hospitals

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Treatment success rate among HIV positive TB cases	77%	ambitious:90% Very ambitious>90%
LTBI treatment coverage among PLHIV	NA	≥80%
Proportion TB-HIV on ART at the end of TB treatment	94.7%	>90%
Proportion of diabetes patients screened for TB	NA	TBD

IV.2.1.2.4. KEY INTERVENTION 2.4: Ensuring diagnosis and management of Lung health diseases

The practical approach to lung health diseases (PAL) is a **syndromic approach** to the management of patients who attend primary health care (PHC) services for respiratory symptoms. The Practical Approach to Lung Health (PAL) strategy was adopted in order to improve the quality of diagnosis and treatment of common respiratory illnesses, harmonize the management of respiratory conditions and enhance referral system in primary health care settings. The strategy focuses on four priorities respiratory diseases: tuberculosis, chronic diseases (Asthma, COPD) and acute respiratory infections with emphasis on pneumonia. Keys population are patients aged 5 years or more, as IMCI handles under five patients.

The Tuberculosis Division and partners have adopted the PAL strategy to address lung health issues comprehensively and to improve the case management of TB, especially at the primary health care level. The PAL strategy is also expected to contribute to health system strengthening for TB and lung health. However, this NSP

will emphasize on the management of respiratory chronic diseases (asthma and COPD) in close collaboration with NCDs Division with the purpose to ensure quality of care management and TB screening among these groups while we are expecting to scale up or shift progressively to other groups of respiratory conditions.

Challenges

- Incomplete coverage of PAL training, knowledge gaps on management of respiratory conditions among healthcare workers.;
- There is no standardized monitoring tool and no indicators on PAL in DHIS2.
- Lack of mentorship and supervision for integrated diagnostic and management algorithms for respiratory diseases, (lower respiratory tract infections in adults, asthma and chronic obstructive pulmonary diseases [COPD]).
- An evaluation of PAL implementation has been conducted and revealed:
 - Lack of skills among HCWs to use spirometers
 - Management of asthma and pneumonia was not completed as per guidelines
- The national team was not sufficiently trained on PAL to support the roll-out of the strategy
- There is an inadequate supply of essential commodities to support diagnosis and treatment at the health facilities
- PAL guidelines not up-to-date

Evidence

The implementation of PAL at health facilities was assessed in 20% of health facilities in December 2017 which represented 113 health facilities in total (26 Hospitals and 87 health center)³⁶. The following observations were made:

- Among 113 health facilities visited, the assessment showed that 69% (18/26) of visited hospitals have at least one medical doctor trained on PAL, while 80% (70/87) of health centers visited have one nurse trained.
- Of 87 health centers only 12(13.8%) have all three pieces of equipment required at this level. And all 26 hospitals visited do not have a spirometer (0%) and 22 (84%) do not have a peak flow meter
- Ability of health care providers to use equipment for treatment of respiratory diseases at HCs was assessed at 10.3% (9/87) for peak flow meter and 37.9% (33/87) for Oxymeter At hospitals, 11.5% (3/26) for peak flow meter and 0% for Oxymeter.
- The proper management of asthma and pneumonia was assessed. 13.01% (35/123) of asthma patients and 28.46% (16/123) of pneumonia patients were well managed at hospital level, while this was only 6.6% (18/428) and 9.12% (29/318) at HCs, respectively, for asthma and pneumonia.

Main activity and sub-activities

³⁶ Assessment of Practical Approach to Lung Health (PAL) strategy implementation in health facilities in 2017, Rwanda

- **Strengthen coordination mechanisms and scale up implementation of PAL**
 - Review and adopt ung health policy guidelines and training materials including diagnostic and management algorithms for lung health.
 - Ensure technical assistance for elaboration of PAL guidelines and tools for recording and reporting
 - Conduct TOT on PAL management.
 - Facilitate the TOTs to conduct regular health facility based on-the-job training
 - Ensuring supply of essential equipment and commodities at health facilities for PAL.
 - Ensure that the PAL diseases are properly recorded in HMIS.
 - Organize TWG meeting to advise on management, recording and reporting of PAL diseases
 - Conduct an assessment to monitor PAL implementation at health facilities
 - Conduct mentorship to strengthen implementation of PAL management and reporting
 - Ensure the quality of PAL implementation through RSQA/DQA
 - Integrate the TB symptom screening in existing chronic disease tools (Asthma, COPD)

Intervention indicator, baseline and target

Indicator	Baseline	Target
Proportion of first level health facilities that have at least one staff trained to provide PAL services	9%	90%

IV.2.1.2.5. KEY INTERVENTION 2.5: Promote intensified screening and diagnosis of high-risk group (HRG) populations

As part of priority gap 1, key populations are people who are disadvantaged compared to others mainly due to limited access to medical services or because of underlying determinants of health. Evidence from routine national TB surveillance data and from the National TB Prevalence Survey (2012) identified the following key populations: persons living with HIV (PLHIV), contacts of TB patients, prisoners, the elderly over 55 years, children below 15 years, health care workers and CHWs, diabetics, miner workers, People Who injected Drugs (PWIDs) and refugees. These groups pose a challenge for TB control due to their vulnerability and their underserved situations.

On the other hand, urban districts are continuously reporting high case notification and high positivity among presumptive cases. The NTP is willing to map all these cases in order to identify high prevalence TB 'hot spots' where active case finding activities will be conducted.

Diagnostic algorithm priority (option 1) is given to systematic CXR screening followed by Xpert testing for persons with an abnormal CXR (suggestive for TB) based on higher sensitivity of CXR over GX to detect early TB. The alternative diagnostic algorithm (option 2) is to screen for symptoms, followed by Xpert for those identified with presumptive TB.

The use of CXR for HRGs or presumptive symptomatic persons is conditioned upon access to digital CXR and limited by the full utilization capacity of existing X-ray equipment, the limited geographic access of HRG to CXR, the cost of CXR examination for patients and the cost of transport for the person going for CXR or for the mobile team going to the HRG.

The criteria to prioritize the five HRGs in the TB NSP were based on the analysis of routine data and the findings of the TB prevalence survey. By the end of June 2019, 53.4% of all TB cases were from HRGs. This NSP will continue to focus on these five HRGs and add other people at high risk to develop TB like PLDM, miners, people who inject drugs (PWID) and refugees. All are presented in table 5. Apart from elderly and PLHIV that contribute more than 16% of all notified TB cases countrywide, other groups such as close contacts of bacteriologically confirmed TB patients and prisoners should be kept as risk groups even if the contribution to TB notification is lower due to a smaller population size of the HRG or a lower proportion who could be reached for screening.

Depending on the availability of funds three scenarios are developed with maintaining the current effort as So, an ambitious scenario S1 and very ambitious scenario S2 with higher funding levels to scale up systematic screening, including more sensitive screening and diagnostic tools and including additional HRG (see Annex 6)

Challenges

- No policy and guidelines to support regular screening of all key populations: Current outreach screening approach does not cover all defined key populations, except for PLHIV, prisoners and child contacts under five years. For example, the screening of HCWs by CXR is not done regularly as planned (every 6 months).
- Limited resources to expand systematic screening for TB to other HRG.
- Limited access to (digital) X-ray at community and HC level due to financial barriers and the availability of equipment.
- Limited human resources and skills in CXR reading and interpretation.
- No current use of AI / CAD4TB software.
- Operational factors that hinder access to diagnosis and treatment for instance transportation cost and indirect cost supported by the person at risk such as unfriendly working hours at service delivery points.
- Legal factors that exacerbate discrimination against key and vulnerable populations hindering their access to TB services (e.g. PWIDs).
- Limited involvement of key populations in TB programming and the coordinating committee.
- TB surveillance data does not capture all key population and specific TB risks.

Evidence

Table 6 : Contribution of HRG to TB notifications through systematic screening for TB

Risk groups	Est pop (x1000)	Screened in 2018-19 FY *	Presumptive TB	TB cases	% total TB	NNS **	Access (1:easy; 3 difficult)* **
1 Prisoners	67,786	163,523	12,679	477	8%	142	1
2. Contacts Bact+	13,002	13,920	3,626	206	3%	68	2
3. PLHIV+	216,000	567,826	16,959	997	17%	217	2
4. < 15 years	4,721,587	1,704,073	19,030	439	7%	3,882	1to3
5. ≥55 years	992,874	1,270,984	50,507	1,055	18%	1,205	1to3
Total HRG	6,011,249	3,720,326	102,801	3,174	53%	1,031	
General population	6,363,149		85,066	2,775	47%		1
Country	12,374,398		187,867	5,949	100%		

*Number Needed to Screen (NNS) was calculated based on the estimate population as denominator (and not on the actual number screened) For prisoners and PLHIV because they were screened several times in 2018/19

Number Needed to Screen (NNS) to find 1 TB case*Easy access for persons coming to HF graded as 1, more difficult to go to these persons who are not coming to HF

Main activity and sub-activities

- **Strengthen the active case finding in HRG**
 - Create demand for TB services among TB HRG populations and presumptive TB screening through targeted messages (IEC).
 - Ensure transport voucher for targeted persons living more than 2 kms from health facilities with (digital) Xray,
 - Develop guidelines and SOPs for screening of TB HRG.
 - Ensure fuel for mobile diagnostic units
 - Ensure payment of maintenance fee for mobile diagnostic units
 - Conduct outreach screening activities in mining sites

Intervention indicator, baseline and target

Indicator	Baseline	Target
Proportion of TB cases notified among high risk groups (disaggregated per HRG)	53.4%	≥55

IV.2.2. Pillar 2: Bold policies and supportive systems

Priority gap 4 of this NSP is related to over-reliance on external funding. To sustain the positive achievements of TB control in Rwanda, in the future, and to reach the SDGs and the End TB strategy goals within UHC, implementing innovative TB funding mechanisms starting with progressive inclusion of TB in Community Based Health Insurance (Mutuelle de Santé) during the timeline of this NSP is essential. (Activities in chapter 2.2.1 on UHC and social protection).

Political commitment, governance and coordination with partners (chapter 2.1.1) and NTP management capacity (chapter 2.1.2) constitute the backbone of the system to close the priority gap 4 on sustainable funding.

The NSP through this pillar strengthens coordination across MoH divisions and other government ministries as well as the collaboration with communities, civil society, private care providers and local administration so that zero TB-affected families are facing catastrophic costs³⁷ due to TB.

IV.2.2.1. STRATEGIC OBJECTIVE 3: Programme management, multi-Sectoral collaboration & engaging all care providers.

IV.2.2.1.1. KEY INTERVENTION 3.1: Political commitment with adequate resources (human, financial, equipment and infrastructure) for tuberculosis care and prevention

This NSP advocates for increased government investment in TB control to close the gap created by reduced donor funding contribution and increased domestic funding to cover gaps in human resource development, renovation of infrastructures and strengthening community-based initiatives. Effective implementation of the End TB Strategy requires effective government stewardship, high-level political commitment and enhanced resources. Active coordination across government ministries as well as engagement and collaboration with communities, civil society and all public and private care providers are essential.

Inter-ministerial social cluster groups allow different ministries to align priorities and closely work together towards a common goal. The RBC also brings together different disease areas and national programs under a single umbrella to allow for a shared vision and mission in terms of service provision for health to all Rwandans.

Challenges

- Uncertainty around the funding landscape; given that TB funding is mostly received through external sources. Priority diseases such as TB are not included in the Community Based Health Insurance (CBHI) (activities in chapter 2.2.1 UHC and social protection);
- TB benefits from approximately 10% of total funds allocated for GF's

³⁷ The operational definition of "catastrophic costs" refers to medical and non-medical out-of-pocket payments and indirect costs exceeding a given threshold (i.e. 20%) of the household's income.

Performance Based Financing which is below the suggested GF allocation ratio per disease..

- Threats to community-based TB care due to decreased funding. This could negatively impact the motivation of CHWs, while the community package is progressively increasing.

Evidence

- Around 10% of total funds from GF support is allocated to Performance Based Financing
- 67% of TB funding during 2018/19 came from external sources

Main activity and sub-activities

- **Advocate for increasing domestic funds of TB Program**
 - Organize annual joint session with the MINECOFIN to discuss / review GOR contribution to TB programs.
 - Advocate for a single strategic plan for infectious disease favouring partnered interventions to provide services
 - Advocate to health insurance scheme to cover all TB services
 - Undertake financial monitoring of resource allocation and purchasing of services related to TB under the responsibility of RBC, in collaboration with different MOH departments including, MPPD, HFU (health financing unit), CHD, etc.
 - Continue the PBF scheme as an MoH policy, to be applied as a part of an individual's salary, in order to improve staff performance. Payment will continue to be based on achievement of fixed targets agreed upon between the two entities. PBF indicators will be reviewed and revised periodically to boost achievement of new interventions or those with suboptimal results.
 - Develop a Multisectoral Accountability Framework (MAF) on TB to support the involvement of the government ministries, the private sector and stakeholders. The framework will be developed to ensure high-level government stewardship and effective coordination of stakeholders in TB control.

Intervention indicator, baseline and target

Indicator	Baseline	Target
Household health expenditure for TB	TBD	TBD

IV.2.2.1.2 KEY INTERVENTION 3.2: Management of tuberculosis care and prevention

Strengths of the NTP include a well-established program with solid leadership structures, skilled human resources, availability of infrastructure including office space and equipment (computers, furniture, vehicles), technical support from partners and stakeholders including technical working groups and support to the districts. Other advantages include the availability of policy documents and guidelines for TB control that are consistent with global guidance; close collaborative networks with other government departments like the HIV control program, disease surveillance, neglected diseases and universities. Strong networks with districts in the implementation of TB activities e.g. isolation facilities, IPC, staff, infrastructure; and mechanisms for internal audit control that ensures financial controls De in place.

Challenges

- High turnover of healthcare staff particularly medical doctors;
- No strategy to address knowledge gaps among health care workers in the field as a result of reduced training activities;
- Successive training without clear planning. Key question include - how to define a balance between online training and/or face-to-face? Also, how to conduct efficient online training?
- Insufficient coverage of TB under the Infectious Disease mentoring initiative at the district level.
- Issues in terms of M&E and drug management and supply, which are part of program management capacity, are presented separately in chapters 2.3 and 2.4

Evidence

- From 2012 to 2016, the average turnover rate of medical doctors was 21.8%, which was three times higher compared to the turnover of nurses (7.6%)³⁸.

Main activity and sub-activities

- **Improve human resource capacity at all levels**
 - Organize training on updated guidelines to support national scale-up of new interventions
 - Develop multimedia and interactive training opportunities. Seek the support of partners to develop interactive online or blended training modules.
 - Establish a comprehensive NTP training database in order to evaluate training coverage among key TB staff and to determine training needs.
 - Develop plan for attendance at the international conference on TB and other respiratory condition diseases.
 - Develop plan for participation in short courses on TB.
 - Technical assistance with a capacity building focus will be required for

³⁸ Health labor analysis market report. Ministry of Health Rwanda, 2019, Page 36

program evaluation (NSP end review), for periodic evaluation of defined program component (such as the laboratory network, MDR-TB, M&E, PAL), for special surveys (catastrophic costs, inventory studies, subnational TB estimation, subnational patient pathway analyses, sensitivity analyses, stigma assessment) and for the SNRL.

- Purchase IT Equipment to facilitate training.
- Conduct supportive supervision and mentorship at all levels.
- Organize webinar courses to update health facility staff on TB guidelines.
- Introduce use of video conference for short courses, meetings, clinical case discussions, etc.
- Organize every three years a workshop with participation of national and international experts within TB to share new knowledge on TB management and update guidelines if needed.

