The report is based on the calendar year Jan 2016 - Dec 2016
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The primary aim of this report is to share information on progress made to tuberculosis control in Swaziland in 2016. The successful completion of the NTCP 2016 Annual Report has been made possible by joint efforts of a number of dedicated NTCP staff both regional and national level. The successes of the program are a result of a close collaboration between the National TB program and its partners and our appreciation goes to the management unit at the national level for their dedication to the accuracy of the reported data. We also thank the health workers at the regional and health facility levels who recorded and timely reported all data, which has been aggregated in this report. IHM for both technical and financial assistance during the analysis and report writing period.

This report would not have been a success without the following individuals:

Sanele Masuku          NTCP
Bongiwe Mhlanga        NTCP
Humble Nxumalo         ICAP
Nonkululeko Diamini    ICAP
Lungelo Bhembe         IHM
## Abbreviations & Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACF</td>
<td>Active Case Finding</td>
</tr>
<tr>
<td>ACM</td>
<td>Advocacy, Communication and Social Mobilization</td>
</tr>
<tr>
<td>AFB</td>
<td>Acid-Fast Bacilli</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immuno-deficiency Syndrome</td>
</tr>
<tr>
<td>ANC</td>
<td>Ante natal clinic</td>
</tr>
<tr>
<td>ART</td>
<td>Anti-retroviral therapy</td>
</tr>
<tr>
<td>ARV</td>
<td>Anti-retroviral medicine</td>
</tr>
<tr>
<td>CBNAAT</td>
<td>Catridge Based Nuclei Acid Amplification Test</td>
</tr>
<tr>
<td>CBO</td>
<td>Community-Based Organization</td>
</tr>
<tr>
<td>CDC</td>
<td>Centre for Disease Control and Prevention, Atlanta, USA</td>
</tr>
<tr>
<td>CHAI</td>
<td>Clinton Health Access Initiative</td>
</tr>
<tr>
<td>CPT</td>
<td>Cotrimoxazole Preventive Therapy</td>
</tr>
<tr>
<td>DOT</td>
<td>Directly Observed Treatment</td>
</tr>
<tr>
<td>DST</td>
<td>Drug Sensitivity Testing</td>
</tr>
<tr>
<td>EGPAF</td>
<td>Elizabeth Glasier Paediatric AIDS Foundation</td>
</tr>
<tr>
<td>EQA</td>
<td>External Quality Assurance</td>
</tr>
<tr>
<td>FDC</td>
<td>Fixed-Dose Combination</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GFATM</td>
<td>Global Fund to Fight AIDS, TB and Malaria</td>
</tr>
<tr>
<td>HDI</td>
<td>Human Development Index</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immuno-deficiency Virus</td>
</tr>
<tr>
<td>HF</td>
<td>Health Facility</td>
</tr>
<tr>
<td>HPI</td>
<td>Human Poverty Index</td>
</tr>
<tr>
<td>HR</td>
<td>Human Resources</td>
</tr>
<tr>
<td>HRD</td>
<td>Human Resource Development</td>
</tr>
<tr>
<td>IPD</td>
<td>Isoniazid Preventive Therapy</td>
</tr>
<tr>
<td>LPA</td>
<td>Line Probe Assay</td>
</tr>
<tr>
<td>MDR-TB</td>
<td>Multi-Drug Resistant TB</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MTP</td>
<td>Medium-Term Plan</td>
</tr>
<tr>
<td>MS</td>
<td>Medical Stores</td>
</tr>
<tr>
<td>MSF</td>
<td>Medicins San Frontiers</td>
</tr>
<tr>
<td>NERCHA</td>
<td>National Emergency Response for HIV and AIDS</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>NSP</td>
<td>National Strategic Plan</td>
</tr>
<tr>
<td>NTCP</td>
<td>National TB Control Programme</td>
</tr>
<tr>
<td>NTRL</td>
<td>National TB Reference Laboratory</td>
</tr>
<tr>
<td>OPD</td>
<td>Out Patient Department</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>PLHIV</td>
<td>People Living With HIV</td>
</tr>
<tr>
<td>PSM</td>
<td>Procurement and supply chain management</td>
</tr>
<tr>
<td>PTB</td>
<td>Pulmonary Tuberculosis</td>
</tr>
<tr>
<td>QA</td>
<td>Quality Assurance</td>
</tr>
<tr>
<td>SACU</td>
<td>Southern African Customs Union</td>
</tr>
<tr>
<td>SADC</td>
<td>Southern African Development Community</td>
</tr>
<tr>
<td>SDGs</td>
<td>Sustainable Development Goals</td>
</tr>
<tr>
<td>SHI</td>
<td>Social Health Insurance</td>
</tr>
<tr>
<td>SNAP</td>
<td>Swaziland National AIDS Control Programme</td>
</tr>
<tr>
<td>TB</td>
<td>Tuberculosis</td>
</tr>
<tr>
<td>TB/HIV</td>
<td>HIV-related Tuberculosis</td>
</tr>
</tbody>
</table>
Achievements:
- Improvement in bacteriological confirmed cases from 54% in 2015 to 61% in 2016.
- Progressive increase in treatment success rate from 78% in 2015 to 79% in 2016 for DS-TB and 60% in 2015 to 70% in 2016 for DR-TB patients.
- A decline in Lost to Follow Up rates from 5% in 2015 to 4% in 2016.
- Increase in HIV testing and ART uptake among TB Patients.
- LIS has been rolled out (DISA system) in high volume sites to improve the turnaround time.
- Introduction of new drugs and Adopted Short Term Regimen among DR patients.

Challenges:
- Decline in TB case notification for both adults and Paediatrics.
- High death rate among DS-TB cases (12% all forms, 14% PLHIV).
- High death rate among DR-TB cases (18%).
- Inadequate implementation of IPC.
- Increasing in cultures unknown among DR patients.

Action Points:
- Procure more equipment to assist with collection of sputum for diagnosis by nurses (nebulisers-sputum induction, NGT gastric aspiration).
- Decentralise diagnosis to peripheral facilities.
- Investigate causes of high mortality.
- Advocate for the establishment of Regional IPC Focal Point positions to oversee the development and implementation of IPC Plans at all Facilities.
## Key Performance Indicators

<table>
<thead>
<tr>
<th>Thematic Area</th>
<th>Indicator</th>
<th>Baseline 2011</th>
<th>Target for 2016</th>
<th>2016 Achievement</th>
<th>Progress Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case detection</strong></td>
<td>Case detection rate</td>
<td>Not available</td>
<td>70%</td>
<td>59%</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Case notification rate</td>
<td>867/100,000</td>
<td>Not available</td>
<td>351/100,000</td>
<td>○</td>
</tr>
<tr>
<td><strong>DS-TB</strong></td>
<td>% of TB patients initiated on ART</td>
<td>35% (2,752/7,788)</td>
<td>90%</td>
<td>92% (2,449/2,649)</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Treatment success rate (All forms)</td>
<td>73%</td>
<td>90%</td>
<td>79%</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Treatment success rate for co-infected patients</td>
<td>72%</td>
<td>90%</td>
<td>78%</td>
<td>○</td>
</tr>
<tr>
<td><strong>DR-TB</strong></td>
<td>% of TB patients initiated on ART</td>
<td>78% in 2013</td>
<td>90%</td>
<td>97% (2015 cohort)</td>
<td>○</td>
</tr>
<tr>
<td></td>
<td>Treatment success rate</td>
<td>18% (2008 cohort)</td>
<td>90%</td>
<td>70% (2013 cohort)</td>
<td>○</td>
</tr>
</tbody>
</table>

**Legend**

- ○ Target off-track, requires action
- ○ Target on-track, likely to be achieved
- □ Target achieved
1

Introduction

1.1. Background

Swaziland, the last absolute monarch in the world, is a landlocked country in southern Africa with a land surface area of about 17,364 square kilometers. It is divided into four administrative regions namely Hhohho, Lubombo, Manzini, and Shiselweni. It is further subdivided into 55 Tinkhundla (constituencies) and 369 chiefdoms. The estimated population of the country is 1,119,375 people in 2015, with 52 percent under the age of 20 years, while 52.7% are females. An estimated 78% of the population lives in Rural Swaziland. The country is classified as a Low-Middle Income Country with an income per capita of $3,550 in 2014.

