

REPUBLIC OF SOUTH SUDAN

MINISTRY OF HEALTH



**GUIDELINE FOR
TUBERCULOSIS & TB/HIV
PREVENTION, CARE AND CONTROL
IN SOUTH SUDAN**

Third Edition - 2016

CONTENTS

CONTENTS	II
TABLE OF TABLES:.....	IV
TABLE OF FIGURES:.....	IV
FOREWORD	V
ACKNOWLEDGEMENT	VI
ABBREVIATIONS AND ACRONYMS	VII
CHAPTER 1: INTRODUCTION	- 1 -
1.1 EPIDEMIOLOGY AND CONTROL OF TUBERCULOSIS AT GLOBAL LEVEL.....	- 1 -
1.2 NATURAL HISTORY OF TUBERCULOSIS.....	- 1 -
1.3 EPIDEMIOLOGY OF TUBERCULOSIS IN SOUTH SUDAN.....	- 2 -
CHAPTER 2: HEALTH SYSTEM OF SOUTH SUDAN	- 4 -
CHAPTER 3: ORGANIZATION OF TUBERCULOSIS CONTROL IN SOUTH SUDAN - 5	
-	
3.1 STRATEGY TO CONTROL TB.....	- 5 -
3.2 STRUCTURE OF THE NTP.....	- 6 -
3.2.1 <i>Programmatic management</i>	- 6 -
3.2.2 <i>Provision of TB prevention, care and control services</i>	- 9 -
3.3 THE TB LABORATORY NETWORK.....	- 12 -
3.3.1 <i>TB National Reference Laboratory</i>	- 12 -
3.3.2 <i>State TB laboratory</i>	- 13 -
3.3.3 <i>County TB laboratory</i>	- 13 -
3.4 THE NATIONAL TECHNICAL WORKING GROUP FOR TB CONTROL IN SOUTH SUDAN ...	- 14 -
3.5 THE PARTNER NETWORK FOR TB CONTROL IN SOUTH SUDAN.....	- 14 -
CHAPTER 4: DIAGNOSIS OF TUBERCULOSIS	- 15 -
4.1 PRESUMPTIVE TB.....	- 15 -
4.2 TOOLS TO ESTABLISH TB DIAGNOSIS.....	- 15 -
4.2.1 <i>Sputum smear microscopy</i>	- 16 -
4.2.2 <i>Culture</i>	- 17 -
4.2.3 <i>Xpert MTB/RIF assays</i>	- 17 -
4.2.4 <i>X-ray</i>	- 18 -
4.2.5 <i>Tuberculin skin test</i>	- 18 -
4.2.6 <i>Interferon-gamma release assays</i>	- 19 -
4.2.7 <i>Histopathology</i>	- 19 -
4.3 FORMS OF TUBERCULOSIS.....	- 19 -
4.3.1 <i>Pulmonary TB</i>	- 19 -
4.3.2 <i>Extra pulmonary TB</i>	- 22 -
4.3.3 <i>Childhood TB</i>	- 22 -
CHAPTER 5: DEFINITIONS	- 26 -
5.1 WHY ARE DEFINITIONS NEEDED?.....	- 26 -
5.2 TB CASE DEFINITIONS.....	- 26 -
5.2.1 <i>Classification according to the anatomical site affected with TB</i>	- 27 -
<i>Pulmonary tuberculosis case</i>	- 27 -
5.2.2 <i>Classification according to the history of previous TB treatment</i>	- 27 -
5.2.3 <i>Classification according to the HIV infection status</i>	- 28 -
5.2.4 <i>Classification according to the TB drug resistance status</i>	- 29 -
5.3 TB TREATMENT OUTCOME DEFINITIONS.....	- 29 -
CHAPTER 6: TREATMENTS REGIMENS	- 31 -
6.1 AIMS OF TB TREATMENT.....	- 31 -
6.2 RULES TO RESPECT IN TB TREATMENT PROVISION.....	- 31 -
6.3 ESSENTIAL ANTI-TB MEDICINES.....	- 31 -