Intervention indicator, baseline and target

Indicator	Baseline	Target
Proportion of public health facilities where at least one staff has participated in training on TB	N/A	100%

IV.2.2.1.3. KEY INTERVENTION 3.3: Engagement of communities, civil society organizations, and public and private care providers

As described earlier, there is excellent engagement of CHWs in TB control contributing to more than half of TB notification. However, their participation is highly dependent on the external funding (activities in pillar 1, chapter 1.1.3)

Challenges

- Suboptimal engagement of private sector care providers especially private-for-profit and the informal private sector. Small standalone formal and informal private providers are not engaged. These include chemistries or pharmacies, individual clinics, private laboratories and private imaging centers. Other informal providers mainly consist of traditional healers, and traditional birth attendant among others.
- Absence of guidance for Public Private Mix on TB care and control
- Limited engagement of the corporate sector and workplaces such as mines, factories and other industries in order to accelerate finding missing people with TB.
- Inadequate capacity to diagnose and manage TB patients in the private sector: knowledge gap among private providers in all areas of TB care and prevention. The capacity gaps are due to inadequate inclusion during trainings or updates on new guidelines and treatment recommendations, high staff turnover also makes it difficult to retain even trained staff and to manage competing activities.
- Low coverage of Public Private Mix DOTS and lack of linkages between private and public clinics: Only 3 of the total private clinics are engaged in TB diagnosis and treatment. Referring patients from private facilities to the public

facilities without a clear referral system may delay TB diagnosis

Evidence:

-

- The 2020 PPA indicated that 10% of patients sought initial TB care at private level 0 (8%) and level 1 (2%) facilities.
- Only 1% of private level 1 facilities provide diagnostic TB services and TB treatment services.
- Access to diagnosis and treatment services at place of care seeking was lower for males (74%) compared to females (85%), as a larger proportion of males seek care at private level 0 facilities (15% vs. 4%) .

Main activity and sub-activities

- **Strengthen and expand Public – Private Partnerships for TB prevention and care**
 - Develop guidelines on the framework of Public Private Partnership on TB prevention and care.
 - Conduct a high level meeting with TB stakeholders aimed at enhancing participation of the private sector in the fight against TB and regulation on mandatory notification of TB treated in the private sector.
 - Organize a coordination meeting for CSOs and the Private Sector to increase active participation in fighting TB.
 - Build the capacity of health care workers in the private sector to provide quality TB care services.
 - Map and identify the private HFs to be accredited in TB management and control.
 - Develop strategy to engage the corporate sector and workplaces on TB prevention and care
 - Develop policy for occupational TB prevention and lung health.
 - Conduct active case finding in workplaces (mines, factories and industries).
 - Organize TB Awareness campaigns at high risk workplaces.
 - Conduct workshop for health professionals of private pharmacies to contribute in TB prevention and increase awareness to seek care at HFs.
 - Provide diagnostic equipment including fluorescent microscopes.

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Number of private clinics engaged to provide comprehensive TB services	3	10
Proportion of TB notifications contribution by private clinics	0.2%	3%

IV.2.2.1.4. KEY INTERVENTION 3.4: Migrant and cross boarder

As per the 2019 WHO Global Tuberculosis Report, 30 countries are considered as TB high burden countries, of which 3 are regional and neighboring countries (Kenya, DR Congo and Tanzania). The TB incidence rate for Rwanda is estimated at 59/100,000 population. All neighboring countries have a higher TB incidence rate than Rwanda. Given forced displacement due to new and ongoing political conflicts within the region as well as increased movements across borders due to the liberalization of economic policies, there is need for a regional policy, guidelines, tools and TB referral system.

Challenges

- Lack of cross boarder policy regarding TB control and regional collaboration in fight to end TB epidemic

Evidence:

- For DRC the TB incidence rate is estimated at 321/100,000 population, for Kenya at 292/100,000 population, for Tanzania at 253/100,000 population, for Uganda at 200/100,000 population and for Burundi at 111/100,000 population.

Main activity and sub-activities

- **Improve cross border TB control**
 - Advocate for EAC for cross boarder policies regarding TB prevention, care and control.
 - Conduct regional consultative meetings through existing regional collaborative framework (EAC ICGR).
 - Conduct early TB screening among new immigrants.
 - Conduct education outreach and screening of immigrants in refugee camps.

Intervention indicator, baseline and target

Indicator	Baseline	Target
Participation rate of TB screening in refugee camps reported by peer educators annually	N/A	70%

IV.2.2.1.5. KEY INTERVENTION 3.5: TB infection prevention & control (IPC)

TB infection control measures are recognized as priority interventions particularly in health care settings. The implementation and application of basic measures for TB IC in Rwanda health care settings, are on a good track and only have to be strengthened and maintained. The package of six basic measures includes: the existence of the IC plan, appointment of the TB focal point, health workers trained on TB, cough triage

system and separation of coughers, health education on cough hygiene, and optimization of natural ventilation by maintaining opened doors and windows in all services.

Challenges

- Lack of guideline and SOPs on infection prevention & control in most facilities.
- Some health facilities have infrastructure limitations hindering effective administrative and environmental TB IPC measures.
- HIV clinic waiting bays are often enclosed, poorly ventilated and pose a moderate to high risk of TB transmission.
- Cough triage in the health facilities is not routine practice.
- No policy of TB screening among HCWs

Evidence:

- A study³⁹ among 1,131 HCWs and 381 enrolled school workers showed that LTBI was more prevalent among HCWs (62%) than SWs (39%). Adjusted odds of a positive TST result were 2.71 (95% CI 2.01–3.67) times greater among HCWs than SWs. Among the HCWs, there was no detectable difference between prevalence of LTBI according to facility type, work setting, or occupation.

Main activity and sub-activities

- **Strengthen TB IPC measures and prevention in high-risk occupations**
 - Rehabilitate waiting areas to meet IPC standards.
 - Develop and disseminate guidelines on TB IPC.
 - Train the focal point of health facilities on IPC guidelines and development of appropriate IPC Plans.
 - Conduct annual assessment of health facilities on implementation of TB IPC measures.
 - Ensure TB surveillance and routine TB screening among health care workers at risk.

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Proportion of HCWs screened for TB	79%	85%
Proportion of health facilities applying basic TB IPC measures	82%	85%

³⁹ Rutanga C, Lowrance DW, Oeltmann JE, Mutembayire G, Willis M, Uwizeye CB, et al. (2015). Latent Tuberculosis Infection and Associated Factors among Health Care Workers in Kigali, Rwanda. PLoS ONE 10(4)

IV.2.2.2. STRATEGIC OBJECTIVE 4: Universal Health Coverage, social protection, human rights & gender, nutrition

IV.2.2.2.1. KEY INTERVENTION 4.1: Universal Health Coverage and social protection,

Universal Health Coverage (UHC) is defined as ensuring that all people have access to needed health services of sufficient quality, while also ensuring that the use of these services does not expose them to financial hardships.

The second pillar of NST1 aims to ensure access to quality health for all by identifying innovative sources of finance for the health sector including public-private partnerships, public community partnership for health financing and a sustainable model for community based health insurance.

Rwanda's community-based health insurance program (Mutuelle de Santé) which has been reformed into a comprehensive insurance scheme through an enactment in mid-2011m transformed Mutuelle de Santé to a system of tiered premiums to make it more financially progressive and sustainable. Moreover, health insurance is mandatory to all people living in Rwanda.

A wealth categorisation program (Ubudehe) which was originally developed as a basic community target scheme, was modified after the 1994 genocide to enroll the most vulnerable citizens into national social protection programs.

Challenges

- Uncertainty around the funding landscape; given that TB funding is mostly received through external sources. Priority diseases such as TB services are not included in Mutuelle de santé. Inclusion of TB budget in the Mutuelle de santé is one of the most important gaps but also the most promising strategy in the context of the UHC 2030 in Rwanda.
- No baseline for catastrophic costs
- Some patients are not able to pay the health insurance, and therefore do not seek treatment swiftly enough. In addition, patients often have difficulties to renew community health insurance when they do not have enough physical capacity to work during treatment;
- TB services and medicines are free; however, patients have to pay for co-morbidities through their community health insurance;

EVIDENCE

- The national Mutuelle de Santé is documented to have ever covered more than 90% of the population, and currently covers above 80% and consequently reduced out-of-pocket spending for health from 28% to 12% of total health expenditure, and increased service utilization to 1.8 contacts per year.

Main activity and sub-activities

- **Advocate for policies and plan to include TB patients and cost in social protection scheme**
 - Ensure more sustainable funding for priority programs such as TB, to eliminate catastrophic costs for TB patients and their families, and monitor progress

towards the high-level End TB Strategy target to achieve zero catastrophic costs by 2020.

- Engagement and participation of the NTP in all Social Protection platforms (health insurances company and the Mutuelle de santé) to ensure that TB patients and their families who meet the inclusion criteria are well covered.
- Conduct a patient cost survey on catastrophic costs encountered by TB affected families to set the baseline and targets.
- Advocate for the inclusion of all elements of TB care and prevention in the insurance scheme.
- Participate in the annual meeting with health insurers to update the packages and tariffs
- Organize annual coordination meetings with Local leaders on linkage of TB Patients with social protection initiatives and inclusion of TB activities in the action plan.
- Organize Social cluster meetings at central level to discuss on TB issues and evaluate the implementation of TB activities at different levels of social cluster

Intervention indicator, baseline and target

Indicator	Baseline	Target
Proportion of households affected by TB facing catastrophic costs	TBD	TBD

IV.2.2.2.2. KEY INTERVENTION 4.2: Human right and gender

The gender inequalities can impact health risks, health seeking behavior, access to care and responses from health systems, which lead to poorer outcomes.

The fourth Health Sector Strategic Plan 2018-2024 (HSSP IV) acknowledges that women and men have specific health needs at all stage of life that are related to both physiological differences and societal roles. The health sector in Rwanda has recorded tremendous achievement including improved access to health care, life expectancy and decline of the infant, child and maternal mortality rate.

The HSSP IV has been developed using a people-centred, inclusive, and social cohesion-driven approach. In Rwanda, this is modelled around a human rights-based approach to health with practical policies, programmes and strategies to address and rectify inequalities, which include gender inequalities causing inequitable health outcomes for poor or marginalized parts of the population. Poverty is recognized as a risk factor for acquiring TB, in our bid to reduce TB incidence and mortality in Rwanda, an all-inclusive model is paramount with strategies aimed at the poorest and the most vulnerable. According to the WHO, TB is the third leading cause of death for women worldwide. This TB NSP recognises that and takes into account the need for gender equity and the removal of any gender based barriers in te fight toeliminate TB as a major cause of morbidity and mortality in women

Challenges

- A rights-based approach is yet to be realized in the management, treatment, care and support of TB patients. Empowerment and education of patients on rights and about TB is largely left to community based, civil society and partner organizations
- There is no data showing about TB stigma in Rwanda
- No available TB services for the blind and the deaf

Evidence

- The National Gender statistics report in Rwanda⁴⁰, 2016-2017 showed that 74.5% and 73.4% of female and male were covered by health insurance.
- 83% of women participates in making decisions about their own health care, only 23% of them decide solely about their own health care.

Main activities and sub-activities

- **Advocate for rights- and gender-based approaches in TB care and prevention**
 - Conduct stigma assessment using the Stop TB Partnership assessment tool.
 - Sensitize health care provider's knowledge about their own rights to health. Reduce stigmatizing attitudes in health care settings by providing necessary skills and tools to ensure patients' rights.
 - Facilitate discussions and negotiations among TB service providers, those who access services and police to address law enforcement practices that impede prevention of TB treatment, care and support efforts.
 - Conduct know your rights campaigns to improve legal and human rights literacy of people infected and affected by TB.
- **Implement rights- and gender-based approaches in TB care and prevention**
 - Align TB services into Reproductive Maternal and Child Health (RMNCH) related health services to facilitate access by women and girls.
 - Train prison personnel regarding prevention, health care needs and human rights of detainees infected with or at risk of TB in the workplace programs for law makers and enforcers.
 - Produce and distribute TB communications materials for individuals who are blind and deaf.
 - Train HCWs on Sign language.
 - Protect the privacy of people with TB.
 - Train HCWs on TB stigma reduction.

⁴⁰ National Gender Statistics Report, 2019, NISR, page 10

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Percentage of people diagnosed with TB who report stigma in health care settings that inhibited them from seeking and accessing TB services	N/A	TBD
Percentage of people diagnosed with TB who report stigma in community settings that inhibited them from seeking and accessing TB services	N/A	TBD

IV.2.2.2.3. KEY INTERVENTION 4.3: Social Protection and Nutrition

Malnutrition is a risk factor for the progression of TB infection to TB disease and is a predictor for increased risk of death, and TB relapse⁴¹. While malnutrition results in a weakened immune system, TB disease results in poor appetite, malabsorption, wasting and further deterioration of the immune system. This results in a vicious cycle of disease and malnutrition⁴².

Additionally, studies indicate that malnourished TB patients have delayed recovery and higher mortality rates than well-nourished patients. The nutritional status of patients also improves during TB treatment⁴³. Nutritional assessment is therefore an essential prerequisite to the provision of nutritional care.

Poor nutritional status and poverty are common features of TB patients; patients face difficulties in taking TB drugs when they haven't enough to eat; no nutritional support is available for drug-susceptible TB patients;

Challenges

- Nutrition support is only provided to DR-TB patients; DS-TB patients with malnutrition are not covered.
- Lack of information about malnutrition levels in the general population and specifically in TB patients.

Evidence

- TB fatality is high among malnourished patients: around 62% of died TB patients were underweight (BMI \leq 18.5)
- In 2018 stunting in children (6 to 59 months) was at 35% and the prevalence of children who are underweight was at 12.6%.⁴⁴

Main activity and sub-activities

- **Improve TB patients nutrition status by providing nutrition supplements to TB patients with low BMI:**

⁴¹ World Health Organization. (2013) Nutritional care and support for patients with tuberculosis. Geneva: World Health Organization; Retrieved from <http://www.who.int/nutrition/publications/en/>

⁴² Food and Nutrition Technical Assistance (2014). Why Good Nutrition Is Important in the Treatment of TB. Retrieved from <https://www.fantaproject.org/news-and-events/why-good-nutrition-important-treatment-tb>

⁴³ Gupta, K. B., Gupta, R., Atreja, A., Verma, M., & Vishvkarma, S. (2009). Tuberculosis and nutrition. *Lung India: official organ of Indian Chest Society*, 26(1), 9-16.

⁴⁴ Rwanda 2018: Comprehensive food security and vulnerability analysis CFSVA, NISR 2019.

- Procure and distribute Nutrition commodities for TB Patients in Ubudehe Category I&II (two lower categories in the Rwanda socio-economic classification system)
- Purchase and distribute nutritional support to DS TB cases with BMI of ≤ 18.5 ; ensure DOT of TB patients with BMI of ≤ 18.5 at HP, HC or Hospital to ensure close clinical follow up and management of malnutrition. (see chapters 1.2.5)
- Introduce data collection on patient's nutrition status in the regular TB program report.
- Develop and distribute a nutrition guidelines tool about nutrition and TB patients.
- Print the new nutrition guidelines tool about nutrition and TB patients.
- Conduct regular supportive supervisions to health facilities on the implementation of the new nutrition guidelines tool about nutrition and TB patients.