1.1.1. Development challenges

The economic growth of Swaziland which has been slow for the past three years is expected to rebound due to a recovery in agricultural production from -0.6% in 2016 to 1.7% in 2017. This slowdown is due to continued drought and a difficult external environment, especially from South Africa, leading to a sharp decrease in SACU revenues. Such a decrease in revenue, combined with increased public spending, is generating higher fiscal deficits and a growing public debt. Under the current policy stance, the public debt to GDP ratio could increase from 17.4% in 2015 to 24% in 2018, increasing risks of fiscal unsustainability. The primary development challenge for the Kingdom of Swaziland is to address the high rate of poverty and inequality in the country. An estimated 63% of the population lives below the poverty line, and about 29% lives below the extreme poverty line. Inequality is very high with a Gini coefficient of 49.5. Between 2001/02 and 2009/10 consumption of the bottom 40% of the population grew very slowly. Poverty is strongly correlated with unemployment which is about 28.5% overall and 52.4% among the youth. Poverty is also associated with the high burden of communicable diseases. The HIV/AIDS prevalence of 31% of the population is the highest in the world and life expectancy has fallen to approximately 49 years.

1.2. Introduction

Tuberculosis (TB) is a major public health problem in the world that affected approximately 10.4 million in 2015, including 1.2 million people living with HIV, with most of the cases and deaths being in the sub-Saharan Africa. TB was one of the top 10 causes of death worldwide in 2015, and was responsible for more deaths than HIV and malaria. In 2015, 1.8 million people died from TB, including 0.4 million among people living with HIV. Globally in 2015, an estimated 480 000 people developed multidrug-resistant TB (MDR-TB).
An additional 100,000 people with rifampicin-resistant TB also required second line treatment in 2015, WHO Global TB 2016 report.

TB prevention and control relies on the Directly Observed Treatment, Short-term (DOTS) strategy, which focuses on case notification and successful treatment as a measure of its performance. TB differentially affects different segments of the community.

Some studies report a higher male to female ratio in TB case notification and lower case fatality rates in men. Access to treatment, poor socioeconomic status, health service access and use, delays in seeking care and diagnosis and poor knowledge about the disease all contribute to discrepancies in case notifications. A change in the occurrence of the disease by age structure, reducing the proportion of the disease by gender and urban-rural settings and trends of treatment results are important indicators to assess the effectiveness of TB control programmes.

The End TB Strategy which was approved by The World Health Assembly in 2014 aims to end the global TB epidemic, with targets to reduce TB deaths by 95% and to cut new cases by 90% between 2015 and 2035, and to ensure that no family is burdened with catastrophic expenses due to TB. The National Tuberculosis Control Program is committed to meeting these targets through the rapid scale up and strengthening of the interventions outlined in the strategic plan.

1.2.1. Burden of TB in Swaziland

According to the Global TB Report of 2016, Swaziland has an estimated TB Incidence of 565 per 100,000 population, including HIV positive people. WHO estimates case detection to be at 59%. This means that the country is able to identify 59% of all suspected TB cases. The current National TB Strategic Plan plans to increase TB case detection from 46% in 2013, to 70% in 2017, we currently have a 11% shortfall to meeting this target.

TB case notification in Swaziland for 2016 was estimated to be 3806 cases, including new and relapsed cases. Of the estimated new cases; 2,045 were bacteriologically confirmed, 739 were clinically diagnosed, and 532 were extra-pulmonary cases. Of the reported retreatment cases; 275 were bacteriologically confirmed, and 215 were other previously treated cases.

Swaziland faces a double burden of HIV and TB. An estimated 70% of TB cases are co-infected with HIV. The estimated mortality rate per 100,000 due to TB among HIV-negative people was 31 in 2015, which is the lowest death rate since 2002 (Figure 35). In the absence of a reliable vital registration system the uncertainty around the point estimates are rather large. The mortality rate among HIV-negative and PLHIV was 151 (66-271) per 100,000 population in 2015.

1.2.2. TB Strategic Plan 2015-2019

In 2015 the country began implementing the new National TB Strategic Plan 2015-2019. The Goal of the 2015-2019 TB National Strategic Plan (TB NSP) is to achieve a 35% reduction of TB prevalence rate by 2019 to 907/100,000. The NSP is based on five objectives for the next five years as follows:

1. To increase TB case detection rates from 46% in 2013 to 70% in 2017 and 80% by 2019
2. To increase TB treatment success rates for all bacteriologically confirmed cases from 72.9% in 2013 to 90% by 2019
3. To implement and expand country-wide collaborative TB/HIV activities and management of co-morbidities by 2019
4. To provide treatment and support to all drug-resistant TB cases and reduce the MDR-TB prevalence rate amongst new TB cases to less than 5% by 2019
5. To strengthen the capacity of the National Tuberculosis Control Program to effectively implement, coordinate and evaluate TB prevention, treatment and care interventions
1.3. The 2015 Annual TB program

1.3.1. Purpose of the Report

In Swaziland TB, efforts are channeled through the MoH and the National TB Control Program. Every year NTCP releases a report that provides an overview of the progress made towards the control of TB in the country. This document therefore serves as the 2016 progress report, intended to share the main national achievements of the TB program in a timely and concise manner.

The report also attempts to look beyond NTCP indicators and other activities, including TB/HIV collaborating activities and TB research that supports the NTCP strategic Framework. The data is presented using national level statistics, disaggregated in population subgroups such as those defined by age, sex, and regions of the country. The level of analysis in the report is primarily descriptive and is particularly useful in tracking progress of the program activities. This report will be useful to policy makers, development partners and the office of the TB Program manager for planning and decision-making.

1.3.2. Report Writing

The TB report writing process is led by NTCP Monitoring and Evaluation department, with extensive collaborations with program staff. The 2016 report writing is aligned to the NTSP 2015-2019; an analysis plan was developed to ensure the report was results based. TB data for the annual report is based on routine data collected throughout the year from community and facility levels. The data is cleaned quarterly as part of the quarterly review meetings. This data was consolidated to provide the annual report dataset. Analysis was conducted using analysis tools like SPSS and excel, based on the data tabulation plan. A final report writing workshop that included stakeholders was conducted in May 2017 to finalize the report.
Program Description

The National TB Control Program (NTCP) is a government entity under the Ministry of Health and forms part of the 13 public health programs. The NTCP is responsible for the coordination, monitoring and evaluation of TB control activities in Swaziland. The Government of Swaziland, through the Ministry of Health has aligned itself to the Global Plan to End TB (2016-2020) “The Paradigm Shift- End TB Strategy”. The NTCP has also aligned itself to the global vision of “A world free of tuberculosis- zero deaths, zero disease and zero suffering due to tuberculosis.

GLOBAL PLAN TO END TB-STRATEGY

Reach at least

90% OF ALL PEOPLE WITH TB
and place all of them on appropriate therapy - DS-TB, DR-TB & IPT as required

As part of this approach, Reach at least

90% OF THE KEY POPULATIONS
the most vulnerable underserved, at-risk populations (Children, miners,etc)

Achieve at least

90% TREATMENT SUCCESS
for all people diagnosed with TB through affordable treatment services, adherence to complete and correct treatment, and social support.

2.1. Organization of TB services

The NTCP is structured at four levels namely the national, regional and facility and community levels, and reports to the Director of Health Services of the Ministry of Health which is under the responsibility of the Principal Secretary and the Honorable Minister. Technically, the NTCP Manager is assisted at National level by a DOTS coordinator, Pediatric TB coordinator, TB/HIV coordinator, Advocacy, Communication and Social Mobilization coordinator, National Active Case Finder, two Monitoring Evaluation and Research Officers, Monitoring and Evaluation Advisor, Clinician Scientist, Grants coordinator, PMDT Technical Advisor, audiologist, IT officer and a Pharmacist.
At regional level there are four regional coordinators, four regional Active Case Finders coordinators, four Health Information officers. The TB regional coordinators and regional ACF officers are part of the Regional Health Management Teams (RHMT) of their respective regions where they supervise all TB/HIV and activities at facility and community level.

At facility level the TB services are provided through TB focal persons in each of the 111 health facilities i.e. TB screening officer, TB/HIV adherence officers.

At community level the TB control program also works closely with the Community and partners through the assistance of Active Case Finders i.e. CBOs, NGOs to provide support to TB patients through care givers; treatment supporters and community health motivators.