6.4 FIXED DOSE COMBINATION	- 32 -
6.5 STANDARDIZED REGIMENS	- 32 -
6.6 TB TREATMENT CATEGORIES	- 33 -
6.6.1 Treatment of new TB cases	- 33 -
6.6.2 Treatment of previously treated TB patients	- 34 -
6.6.3 Treatment of TB in children	- 35 -
6.6.4 Treatment of extra pulmonary TB	- 36 -
6.7 PROVISION OF TB TREATMENT TO PATIENT	- 37 -
CHAPTER 7: MONITORING DURING TB TREATMENT	- 38 -
7.1 MONITORING TB PATIENT	- 38 -
7.1.1 Monitoring practices for all patients irrespective of their form of TB	- 38 -
7.1.2 Monitoring according to the form of TB	- 38 -
7.2 RECORDING THE TREATMENT OUTCOMES	- 43 -
7.3 COHORT ANALYSIS OF TREATMENT OUTCOMES	- 43 -
7.4 SIDE EFFECTS OF ANTI-TB DRUGS AND THEIR MANAGEMENT	- 44 -
7.4.1 Prevention of adverse reactions associated with anti-TB medicines	- 44 -
7.4.2 Monitoring and recording adverse effects	- 45 -
7.4.3 Symptom-based approach to managing side-effects of anti-TB drugs	- 45 -
CHAPTER 8: TUBERCULOSIS, HIV AND AIDS	- 49 -
8.1 STRENGTHENING THE MECHANISMS FOR DELIVERING INTEGRATED TB/HIV SERVICES	- 49 -
8.1.1 Maintaining and strengthening the existing coordination mechanism for	- 49 -
8.1.2 Ensuring the surveillance of HIV infection among TB patients and TB among PLHIV	- 49 -
8.1.3 Undertaking joint TB/HIV planning to integrate TB and HIV services	- 51 -
8.1.4 Monitoring and evaluating TB/HIV collaborative activities	- 51 -
8.2 REDUCING THE BURDEN OF TB AMONG PLHIV	- 51 -
8.2.1 Intensifying TB case-finding and ensuring high-quality anti-TB treatment	- 52 -
8.3 REDUCING THE BURDEN OF HIV IN PATIENTS WITH TB	- 56 -
8.3.1 Providing HIV testing and counselling to TB patients	- 56 -
8.3.2 Introducing HIV prevention interventions for patients with TB	- 56 -
8.3.3 Providing co-trimoxazole preventive therapy for TB patients living with HIV	- 57 -
8.3.4 Providing antiretroviral therapy for TB patients living with HIV	- 57 -
8.3.5 Ensuring HIV prevention interventions, treatment and care for TB patients living with HIV	- 58 -
CHAPTER 9: DRUG-RESISTANT TUBERCULOSIS	- 59 -
9.1 IDENTIFICATION OF DRUG-RESISTANT TB	- 61 -
9.2 TREATMENT OF DRUG-RESISTANT TB	- 61 -
9.3 MONITORING OF DRUG-RESISTANT TB TREATMENT	- 63 -
9.4 TREATMENT EVALUATION	- 63 -
CHAPTER 10: TREATMENT REGIMENS IN SPECIAL SITUATIONS	- 64 -
10.1 PREGNANCY	- 64 -
10.2 BREASTFEEDING	- 64 -
10.3 ORAL CONTRACEPTION	- 64 -
10.4 LIVER DISEASE	- 64 -
10.5 RENAL FAILURE	- 65 -
10.6 ADJUVANT STEROID THERAPY	- 66 -
CHAPTER 11: ADHERENCE TO TREATMENT	- 67 -
11.1 TREATMENT ADHERENCE	- 67 -
11.2 DIRECTLY OBSERVED TREATMENT	- 68 -
11.3 INTERRUPTION OF TB TREATMENT	- 69 -
11.3.1 Prevention of interruption of treatment	- 69 -
11.3.2 Action to be taken when a patient is lost to follow-up	- 70 -
11.3.3 Strategies to improve treatment adherence	- 72 -
CHAPTER 12: PREVENTION OF TUBERCULOSIS	- 74 -

12.2 PREVENTIVE THERAPY	- 74 -
12.3 BACILLE CALMETTE-GUERIN VACCINE	- 74 -
12.4 TB CONTACT INVESTIGATION	- 75 -
12.5 PREVENTION OF TB TRANSMISSION IN LABORATORY	- 75 -
12.6 CONTROL OF TB IN HEALTH CARE SETTINGS	- 76 -
12.7 IMPROVEMENT IN HOUSING CONDITIONS	- 76 -
12.8 CONSUMPTION OF RAW MILK	- 76 -
REFERENCES	- 77 -
ANNEXES	- 80 -
ANNEX 1: STRUCTURE OF THE NATIONAL TUBERCULOSIS PROGRAMME IN SOUTH SUDAN ..	- 80 -
ANNEX 2: TECHNIQUES OF COLLECTING SPUTUM	- 81 -
ANNEX3: QUALITY ASSURANCE OF SPUTUM SMEAR MICROSCOPY	- 82 -
ANNEX 4: SIDE EFFECTS OF ANTI-TUBERCULOSIS DRUGS AND THEIR MANAGEMENT	- 84 -
ANNEX 5: DRUG MANAGEMENT	- 87 -
ANNEX 6: TUBERCULOSIS RECORDING AND REPORTING TOOLS	- 88 -

TABLE OF TABLES:

Table 1: Reporting results of sputum examination	- 17 -
Table 2: Doses of first line anti TB in adults	- 32 -
Table 3: Treatment administration in new patients (adults0, South Sudan	- 33 -
Table 4: Administration of TB treatment in adults	- 35 -
Table 5: Daily doses of first-line anti-TB drugs for children	- 35 -
Table 6: Administration of TB treatment in children (<25kg body weight).....	- 36 -
7: Box 1 Possible reasons for positive presumptive sputum smear microscopy at the end of the initial phase of TB treatment.....	- 43 -
Table 8: symptom-based approach to managing side effects of anti TB drugs ..	- 47 -
9: Box 2 Common errors that can contribute to the emergence of drug-resistant Tuberculosis.....	- 60 -
Table 10: Management of new patients who interrupt treatment	- 70 -
Table 11: Management of re-treatment patients who interrupt treatment	- 72 -

TABLE OF FIGURES:

Figure 1: Notified incidence of smear-positive pulmonary TB by age group and gender, South Sudan, 2014	- 3 -
Figure 2: Flow chart for diagnosis of tuberculosis in South Sudan.....	- 21 -
Figure 3: Diagnosis of TB in seriously ill HIV positive patient.....	- 53 -
Figure 4: Diagnosis of TB in PLHIV in ambulatory settings	- 54 -

Foreword

The Ministry of Health is privileged to present to all stake holders engaged in the fight against Tuberculosis in South Sudan the third edition of the National Tuberculosis and TB/HIV treatment, prevention and control guidelines. The second edition that this guideline supersedes was developed in 2010. Since then, significant events have taken place in the fight against Tuberculosis not only in South Sudan but on the global scene. It is thus, opportune time that prevention, treatment and control guidelines are reviewed in line with current global and national trends.

The guideline is organized into 12 chapters including a section on various annexes.

New in this guideline compared to the second edition include:

- A slight modification in terminology; for instance, instead of using the stigmatising phrase ‘TB suspect’ this guideline recommends use of ‘Presumptive TB case’ for people with features suggestive of TB;
- Recommendation of using two sputum tests for diagnosis of Tuberculosis instead of three tests and one test for all follow up tests;
- Use of new technology such as LED microscopy and Gene – X-pert tests in special situations;
- In the area of TB/HIV; this guideline recommends initiation of ART for any patient co-infected with TB/HIV regardless of CD4 status, initiation of Isoniazid Preventive Therapy (IPT) for all HIV positive patients with no evidence of TB and use of Gene X-pert test as a first line test for diagnosis of TB in People Living with HIV (PLHIV) and a recommendation for use of the standard WHO four questions for screening TB among PLHIV;
- The recording and reporting tools have also been reviewed to capture new technology and realign the tools to current WHO recommendations.

It is the hope of the Ministry of Health that, all partners private and public engage in TB prevention, treatment and control activities adhere to the recommendations put forward so that we can realise the goal of reducing the prevalence of TB by at least 30% by 2030 in line with the Tuberculosis National Strategic plan 2015 – 2019.

Signed,

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Undersecretary,
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Signed,

.....
Dr. John Rumunu,
Director General, Preventive Health Services,
Ministry of Health.

Abbreviations and acronyms

AAA	Arkangelo Ali Association
AFB	Acid Fast Bacilli
AIDS	Acquired Immunodeficiency Syndrome
ARV	Antiretroviral
BCG	Bacille Calmette Guérin
COSV Volontario	Coordinamento delle Organizzazioni per il Servizio
CPT	Co-trimoxazole Preventive Therapy
CTB	Challenge TB Project
CXR	Chest X Ray
DOT	Directly Observed Treatment
DOTS	Internationally recommended strategy for TB Control until 2005
DST	Drug Susceptibility Testing/Test
E	Ethambutol
EPTB	Extra pulmonary Tuberculosis
FBO	Faith-Based Organization
FDC	Fixed-Dose Combination
GF	Global Fund
H	Isoniazid
HIV	Human Immunodeficiency Virus
IGRA	Interferon-Gamma Release Assays
IPT	Isoniazid Preventive Therapy
IOM	International Organization of Migration
LED	Light Emitting Diode
MCH	Maternal and Child Health
MDR	Multi-Drug Resistance/Resistant
MDR-TB	Multi-Drug Resistant Tuberculosis
MSH	Management Sciences for Health
NACP	National HIV and AIDS Control Programme
NGO	Non Governmental Organization
TBNRL	National Reference Laboratory
NSP	National Strategic Plan
NTP	National Tuberculosis Programme
NTWG	National Technical Working Group
PCP	Pneumocystis Carinii Pneumonia
PHC	Primary Health Care
PHCC	Primary Health Care Centre
PHCU	Primary Health Care Unit
PLHIV	People Living with HIV
PMDT	Programmatic Management of Drug-resistant Tuberculosis
PMTCT	Prevention of Mother-To-Child Transmission