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Proportion of TB patients who are evaluated for nutritional support	NA	100%
Proportion of eligible malnourished TB patients (BMI<18.5) who have accessed nutrition support	NA	80%

IV.2.2.3. STRATEGIC OBJECTIVE 5: Stable and quality assured supply of drugs, diagnostics and commodities

Ensuring an uninterrupted supply of high-quality and affordable, first and second-line anti-TB drugs for all people with TB, is critical for sustaining treatment success and prevention of TB and drug resistance.

Management of TB commodities is ensured by MPPD at central and intermediate level, and the whole supply chain is supported by the NTP. This plan will contribute to strengthening skills of district pharmacies (DP) in accurate stock forecasting and appropriate use of the electronic logistic management information system (e-LMIS) for stock management through training and on-site supervision of staff. Rwanda has a plan to switch fully to e-LMIS and phase out the paper based system nationwide for management of health commodities. This requires strong capacity building of users, mentorship and strengthening internet capacity by availing 4G internet in remote areas with network problems, which goes beyond funding available for this NSP.

IV.2.2.3.1. KEY INTERVENTION 5.1: Supply chain management

Challenges

- The public laws in Rwanda are conflicting with the Global Drugs Facility (GDF), which is the UN entity to supply affordable TB drugs and commodities. GDF mechanism requires 100% pre-payment before shipment while the Rwanda Public Procurement laws warns against this.
- Inaccurate recording of consumption data and stocks in e-LMIS.
- Insufficient number of pharmacists at the TB&ORD Division due to heavy workload.
- Limited internet access hindering proper use of e-LMIS in some health facilities'
- Insufficient skills and knowledge on use of e-LMIS at decentralized level.

Evidence

Two months (April and May) of GeneXpert cartridges stockout in 2019.

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Main activities and sub-activities

- **Improve the availability of quality TB drugs and commodities**
 - Request cabinet brief regulating procurement of tuberculosis commodities through the global drug facility mechanism and 100% pre-payment.
 - Engage in restructuring of medical procurement and production division to ensure the documents guiding procurement processes of the new institution are flexible to comply with requirements of the global drug facility.
 - Install air conditioners in the health facilities to maintain the quality of medicines in stock.
 - Conduct quality control of all new batches and sampled batches at MPPD and decentralized level.
- **Strengthen the supply chain, stock management and efficient use of e-LMIS**
 - Harmonize coding of medicines to prevent duplications in reports.
 - Conduct workshop to develop a harmonized code of medicines, validate new codes and ensure old codes are totally replaced.
 - Train store manager on new channels for requisition of TB medicines.
 - Allow all health facilities including CT to request medicines from DPs.
 - Revise the SOPs on recording of consumption data in e-LMIS.
 - Conduct workshop to revise SOPs on consumption data integrating quantity dispensed by CHW.
 - Conduct mentorship of HCW to ensure quality of data and timely reporting in e-LMIS.
 - Integrate validation of consumption data in e-LMIS during TB quarterly evaluation meetings

- Conduct every quarter data analysis of consumption data recorded in e-LMIS.

Intervention indicators, baselines and targets

Indicator	Baseline	Target
Percentage of CDT with no stock out of FL tracers (RHZE and RH ad) drugs of experienced in the last 12 months	96%	100%
Percentage of MDR TB centers with no stock out of SLD in the last 12 months	100%	100%

IV.2.2.3.2. KEY INTERVENTION 5.2: Rational use of medicine

Use of TB medicines in Rwanda is controlled and TB medicines cannot be sold in private pharmacies. To increase access to patients TB medicines are dispensed free of charge. The quality of medicines is controlled through the procurement of medicines from WHO prequalified manufacturers and are verified by GDF and by RBC through the accredited WHO laboratory.

Challenges

- We still report number of treatment failures on TB first-line medicines, which are not resistant to TB and if they are retreated, they get cured. This can be due to suboptimal plasma concentration of medicines that can be caused by individual particularities. Therefore, the plasma concentration needs to be measured in order to adjust patient's drug dose for cases with control positive results on microscopy even though they are sensitive to TB medicines.
- In addition to the rational use of medicines, adverse drug reactions are poorly reported (*already covered in the chapter on MDR-TB*).
- Fluoroquinolone medicines which are in the same family with some medicines being used in treatment regimens of DR TB cases are sold in pharmacies and this can lead to resistance if close collaboration with private clinics and private pharmacies is not strengthened.

Evidence

- The current quarterly reporting system is not collecting the information on aDSM. However, the new patient file version is evaluating adverse events on a monthly basis.

Main activities and sub-activities

- **Implement TB Therapeutic Drug Monitoring**
 - Purchase toxicology lab reagents for NRL for TB therapeutic drug monitoring (TDM).
 - Train staff on TB TDM and interpretation of lab results.

- Conduct mentorship in collaboration with College of Medicine and Health Sciences on the implementation of the TB TDM.
 - Develop SOP on use of TDM.
 - Work with Rwanda Food and Drugs Authority to restrict use of fluoroquinolones.
- **Improve aDSM system**
 - Strengthen capacity of health providers to use audiometer, ECG, etc.
 - Develop protocols and conduct active surveillance of medical products used in TB program.
 - Educate and inform patients on the importance of reporting adverse drug events.

Intervention indicator, baseline and target

Indicator	Baseline	Target
Proportion of TB treatment cards where aDSM section is completed	N/A	85%

IV.2.2.4. STRATEGIC OBJECTIVE 6: M&E and data quality system (e-TB, health information system, Civil registration and vital statistics (CRVS) system

IV.2.2.4.1. KEY INTERVENTION 6.1: Surveillance system including mortality registration

Proper data management associated with strong monitoring and evaluation are needed to help improve program interventions, achieve goals and sustain funding. Significant progress is evident since the implementation of an electronic recording and reporting system. Considering current achievements and challenges, the NTP will continue developing and consolidating the system, in particular, core data along the continuum of TB care that are currently not included, and enhance the quality of TB data management.

The GoR needs reliable mortality data to monitor the impact of investments in disease control. The TB program and other health programs are likely having a remarkable impact on reducing mortality among children and adults. Therefore, the investment in building systematic mortality surveillance systems which comply with global standards for the reporting of deaths and causes of death are considerably important to contribute in strengthening health systems and CRVS system. Mortality is a key measurable indicator of the Sustainable Development Goals (SDGs) used as measurement for 5 goals and 15 mortality related indicators.

Therefore, the GoR embarked on the formal process for measurement and monitoring of levels of mortality and distribution of causes of death (COD) at population level to improve the CRVS system.

Mortality data from the civil registration system permits the production of mortality statistics on a continuous basis and contributes to an understanding of the burden of disease at national and local geographic levels. Given the huge importance of a well-functioning civil registration system in the production of complete, accurate, relevant and timely mortality statistics, the GoR has published amended law No 001/2020 of 02/02/2020, thereby replacing law No 32/2016 of Family and Persons to improve birth and death registration coverage, completeness and causes of death reported to ensure both continuity and consistency of the system.

Complete and accurate data related to cause of death is critical to both the fields of medicine and public health policy and planning. Death certificates are significant tools to ascertain population based mortality and other vital statistics information to be used to monitor disease incidence, prevalence and mortality in a community. However, incomplete and inaccurate death certificate information can significantly impair the precision of a national health information database.

The GoR started building the system for generating and reporting ICD- coded mortality information as part of routine health information including a hospital coded module in the HMIS Mortality module, from January 2018. However, the quality of COD reported at health facilities remains a challenge.

Rwanda has instigated an ongoing strategy to sustain its progress in diminishing premature deaths through strengthening its civil registration and vital statistics systems. Thus, the country started implementing a major intervention to improve the quality of COD data, namely, the introduction of verbal autopsy to gain a better understanding of the patterns of COD when people die outside the health facility where there is no physician to certify death.

Challenges

- Low coverage and production of high quality COD data for deaths occurring in the health care system.
- The registration of death is very low because only deaths occurring in the district hospital are captured while the majority of deaths occurs in the community.
- No functional civil registration system in the health facilities to monitor deaths and causes of death. However, the new law designates powers to health officers to register birth and death at HFs and the executive secretary of a cell (administrative community) to conduct verbal autopsy for community death.
- Data completeness into e-register (e-TB) not yet reached. This will allow to transition from aggregated quarterly reports (RHMIS) to case-based data and phase out the aggregating reporting (activities included in chapter 3.1).
- Non-interoperability or interface connectivity of e-TB and RHMIS with other electronic health systems (laboratory information system (LIS), CRVS, HIV case-based database DataToCare, eLMS, OpenMRS, among other relevant systems so that TB surveillance is optimized, data are

available in real time, data entry workload is reduced, and quality of data increases . (activities included in chapter 3.1).

- Insufficient M&E capacity of the TB&ORD division to record, analyze and use TB data at national and subnational level with the new eTB system. Additional staff with fully dedicated time to eTB will be required for training, data cleaning, data management, and supervision for a fast and smooth implementation.

Evidence

- Over 50% of ICD-coded causes of death are unusable data for policy action (HMIS,2019).
- 30% of deaths occur in health facilities while 70% occur in the community (NISR,2019). Since the majority of deaths occur outside health facilities, there is a great need for establishing a community death surveillance system that provides high quality COD using recommended WHO verbal autopsy instruments.

Main activities and sub-activities

- **Advocate for legal framework for TB case notification and vital registration:**
 - Collaborate with the MoH for the implementation of the public health law which captures TB notification as a requirement.
 - Regulatory frameworks for vital registration.
 - Collaborate with relevant institutions on implementation of Medical Certification of Cause of Death (MCCOD) to determine underlying cause of deaths.
 - Collaborate with relevant stakeholders to integrate e-TB with other health and administrative systems (HIV, LIS, OpenMRS, DataToCare, LIMS, NIDA, CVRS, etc).
 - Train and mentor Health professionals on sustainable quality improvement of medical certification of cause of death.
- **Strengthen Community-based mortality surveillance established, scaled, and quality-assured, using WHO standard verbal autopsy (VA) tools for deaths occurring outside health facilities**
 - Conduct supervision, on-the-job coaching and mentorship on mortality reporting for community deaths using VA.
 - Contribute to the procurement of internet data bundles of VA interviewers to transmit VA into ODK server in HMIS/DHIS2 and CRVS system.
 - Purchase android tablets for VA supervisors to check the quality of causes of death reported in HMIS/DHIS2 and CRVS system.
 - Contribute to the interoperability process of VA ODK aggregate and NCI-CRVS system with the national identification number (NIN) to improve the quality of causes of death reported.
 - Workshop for VA technical team to develop incremental VA scale up

strategy to achieve nationally representative COD data for deaths outside health facilities.

- Collaborate with the Ministry of Health for the elaboration of public health law which capture TB notification as a requirement.
 - Collaborate with relevant institutions to integrate e-TB with other health and administrative systems (HIV, LIS, OpenMRS, DataToCare, LIMS, NIDA, CVRS, etc).
- **Strengthen the monitoring and evaluation of the TB surveillance system**
 - Develop/update job aides on procedures of TB data recording, validation, reporting and use.
 - Conduct trainings/inductions/regular mentorships at all levels, using developed/updated job aides on procedures of TB data recording, validation, reporting and use.
 - Hold quarterly evaluation meetings with facilities to cross-check, analyze and use TB data.
 - A new assessment of the TB surveillance system will be conducted by the end 2021 to reach WHO certification and measure if TB indicators are on track with NSP targets and END-TB strategy milestones for 2024.

Intervention indicator, baseline and target

Indicator	Baseline	Target
e-TB coverage in CDT and CT as proxy of Timeliness of routine reporting	N/A	100%

IV.2.3. Pillar 3: Research and innovation

This NSP encourages program-based operational research as a core component to improve program implementation locally through the identification of problems, evaluation of interventions and monitoring of activities, in order to adjust policy along evidence-based recommendations. The NTP is willing to conduct a survey on the “catastrophic costs associated with TB”; a research on the “Long term outcomes of former MDR TB patients who have been successfully treated with second line TB Drugs in Rwanda.” The NRL has already developed a protocol with the aim “To assess the prevalence of mutations associated with Rifampicin resistance outside the RRDR and of “disputed” mutations in the rpoB gene”. NTP research capacity at different levels will be developed and a research team will be set up to work on identified research topics, including people from different institutions. Technical assistance may also be needed in many of those steps to carry out better research to inform for better strategy.

IV.2.3.1. STRATEGIC OBJECTIVE 7: Data for programmatic monitoring, evaluation, learning and planning

IV.2.3.1.1. KEY INTERVENTION 7.1: Evidence generation and use of electronic data systems

Challenges

- Issue of data completeness into e-register (e-TB) which will not allow transition from aggregated quarterly reports (RHMIS) to case-based data and phase out the aggregating reporting. Transition from paper-based reporting to case-based electronic surveillance system not started.
- Non-interoperability or interface connectivity of e-TB and RHMIS with other electronic health systems (laboratory information system (LIS), HIV case-based database Data-To-Care, eLMS, Open MRS, among other relevant systems so that TB surveillance is optimized, data are available in real time, data entry workload is reduced, and quality of data increases.
- Low reporting in e-TB due to high workload to report presumptive TB patients in the system including difficulties to report presumptive TB without ID.
- Insufficient M&E capacity of the TB&ORD division to record, analyze and use TB data at national and subnational level with the new eTB system. Additional staff with fully dedicated time to eTB will be required for training, data cleaning, data management, and supervision for a fast and smooth implementation.
- The data quality assessment SOP for the new eTB should be updated.

Evidence

- In 2018, based on the WHO standards and benchmarks, in Rwanda, 8 standards were met, 2 partially met (B 1.4 and B 1.9) and 2 not met (B 1.10 and B 2.3).

Main activities and sub-activities

- **Strengthen evidence based program monitoring and evaluation**
 - Re-design TB case based surveillance to be user-friendly.
 - Train central level, facility clinical staff and data managers on the use of new TB case based surveillance (data entry, data management, analysis and use).
 - Hire dedicated staff at central level to manage a TB case based surveillance system.
 - Avail fund for increased capacity of central servers to host the TB case-based surveillance system.
 - Organize a workshop for developing job aides/SOPs on data quality, analysis and use of case-based surveillance system.
 - Conduct bi-annual reviews/evaluation of the system

- **Conduct special surveys and program-wide reviews**
 - Conduct repeat patient pathway analysis using data from the 2020 DHS and comparing provinces.
 - Conduct mid-term review of TB NSP
 - Conduct end term review of TB NSP
 - Conduct epidemiological review using WHO standards & benchmarks
 - Implement and update a dashboard using the table of core TB data along the continuum of care to monitor performance of the TB program according to the people-centered framework for planning and programming.
 - Conduct annual evaluation meetings with stakeholders on TB annual performances

Intervention indicator, baseline and target

Indicator	Baseline	Target
Number of standard criteria met using WHO TB standard and benchmarks checklist	8	10

IV.2.3.2. STRATEGIC OBJECTIVE 8: Research priorities

IV.2.3.2.1. KEY INTERVENTION 8.1: Research strengthening

NTP research capacity at different levels will be developed and a research team will be set up to work on identified research topics, including people from different institutions. Technical assistance may also be needed in many of those steps to carry out better research for better strategy.