2.2. Political commitment and leadership

The country is in line with the Post-2015 Global TB Strategy launched at the 67th World Health Assembly in May 2014. The ongoing NSP (2015-2019) is based on this framework whose vision is a world free of tuberculosis – zero deaths, zero disease and zero suffering due to tuberculosis. Thus, the NSP objectives have been aligned to comprehensively embrace the Principles as well as the Pillars and Components of the Post-2015 Global TB Strategy:

**Principles:**

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

**Sustainable Development Goals:**

The Sustainable Development Goals (SDGs) continue to be the focus of global priorities for development cooperation and also guide national priorities in most countries. The END TB strategy calls for effective use of existing tools to combat TB complemented by universal health coverage to push down global incidence rates and the reduction of people who die from TB by 2025. The country committed to the SDGs in September 2015 during the UN General Assembly. In line with this, the country has also committed to ending the TB epidemic by 2030 which is one of the targets under Goal 3; “ensure healthy lives and promote well-being for all at all ages”.
2.3. Program Components:

- **TB Diagnostics & Laboratory Strengthening**
  - The Swaziland Health Laboratory Services (SHLS) focuses on increasing case detection.
  - Strengthening the decentralization of Xpert MTB/RIF implementation process at country level, through placement of GeneXpert instruments.
  - The External Quality Assurance (EQA) program has three components that is panel testing, blinded rechecking and onsite evaluation.
  - There are currently 28 microscopy sites in the country. All 28 of these sites are enrolled on Microscopy EQA.
  - The NTRL is enrolled through the Uganda Supra National lab EQA scheme.
  - The National TB reference Laboratory (NTRL) WHO-AFRO SLIPTA accreditation status is at 1 star grading award.
  - NTRL to ensure accreditation preparedness and is currently working towards ISO 15189 International accreditation under the South African National Accreditation Systems.
  - The NTRL has established a second line drug susceptibility testing through the support from the Uganda Supra National Laboratory.
  - Laboratory QA systems are implemented at different levels. The SLMTA (NTRL, mother labs), mentorship (mini labs) and proficiency testing (sputum, microscopy and Xpert).
  - GX-Alert, a results based notification was introduced in Q4, 2016.

- **Standardized TB treatment and patient support (DOTS)**
  - Works towards timely and effective TB treatment, guarantees cure of active TB, render the patient non-infectious within the shortest possible time to prevent transmission to others in the communities, and minimizes development of further drug resistant strains of TB.
  - NTCP aims to deliver treatment using flexible patient-friendly approaches to ensure adherence to therapy including in children.
  - Provide Anti-TB drugs at no cost to all patients in the country.
  - Ensure all patients have treatment supporters at initiation of treatment. A family supporter is designated for susceptible TB and community supporter for DR TB patients.
  - Ensure patients are provided psychosocial support throughout treatment and Nutritional support for DR TB patients.
  - Training for community treatment supporters.

- **Commodities Supply (Central Medical Stores)**
  - To ensure an uninterrupted supply of quality-assured first and second line anti-TB drugs, the NTCP has established a collaboration with the Global TB Drugs Facility (GDF).
  - To facilitate the availability of repurposed medicines for short course DR-TB regimen and DR-TB management.
  - In order to ensure an effective supply chain management system, the NTCP collaborates actively with Central Medical stores (CMS) via a dedicated NTCP pharmacist.
  - Ensure timely forecasting aquantification and ordering of TB medicines to ensure an uninterrupted supply of anti-TB medicines through capacity building and with support from partners.
  - To strengthen pharmacovigilance and adverse drug systems.

- **Monitoring and Evaluation, Data Management and Research**
  - To conduct periodic progress review meetings to discuss achievements, lessons learned, share information with health facilities and partners so as to ensure high quality patient care.
  - Strengthened M&E capacity for all program levels community, region and national to improve programme performance.
  - Development and conduct of a Research Strategy and Agenda and build capacity of staff.
  - Engage EPR to include MDR-TB in the Immediate notification system.
  - A functional and comprehensive TB Electronic Information system set up by 2019.
  - Revision of TB data recording and reporting tools.
  - Swaziland has been experiencing a steady decline in TB notified cases notified to the NTCP over the last five years, much against the WHO modelled estimates.
  - A TB epidemiological assessment was conducted during the WHO led NTCP joint external review in 2014 which in the 2015 WHO global report where by it reflects a 36% and 47% reduction in TB prevalence and incidence rates in Swaziland.
  - DR-TB survey is underway.
  - Prevalence survey preparations are already underway with the actual survey to commence in October.
  - Research agenda has been developed.
  - Research capacity strengthening through training of staff to ascertain the burden of disease in pulation which is critical in the fight against TB towards ending the epidemic. (paradigm shift: Global plan to End TB - 2016-2020).

2.4. Technical and Financial Support

The government of Swaziland continues to show unwavering political commitment as the program has an established budget line that covers some human resources, first and second line anti-TB drugs and administrative costs.
3.1. COVERAGE OF TB SERVICES

According to SAM (2013), there are 287 health facilities in the country, of which 111 health facilities (39%) are Basic Management Units (BMUs). These shows a slight increase since in 2015 there were 109 health facilities which were BMUs. Among the regions, Lubombo region has the highest (34) number of health facilities offering TB treatment when compared to all the others regions, followed by Hhohho and Manzini (both having 26 health facilities offering TB treatment) and Shiselweni regions having the least (25).
3.2. TB diagnosis

3.2.1. Systematic screening for active tuberculosis

Screening for tuberculosis (TB) disease aims to improve early TB case detection. The ultimate goal is to improve outcomes for people with TB and to reduce Mycobacterium tuberculosis transmission in the community through improved case detection, reduction in diagnostic delays and early treatment. TB screening in human immunodeficiency virus (HIV) infected individuals has been recommended by the World Health Organization (WHO) as part of the ‘Three I’s’ policy initiative. Although systematic screening of household contacts of infectious TB cases has been recommended, population-wide mass screening has been discouraged due to its uncertain impact, high cost and poor sustainability. There has recently been a renewed interest in systematic screening for active TB disease among risk groups as well as population-wide screening interventions. Studies have suggested that screening, if done in the right way and targeting the right people, may reduce suffering and death due to TB.

In the country a standardized TB screening tool is used to investigate symptoms of TB among all eligible patients visiting health facilities. Patients are either diagnosis bacteriological using GeneXpert, culture and other tests. There are other none-bacteriological methods acceptable for TB diagnosis which include clinical symptoms staging by the medical officer, X-ray diagnosis for cases where sputum cannot be obtained from patients. For all patients who are able to produce sputum, the country recommends collection of sputum before initiation to TB treatment.

The table above shows an increasing trend in TB screenings conducted over the years from 294, 611 cases in 2012 to 1, 075,077 in 2016. This upward trend can be attributed to the improvement the program has made in data quality through conducting data reviews where health facilities and other relevant stakeholders have the opportunity to interrogate TB data. There has been a stagnant increase in presumptive cases. Among cases enrolled on TB Treatment, over the years there has been significant increase from 85% in 2012 to 95% in 2016. This implies that most of the patients who are diagnosed to have TB are put on treatment hence reduction in infection rate.

<table>
<thead>
<tr>
<th>Year</th>
<th>Number screened</th>
<th>Presumptive cases</th>
<th>Number diagnosed</th>
<th>Number enrolled on Rx</th>
<th>% enrolled on Rx</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>294,611</td>
<td>16,140</td>
<td>1,671</td>
<td>1,428</td>
<td>85%</td>
</tr>
<tr>
<td>2013</td>
<td>294,590</td>
<td>12,001</td>
<td>1,281</td>
<td>1,239</td>
<td>97%</td>
</tr>
<tr>
<td>2014</td>
<td>286,073</td>
<td>9,744</td>
<td>838</td>
<td>715</td>
<td>85%</td>
</tr>
<tr>
<td>2015</td>
<td>240,051</td>
<td>11,641</td>
<td>1,139</td>
<td>958</td>
<td>84%</td>
</tr>
<tr>
<td>2016</td>
<td>-</td>
<td>18,980</td>
<td>1682</td>
<td>1596</td>
<td>95%</td>
</tr>
</tbody>
</table>

NB: Please note that the number screened are screenings performed not the number of people screened.

The table above shows an increasing trend in TB screenings conducted over the years from 294, 611 cases in 2012 to 1,075,077 in 2016. This upward trend can be attributed to the improvement the program has made in data quality through conducting data reviews where health facilities and other relevant stakeholders have the opportunity to interrogate TB data. There has been a stagnant increase in presumptive cases. Among cases enrolled on TB Treatment, over the years there has been significant increase from 85% in 2012 to 95% in 2016. This implies that most of the patients who are diagnosed to have TB are put on treatment hence reduction in infection rate.
3.2.2. Case Detection

Either confirmed bacteriologically or diagnosed by a clinician, a TB case is defined as an individual from which the existence of the TB bacteria has been confirmed. The classification of the cases is based on the site of the lesions, either pulmonary or extra pulmonary (WHO 2004). Case detection has remained one of the most critical components of a TB control programme given that the main objective of case detection is identifying the main causes of continued infection at community level whilst also ensuring that delays in initiating treatment are minimized. Basically, case detection increases the probability of each TB case to be cured. It is therefore based on identification of presumptive TB cases attending health facilities through sputum examination. In line with WHO recommendations the NTCP adapted the diagnostic standardized diagnostic algorithms for diagnosing smear positive; smear negative pulmonary and extra pulmonary TB in adult and pediatric patients. Drug resistant TB cases are diagnosed using solid culture/liquid culture DSTs/L-PA. Comparative accuracy of GeneXpert/ Cartridge Based Nucleic Acid Amplification test (CBNAAT) is used for diagnosing TB and DR-TB in all sites.
Despite the slight increase of the TB incidence and prevalence rates from 2010 to 2013 before declining in 2014, case notification rates of all forms of TB had been steadily declining during the same time period, as shown in Figure 1 below. The scenario presented by Figure 5 below, on the national TB incidence and prevalence rate, mirrors the WHO estimates on the prevalence and incidence rates with the difference being the rate of increase being lower for the actual compared to the estimates. In terms of the case notifications, the current data on significantly lower than the values of the WHO estimates where the country was expected to notify more cases than what has been reported in the same time period. This can further be explained by the high confidence intervals in WHO estimates.

![Figure 5: Estimated Prevalence, Incidence and Notification Rate (Actual), Swaziland 2009-2015](image)

The figure above presents the estimated TB prevalence, incidence and notification rate per 100,000 population for Swaziland from 2009-2015. Case notification rate for all forms shown above depicts a declining trend from 1,069 cases per 100,000 population in 2010 to 351 cases per 100,000 population in 2015. These declining trend has raised concerns within the program as according to set target by WHO the country is expected to have notified more cases (565 cases per 100,000 population. Worth mentioning is the huge gap between the incidence rate and the notification rate. This implies that we are missing a number of cases as a country. In terms of prevalence rate the country is estimated to be at 403 per 100,000 population. To accurately determine the TB burden in the country, the program has embarked into two surveys; TB prevalence and Drug Resistant surveys, that will set to confirm the exact TB Prevalence in the country.

**a) Case Notification of TB: All Forms**

The NTCP, on quarterly basis, receives aggregate data for patients registered under the program from over 111 BMUs in the country. These data are analyzed and disseminated in different forums which include quarterly review meetings, regional and National Semi Reviews. These forums enable different stakeholders to interrogate data and further develop quality improvement projects to enhance programming.
Figure 6 above shows the number of TB cases notified between 2011-2016. Over the years, a declining trend in number of cases notified is observed, however according to WHO estimates, the country is expected to notify more cases. These shows a 59% decline in cases notified in 2016 when compared to TB cases notified in 2011. These is despite the effort the program has put in place of strengthening active case finding and contact investigation in communities hence a strong indication of a need for a prevalence survey to determine the burden of TB in the country.

Figure 7 above shows the number of TB cases notified by type from 2012-2016. Among bacteriological confirmed cases, a significant increase is noted from 2013 to 2016 which can be attributed to the introduction of Gene-expert machines (more sensitive first line diagnostic test than the smear microscopy) in peripheral laboratories. In 2016, only 39% of cases were diagnosed clinically. These indicate that the country is moving towards a right direction in terms diagnosing TB patients as the program’s main aim is to scale up cases diagnosed bacteriological.
Furthermore, smears not done continue to show a declining trend which is mainly due to the continuous efforts the program has put in place in capacitating health care workers on sputum production which include sputum induction and gastric lavage among pediatrics TB patients.

The figure above shows TB notification rates for all forms of TB for all ages and children (<15 years). Despite strengthening intensified case finding in all health care setting which include neonatal and Child Health Units, case notification rate among children continue to show a decline (6%), lower than the 10% notification rate recommended for high burden countries (WHO standards and Benchmarks). According to Haumba et al (2015), wide coverage of ART services results to reduced TB notification rates. By implication, the scaling up and strengthening of the ART programme in the country has contributed towards reduction of TB notification rates in all age groups.
The figure above shows bacteriological confirmed TB cases from 2012-2016. Despite the decline in TB cases notified over the years, bacteriological confirmed cases have been increasing from 37% in 2012 to 61% in 2016. At the above rate, it will take the country at least 6.5 years to ensure that 100% of all TB cases are bacteriologically confirmed. These implies that more than a third on TB cases in the country are clinical confirmed. The implication of having more than a third of TB cases in the country not bacteriologically confirmed implies that, among other things, people still delay to visit health facilities for TB testing until their CD4 count is low yet, for individuals with low CD4 count the TB bacteria cannot be easily detected. This also reflects TB/HIV co infection. Hence the need for more sensitive TB diagnostic Tests, for example, TB LAM that has proved efficient in the detection of TB among immune compromised patients in particular those with a low CD4 count (Pasi et al, 2016).

The figure above shows that more males are infected with TB compared to females. This however was not the case in 2011 given that for every 1 female with TB there was also 1 male with TB yet in 2016, there was slightly more than 1.2 males infected with TB for every one female. Historically, more males have been reported to be infected with TB compared to females. However, this premise is challenged by different researchers as it is argued that, the higher sex ratio is not because males are more infected with TB compared to females but this scenario is a result of different reasons. These reasons include that; it is most likely for a male to be asked to produce sputum for testing compared to females and that due to delay from health care provider, females are diagnosed two weeks later than men. Some studies further argue that women and men present slightly different set of TB symptoms whilst the males have the normative TB symptoms. This adversely affect the overall public health programme and implies the need to equally target females as much as males in TB active case finding interventions. Lastly, women are reported to dominate the extra pulmonary TB yet the strong focus of TB interventions is on prevention and treatment of pulmonary TB. To verify the veracity and applicability of these assumptions in the case of Swaziland there is need to examine the distribution of the different types of TB (Pulmonary and extra pulmonary) by sex.
b) TB/HIV collaborative activities

People infected with HIV are 31 times more likely to develop TB compared to people not infected with HIV. TB is the most common opportunistic infection and cause of mortality among people living with HIV (PLHIV), difficult to diagnose and treat owing to challenges related to co-morbidity, pill burden, co-toxicity and drug interactions. Hence the goal of the TB/HIV collaborative activities is to reduce the burden of either disease amongst the people at risk or affected by TB or HIV. HIV infection increases the risk of TB infection on exposure, progression from latent infection to active TB, risk of death if not timely treated for both TB and HIV and risk of recurrence even if successfully treated. The focus of the collaborative activities therefore seeks to; establish and strengthen the mechanisms for delivering integrated TB and HIV services; reduce disease burden on people living with HIV and increase utilization of ART services; and to reduce disease burden on people diagnosed with TB or with TB symptoms.

By TB collaborative activities reference is made to TB and HIV services that were provided to patients who presented or were diagnosed with either TB or HIV at health facilities. Specifically, the services are; HIV testing, CPT and ART, as presented in Figure 6 below.

The number of TB patients that have been tested for HIV has decreased from 7093 in 2012 to 3774 in 2016, reflecting an over 40% decline. These declining trend is due to the decline also on TB cases notified. The number of people tested for HIV as compared to the number of notified cases of TB has increased from 91.7% in 2012 to 99.2% in 2016. Worth mentioning is the decline in positivity rate among TB patients tested for HIV, from 79% in 2012 to 70.2% in 2016 which reflect an almost 10% decline. These shows a decline in co-infection rate which could be a result of the increasing uptake of IPT prophylaxis. This decline could also mean that there is an increase in TB patients who are HIV negative which could be a result of poor infection control measures at all levels (community, facility etc.) hence the need to strengthening IPC measures.

An improvement in ART initiation is noted from 66% in 2012 to 92% in 2016. The proportion of TB patients living with HIV initiated on CPT has remained high throughout the years. This can be attributed to the continuous effort the program has put in place to strengthen the delivery mechanism for integrated TB/HIV services.
3.3. TB treatment

A new case of TB patient will receive 6 months of treatment with 2 months of intensive phase (RHZE) and 4 months of continuation phase (HR). Re-treatment TB case will receive 8 months of treatment with 3 months of intensive phase (RHZE) and 5 months of continuation phase (HRE). Follow-up sputum smear examinations are done at the end of the intensive phase, 2 months into the continuation phase and at the end of treatment. If the smear is positive at the end of the intensive phase, the same drugs are given for one more month and then the continuation phase is started. The treatment outcome is determined according to the results of the follow-up smear examinations done during treatment and at end of treatment. For pediatric TB patients; asymptomatic children under 5 years who are household contacts of bacteriologically pulmonary TB patients; chemoprophylaxis with isoniazid (10 mg/kg body weight) is administered daily for a period of 6 months.