Challenges

- Lack of funds for research activities

- Inadequate capacity among staff at all levels to conduct research
- Lack of multidisciplinary taskforce including academia for operational research

Evidence

- Research priority, KAP study on health seeking behavior in current NSP was not conducted

Main activity

- Develop and implement the prioritized research agenda

Thematic Area	Research Priorities
Promoting Care Seeking and Prevention in the Community	Patient pathway analysis comparing provinces and access barriers to TB care Conduct a national assessment of stigma on TB TB knowledge and health seeking care survey
Accelerating Appropriate Diagnosis	Molecular studies- characterization of TB – DIAMA study ongoing
Quality of Care and Ensuring Cure	Adherence surveys: Uptake of digital solutions and effect on patient follow up and adherence
	Assessment of risk factors and barriers to access to TB services and care
	Conduct LTBI prevalence survey Post TB complications burden and patterns of respiratory complications following TB care
Programmatic Management of Drug – Resistant Tuberculosis	“Therapeutic drug monitoring”, to assess causes of failure & relapse (such as suboptimal dosages). This may lead to individualized dosages.
	Drug Resistance Survey: to determine the burden of drug resistant TB
	Assess effectiveness of MDR-TB regimen and factors associated with poor/unfavorable outcomes among MDR-TB patients.
UHC and Social Protection	Catastrophic costs study
Data for Programmatic Monitoring and Planning	Series of subnational TB Inventory studies to assess potential underreporting
	Risk factors associated with high TB deaths rate among clinically diagnosed TB cases
	Impact assessment of ACF interventions (PPV/NPV/TP/FP/TN/FN) Accuracy study of CAD4TB in screening algorithm Cost effectiveness analysis of ACF interventions

Intervention indicator, baseline and target

Indicator	Baseline	Target
Percentage of studies/ surveys of research priorities (above) conducted	N/A	60%

V. ESTIMATED BUDGET COST FOR THE 2019-2024 TB NSP IN RWANDA

Rwanda 2019-2023 TB NSP cost estimates and the funding landscape for its implementation are both vital preconditions to ensure realistic levels of ambition for the strategy. These estimates are expected to facilitate the prioritization of planned investments and ensure appropriate measures to finance the emerging resource gaps are articulated. This section presents, the methodology used in estimating Rwanda 2019-2023 TB NSP costs including information of available resource commitments within the Country over the plan period.

V.1. Costing methodology

Cost estimates of the Rwanda 2019-2024 TB NSP was generated using the UN OneHealth Tool (OHT), a unified costing template that estimates the cost of health services and systems input required to achieve desired health outcomes and impacts.

The scope of the costing exercise included estimating all costs, both services and system, related to delivering the package of TB interventions identified in the Rwanda 2019-2024 TB NSP. Other outputs of the process include TB impacts (mortality, incidence and notification) modeled for different policy scenarios of the plan. Details of the policy scenarios will be elaborated in subsequent sections.

TB services costed as part of the strategy include TB Care and Prevention, MDR TB, and TB/HIV collaboration, while the share of health System investment estimated as part of the process include Infrastructure, Logistics and Human Resources. Other HSS component such as governance, HIS and financing were estimated as part of the programmatic and coordination cost to be incurred by the programme.

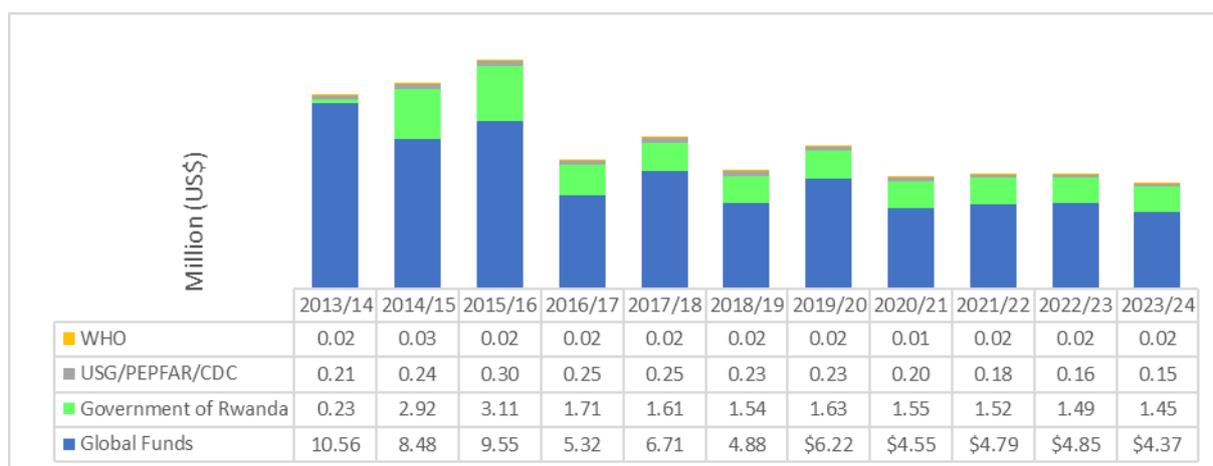
The costing process involved series of consultations, discussions and workshops with different TB control activities implementers, partners and decision-makers to generate inputs required for the application of the One health tool. The entire process was premised on the goals and objectives including targets defined in the Rwanda 2019-2024 TB NSP. From these objectives, strategic interventions were generated, for which activities were defined and costed.

With the aid of the excel planning template provided by the Planning Unit/RBC, these objectives, strategic interventions and their specific activities were costed as key inputs for the One Health Tool application. The Planning Unit/RBC provided the unified unit costs applied in the costing process. Upon completion of the costing process, the total budget of the NSP was generated for three policy scenarios modeled for the plan. These estimates were disaggregated by NSP objectives, strategic interventions, cost categories, and sources of funding. Several revisions of the budget were carried out to ensure the relevance and feasibility of each activity in terms of quantity, frequency and unit cost, and to ensure the most cost-effective option.

V.2. Funding landscape

In determining the resources available for the implementation of the Rwanda 2019-2024 TB NSP, three main funding sources were considered in the forecast calculations: Government funding projections (USD 7.4 million for NSP period), Global Fund allocation (USD 24.8 million,) and USG funding (USD 0.9 million). While funding envelope for the first two years for of the NSP were based on commitments, the remaining years were estimated according to historical data and a linear regression analysis. Figure 4 presents the results of this analysis. For GF, estimate for TB were derived from the GF allocations letters.

Figure 7. Forecasted TB funding. USD



Although this forecast is meant to provided high level guidance for the adoption of a realistic policy scenario; it shouldn't be considered as the most accurate picture of future funding since past funding levels are not always indicative of what future funding levels will look like, and on the other hand, the regression analysis was done with limited historical data.

V.3. Costing results, gap analysis and scenario development

Estimates of the TB NSP cost was modeled for three policy scenarios (So, S1, and S2) with investments in diagnosis pathway serving as one of the major distinguishing cost assumptions across the different scenarios. While TB treatment protocol remained unchanged for each of the scenario, NSP cost was calculated with the aim to expand the use of Xpert MTB/RIF as initial test for all TB presumptive cases countrywide. Other cost assumptions upon which the three policy scenarios have been modeled is presented below.

For Scenario So: representing the “continuation” of the current TB diagnosis effort, Funds were allocated to sustain the 55% Coverage for Gene Xpert. Likewise, to

provide Nutrition Support for MDR TB clients. Another cost assumption covered is the provision of TB Preventive Treatment (TPT) for Bact+ under-five children.

For Scenario S1: considered as “ambitious realistic”, for this policy scenario, funds were allocated for increase to 80% the coverage for Gene Xpert as initial test for TB presumptive cases. Also considered in this model is the provision of Nutrition support for both MDR TB and TB clients with BMI<18.5. For TPT, provision was made for Bact + under five, Bact + >5yrs with BMI <18.5 and PLWHIV.

For Scenario S2: referred to as “very very ambitious”, for this instance, funds were allocated for use of Xpert as initial test for all TB presumptive cases countrywide. Likewise, Nutrition Support was provided for MDR and DS – TB, while funds were allocated for the provision of TPT Bact + <5yrs, all Contacts and new PLWH on ART.

Based on the assumptions provided above for three scenarios, the Rwanda 2019-2024 TB NSP was estimated at nominal cost of \$46.5million for Scenario “So”, \$50million for Scenario “S1” and \$53.5 for Scenario “S2”. And the mean cost per capita for each scenario estimated at \$0.66, \$0.71, \$0.76 for Scenario’s So, S1 and S2 respectively. See table 7

Table 7 : TB NSP budget by scenario

Rwanda 2019-2024 TB NSP Policy Scenarios	Total Cost of Rwanda 2019-2024 TB NSP, in Million (US\$)						Mean Cost per Capita
	2019/20	2020/21	2021/22	2022/23	2023/24	Total	
Scenario S2	\$ 7.44	\$ 11.95	\$ 13.48	\$ 12.10	\$ 8.57	\$ 53.54	\$ 0.76
Scenario S1	\$ 7.35	\$ 10.61	\$ 12.12	\$ 10.72	\$ 9.21	\$ 50.0	\$ 0.71
Scenario So	\$ 6.95	\$ 10.10	\$ 11.59	\$ 10.21	\$ 7.72	\$ 46.48	\$ 0.66

While Scenario “So” was modeled to demonstrate the impact of continuing with the current diagnosis efforts, both Scenario “S1” and “S2” have been modeled to demonstrate the impact gains of expanding the use of Xpert MTB/RIF as initial test for 80% of the TB presumptive cases countrywide. Consequently, the major cost drivers both scenarios are the investment in GeneXpert Machines and Supplies. For scenario S1, aimed at conducting Xpert test for 80% of TB presumptive cases countrywide, a total sum of \$3million was allocated for the purchase of supplies over the NSP lifespan. For scenario S2, GeneXpert is done for all HRGs and all presumptive TB cases countrywide, thereby increasing the need for GeneXpert machines and supplies by 20% when compare to S1. \$5.5million was allocated to provide GeneXpert Supplies to achieve the desired coverage.

Table 8a : Summary costs by Thematic Pillars of Rwanda TB NSP 2019/20 - 2023/24 Scenario (Sc 0), in Million (\$)

Rwanda TB NSP 2019 -24 Strategic Pillars	2019/20	2020/21	2021/22	2022/23	2023/24	Total	% of Total Cost
Pillar1: PATIENT-CENTRED CARE	\$4.90	\$6.49	\$8.65	\$7.47	\$5.25	\$32.70	70.4%
Pillar 2 : BOLD POLICIES AND SUPPORTIVE SYSTEMS	\$1.82	\$3.01	\$2.82	\$2.33	\$2.20	\$12.18	26.2%
Pillar III: RESEARCH AND INNOVATION	\$0.22	\$0.60	\$0.12	\$0.42	\$0.23	\$1.60	3.4%
Total Cost	\$6.95	\$10.10	\$11.59	\$10.21	\$7.62	\$46.48	

Table 8b : Summary costs by Thematic Pillars of Rwanda TB NSP 2019/20 - 2023/24 Scenario (Sc 1), in Million (\$)

Rwanda TB NSP 2019 -24 Strategic Pillars	2019/20	2020/21	2021/22	2022/23	2023/24	Total	% of Total Cost
Pillar1: PATIENT-CENTRED CARE	\$5.30	\$7.00	\$9.18	\$7.97	\$6.78	\$36.22	77.9%
Pillar 2 : BOLD POLICIES AND SUPPORTIVE SYSTEMS	\$1.82	\$3.01	\$2.82	\$2.33	\$2.20	\$12.18	26.2%
Pillar III: RESEARCH AND INNOVATION	\$0.22	\$0.60	\$0.12	\$0.42	\$0.23	\$1.60	3.4%
Total Cost	\$7.35	\$10.61	\$12.12	\$10.72	\$9.21	\$50.00	

Table 8c : Summary costs by Thematic Pillars of Rwanda TB NSP 2019/20 - 2023/24 Scenario (Sc 2), in Million (\$)

Rwanda TB NSP 2019 -24 Strategic Pillars	2019/20	2020/21	2021/22	2022/23	2023/24	Total	% of Total Cost
Pillar1: PATIENT-CENTRED CARE	\$5.39	\$8.34	\$10.54	\$9.36	\$6.15	\$39.77	85.6%
Pillar 2 : BOLD POLICIES AND SUPPORTIVE SYSTEMS	\$1.82	\$3.01	\$2.82	\$2.33	\$2.20	\$12.18	26.2%
Pillar III: RESEARCH AND INNOVATION	\$0.22	\$0.60	\$0.12	\$0.42	\$0.23	\$1.60	3.4%
Total Cost	\$7.44	\$11.95	\$13.48	\$12.10	\$8.57	\$53.54	

NB: the cost of budget by strategic objectives are in annexe 7

With Scenario S1 and S2 considered as improvements over the Rwanda TB Program's current performance, a financial sustainability analysis was conducted on both scenarios. While the output of this process should be interpreted with caution on account of limited information on resource availability, it provides some insights into the resource constraint for either of the policy scenarios. More so, it is also expected to provide some guidance as policymakers and other relevant key stakeholders decide on the scenario that can be realistically implemented.

Table 11. Rwanda 2019-2023 TB NSP Costing funding source.

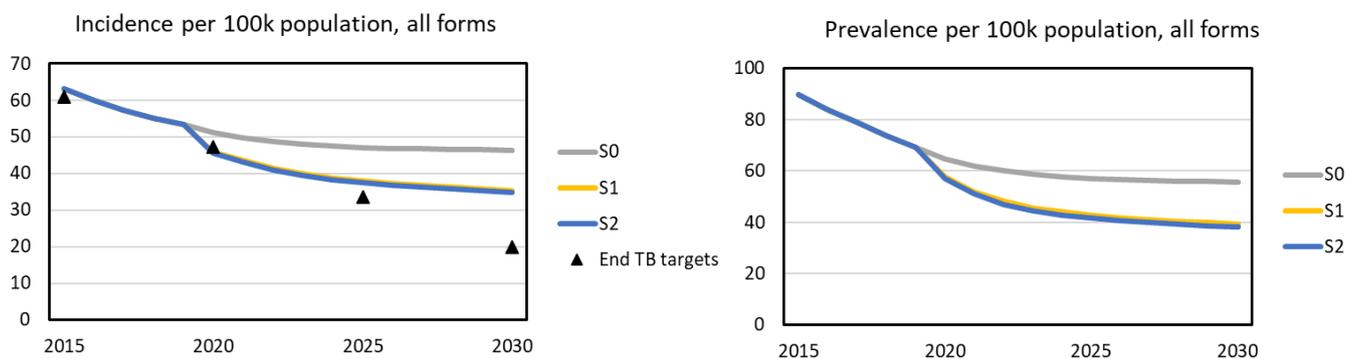
Funding Source	2019/20	2020/21	2021/22	2022/23	2023/24	USD Total	%
Government of Rwanda	\$1.63	\$1.55	\$1.52	\$1.49	\$1.45	\$7.63	23%
Global Funds	\$6.22	\$4.55	\$4.79	\$4.85	\$4.37	\$24.78	74%
USG/PEPFAR/CDC	\$0.23	\$0.20	\$0.18	\$0.16	\$0.15	\$0.91	3%
WHO	\$0.02	\$0.01	\$0.02	\$0.02	\$0.02	\$0.09	0.3%
Resource Available	\$8.10	\$6.31	\$6.51	\$6.52	\$5.99	\$33.41	% of Gap
TB NSP Scenario S1 Cost	\$7.35	\$10.61	\$12.12	\$10.72	\$9.21	\$50.00	33.2%
S1 Gap	(\$0.75)	\$4.30	\$5.61	\$4.20	\$3.22	\$16.59	
TB NSP Scenario S2 Cost	\$7.44	\$11.95	\$13.48	\$12.10	\$8.57	\$53.54	37.6%
S2 Gap	(\$0.66)	\$5.64	\$6.97	\$5.58	\$2.58	\$20.13	

From the table above the Total NSP implementation will require US\$50 million for Scenario S1 and US\$ 53.5million for Scenario S2 of which US\$ 24.8 million (74%) represents the projected committed on behalf of GF, US\$ 7.6million (22%) estimated as contributions by the government of Rwanda and 3.3% by the USG/UN.