The distribution of TB cases across the four regions of the country is not uniform, similarly for the TB treatment enrollment. The contribution of the Manzini region to total TB cases enrolled on treatment has remained high throughout the years but further increase in 2016 to 45% from an average of 41.5% between 2012 and 2015. The Hhohho region presents the second highest figures of 24% whilst Lubombo and Shiselweni region are the third and fourth contributors to annual TB treatment enrollments with 17 and 13%, respectively. Evidenced from the table above shows that the number of confirmed TB cases and the number of patients being enrolled to TB treatment annually is decreasing. With all things being equal and assuming that things remain the same, the implications of Figure 4 and Table 4, are that TB will be eradicated in the country within 5 years. These predictions highlight existence of gaps in TB case finding and confirmation as well as enrollment on TB treatment.

Based on existing arguments on miners and ex miners as well as their families and communities in terms of their high probability to active TB, one would expect Shiselweni and Lubombo region to present highest cases of TB and enrollment to TB treatment. In reality, as presented above, the opposite is true, Manzini and Hhohho regions have the highest and second rates of enrollment to TB and TB cases. The cause of this scenario might be to some extent due to the distribution of health facilities in the country and their capacities to enroll people on TB treatment. However, this also reflects the gender bias of TB programming and reporting, higher sex ratios, which have portrayed males to be mostly infected with TB compared to women of which the end result has been more interventions targeting men yet women are also equally infected.
TB interventions need to equally target males and females and there is need to pay equal or more attention to females in terms of screening and testing.

### 3.3.1. Sputum Smear Conversion

The national guidelines for TB treatment stipulates that follow-up of patients already on treatment should be done at least at month two, three, five and end of treatment through sputum microscopy. In accordance with these guidelines, the TB program monitors progress of TB patients once started on treatment and documents this for future programmatic interventions and corrective actions when needed.

The proportion of smear-positive patients with sputum smear conversion at the end of the intensive phase is also an indicator of TB program performance. This is because sputum smear and culture conversion are important indicators for the effectiveness of treatment and the infectivity of the patient. WHO recommends its use as a useful indicator for TB control programs in monitoring the TB program performance, and as a trigger for rigorous assessment in patients who still have a positive smear. Once a patient has a sputum smear that has become negative they are considered no longer infectious. Those who still have a positive sputum after 2 months are more likely to have poor treatment outcomes. A positive sputum smear at the end of the intensive phase, as defined by WHO, may indicate any of the following:

- the initial phase of therapy was poorly supervised and patient adherence was poor;
- poor quality of anti-TB drugs;
- doses of anti-TB drugs are below the recommended range;
- there are co-morbid conditions that interfere either with adherence or with response;
- The patient may have DR-TB that is not responding to first-line treatment.

The figure above, presents sputum smear conversion rates among new and retreatment cases in 2016 nationally. The conversion proportions are relatively acceptable, recorded as 85% (met the 85% set target by WHO) and 78% for new and retreatment cases, respectively. WHO set targets stipulates that smears not done should be less than 5%, however, the country is still experiencing high rates of smears not done. In TB control, a smear not done is reason enough for an alarm as these could lead to undetected DR-TB, delayed diagnosis and subsequently, loss of life. Among retreatment cases, 8% failed to convert and 7% died. Overall it was observed that smears not converted and deaths were high among retreatment cases, 8% and 7% respectively, when compared to new cases. These high proportion in smears not converted for retreatment cases is evident enough that some of these patients are likely to have an unfavorable outcome at the end of treatment hence prone to DR-TB.
The figure above, presents sputum smear conversion rates among new and retreatment cases across the regions in 2016. Generally, across all the regions, conversion proportions are relatively high for both new and retreatment cases. This is evidence of proper patient management and use of appropriate treatment regimen. Among smears not done, Lubombo has the highest rates (9% of new cases and 6% of retreatment cases) when compared to the other 3 regions followed closely by the Hhohho region with 5% smears not done in new cases and 7% in retreatment cases.

The death rate among both new and retreatment cases remains a challenge in all the regions with an exception for Manzini region which achieved 3% in new cases and 5% in retreatment cases.

### 3.3.2. Treatment Outcomes

Monitoring of the treatment outcomes is a critical component for TB control. The treatment outcomes are often used as a proxy indicator of the quality of the TB services in a health care system. The End TB Strategy states that TB treatment success should be 90% for all patients diagnosed with TB and started on TB treatment.
Figure 15 above presents the treatment outcomes for all Smear Positive TB cases enrolled to treatment in 2012-2016. In 2016, a 5% increase in cure rate was noted from 68% (2015) to 73%. It is critical to note that the proportion cured has been increasing with the highest increase observed between 2014 and 2015. Death rate fluctuates between 9% and 7% over years (2012-2016). Treatment failure was at 5% in 2016 representing a 1% decline from 6% in 2015. Not evaluated remains constant low at 1% from 2015 to 2016. This shows a good performance for the program since almost all patients put on treatment are evaluated at the end of the continuation phase.

Table 2 above presents TB treatment outcomes for all forms of TB between 2016. The overall TB treatment success rate for all forms of TB cases increased in 2016 (79%) when compared to previous years however the country is still having a 11% shortfall from the 90% set target stipulated in the END TB strategy. It is worth noting that in 2016 almost similar proportions of TB cases are categorized as completed treatment and cured whilst ideally, all who have completed treatment should be cured. LTFU, Rx Failure and not evaluated constitute 10% of all the registered TB cases assigned outcomes.
Higher mortality rates of TB cases are linked with older age groups, implying that the elder the people infected with TB, the higher the mortality among TB patients. This has fluctuated between 10 and 14% in 2012 and 2016 with 2016 reflecting an increase from 10% in 2015 to 12% in 2016. Despite 79% treatment success achieved in 2016, the country is still 11% short of the desired 90%. At this rate of increment, it will take about 5 years for the country to achieve 90% treatment success stipulated in the End TB strategy and even more years to achieve at least 90% of all TB cases being cured of TB.

This scenario therefore highlights the need to strengthen the integration of TB case finding and notification activities with TB treatment enrolment to ensure that all new TB cases identified are enrolled on treatment and that all cases enrolled on treatment are tested after completing treatment.
The figure above presents the treatment outcomes of co-infected patients for the period of 2011-2015 cohort. Over the years, an improvement in treatment success is noted from 69% in 2012 to 78% in 2016. A downward trend is noted among treatment completion however the proportion for those who are cured shows an increasing trend. This improvement in cure rates implies that a number of patients complete their treatment and have no evidence of failure after the intensive phase. In terms death rates, the country is still experiencing the highest rates, far from achieving the WHO set target of less than 5%.

3.4. Burden of paediatric TB in the country

Accounting for between 15 - 20% of all TB cases globally, pediatric TB represents active transmission of TB in the community mainly from adult sources. Majority of pediatric TB cases are due to a household exposure to a sputum positive adult with smear negative accounting for the least number of cases. However, in adequate pediatrics diagnosis results to poor detection which subsequently results to increased morbidity and mortality due to TB amongst children. This therefore underscores the importance of TB diagnosis and treatment for children. MDR-TB and XDR-TB cases have been documented among pediatrics age group, however, there are no estimates of the overall burden, chiefly because of diagnostic difficulties and exclusion of children in most drug resistance surveys.

In the last 5 years, pediatric TB cases has been ranging between 5% - 10% of the total notified cases. In 2016 pediatric TB cases showed the lowest contribution (6%) below the recommended 15% as per the WHO Standards and Benchmarks. Alongside the decrease in the number of pediatric TB cases, the HIV positivity rate among pediatrics has also been declining over the same time period with 2015 representing the highest positivity rate of 65.7% whilst 2016 have the lowest positivity rate of 42.5%. Sputum examination remains a major challenge for diagnosis of pediatric TB, as children are paucibacillary and smaller children cannot produce sputum. TB in children is thus a condition that is usually clinically diagnosed based on a combination of signs and symptoms that are not specific to TB.
An improvement in pediatric TB care has been noted in TB-HIV collaborative activities, shown by the gradual increase in the uptake of ART among children with TB. Of the 91 pediatric TB cases with HIV, 93% of them were initiated on ART in 2016 which reflects a decline compared to 2015 where 95% of all the pediatric TB cases with HIV were initiated on ART. Despite the decrease in 2016, the initiations on ART of all eligible pediatric TB cases has been increasing over the years. Over the same time period, the proportion of pediatrics initiated on CPT has remained high with 2015 and 2016 reflecting 100% of all pediatrics with TB initiated on CPT.