Regardless of the adopted policy scenario, additional resources would be required for the successful implementation of the TB NSP. There will still be a remaining gap of about USD 9.5 million (33.2%) for Scenario S1 and USD 12million (37%) for Scenario S2.

Based on the resource analysis conducted for both scaled scenarios, Scenario S1 estimated at \$50 million that is \$0.71per capita and with a funding gap of 33.2%, was adopted as the more sustainable and realistic financial pathway to implementing the Rwanda 2019-2023 TB NSP. To address the funding gap estimated for Scenario S1, some funding options have been proposed to increase the financial space available for implementation of the Strategy. Some of the recommended financing options for increasing the resource envelope includes:

- Inclusion of TB services (TPT, CXR screening, diagnosis, treatment, and care) in public and private insurance schemes (including Mutuelle de Santé); this is a veritable funding option for increasing the resource available for NSP implementation.
- Improved mechanism joint planning and funding of TB co-morbidities
- Establish TB Multisectoral Accountability Framework to attract and monitor the funding

V 4. Impact Result for the Rwanda 2019-2023 TB NSP according to scenario**Figure 8. Modelling projection by scenario for incidence and prevalence**

VI. MONITORING AND EVALUATION PLAN FOR THE 2019-2024 TB NSP IN RWANDA

VI.1. Process of development of the 2019-2024 TB NSP M&E Plan

This M&E plan has been developed to measure progress made in the implementation of activities of the 2019-2024 TB NSP, as well as to measure progress made to achieve the intended goal(s), objectives and targets.

For each indicator, the following elements must be specified:

- The purpose of the indicator (impact, outcome, output or process);
- The procedure of calculation (absolute figure, proportion, ratio, rate, index, others);
- The source(s) of information that will be used; if it is a rate, ratio or proportion, the sources of information of the numerator and denominator need to be specified;
- The periodicity (and timeliness) of data collection;
- The entity that will collect the information;
- The levels where the information will be collected, compiled and analyzed;
- The values of the indicator at the baseline and expected values at the end of each fiscal year covered by the NSP.

This monitoring and evaluation plan contains 38 indicators, representing the goals and objectives of the plan as well as the Top-ten indicators of the End TB strategy. These indicators assess the goals (impact), strategic objectives (outcomes) and key interventions (outputs), as defined in the core plan. The process indicators need to be considered only for the most important activities. The 2019-2024 TB NSP M&E system

VI.2. M&E Coordination

The TB control M&E system is fully integrated into the national RHMIS system. The NTP will coordinate all stakeholders involved in TB control activities at national and decentralized levels, to ensure optimum utilization of available M&E resources. This coordinating structure will oversee resources mobilization for M&E, capacity development, data quality assurance and data analysis, reporting and archiving.

VI.3. Data flow, validation and use

The reporting system is organized from community level to health centers and is compiled by hospital catchment area, district and national level. This includes public and private health facilities (CTs and CDTs). Data are entered from health centers and hospitals (for their own patients), compiled by hospital in catchment area, and then for the district and the national level⁴⁵.

⁴⁵ 2013 Procedural Manual for M&E of TB in Rwanda

For data from the community, a transfer form is used when transferring a presumptive TB case to health center for diagnosis, the patient is then recorded in the health center (HC) TB laboratory register if the HC has confirmed the “presumptive TB” status. For TB cases managed by CHWs in community DOT (cDOT), a specific treatment card for cDOT is used, and is brought to the health center each month, where its data are recorded on the TB treatment card and TB cases register of the health center.

During this new TB NSP 2019-2024, the TB & ORD Division will continue the substitution of the paper-based TB surveillance system by an electronic case based system, under RHMIS. This electronic register has two objectives, to improve data quality and to improve quality of case management. The latter will involve a reminders system (SMS) for TB patients to improve treatment compliance. Only confirmed TB cases will be recorded in the new case-based surveillance through the DHIS2 tracker. Data will be entered by the TB Focal Point at health facility level and each health facility will enter cases regardless if the health facility is a CDT or CT. The e-TB captures information on TB notification, TB/HIV, TB laboratory, TB in HRGs, TB treatment outcomes, MDR-TB and TB PPC⁴⁶.

The electronic reporting system contains validation rules, which allow it to measure timeliness (fixed on 05th of each month following the evaluated quarter). The system is also designed to not permit any submission of incomplete data.

Each quarter, evaluation and performance assessment (quarterly evaluation meetings) are held at district hospital (DH) level. Before these assessments, health facilities have to upload their report in the system. During evaluation meetings, the last quarter’s TB data are reviewed and cross-checked with the data from source documents and agreed upon in case of discrepancies. Then after feedback is provided, through data analysis and interpretation for selected indicators, using a standardized tool. The validated national report is uploaded into the system as part of the feedback.

The National level will conduct data quality assurance in selected health facilities and on selected indicators. Supervisions oriented to quality of TB services are conducted, with community level being supervised by health centers and health centers by district hospitals. Districts hospitals are supervised by the national level through an integrated approach.

Electronic TB data in the HMIS and e-TB will be archived in the National Data Center.

VI.4. Evidence generation and Data consolidation along the TB continuum of care

As per the WHO People Centered Framework User Guide, a dashboard of pre-populated core data and automated visualizations (in Tableau) on epidemiology, patient care seeking and health system capacities along the care continuum will be reviewed annually to monitor performance of the TB program with the purpose to ensure desired progress in addressing service gaps and losses of patients in the TB care cascades for TB, RR/MDR-TB and TB/HIV (see Annex 7).

⁴⁶ 2014 Policy of TB electronic surveillance system

VI.5. NSP Reviews

An end-of-term TB NSP review will be conducted (April-June 2024) with the purpose of evaluating NSP achievements, implementation gaps and to provide recommendations which will serve for the next strategy and plan. A TB epidemiological review including TB surveillance checklist review will be conducted in partnership with WHO and other partners (2023-2024). However, specific program evaluations will also be conducted during the implementation period of this plan.

VI.6. M&E plan

Assumptions:

Impact targets are based on current estimates published in the WHO 2019 Global TB report and are expected to continually decline to be close in line with the End TB strategy milestones for 2025, by about 3.9% annually for TB incidence and by 6.3 % annually for TB mortality, as a result of good program design and implementation of all key recommended TB activities with high performance levels and synergistic efforts in HIV control.

In regards to TB notification (all forms), active case-finding in HRGs should detect additional cases so that treatment coverage is expected to increase from 80% in 2015 up to more than 90% by mid-2024. The number of additional cases will not be sufficient to invert the declining overall notification but the total number of cases is expected to decline on average by approximately 5% per year over the TB NSP period 2019-2024.

The top-10 indicators of the End TB strategy were incorporated in the M&E plan and new targets set for all indicators based on recent achievements (2018/19). Most of these will be collected through the routine surveillance but some will still rely on WHO estimates such as the treatment coverage and the case fatality rate. In addition, the target for catastrophic cost will be updated after the completion of the catastrophic cost survey planned in 2020. The LTBI coverage indicator will be expanded to other groups such as all PLHIV and contacts with a bacteriologically confirmed TB patient.

VI.7. Performance framework

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
Goal	1. Percentage of reduction of TB Incidence rate (per 100,000 hab)	Impact	Measured by WHO estimations by modeling	WHO annual TB Report	Annually Cumulative	WHO			12%	17%	23%	29%	35%
Goal	2. Percentage of reduction of TB Deaths rate	Impact	Measured by WHO estimations by modeling	WHO annual TB Report	Annually Cumulative	WHO			20%	30%	39%	47%	55%
Goal	3. Percentage of TB-affected families facing catastrophic costs due to TB <i>(End TB Top-ten indicator N°3)</i>	Impact	<u>Numerator:</u> Proportion of TB patients (and their households) who incur catastrophic costs <u>Denominator:</u> all patients treated	Survey results				NA	-	-	-		20%
O	4. Proportion of first level health facilities that have at least one staff trained to provide PAL services	process	<u>Numerator:</u> Number of first level health facilities that have at least one staff trained on PAL approach <u>Denominator:</u> Total number first level health facilities	Report assessment	Annually	NTP		9%	9%	20%	30%	90%	90%
I	5. TB notification rate new and	Outcome	<u>Numerator:</u> Number of TB cases notified (new	RHMIS report	Annually	NTP	National level	#	5335	5133	4896	4584	4255

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
	relapses (per 100,000)		and relapses) <u>Denominator:</u> Population/100,000					Rate	43/100k	40/100k	37/100k	34/100k	31/100k
	6. TB treatment coverage <i>(End TB Top-ten indicator N° 1)</i>	Outcome	<u>Numerator:</u> Number of new and relapses cases that were notified and treated <u>Denominator:</u> estimated number of incident cases in the same year (%)	RHMIS report WHO incidence estimates	Annually	WHO	National level	82% 2015	87%	88%	89%	89%	89%
1.1.	7. Contact investigation coverage <i>(End TB Top-Ten N°6)</i>	Coverage	<u>Numerator:</u> Number of contacts of bacteriologically confirmed TB cases who were investigated for TB <u>Denominator:</u> Number of contacts of bacteriologically confirmed TB cases	RHMIS report	Annually	NTP	National level	93.9% 2017/18	≥90%	≥90%	≥90%	≥95%	≥95%
1.1.	8. Proportion of TB cases notified among high-risk groups (HRGs (Number and Percentage)	Process	<u>Numerator:</u> Number of TB cases (new & relapses)) notified in HRGs <u>Denominator:</u> Total number of TB cases notified during the period of assessment	RHMIS	Quarterly and annually	NTP	National	53% 2018	53%	≥53%	55%	58%	60%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
4.3	9.Proportion of eligible malnourished DS TB patients (BMI<18.5) who have accessed appropriate nutrition support	Coverage	<u>Numerator:</u> Number of DS TB cases who receive nutrition support <u>Denominator:</u> Total number of DS TB cases with BMI ≤ 18.5 notified during the period of assessment	RHMIS report	Annually	NTP	National level	NA	50%	60%	70%	80%	≥80%
1.2.	10. Proportion of children 0-14 years notified among TB cases new and relapse	Output	<u>Denominator:</u> Total number of TB cases notified during the period of assessment Number of TB cases aged 0-14 (new & relapses) <u>Denominator:</u> Total number of TB cases notified (new and relapses)				District HF	7.8% in 2017/18	8%	8.5%	9%	9.5%	10%
1.3.	11. Proportion of newly notified patients diagnosed using WHO recommended rapid tests <i>(End TB Top-Ten N°4)</i>	Output	<u>Numerator:</u> Number of all newly notified TB patient diagnosed with WHO recommended rapid tests <u>Denominator:</u> All number of newly notified TB patients	RHMIS	Annually	NTP	National District HF	54%	S0:54% S1:60% S2:65%	S0:54.5% S1:65% S2:75%	S0:54.5% S1:70% S2:80%	S0:54.5% S1:75% S2:90%	S0:55% S1:80% S2:100%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
	12. DST Coverage for TB patients <i>(End TB Top-Ten indicator N° 7)</i>	Coverage	<u>Numerator:</u> Number of TB patients with a drug susceptibility result for at least Rifampicin (Xpert MTB/RIF or phenotypic DST) <u>Denominator:</u> Number of all notified cases in the same year. Disaggregation for New TPB+ and previously treated cases	RHMIS	Annually	NTP	All	67% 2018/19	70%	75%	79%	83%	≥85%
1.3.	13. Proportion of notified patients with rifampicin resistant (RR) or MDR who receive second line DST		<u>Numerator:</u> Number of TB notified patients with rifampicin resistant (RR) or MDR who receive second line DST (LPA or phenotypic DST) <u>Denominator:</u> Number of all notified patients with rifampicin resistant (RR) or MDR in the same year.	RHMIS	Annually	NTP	MDR-TB centers	TBD	85%	90%	95%	100%	100%
1.4.	14.a. Proportion of diagnostic sites enrolled in an EQA system for all diagnostic methods		<u>Numerator:</u> Laboratories sites enrolled in an EQA system for all diagnostic methods	NRL EQA reports	Annually	NRL-Division	National level	NA	50%	60%	70%	80%	95%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
	including smear microscopy and Xpert MTB/RIF		(once per year) <u>Denominator:</u> Total number of laboratories with TB diagnostic testing methods (number and percentage)										
	14. b Proportion of diagnostic sites scoring pass in EQA for all diagnostic methods including smear microscopy and Xpert MTB/RIF		<u>Numerator:</u> Laboratories sites scoring pass in EQA for all diagnostic methods (once per year) <u>Denominator:</u> Total number of laboratories with TB diagnostic testing methods (number and percentage)	NRL EQA reports	Annually	NRL-Division	National level	NA	50%	60%	70%	80%	90%
2	15. Treatment success rate (TSR) for all forms of TB cases (DS & DR-TB cases) <i>(End TB Top-ten 2)</i>	Outcome	<u>Numerator:</u> TB cases (DS- and DR-TB cases) successfully treated (cured plus completed treatment) <u>Denominator:</u> total number of TB cases (DS- and DR-TB cases) registered during the year	RHMIS	Annually	NTP	National District CDT	85.4% 2018/19	So:86% S1≥86% S2>86%	So:86% S186.5% S2>87%	So:86.5% S1≥87% S2>88%	So:87% S1≥88% S2>89%	So:87% S1≥89% S2>90%
2.1.	16. Percentage of CDT with no stock out of FL tracers (RHZE and RH ad)	coverage	<u>Numerator:</u> Percentage of CDT with no stock out of First-Line TB tracer drugs	eLMIS reports	Annually	NTP	CDT	96%	97%	98%	99%	100%	100%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
	drugs of experienced in the last 12 months		(R150H75ZE&R150H75) <u>Denominator</u> Total number of CDT										
2.1.	17. Percentage of MDR TB centers with no stock out of SLD in the last 12 months	coverage	<u>Numerator:</u> Number of MDR TB centers with no stock out of SLD in the last 12 months <u>Denominator</u> Total number of MDR TB centers	Supervision reports of MDR-TB centers to CDT giving ambulatory DOT	Annually	NTP	MDR-TB centers and CDT giving ambulatory DOT	100%	100%	100%	100%	100%	100%
	18. Proportion of eligible PLHIV initiated on TPT	coverage	<u>Numerator:</u> Number of eligible PLHIV initiated on TPT <u>Denominator</u> Total number of eligible PLHIV	RHMIS	Annually	NTP	National	0%	20%	70%	80%	85%	≥90%
2.3	19. Treatment success rate, confirmed RR/MDR-TB	Outcome	<u>Numerator:</u> Rifampicin resistant (RR)/MDR-TB cases successfully treated (cured plus completed treatment) <u>Denominator:</u> RR/MDR-TB cases enrolled on second-line anti-TB treatment (shorter regimen: patients enrolled in the previous 12 to 24 months; conventional	RHMIS	Annually	NTP	National	83% 2017/18	85%	86%	87%	88%	≥88%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
			regimen; patients enrolled in the previous 24 to 36 months)										
2.3	20. Treatment coverage new drugs <i>(End TB Top-ten indicator N°8)</i>	Coverage	<u>Numerator:</u> Number of TB patients treated with regimens that include new TB drugs <u>Denominator:</u> Number of notified TB patients eligible for treatment with new drugs	RHMIS	Annually	MDR-TB unit NTP	National	Not Applicable	80%	90%	≥95%	≥95%	≥95%
2.5.	21. Proportion of TB treatment cards where ADSM section is completed	Output	<u>Numerator:</u> Number of TB patients whose TB treatment card section on AE was completed adequately (every month for MDR-TB and for DS-TB) <u>Denominator:</u> Total number of registered TB cases during the period of assessment.	RHMIS (variable to be added)	Quarterly and annually	NTP	National, District Hospital, CDT	NA	30%	30%	40%	60%	85%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
2.5.	22. Proportion of diagnosed TB cases tested for HIV infection <i>(End TB Top-ten indicator N°9)</i>	Output	<u>Numerator</u> : Number of TB patients who had an HIV test result recorded in the TB register <u>Denominator</u> : Total number of registered TB cases during the period of assessment.	RHMIS	Quarterly and annually	NTP	National, District Hospital, CDT	99.9%	≥95%	≥95%	≥95%	≥95%	≥95%
2.5.	23. Proportion of HIV positive TB cases given antiretroviral therapy during TB treatment	Output	<u>Numerator</u> : number of HIV-positive TB cases given antiretroviral therapy during TB treatment <u>Denominator</u> : number of HIV-positive TB cases registered during the evaluated period	RHMIS	Quarterly and annually	NTP	National, District Hospital, CDT	92%	93%	93.5%	94%	94.5%	95%
2.6.	24. Treatment success rate for TB patients (all forms) receiving DOT through community health workers (CHW)	Outcome	<u>Numerator</u> : TB patients receiving DOT by CHW who were successfully treated <u>Denominator</u> : all TB patients receiving DOT by CHW during the evaluated period	RHMIS	Quarterly and annually	NTP	CDT	94.9%	95%	95.5%	96%	96%	≥96%
3.1.	25. Percentage of Health providers screened for TB at least once during the year. (health facility workers)	Coverage	<u>Numerator</u> : number of Health providers screened for TB at least once during the year. <u>Denominator</u> : number of health providers	RHMIS	annually	NTP	All HF	77%	78%	78.5%	79%	79.5%	>=80%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
3.2	26.a LTBI treatment coverage among contacts < 5 years <i>(End TB Top-ten indicator N°5)</i>	Coverage	<u>Numerator</u> : number of children who are contacts of TB cases started on LTBI treatment <u>Denominator</u> : number of children eligible for LTBI treatment	RHMIS	Annually	NTP	National, District Hospital, HF	89%	90%	90%	90%	90%	≥90%
	26.b LTBI treatment coverage among contacts > 5 years	Coverage	<u>Numerator</u> : number of people of > 5 years who are contacts of TB cases started on LTBI treatment <u>Denominator</u> : number of people of > 5 years eligible for LTBI treatment	RHMIS	Annually	NTP	National, District Hospital, HF	NA	NA	NA	30%	40%	50%
	26.c Contact investigation coverage	Coverage	<u>Numerator</u> : number of contact people with bacteriologically confirmed TB cases who are screened for TB <u>Denominator</u> : total number of contact eligible for TB screening	RHMIS	Annually	NTP	National, District Hospital, HF	78%	80%	82%	85%	88%	≥90%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
1.6.	27. Percentage of population with adequate knowledge* on TB symptoms, transmission and prevention	Outcome	<u>Numerator:</u> Number of people with adequate knowledge* on TB symptoms, transmission and prevention <u>Denominator:</u> Number of people interviewed through the survey.	Survey (integrated in RDHS)	Once during the extended NSP	NTP	National level	56% (2012)	NA	NA	NA	NA	≥80%
1.6.	28. Proportion of TB cases (all forms) referred by community health volunteers during the evaluated year.	Output	<u>Numerator</u> Number of TB cases (all forms) referred by CHW during the evaluated period <u>Denominator:</u> The total number of notified TB cases (all forms).	RHMIS	Quarterly, Annually	NTP	Health facilities	25% 2018/19	≥25%	≥25%	≥25%	≥25%	≥25%
4.1.	29.eTB coverage in CDT and CT roxyoxi of Timeliness of routine reporting	Process	<u>Numerator:</u> Number of cases reported in eTB during the evaluated period by RSQA <u>Denominator:</u> Total Number of cases reported in all sources documents (eTB + and register) during the evaluated period by RSQA	eTB and RSQA	At least once a year	NTP	National, District HF	NA	95%	96%	97%	98%	100%

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
	30. Case fatality ratio (CFR) <i>(End TB Top-ten indicator N° 10)</i>	Outcome	<u>Numerator:</u> Number of TB deaths (from VR system) <u>Denominator:</u> estimated number of incident cases in the same year	<u>Numerator:</u> VR system <u>Denominator:</u> WHO	annually	NTP WHO	National	6.6% (464/7000 in 2018)	6.5%	6.5%	6%	5.5%	≤5%
4.3.	31. Percentage of studies/ surveys of research priorities conducted	Output	<u>Numerator:</u> Number of completed operational researches/surveys <u>Denominator:</u> Number of completed operational researches/surveys	Study reports	annually	NTP	National, District HF	1 every 2 years	8%	15%	31%	46%	60%
4.4	32. Number of standard criteria met using WHO TB standard and benchmarks checklist		Number of standard criteria met using WHO TB standard and benchmarks checklist	Epi-review report	1 every 4 years	NTP	National	6	8	8	8	10	10
4.5	33. Household health expenditure for TB			TB catastrophic cost survey	1 every 4 years	NTP	National	tbd	tbd	tbd	tbd	tbd	tbd
4.6	34. Proportion of public health facilities where at least one staff has participated in training on TB		<u>Numerator:</u> Number of public health facilities where at least one staff has participated in training on TB <u>Denominator:</u> Number of public health					???	???	???	???	???	???

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
			facilities in Rwanda										
4.7	35. Participation rate of TB screening in refugee camps reported by peer educators annually		Numerator: Number of refugees in the refugee camps that have been screened for TB at least once a year. Denominator: Number of refugees reported in the refugee camps during the reporting period.	Reports from refugee camps, by peer educators	Quarterly, Annually	NTP	National	N/A	???	???	???	???	70%
4.8	36. Percentage of people diagnosed with TB who report stigma in health care settings that inhibited them from seeking and accessing TB services		To be reported from the survey on stigma of TB patients	Survey on stigma of TB patients			National	N/A	tbd	tbd	tbd	tbd	tbd
4.9	37. Percentage of people diagnosed with TB who report stigma in community settings that inhibited them from seeking and accessing TB services		To be reported from the survey on stigma of TB patients	Survey on stigma of TB patients			National	N/A	tbd	tbd	tbd	tbd	tbd
4.10	38. Number of standard criteria		From Epidemiological Review	Report of Epidemiologica	1 every 4 years	NTP and Consultant	National	6	8	8	8	10	10

GOALS for 2024 as compared to 2015:													
<input type="checkbox"/> 35% reduction of TB incidence rate <input type="checkbox"/> 57% reduction of TB deaths <input type="checkbox"/> Reduction of TB-affected families facing catastrophic costs due to TB (to be determined after the survey).													
	Indicator		Detail	source	freq	Who collect	Level	2015	2019/20	2020/21	2021/22	2022/23	2023/24
	met using WHO TB standard and benchmarks checklist			l Review		s							

VII. ANNEXES

Annex 1 : Document reviewed and international guidance

DIAGNOSIS

- 1) Guide for providing technical support to TB laboratories in low- and middle income countries. GLI / STOP TB partnership
- 2) WHO/HTM/TB/2015.11. Implementing tuberculosis diagnostics. Policy framework.
- 3) WHO/HTM/TB/2016.18. Framework of indicators and targets for laboratory strengthening under the End TB Strategy.
- 4) WHO_HTM_TB_2007.379. Improving the diagnosis and treatment of smear-negative pulmonary and extrapulmonary tuberculosis among adults and adolescents. Recommendations for HIV-prevalent and resource-constrained settings. World Health Organization 2007
- 5) WHO/HTM/TB/2011.4 Policy statement: Automated real-time nucleic acid amplification technology for rapid and simultaneous detection of tuberculosis and rifampicin resistance: Xpert MTB/RIF system
- 6) WHO/HTM/TB/2011.2 Rapid implementation of the Xpert MTB/RIF diagnostic test. Technical and operational 'How-to'. Practical consideration
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- 8) Zachary D et al. Changes in tuberculosis notifications and treatment delay in Zambia when introducing a digital X-ray service, IUATLD VOL 2 NO 3 PUBLISHED 21 SEPTEMBER 2012
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- 5) WHO/HTM/TB/2011.3 Towards universal access to diagnosis and treatment of multidrug-resistant and extensively drug-resistant tuberculosis by 2015. WHO progress report 2011
- 6) WHO/HTM/TB/2011.6 Guidelines for the programmatic management of drug-resistant tuberculosis - 2011 update
- 7) WHO/HTM/TB/2015.28 Active tuberculosis drug-safety monitoring and management (aDSM): Framework for implementation

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- 1) Systematic screening for active tuberculosis: principles and recommendations (WHO/HTM/2013.4)
- 2) Systematic screening for active tuberculosis: an operational guideline (WHO/HTM/TB/2015.16)
- 3) WHO. Chest radiography in tuberculosis detection (WHO/HTM/TB/2016.20)
- 4) Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries. Geneva, World Health Organization, 2012 (WHO/HTM/2012.9)
- 5) Guidelines for control of tuberculosis in prisons. January 2009. USAID. TBCTA. ICRC
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- 7) WHO. Guideline: Nutritional care and support for patients with tuberculosis. Geneva: World Health Organization; 2013.
- 8) WHO/HTM/STB/PSI/2011.21 Early detection of tuberculosis: An overview of approaches, guidelines and tools
- 9) WHO Collaborative framework for care and control of Tuberculosis and Diabetes.
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- 2) WHO/HTM/TB/2013.12. Roadmap for childhood tuberculosis: towards zero deaths.
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- 2) WHO/HTM/TB/2012.1 WHO policy on collaborative TB/HIV activities: guidelines for national programmes and other stakeholders
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- 1) WHO/HTM/TB/2015.21. Digital health for the End TB strategy.
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Human resources development

- 1) WHO/HTM/TB/2008.407. Planning the development of human resources for health for implementation of the Stop TB Strategy
- 2) <http://www.theunion.org/what-we-do/courses/online-and-multimedia-training>

Community DOTS

- 1) ENGAGE-TB. Integrating Community-based tuberculosis activities into the work of nongovernmental and other civil society organizations. Operational guidance
- 2) ENGAGE-TB. Integrating Community-based tuberculosis activities into the work of nongovernmental and other civil society organizations. Implementation manual.

Planning

- 1) Global Plan to End TB.2015. Stop TB Partnership
- 2) Implementing the end TB strategy: the essentials. WHO. 2015
- 3) Toolkit to Develop National Strategic Plan for TB Control
- 4) WHO People-centered framework for tuberculosis program planning and prioritization - User guide (2019)

Annex 2. Desk review to support for TB NSP 2019-2024 development -1 June 2019

Challenges and achievement from the last MTR 2016 were reviewed end of May 2019 through a desk review performed by the NTP central unit and Pierre Yves Norval from TeAM who was the external consultant. The review team focused in this document on challenges in view of the preparation of the new NSP 2019-2024 and follows the same structure used in 2016. From 94 challenges identified in 2016 leading to recommendations, the review team identified 55 challenges including 9 new challenges. The reduction by half of the challenges is in favour of good performance. However, the 9 new challenges in grey (N° 1,6,15, 17,23,32, 36,37, 51) should guide the prioritization of the new NSP 2019-2024.

1.TB response management

1.1. Programme management and coordination

- Uncertainty around the funding landscape; given that TB funding is mostly received through external sources. **Priority diseases such as TB are not clearly included in Mutuelle de santé**; How NTP can prepare inclusion of TB budget in the Mutuelle de santé ?
- High turnover of health care staff particularly Medical Doctors;
- Threat to the community based TB care due to potential demotivation of CHWs. Reduction of TB community PBF stipends and tools. How to increase HWC stipends and efficiency ?

1.2.NSP implementation

- How to reconcile addressing the knowledge gaps among health care workers in the field and reduction of training activities;
- Insufficient coverage of TB under the Infectious Disease mentoring initiative at the district level.
- Successive training without clear planning. How to define a balance between on line training or/and face to face? How to conduct efficient online training?

2.TB Case finding including lab diagnosis

- Dwindling funding allocation for TB control from both Government and partners as the burden of disease decreases while more funds are required to intensify targeted case finding strategies.
- Extension of DataTocare software in all the Genexpert sites
- Ownership of laboratory data by the lab technicians is a concern, the perception is that data belongs to someone else, the data manager or the NTP.
- PAL implementation is weak although the strategy has been included in TB NSP as it is likely to contribute to TB detection among patients with respiratory diseases;

- Stock out of GXP cartridges due to GDF procurement regulations not complying with the Rwanda National Procurement regulations.
- Issue of sample transportation mechanism from Health Centers to Genexpert Sites.

3.Management of Drug-susceptible TB patients

- Payment is required for the management of co-morbidities like diabetes and others;
- TB treatment materials and pamphlets for the patient and their families are not available.
- Insufficient motivation among medical doctors and nurses and high turn over

4.Childhood TB management

- Childhood treatment coverage currently at 60% (367/590) especially in Kigali compared to 84% in adults; However ratio 0-5/6-10 is high (60%) in favor of good work on child diagnosis

5.TB/HIV collaborative activities

- **Delayed publishing of the updated TB/HIV** guiding policy: although the TB/HIV guiding policy was revised in October 2015, there has been delays of over a year in publication and dissemination. This may potentially affect the quality of service delivery in the course of implementing the new global guidance. PT among newly enrolled HIV with updated diagnosis based on sympt-GX or symp-CXR-GX, 6H-cotrim-Vit. Shall we consider other treatment regimen?
- Though the scope of the HIV clinical mentorship program at district level has been expanded to integrate TB and malaria, the coverage of TB activities is inadequate and not consistent.
- There still exist significant gaps in TB/HIV capacity building for frontline health care workers, especially due to the turnover of staff.
- Provision of HIV preventive services among TB patients and their household members was sub- optimal.
- Absence of a joint TB/HIV research agenda as envisaged in the NSP.

6.Community TB Care

- The reduction in CHWs stipend in the 2 last years appears to be a major factor that may have impacted on their work as evidenced by stagnation of the case detection performance (19% of all cases in 2013-2014; 19,2% in 2014-2015, 19,4% in 2015-2016, 20.3% in 2016-2017 and 19.3% in 2017-2018).
- There is no data or mechanism to measure community knowledge
- Lack of refresher training for old and new CHW or sensitization on TB for the CHWs in recent years. As a consequence, CHWs have gaps in their basic knowledge of TB and it is difficult to ascertain the quality of messages they are

transmitting to the community.