3.5. Drug Resistant TB

Swaziland has the highest TB prevalence rate per capital in the world (Global Health Report, 2013) with a severe MDRTB epidemic of 7.7% among new TB cases and 33.9% among previously treated cases (2009 DR Survey). The high burden of MDR-TB poses a major threat to national TB Control efforts. The estimated MDR-TB incidence rate is 69/100,000 population, with a TB/HIV co-infection rate of 75% (WHO Global TB Report, 2016).

Swaziland has experienced an increase in the number of DR-TB cases over the years partly due to improved diagnostic techniques that improved identification of cases through roll out of Gene Xpert machines, decentralization of laboratory networks and universal access to first line and secondline Drug sensitivity testing. The NTCP in an effort to increase access to DR-TB treatment initiation has managed to decentralize DR-TB treatment services to 12 sites and planning to accredit 2 additional sites. This will ensure improved access to DR-TB treatment in all the four regions as per the NSP strategic objectives. The table below further illustrates the facilities by region.

**Table 3: Number of DR-TB sites in Swaziland by Region**

<table>
<thead>
<tr>
<th>REGION</th>
<th>FACILITY NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANZINI</td>
<td>Mankayane Government</td>
</tr>
<tr>
<td></td>
<td>Matsapha Comprehensive Care</td>
</tr>
<tr>
<td></td>
<td>National TB Hospital</td>
</tr>
<tr>
<td>SHISELWENI</td>
<td>Hlathikhulu Hospital</td>
</tr>
<tr>
<td></td>
<td>Nhlangano Health Centre</td>
</tr>
<tr>
<td></td>
<td>Matsanjeni Health Centre</td>
</tr>
<tr>
<td>HHOHHO</td>
<td>Mkhuzweni Health Centre</td>
</tr>
<tr>
<td></td>
<td>Pigg’s Peak Hospital</td>
</tr>
<tr>
<td></td>
<td>Dvokolwako</td>
</tr>
<tr>
<td></td>
<td>Baylor Clinic</td>
</tr>
<tr>
<td>LUBOMBO</td>
<td>Good Shepherd</td>
</tr>
<tr>
<td></td>
<td>Sithobela Health Centre</td>
</tr>
</tbody>
</table>

3.5.1. Enrollment by Type of Resistance

**Table 4: DR TB patients Enrolled on treatment by type of resistant 2016**

<table>
<thead>
<tr>
<th>Type of TB</th>
<th>DR -TB Patients in 2016</th>
<th>nr</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rif Resistant TB</td>
<td></td>
<td>199</td>
<td>52%</td>
</tr>
<tr>
<td>Polydrug-resistant TB</td>
<td></td>
<td>69</td>
<td>18%</td>
</tr>
<tr>
<td>INH resistant TB</td>
<td></td>
<td>56</td>
<td>15%</td>
</tr>
<tr>
<td>MDR-TB</td>
<td></td>
<td>36</td>
<td>9%</td>
</tr>
<tr>
<td>XDR-TB</td>
<td></td>
<td>13</td>
<td>3%</td>
</tr>
<tr>
<td>Presumptive TB</td>
<td></td>
<td>11</td>
<td>3%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>384</td>
<td>100%</td>
</tr>
</tbody>
</table>
The figure above shows the number of DR TB cases enrolled in 2016 disaggregated by type of resistance. A total of 384 DR-TB cases were enrolled into treatment in 2016, this shows a 20% percent decline in the number of DR-TB cases notified in the country when compared to 481 cases in 2015. The most common type of resistance is Rifampicin Resistant TB with 199 cases (52%) and the least common is the presumptive TB with 11 cases (3%). According to the Global TB Report 2016, it is estimated that there are 480 000 MDR cases, 100 000 Rif Resistant cases. However, in contrast to this, the country has noted a wide difference between the Rifampicin Resistant TB and MDR –TB which might be as a result of the second sample not being sent and reclassification. XDR TB was found to 3% which is way below the WHO approximate of around 10%.

### Trends in DR-TB Enrollment

![Trends in DR-TB Enrollment](image)

The graph above presents trends in DR-TB patients enrolled treatment between 2009 and 2016. A general upward trend has been noted over the years 2010-2013. In 2009 with the highest number of cases recorded in 2013 where 566 cases were enrolled on treatment. This increase can be attributed to the introduction of both the rapid diagnostic tests and universal access to first line DST in 2011/2012. A downward trend of DR-TB cases has been observed within the period 2014-2016.

### 3.5.2. Enrollment by Age Disaggregation

According to WHO standards and benchmark the proportion of childhood TB out of all TB cases should be approximately 10 % of the total TB cases notified. Paediatric TB cases are among high risk population and this is due to their under-developed immune systems as a result, the program highlighted the need to address and optimize TB diagnosis and management (the NSP 2015-2019).

![Enrollment by Age Disaggregation](image)
The graph above represents DR-TB enrollments by age disaggregation. In 2016 a total of 384 DR-TB cases were enrolled in the 12 DR-TB facilities in the country. Among these cases (384), 98% were adults and 2% were pediatrics which is far below the WHO target. Generally, it is difficult to confirm DR-TB in pediatrics, therefore we expect a high number being presumptive cases, however the graph above shows that there are no presumptive paediatric cases which points more to underdiagnoses of this group. The program has invested in strengthening TB diagnosis among paediatric cases in the past year by procuring equipment (nebulizers, etc) and conducted trainings for health care workers so as to enhance sputum production among presumptive paediatric TB cases. However, there is still a need to strengthen contact tracing of DR-TB index cases which could enable the program to identify more children in the households.

During the year 2016 46% of DR-TB patients were new cases; 47% were patients that had previously been treated with 1st line and 7% were patients that had previously been treated with 1st and 2nd line TB medicines. Since 2013 approximately half of the patients enrolled on DR-TB treatment each year were identified as new cases and this trend has remained constant over the years. However, a new emerging increase in the numbers of patients previously treated with 1st and 2nd line TB medicines has been noted from 1% in 2013 to 7% in 2016.

**Figure 20: Trend in Treatment history of patients enrolled on DR-TB treatment from 2013-2016**

**Figure 21: TB/HIV Collaborative activities among DR-TB patients, 2013-2016**
During the year 2016, 99% of DR-TB patients were tested on HIV whilst 97% were initiated on ART. This illustrate significant improvements in the TB/HIV collaborative activities among DR-TB patients. Notably ART initiation for co-infected patients improved significantly since 2013. CPT initiation was also found to be 97%.

3.5.3. Multi-Drug Resistant TB Interim Outcomes

The country has adopted the ambulatory model of care where all patients with Multi-drug resistant TB are managed as outpatients and only those who are critically ill or have other social problems are admitted. Patients with MDR-TB receive 8 months daily injection in the intensive phase from the nearest clinic followed by 12-16 months of oral medication at home. They are reviewed monthly at the DR-TB initiating sites. In 2016 WHO recommended shorter MDR-TB regimen for all eligible patients with MDR-TB for 9-12 months and those not eligible will be initiated on conventional/longer regimen for 20-24 Months. The intensive phase for shorter regimen is 4-7 months according Swaziland guidelines and continuation phase of 5 months. The shorter MDR-TB regimen includes seven drugs namely: Kanamyci/Amikacin, High dose Moxifloxacin, Clofazimine, Prothionamide, High dose Isoniazid, Ethambutol and pyrazinamide. The conventional regimen includes five drugs namely: Kanamycin/Amitacin, Levofloxacin, Prothionamide, Terizodone/Cycloserine, Pyrazinamide and PAS. Baseline investigations are done for all patients and culture examinations and sputum smear microscopy are performed every month to monitor the patient’s bacteriological response to treatment. Interim outcomes are assessed at 6 months to monitor the conversion status before patients are changed to continuation phase.

Table 5: Interim treatment outcomes, 2016

<table>
<thead>
<tr>
<th>Interim assessment</th>
<th>Grand Total</th>
<th>no</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Outcome</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>enrolled</td>
<td>506</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>culture negative</td>
<td></td>
<td>282</td>
<td>56%</td>
</tr>
<tr>
<td>culture unknown</td>
<td></td>
<td>154</td>
<td>30%</td>
</tr>
<tr>
<td>died</td>
<td></td>
<td>35</td>
<td>7%</td>
</tr>
<tr>
<td>culture positive</td>
<td></td>
<td>32</td>
<td>6%</td>
</tr>
<tr>
<td>lost for follow-up</td>
<td></td>
<td>2</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 6 above, presents interim (end of the intensive-phase) treatment outcomes. A total of 506 bacteriologically confirmed DR-TB patients interim outcomes were evaluated at the end of the intensive phase. Among this cohort, 56% (282) of those patients had a culture negative which shows a good response to treatment however on the other hand 6 % of the patients still had a culture positive by the end of the intensive phase. Patients with a culture- unknown comprise of patients who have not have their outcomes evaluated and those who have their monitoring/ assessment results not yet back from the lab or not documented in the registers. For this cohort 30% (154) of the cases had a culture unknown at the end of the intensive phase of treatment. Seven percent (35) died before the end of the intensive phase.