- Inadequate IEC/BCC materials to improve the awareness on TB for the families, close contacts, and the TB patients themselves. In adequate jobaids for CHWs.
- Low coverage of Public Private Mix DOTS. Only 3 of the total private clinics are engaged in TB diagnosis and treatment.
- Although strategic documents acknowledge the importance of partners' involvement, there is no guidance to assist NGOs/CSOs to engage on TB prevention, treatment and care at their workplace.
- Absence of guidance for Public Private Mix on TB care and control

7.TB prevention and Infection control

- Lack of SOPs on infection control in most facilities;
- Some health facilities have infrastructure limitations hindering effective TB IC measures.
- HIV clinic waiting bays are closed, poorly aerated and pose TB infection risk.
- There is no clear guidance about the procedure for claiming compensation in case HCW develop Facility acquired TB infection.
- INH prophylaxis policy in PLHIV is not implemented according to International Standards (except for HIV positive or negative children contact of an active TB case). TPT in process
- There is no data or mechanism to measure community knowledge
- Poor knowledge on TB spread and prevention amongst Health care workers and patients interviewed.

8.Health support systems for TB

8.1.PSM: Medicines and commodities supply management

- Insufficient number of pharmacists at the TB&ORD Division due to heavy workload;

8.2.M&E

- Transition from paper-based reporting to case-based electronic surveillance system.
- Non-interoperability of RHMIS with other electronic health systems (Data-To-care, LIS, OpenMRS)

8.3.Financing, Coordination mechanism for TB control, universal health coverage (UHT) and social protection.

FINANCING

- Reduction in fund flow to the health sector especially for NSP is real;
- TB benefits only 10% of total funds for Performance Based Financing from GF support. Need to adjust this data in collaboration with Finance team specifically

Theo

- Inadequate human resources for health (HRH) and financial resources;

8.4.UHC Universal Health Protection

- Declining enrolment rates partly due to incorrect categorization of members in the Ubudehe system. Some members are categorized as wealthier than they actually are and tend to drop out. Other members, whilst correctly classified, experience difficulties in paying the premiums due to seasonal or irregular incomes.
- There is also the challenge of adverse selection where people tend not to enrol unless they are in need of health care. This is facilitated by the fact that the waiting period of one month has not been strictly enforced. Furthermore, some members may access health-care services without paying the entire premium. There is no penalty system in place for such cases.

8.5.Inadequate Human Resources for Health (HRH) access to health services was still hampered for some 80 per cent of the population due to deficits in the professional health workforce and funds partly compensated by the large number of CHWs.

- Increasing indebtedness of hospitals due to CBHI's low contribution rates and patients having to buy drugs themselves from pharmacies without reimbursement.

SOCIAL PROTECTION

- it would be prudent for the ministry of health to be represented and be proactive on all Social Protection platforms to ensure that TB patients and family who meet the inclusion criteria are well covered

9. Patient's perspectives

- Some patients are not able to pay the health insurance, and therefore do not seek treatment swiftly enough;
- TB services and medicines are free; however, patients have to pay for co-morbidities through their community health insurance;
- Poor nutritional status and poverty are common features of TB patients; patients face difficulties to take TB drugs when they haven't enough to eat; no nutritional support is available for drug- susceptible TB patients;
- Patients have difficulties to renew community health insurance when they have not enough physical capacity to work during treatment;
- Some key information is not transmitted to patients, such as the need of sputum tests during treatment, information on when patients can stop spreading TB to others, and contact screening and side effects;
- Delays in MDR-TB patient support during ambulatory phase" are persistent. Irregularity of MDR-TB patient support during ambulatory phase.

10. Practical Approach to Lung Health

- Incomplete coverage of PAL training;

- There is no standardized monitoring tool and no indicator on PAL.

11. Research

- The study on “Risk factors of death during TB treatment” was delayed and should start soon. The protocol is currently at Rwanda National Ethics Committee (RNEC) for final evaluation and approval for implementation.
- The study on “Long term outcomes of MDR-TB treatment” was not funded.

Annex 3. Situation analysis: Strengths, weaknesses, opportunities and threats

<p>Strengths</p> <ul style="list-style-type: none"> • Strong political commitment at various levels of Government • Structured and adequately staffed NTP • Well-articulated TB NSP linked to the National Health Sector Strategy and aligned to international recommendations • Decreasing incidence in favour of decreasing transmission. • Robust health planning at Central and District levels, • Good collaboration with other MOH programs, • Availability of guidance documents in the field, • Robust management of TB commodities. • TB burden estimates based on 2014 prevalence survey results. • Access to Xpert and CXR in all DH • Sustained high treatment success rate for bacteriologically-confirmed TB cases. • Integrated care and treatment of TB-HIV coinfection and TB/HIV targets fully reached; universal access to ART. • Good PMDT with patient support and shorter regimen • Strong routine surveillance system integrated into RHMIS and transitioning to an electronic case-based system • Efficient community DOTS in the whole country • Application of infection control measures in health facilities dealing with TB and MDR-TB patients 	<p>Weaknesses</p> <ul style="list-style-type: none"> • 14% of the estimated incident cases were missed in 2015 (WHO GR 2016). • Underutilization of XPert and CXR in the diagnostic process; lack of standardized screening tools • Low capacities for diagnosis of extrapulmonary and smear-negative TB forms • Sub-optimal efficiency and quality of the overall laboratory network (sample transportation system, EQA, lack of connectivity system for rapid transmission of results, biosafety concerns, lack of maintenance system of laboratory equipment) • Insufficient DST coverage • Low detection of childhood TB • Absence of a pharmacovigilance monitoring system (aDSM system) • Lack of nutritional support to drug-susceptible patients; • Treatment success rate target (90%) not achieved for all TB patients; elevated fatality rate among TB-HIV and clinically diagnosed forms of TB whose causes are not yet analysed • Overall quality of supervision needs to be improved; TB insufficiently covered in the mentorship program • Gaps in CHW knowledge related to TB; decreased motivation owing to decreased incentives • Lack of ACSM strategy and IEC materials for patients and their families • Low use of e-TB; low ownership of M&E activities • Limited capacities for research
<p>Opportunities: a) national</p>	<p>Threats</p> <ul style="list-style-type: none"> • Over-reliance on donor funding and

<ul style="list-style-type: none"> • Vision and political commitment to universal health coverage and to attain SDGs • High political commitment to poverty reduction and fighting against malnutrition. • High coverage of health insurance. • Various social protection schemes to address the wider determinants of TB • Existence of umbrella organization of willing NGOs, CSOs, and medical associations • Development of a vital registration system which will aid the estimation of TB-related deaths. • Integration of TB within other health programs; • Ongoing implementation of a nationwide Laboratory Information System (LIS) which has the potential to be linked with the e-TB register. <p>b) international</p> <ul style="list-style-type: none"> • Availability of global guidance on End-TB strategy and specific strategies • Existence of online training platforms • Willingness of partners to support the development of interactive training courses • Innovative diagnostics and new drugs • New drugs and vaccine in pipeline 	<p>uncertainty around the funding landscape while more funding is necessary to find the missing cases</p> <ul style="list-style-type: none"> • Turnover of health care staff generating ongoing capacity building needs • Threat to the Community-based TB care due to potential lack of motivation of CHWs following reduction of TB community PBF stipends • Internet connectivity issue, which hinders input of data within RHMIS and other electronic systems used for TB management. • Higher TB burden in neighbouring countries
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Annex 4 : Summary of WHO TB standards and Benchmarks

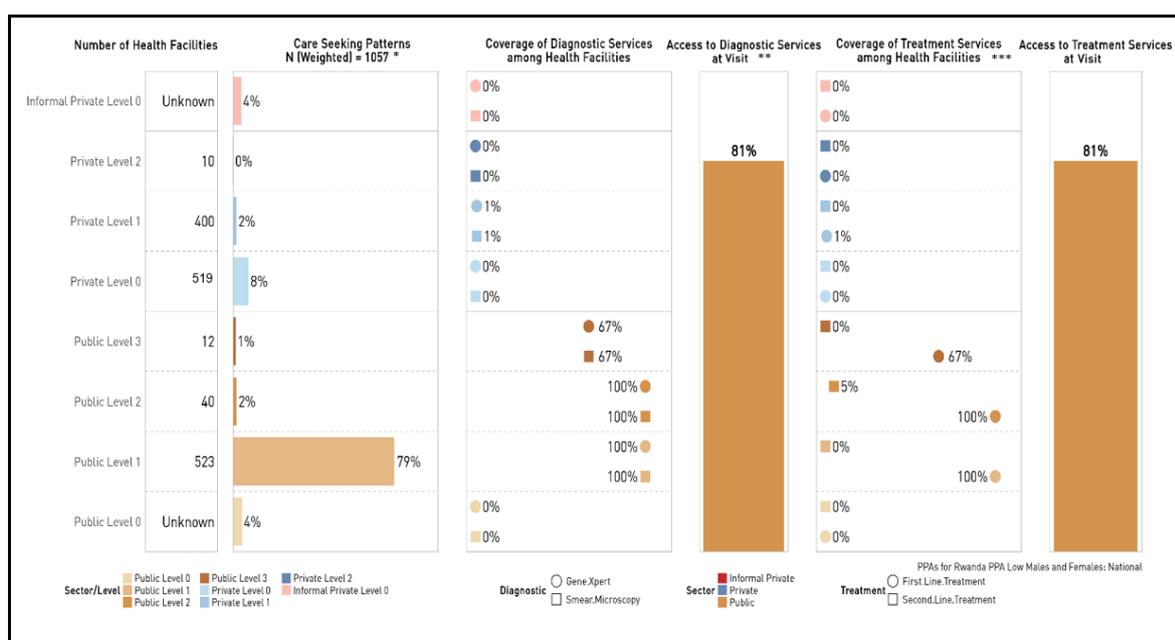
Standard		2013	2018
Data quality	B 1.1: case definitions are consistent with WHO guidelines	Met	Met
	B 1.2: the TB surveillance system captures a minimum set of variables for all reported TB cases	Met	Met
	B 1.3: all scheduled periodic data submissions are received and processed at the national level	Met	Met
	B 1.4: data in quarterly reports are accurate, complete and internally consistent	Partially Met	Met
	B 1.5: data in national database are accurate, complete, internally consistent, and free of duplicates (<i>electronic case-based or patient-based systems only</i>)	NA	NA
	B 1.6: TB surveillance data are externally consistent	Met	Met
	B 1.7: TB surveillance data are internally consistent	Partially Met	Met
System coverage	B 1.8: All diagnosed cases of TB are reported	Partially Met	Partially Met
	B 1.9: Population has good access to health care	Partially Met	Partially Met
Vital registration	B 1.10: Vital registration system has high national coverage and quality	Not Met	Not Met
Special subpopulations	B 2.1: surveillance data provide a direct measure of drug resistant TB in new cases	Met	Met

	B 2.2: surveillance data provide a direct measure of the prevalence of HIV infection in TB cases	Met	Met
	B 2.3: surveillance data for children reported with TB are reliable and accurate, and all diagnosed childhood TB cases are reported	Not Met	Not Met

In 2013, the Rwanda TB surveillance system (i.e. aggregate data entered in RHMIS was considered the formal system) met 6 of the 13 standards of the TB Standard & Benchmark Checklist, partially met 4 and did not meet 2. In 2018, 8 standards were met, 2 partially met and 2 not met. The table below shows the results from the 2013 and 2018 S&B assessments. Although there are multiple indications that the TB surveillance system coverage is high, reporting TB is not formally a legal requirement and no inventory study was conducted in the last 10 years to determine potential under-reporting as the standard requires, therefore standard B1.8 is partially met. The standard to evaluate the system coverage with two health care access indicators (an under 5 mortality rate < 10 per 1000 live births and an out-of-pocket expenditure out of all health expenditure < 25%) was also partially met (B 1.9). The CRVS is currently being piloted to strengthen the notification and classification of health facility and community deaths. However, as of 2018, the CRVS lacked both national coverage and quality, therefore standard B1.10 was not met. Standard B2.3 requires that the ratio of TB cases in children ages 0-4 years old to 5-14 years old to be within the range of 1.5-3.0 and 90% or more of childhood TB cases are notified as determined by an inventory study. Since the ratio peaked at 1.3 in 2017 and no inventory study was conducted, standard B2.3 was not met. Due to the transition from the old eTB to the new eTB, we considered standard B1.5 not applicable, yet efforts should be made so the new case-based system meets this standard as soon as possible.

Annex 5 Patient Pathway Analysis

The 2020 Patient Pathway Analysis⁴⁷ indicated that the majority (79%, Figure 7) accessed public level 1 facilities which had diagnostic capacity (29% sputum smear microscopy (SSM); 3% GeneXpert) or sample transportation in place (71%). Of all health care facilities, 10% had SSM capacity, 3% had GeneXpert capacity and 26% had a sample transportation system. The Patient Pathway Analysis showed 81% of the persons seeking care for TB symptoms accessed facilities with diagnostic services (25%) or specimen transport in place (56%). There was 100% first-line treatment coverage at public level 1 and 2. Second-line treatment initiation was possible in two public health care level 2 facilities (5%), but ambulatory second-line treatment can be provided in all public health care level 1 and 2 facilities. The Patient Pathway Analysis showed 81% of the persons seeking care for TB symptoms accessed facilities with treatment capacity. Access to diagnosis and treatment services at the place of care seeking was lower for males (74%) compared to females (85%) due to males seeking care at private level 0 facilities more often (15% vs. 4%). Results of the PPA have to be interpreted with caution as the DHS data are from 2014/2015 and may be outdated



* When multiple visits were conducted (n=97) the lowest facility was assumed to be the initial place of care seeking

** considering health facilities connected to a diagnostic facility through sample transportation as “having diagnostic capacity”

*** only considering care facilities that can *initiate* (SL) treatment as “having SL treatment capacity” Among public level 3 facilities, diagnostic and treatment capacity was 67% due to the 4 of 12 being specialized orthopedic centers.

⁴⁷ van de Berg S, Pelzer PT, Meis M, Dushime A, Migambi P. Patient Pathway Analysis. The Hague; 2020.

Figure 7: Patient Pathway analysis care seeking for adults experiencing TB symptoms DHS 2014/2015

Gaps emerging from the PPA

- The Patient Pathway analysis showed that 56% of persons seeking care for TB symptoms accessed facilities with a sample transportation system in place, indicating its' importance
- Of all health care facilities, 10% had SSM capacity, 3% had GeneXpert capacity and 26% had a sample transportation system. There was no diagnostic capacity (or sample transportation system) at public and private health care level 0 facilities and private health care level 2 facilities; 1% of private level 1 facilities had diagnostic capacity (or sample transportation system)
- Access to diagnosis and treatment services at the place of care seeking was lower for males (74%) compared to females (85%) seeking care for TB symptoms due to a larger proportion of males seeking care at private level 0 facilities (15% vs. 4%)¹.

Recommendations based on gaps

- After finalizing 2020 DHS survey repeat PPA for more current data and including subnational PPA.
- Maintain and expand sample transportation where needed according to mapping. Include differentiation of private sectors, where the diagnostic and treatment capacity is low. Expand usage of WRD molecular diagnostic tests
- Initiative for sample transportation from community health workers, would provide ability for patients to go to level 0 (community level)
- Initial care seeking was difficult to derive for the adults, recommendation for a health care seeking behavior and barriers survey.