The figure below further illustrates the trends in the interim outcomes over the years. Of note is the increase in the culture- unknown which doubled from 12% in 2012 to 30% in 2016. This shows a need to improve documentation of results from the lab, communication from the labs to facilities and also strengthen the national sample transportation system to allow ease of movement of culture samples and results between the NTRL and health facilities. The program is working on improving the cultures unknown at 6 months through quality improvement projects at each DR-TB site.

There has been quite a significant improvement of lost to follow up during the intensive phase. This could be attributed to the efforts made by the program to ensure adherence to treatment through engaging treatment supporters, intensive adherence counselling sessions, provision of psychosocial support to patients during the course of treatment.
3.5.4. Drug Resistant TB Final Treatment Outcomes

DR-TB treatment outcomes in Swaziland are defined according to WHO recommendations. Final treatment outcomes are assigned upon completion of the recommended 36 months' duration of treatment or following premature termination of treatment due to death, treatment failure or LFTU.

This figure above shows the treatment outcomes for patients who were initiated on treatment in 2013 and completed treatment in 2016. Mono and poly drug resistant patients showed a high treatment success rate of 77% among this cohort. These were followed by MDR-TB patients who had 76% treatment success rate, Rif resistant TB cases treatment success rate of 66% and lastly XDR-TB with treatment success rate of 0%. To note is the high death rate of 24% among the Rif resistant DR-TB cases as compared to 13% of MDR-TB patients yet these patients are on the same treatment regimen, which is even higher than the average death rate among DR-TB patients which is at 18%. This could be attributed to second sample not being followed up to determine true MDR-TB, Rif mono or XDR-TB and this enables the patients to be initiated on the right and effective regimen. Generally Rif Resistant cases are diagnosed by geneXpert which is the first line of diagnosis and second sample is then needed to diagnose other further Resistant types.

Overall death rate could be due to late presenting, high HIV-Coinfection (79%), poor DOTS implementation; patients stopping treatment and coming back when they have deteriorated. Loss to follow up above the target of <5% are a result of patients defaulting because of the longer duration of the treatment-patients end up losing jobs, no money for transport, and or hard to reach areas since DR-TB facilities are few.
Figure above, shows final outcomes for all DR-TB patients who initiated treatment between 2009-2013 and completed treatment in 2012-2016 respectively. Treatment success rates for patients initiated on DR-TB treatment in Swaziland has shown some improvement with great strides from 38% in 2012, 53% in 2013, 56% in 2014, 64% in 2015 and 70% in 2016.

Encouragingly, treatment success rates have improved due to improved quality of care following the decentralization of MDR-TB services from National TB hospital in 2012, to 12 sites countrywide by 2016 and also strengthening of PMDT health systems. Coupled with reduced loss to follow up and minimal failure rate this may contribute to reduced DR-TB transmission within the broader community.
The overall aim of the NTCP is to decrease mortality and morbidity due to TB and cut transmission of infection until TB ceases to be a major public health problem in Swaziland. In 2016, the program realized improvements in the key indicators monitored. The program managed to achieve its set goals and implement planned activities even in 2016. Of course, it would not be a worthwhile journey without challenges along this road.

4.1. ADVOCACY, COMMUNICATION AND SOCIAL MOBILIZATION (ACSM)

Achievements:

- Sensitization dialogues at Buhleni and Hlane Royal Residences on TB, TB/HIV and MDR-TB, during the Marula season. Hundreds of women were reached through dissemination of information on TB, TB/HIV and MDR-TB. An information desk was displayed and women were advised on TB prevention, treatment and adherence.
- World TB day 2016 was commemorated in the Lubombo region at Lugongolweni Inkundla (SOS Children’s Village). Hundreds of people attended the event which was led by the Minister of Health, Minister for Tinkhundla and Administration, Members of Parliament, The clinical directorate, The US Embassy and WHO country Representatives.
- The National TB Control Programme annually takes part in the exhibition of the International Trade Fair. In 2016, information on TB, TB/HIV and MDR-TB was disseminated. An estimate of 820 people visited the NTCP information stand to access information.

Challenges:

- Most of the ACSM activities lack funding which makes it impossible to carry out some of its activities.
- To implement
4.2. DOTS

Strengthened Monitoring, Evaluation, and Supervision of DOTS implementation: the TB program has engaged officers to be responsible for DOTS at regional level. These officers work collaboratively with regional TB/HIV coordinators responsible for supervision and strengthening of DOTS activities at regional level. They supervise community structures involved in DOTS such as treatment supporters, TB Expert clients, Adherence officers and TB screening officers. Moreover, there was an introduction of an improved, comprehensive reporting form for community treatment supporters for DR TB DOTS PLUS, which will further improve monitoring of treatment supporters at community level and DOTS PLUS for DR TB patients throughout treatment.

Achievements:
• The involvement of treatment supporters has improved treatment success rate from 78% in 2015 to 79% in 2016 for DSTB and for MDRTB 60% in 2015 to 70% in 2016.
• Lost to follow up continues to decrease through the involvement of Adherence Officers i.e. 5% in 2015 to 4% in 2016.

Challenges:
• Consistent breakdown of motorbikes.
• Stigma resulting in health care workers not offering adequate services to TB patients in non-TB units.
• Lack of Psychosocial support resulting in depletion of adherence.
• Minimum reporting on TB screening in facilities where there are no screening officers.
• Reluctance of health care workers to offer TB services due to the fear of the unknown.
• TB clients losing their jobs due to the longer duration of treatment in the absence of labor laws to protect them.
• TB clients presenting to facilities late thus leading to an increase in death rate i.e. from 10% in 2015 to 12% in 2016.
• TB case notification continues to decline i.e. 4567 cases in 2015 and 3806 in 2016.

4.3. PEDIATRICS

ACHIEVEMENT
• 99% of children enrolled on TB treatment tested for HIV,
• 93% ART coverage among Children on TB treatment that are HIV+
• Contact tracing conducted in most facilities
• To improve TB diagnosis in children, the programme facilitated the procurement of equipment (nebulizers) for the diagnosis of TB in children and further assisted in the procurement of child-friendly formulations (drugs).

Challenges:
• Declining cases of children notified for TB
• Diagnosis of TB in children more centralized
• Inadequate diagnostic equipment for childhood TB (e.g digital X-rays, sputum induction equipment)
• Absence of incorporation of childhood TB in maternal and child health services
• The paucibacillary nature of TB in children depends largely on clinical diagnosis, a diagnosis which might be missed.

Recommendations
• Decentralization of childhood TB services to peripheral facilities
• Procure more equipment to assist in sputum collection in children
• Promote the use of digital X-ray for screening at peripheral facilities
• In cooperate culture for children as first line of diagnosis
• Integrate childhood TB diagnosis and management into MNCH
4.4. PRISON POPULATION

Evidence has shown that TB incidence among Prisoners is double that of the general population. The National TB Control Programme has invested in TB control activities targeting inmates.

Achievements:
- The on-going ACF strategy targets all correctional facilities in Swaziland to strengthen existing TB case finding activities as well as implement other strategies that will help to further reduce the transmission of TB in the Prisons.
- One correctional facility was renovated to ensure adequate ventilation.
- Strong collaboration between NTCP and correctional services.

Challenges:
- Poor ventilation in majority of correctional facilities.
- Lack of screening reports from correctional facilities.

4.5. MINERS AND EX-MINERS

Memorandum of understanding was developed between Maloma mine and NTCP to miners and other staff receive fair treatment and compensation when suffering from occupational lung disease and silicosis

Achievements
- A Wits Health consortium was appointed by the Regional Coordinating Mechanism as the PR for the GF grant to contribute to the reduction of the TB burden in the mining sector. Health Focus was appointed as a sub recipient to conduct tracking and tracing of current and ex-miners in Swaziland (8-11 November 2016).
- NTCP implemented the tracking and tracing project for current and ex-miner. The exercise was collaboratively conducted in partnership Ministry of labour and the civil society.
- 281 ex-miners did benefit medical examinations (including TB screening) for occupational compensation. 270 claimants opened account with Swazi Bank for them to receive their benefits.
- 1599 ex-miners / miners completed V12 form for compensation after the medical examinations and are still awaiting compensation.
- Health care workers were capacitated on occupational lung disease and silicosis.
- Hlathikhulu OHSC site referral hospital was established for medical examination of current and ex-miners.

Challenges:
- Baseline information is required for educating miners about dust in the mining community.
- Miners are not educated on use of PPE whilst silicosis is latent for 10 – 20 years.
- Lack of knowledge from miners about occupational compensation.

4.6. ACTIVE CASE FINDING

Since 2009 detecting TB using passive case finding at facility level has been the principal approach for finding cases. This strategy was focusing at cases who present itself with signs and symptoms of TB. Since 2010, there has been significant decline of the notification rate of TB cases. A midterm review conducted in 2014 lead by WHO representatives, had concerns about the decline of the notification rates as it was not incline with the WHO estimates. The program was advised to be more vigorous on case finding thus implementation of Active Case Finding Strategy in communities.

Achievements:
- Sensitization of communities on Active Case Finding
- Sensitization meetings were held with Regional Administrators, Regional Health Administrators and Regional matrons, Traditional leaders (Chiefs) and Members of parliament of the four regions of the country were conducted in October 2015.
369 active case finders were recruited through the traditional structures.
Capacitation of ACFs was done on basic facts of TB, IPC and sputum collection.
Implementation of the ACF strategy started in June 2016, ACFs are able to conduct systematic TB screenings at community level, collect sputum samples, send to the lab and those who are biologically confirmed are linked to treatment and care.
Distribution of equipment (Bicycles, GIS alert, cellphones, identification gear).
Revision of the M&E tool as well as printing and distribution.
Semi-annual review meeting conducted in November 2016.

Challenges:
- No maintenance company tendered to the maintenance for broken ACF equipment hence ACF are not able to screen and collect sputum samples from the community to reach their target.
- Some ACFs still need to be capacitated in report compiling their monthly reports.
- No transport was available for mentoring and support supervision from the coordination team.
- High attrition of both ACFs and the regional coordination team
- TB presumptive case who are referred to facilities do not access the services the facilities.
- Children who are referred from the communities have not been able to access the services due to socio-economic issue and un-capacitated health care worker on sputum collection for children's diagnosis.

4.7. TB/HIV integration

Achievements:
- National TB/HIV coordination committee meetings were conducted routinely
- TB/HIV services has also been decentralized to 111 health facilities in the country
- All facilities conduct routine TB screening in HIV patients
- In strengthening TB/HIV services, 99% of TB patients were tested for HIV, and 99% of all TB/HIV coinfected patients were initiated on CPT and 92% initiated on ART.

Challenges
- No regional TB/HIV coordination committees
- Low IPT uptake
- Frequent stock out of INH
- TB treatment is not available at some ART sites (166 ART /110 TB)
- Limited options for screening and diagnosis of childhood TB
- Most facilities lack IPC plan, focal person and committees

Action Points
- Establish regional coordination committees.
- Strengthen supply chain management for INH.
- Address health worker attitudes towards IPT.
- Invest in improving infrastructure for infection control.

4.8. PMDT ACHIEVEMENTS

Achievements:
- Good program coordination of DR TB activities
- Strong and well established clinical review panels- regular meetings
- Good integration of DRTB/HIV services (97%)
- Well trained and knowledgeable DR TB focal staffs
- Treatment Success Rate improved from 56% (2014) to 70% (2016)
- Introduction of new drugs
- Adopted Short Term Regimen
- Increase access to DR-TB treatment; DR-TB sites have been increased from 10 to 14.
- Establishment of weekly in-service meetings in some DR-TB facilities especially National TB hospital to discuss issues pertaining patient management as well as presenting on upcoming evidence.
• On-going weekly DR-TB clinical meeting (Wednesdays) which provide a forum to discuss difficult cases.
• On-going quarterly DR-TB expert clinical meetings which provide a forum to discuss difficult cases, DRTB data analysis, update knowledge and skills through information sharing on new innovations, research and evidence based interventions.
• A clinical access program (CAP) committee has been set up to review cases that need to be initiated on new drugs and ensure appropriate initiation of eligible patients. The committee consists of 15 members from implementing partners and international experts.
• 65 patients have been initiated on new drugs (bedaquiline and delamanid) from 2015 up to December 2016.
• Clear SOPs for admission of patients exist and patients are only admitted until they are stable. MDRTB patients with specific socio-economic factors, clinically unstable and those with adherence issues are admitted until they are stable.
• Assessments were conducted in all the 8 DR-TB facilities in the country to ensure good quality DR-TB services, identify gaps in management of DR-TB patients in each site, assess the three levels of IPC measures in the facilities, identify best practices in DR-TB management that can be shared and adopted in other sites, identify needs for audiology services to be implemented in each site, identify training needs to be included in the upcoming trainings and to come up with recommendations that will strengthen DR-TB management in the country.
• An electronic data base system has been developed and piloted at NTBH and soon to be rolled out for monitoring of DR-TB patients in all other facilities.
• Implementation of comprehensive patient support (food package, transport allowance as well as stipend for community treatment supporters) across all regions.
• Community treatment supporters have been recruited for each DR-TB patient to ensure DOTS is observed.
• Existence of community outreach teams in most facilities to provide services to patients in the comfort of their homes.
• Community tools have been developed to ensure continuum of care.
• Procuring and implementation of audiological services to 8 DRTB facilities.

Challenges:
• Unavailability of patient support in 2 region
• Sustainability of DR TB care in partner supported sites
• High DR TB mortality rate
• No Regional admission facilities (Hhohho & Lubombo regions)

4.9. LABORATORY

Achievements:
• Adequate staff complement with a Microscopist at each testing site.
• No stock out of Gene Xpert cartilages.
• LIS has been rolled out (DISA system) in high volume sites to improve the turn around time.
• Procured and installed 16 modules Gene Xperts to accommodate ACFs.
• Establishment of the new culture lab in Nhlangano Health Center.

Challenges:
• Frequent breakdown of Gene Xpert modules and the supplier taking time troubleshooting.
• Breakdown of BioSafety Cabinets in high volume sites interrupting the TB lab services.
• National transport system experiences challenges with fuel.
• Breakdown of vehicles without a replacement plan
4.10. MONITORING & EVALUATION (M & E)

Achievements:
- The program managed to conduct periodic quarterly review meetings to present achievements, lessons learned, information-sharing with health facilities and partners for planning and forecasting. All 4 regional meetings and national meeting were held per quarter in 2016.
- Health care workers have been trained on recording and reporting tools to strengthen M&E capacity with support from partners. The trainings continue to be necessary with the high rotation of health care workers in the MOH system.
- Recording and reporting capacitation during all thematic trainings conducted
- Capacity building for regional Strategic Information officers on recording and reporting tools
- Data Quality Management: All (111) TB BMUs produced quarterly reports and were submitted timely to the program. To ensure data quality the program also conducted routine data verification exercise in selected facilities across the four regions.

Challenges:
- Not all facilities report on TB screenings thus the data we have is not a true reflection of what is happening on the ground.
- Community data is of poor quality due to lack of forums e.g. QRMs to interrogate data issues, identified gaps and share best practices from other communities.
- No proper data-base for community TB data
Conclusions and Action Points

5.1. Conclusions

The National TB control Programme continued to implement and coordinate TB prevention and control activities in all the 4 region of the Country. The NTCP takes the End TB Strategy as its foundation and provides the country with a path towards achieving the Strategy’s milestones. The NTCP presents a means for how the country can break out of the current trend of slow decline and “bend the curves” of incidence and mortality towards ending TB. It provides a set of people-centered targets that the country uses for planning and implementation of TB services.

5.2. Action Points

• Procure more equipment to assist with collection of sputum for diagnosis by nurses (nebulisers-sputum induction, NGT gastric aspiration) especially for the presumptive paediatric TB cases.
• Decentralize diagnosis to peripheral facilities eg equipment for sputum production for paediatric cases and the need to invest more in the decentralization of laboratories in peripheral facilities and reduce the burden on the sample transportation system.
• Investigate causes of high mortality, the discussion was around the need for regional teams to work in collaboration with their regional implementing partners to conduct mortality audits in their respective regions so as to come up with the appropriate strategies to address mortality.
• Advocate for the establishment of Regional IPC Focal Point positions to oversee the development and implementation of IPC Plans at all Facilities.
• There is a need to strengthen linkages for DS-TB and laboratory data.