Annex 6: Systematic TB Screening

Scenario 0 targets to be screened

Intervention package	General pop	HRG1	HRG2	HRG3	HRG4	HRG5	HRG6	Total
Symptom screening	1,195,412	67,786	17,308	199,080	1,854,755	740,380	74,317	4,149,038
Chest x-ray screening		43,582						43,582
Microscopy current sites:200	80,556							80,556
Xpert current sites: 68	12,696	5,241	4,461	16,922	22,772	29,615	1,617	76,402

Scenario 1 Targets to be screened

Intervention package	General pop	HRG1	HRG2	HRG3	HRG4	HRG5	HRG6	HRG7	HRG8	HRG9	HRG10	Total
Symptom screening	1,208,970	67,786	17,844	200,000	1,854,755	740,380	74,317	44,986	60,000	X	10,303	4,279,341
Chest x-ray screening	84,647	40,672	17,844	11,400	2,728	49,754	23,317		20,000	X		247,634
Microscopy No additional sites	44,122											44,122
Xpert additional sites: 17	42,234	6507	3569	19,004	22,272	38,073	6,394	2,249	3,200		515	144,017

Scenario 2 Targets to be screened

Intervention package	General pop	HRG1	HRG2	HRG3	HRG4	HRG5	HRG6	HRG7	HRG8	HRG9	HRG10	Total
Symptom screening	1,208,970	67,786	17,844	200,000	1,854,755	740,380	74,317	44,986	60,000	X	10,303	4,225,341
Chest x-ray screening		40,672	17,844	11,400		49,754	23,317		20,000	X		162,987
Microscopy No additional sites	44,122											44,122
Xpert additional sites: 17	60,449	6,507	3,569	19,004	22,272	38,073	6,394	2,249	3,200		515	162,232

HRG1: Prisoners; HRG2: HH contacts <5; HRG3: PLHIV newly enrolled ART-naïve PLHIV in a year and those already on ART for that year; HRG4: Children 5-14; HRG5: People aged 55 years and above; HRG6: HCW/CHW; HRG7: Refugees newly registered in a year and those already residing >1 year in the refugee camps; HRG8: Slum dwellers; HRG9: Underground Miners; HRG10: People Living with Diabetes Mellitus

Annex 7 : Summary of Budgets by scenario

Summary costs by strategic objectives of Rwanda TB NSP 2019/20- 2023/24 Sc 0 in Million(\$)

	2019/20	2020/21	2021/22	2022/23	2023/24	Total
Pillar I: PATIENT-CENTRED CARE (1.1. CONSIDERING THE PATIENT PATHWAY FOR TUBERCULOSIS)	\$4.90	\$6.49	\$8.65	\$7.47	\$5.20	\$32.70
2.1.1. Considering the Patient Pathway for Tuberculosis	\$3.30	\$4.22	\$5.48	\$4.80	\$2.88	\$20.68
2.1.2. Targeted approaches for key drivers of TB epidemic and selected populations	\$1.61	\$2.26	\$3.17	\$2.67	\$2.31	\$12.02
Pillar I: PATIENT-CENTRED CARE (1.2 TARGETED EPIDEMIOLOGY AND POPULATIONS)	\$1.82	\$3.01	\$2.82	\$2.33	\$2.20	\$12.18
2.2.1. Programme management, multi-Sectoral collaboration & engaging all care providers	\$1.60	\$1.71	\$1.77	\$2.03	\$1.70	\$8.82
2.2.2. Universal Health Coverage, social protection, human rights & gender, nutrition	\$0.12	\$0.17	\$0.24	\$0.16	\$0.16	\$0.86
2.2.3. Stable and quality assured supply of drugs, diagnostics and commodities	\$-	\$0.03	\$0.06	\$0.02	\$0.04	\$0.15
2.2.4. M&E and data quality system (e-TB, health information system, Civil registration and vital statistics (CRVS) system	\$0.10	\$1.09	\$0.75	\$0.12	\$0.29	\$2.35
Pillar III: RESEARCH AND INNOVATION	\$0.22	\$0.60	\$0.12	\$0.42	\$0.23	\$1.60
2.3.1. Data for programmatic monitoring, evaluation, learning and planning	\$0.01	\$0.18	\$0.02	\$0.19	\$0.05	\$0.45
2.3.2. Research Priorities	\$0.21	\$0.42	\$0.11	\$0.23	\$0.18	\$1.14
Total Cost	\$6.95	\$10.10	\$11.59	\$10.21	\$7.62	\$46.48

Summary costs by strategic objectives of Rwanda TB NSP 2019/20- 2023/24 Sc 1 in Million(\$)

	2019/20	2020/21	2021/22	2022/23	2023/24	Total
Pillar I: PATIENT-CENTRED CARE (1.1. CONSIDERING THE PATIENT PATHWAY FOR TUBERCULOSIS)	\$5.30	\$7.00	\$9.18	\$7.97	\$6.78	\$36.22
2.1.1. Considering the Patient Pathway for Tuberculosis	\$3.69	\$4.73	\$6.01	\$5.30	\$4.47	\$24.20
2.1.2. Targeted approaches for key drivers of TB epidemic and selected populations	\$1.61	\$2.26	\$3.17	\$2.67	\$2.31	\$12.02
Pillar I: PATIENT-CENTRED CARE (1.2 TARGETED EPIDEMIOLOGY AND POPULATIONS)	\$1.82	\$3.01	\$2.82	\$2.33	\$2.20	\$12.18
2.2.1. Programme management, multi-Sectoral collaboration & engaging all care providers	\$1.60	\$1.71	\$1.77	\$2.03	\$1.70	\$8.82
2.2.2. Universal Health Coverage, social protection, human rights & gender, nutrition	\$0.12	\$0.17	\$0.24	\$0.16	\$0.16	\$0.86
2.2.3. Stable and quality assured supply of drugs, diagnostics and commodities	\$-	\$0.03	\$0.06	\$0.02	\$0.04	\$0.15
2.2.4. M&E and data quality system (e-TB, health information system, Civil registration and vital statistics (CRVS) system	\$0.10	\$1.09	\$0.75	\$0.12	\$0.29	\$2.35
Pillar III: RESEARCH AND INNOVATION	\$0.22	\$0.60	\$0.12	\$0.42	\$0.23	\$1.60
2.3.1. Data for programmatic monitoring, evaluation, learning and planning	\$0.01	\$0.18	\$0.02	\$0.19	\$0.05	\$0.45
2.3.2. Research Priorities	\$0.21	\$0.42	\$0.11	\$0.23	\$0.18	\$1.14
Total Cost	\$7.35	\$10.61	\$12.12	\$10.72	\$9.21	\$50.00

Summary costs by strategic objectives of Rwanda TB NSP 2019/20- 2023/24 Sc 2 in Million(\$)

	2019/20	2020/21	2021/22	2022/23	2023/24	Total
Pillar I: PATIENT-CENTRED CARE (1.1. CONSIDERING THE PATIENT PATHWAY FOR TUBERCULOSIS)	\$5.39	\$8.34	\$10.54	\$9.36	\$6.15	\$39.77
2.1.1. Considering the Patient Pathway for Tuberculosis	\$3.78	\$6.07	\$7.37	\$6.69	\$3.83	\$27.74
2.1.2. Targeted approaches for key drivers of TB epidemic and selected populations	\$1.61	\$2.26	\$3.17	\$2.67	\$2.31	\$12.02
Pillar I: PATIENT-CENTRED CARE (1.2 TARGETED EPIDEMIOLOGY AND POPULATIONS)	\$1.82	\$3.01	\$2.82	\$2.33	\$2.20	\$12.18
2.2.1. Programme management, multi-Sectoral collaboration & engaging all care providers	\$1.60	\$1.71	\$1.77	\$2.03	\$1.70	\$8.82
2.2.2. Universal Health Coverage, social protection, human rights & gender, nutrition	\$0.12	\$0.17	\$0.24	\$0.16	\$0.16	\$0.86
2.2.3. Stable and quality assured supply of drugs, diagnostics and commodities	\$-	\$0.03	\$0.06	\$0.02	\$0.04	\$0.15
2.2.4. M&E and data quality system (e-TB, health information system, Civil registration and vital statistics (CRVS) system	\$0.10	\$1.09	\$0.75	\$0.12	\$0.29	\$2.35
Pillar III: RESEARCH AND INNOVATION	\$0.22	\$0.60	\$0.12	\$0.42	\$0.23	\$1.60
2.3.1. Data for programmatic monitoring, evaluation, learning and planning	\$0.01	\$0.18	\$0.02	\$0.19	\$0.05	\$0.45
2.3.2. Research Priorities	\$0.21	\$0.42	\$0.11	\$0.23	\$0.18	\$1.14
Total Cost	\$7.44	\$11.95	\$13.48	\$12.10	\$8.57	\$53.54

Annex 8: Data Consolidation along the TB care continuum

In October 2019, WHO released the People Centered Framework User Guide to systematically consolidate evidence along the TB care continuum, facilitate analysis and discussions for prioritized national policy and strategy formulation.

The vision of the People Centered Framework is a future in which: (i) Evidence is reviewed and analyzed in a patient-centered manner along the care continuum to ensure that priority gaps and opportunities are identified so that all people have access to high-quality TB services; (ii) Planning is based on the best available data and prioritized to optimize the impact of interventions and investments to identify program priorities and design effective, evidence-based interventions; and (iii) Evidence is systematically generated along the care continuum in accordance with program needs and perspectives of patients and communities to decide how best to allocate resources.

	People not accessing the health system			People with TB seeking care but either not diagnosed or not notified			People notified as a TB case but not successfully treated		
	People with TB infection, high-risk for disease	Asymptomatic disease, not seeking care	Symptomatic disease, not seeking care	Presenting to health facilities, not diagnosed	Diagnosed by non-NTP, not notified	Diagnosed by NTP, not notified	Diagnosed, not started on treatment	Notified, not successfully treated	Successfully treated, not relapse free
Epidemiological data									
People-centred data									
System-related data									

Figure 8: Conceptional framework for consolidation and mapping of data along the care continuum

Main care cascades:

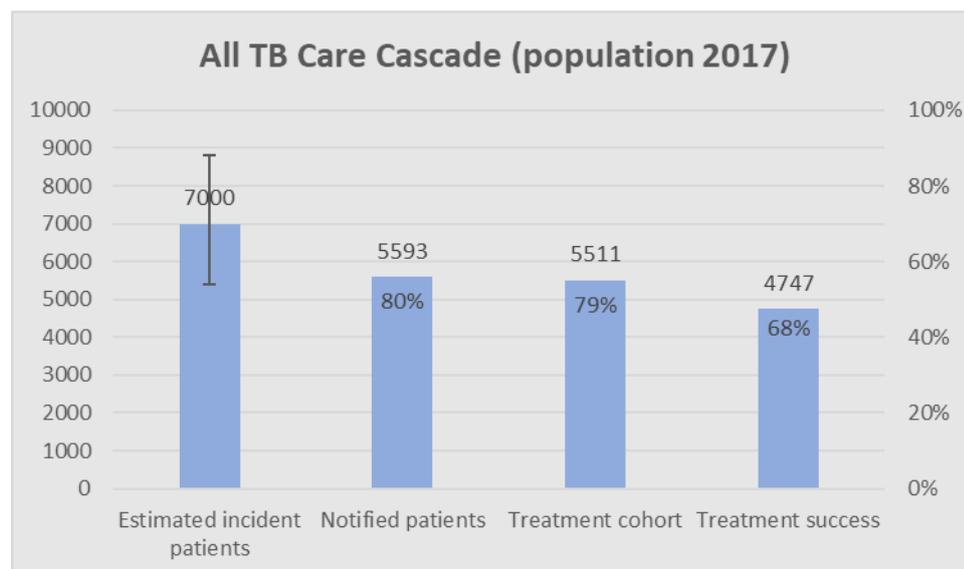
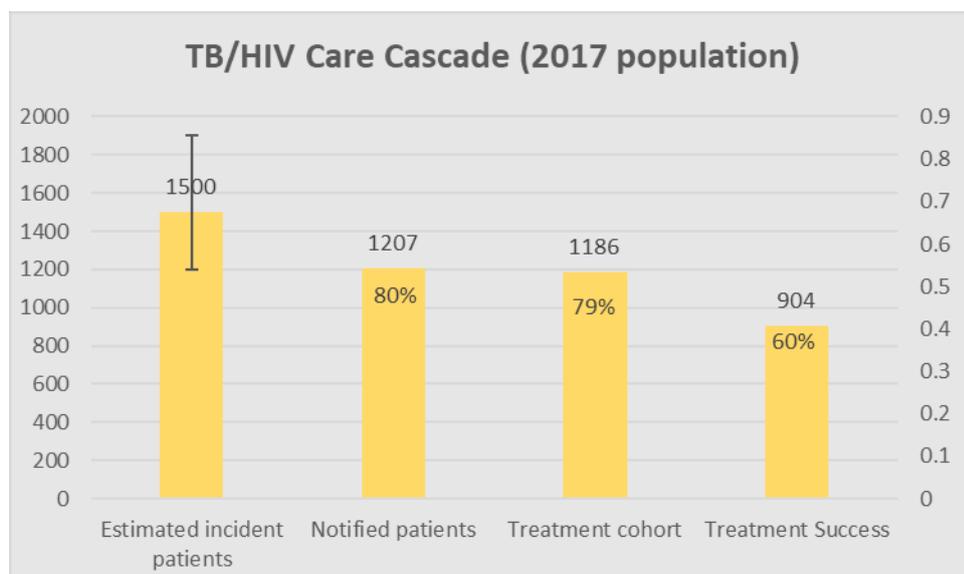
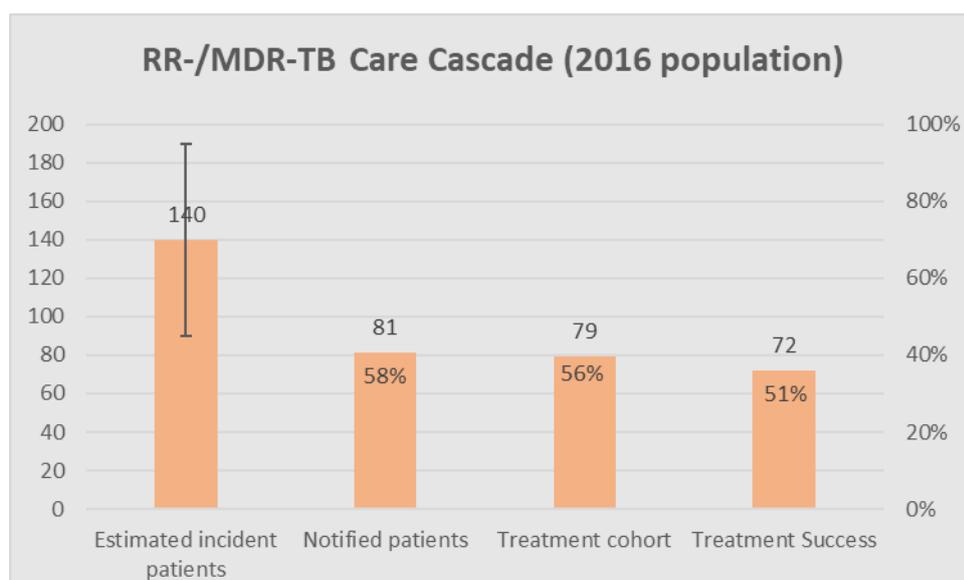


Figure 9: All TB Care Cascade (WHO data)**Figure 10: TB/HIV Care Cascade (WHO data)****Figure 11: RR-/MDR-TB Care Cascade (WHO data)**

Along each and every step of the TB care continuum data can be gathered, documented, reported and analyzed, **building the evidence on where and why patient losses occur in the care continuum, in finding and managing people who have developed (recurrent) TB or post-TB lung problems.**