PTB	Pulmonary Tuberculosis
R	Rifampicin
S	Streptomycin
SOP	Standard Operating Procedure
SSAC	South Sudan AIDS Commission
TB	Tuberculosis
TBMU	TB management unit
TST	Tuberculin Skin Test
USAID	United States Agency for International Development
WHO	World Health Organization
XDR-TB	Extensively Drug Resistant Tuberculosis
Z	Pyrazinamide

Chapter 1: INTRODUCTION

1.1 EPIDEMIOLOGY AND CONTROL OF TUBERCULOSIS AT GLOBAL LEVEL

Tuberculosis (TB) is a major problem of public health at global level. It ranks 4th among the top infectious disease killers, after acute respiratory infections, diarrhoeas and human immunodeficiency virus (HIV) infection/acquired immunodeficiency syndrome (AIDS). The World Health Organization (WHO) estimates, for the year 2014, that, worldwide, approximately:

- 9,6 million people developed active TB, among whom 3.2 million are women, 1.2 million persons living with HIV (PLHIV) and 1 million children,
- 1.5 million died from TB, among whom 480,000 are women, 400,000 HIV-infected persons and 140,000 children,
- 480,000 people developed multidrug-resistant (MDR) TB, among whom 190,000 died from it.

Approximately 60% of TB cases are males and 75% are aged 15 to 54 years which indicates that TB is significantly affecting individuals belonging to the economically productive age group. The African (58%) and Asian (28%) continents account for 86% of the global TB burden. The top country contributors to the global TB burden are India (23%), China (10%) and Indonesia (10%).

The highest TB prevalence is in sub-Saharan Africa countries; in 2014, the prevalence was on average 281 per 100,000 populations (versus 133 per 100,000 populations at global level).

It is estimated that, at global level, the incidence fell on average by 1.5% per year between 2000 and 2014 while the mortality rate and the prevalence decreased by 47 and 42% respectively between 1990 and 2014. Worldwide in 2014, 63% of the estimated 9.6 million of TB cases were identified and notified. In 2013, 86% of notified new TB cases were successfully treated. Since 1995, 66 million TB patients have been cured.

1.2 NATURAL HISTORY OF TUBERCULOSIS

The bacteria that causes TB belongs to *Mycobacterium tuberculosis* complex which includes eight distinct closely related microorganisms. Among them, the most common and important agent of TB in human beings is *M. tuberculosis*. WHO estimates that approximately one third of the world population is infected with this bacillus. Once infected, a person remains infected for many years, probably for life.

People with active pulmonary TB are the source of TB infection; they shed TB bacilli in the community. The route of transmission of TB bacilli is airborne

through droplets produced by patients with active TB when they cough or sneeze. These droplets contain tubercle bacilli, usually evaporate, decrease in size, become droplet nuclei and remain suspended in the air for several hours. If inhaled, a droplet nucleus is small enough in size to reach an alveolus in the lung. A person who breathes in air including droplet nuclei containing tubercle bacilli may become infected with TB bacilli; this is the reason why ventilation and ultraviolet light reduce the risk of transmission of TB bacilli.

The vast majority (90 to 95%) of people who are infected with the *M. tuberculosis* do not develop active TB disease. In these healthy and asymptomatic individuals, the only evidence of infection is usually a positive tuberculinic reaction. Infected people can develop active TB at any time of their life. The risk of developing TB disease is high in the first few years following infection, then decreases for a prolonged period of time. Various factors may trigger the progression of infection to disease, the most important is immunodeficiency, especially when it is related to HIV infection. TB can affect most tissues and organs, but it most commonly involves the lungs.

TB chemotherapy can cure more than 90% of patients with drug-sensitive TB. Without treatment, approximately 50% of active pulmonary TB patients who are HIV-negative will die after 5 years (the death rate is commonly much higher in HIV-positive patients), 25% will be healthy (self-cured because of the existence strong immune defense), and 25% will remain ill with chronic, potentially infectious TB.

1.3 EPIDEMIOLOGY OF TUBERCULOSIS IN SOUTH SUDAN

TB is a major problem of public health in South Sudan. According to the WHO estimates for the year 2014: i) the prevalence of TB was 319 cases per 100,000 population, ii) 17,000 people were newly affected with TB, indicating an incidence of 146 new TB cases per 100,000 population and iii) 3,400 persons died of TB which resulted in a mortality rate of 29 deaths from TB per 100,000 population.

The information system of the National TB Programme (NTP) indicates that TB notification has increased from 2,955 cases in 2008 to 8,856 in 2014. The information system of NTP reported that among smear-positive pulmonary TB cases notified in 2014:

- 65% are males, which indicates a sex-ratio of 2 males for 1 female;
- One third of them belongs to the age group 25-34 years in both gender groups;
- 85% are aged less than 45 years in both gender groups.

Among the total number of smear-positive pulmonary TB patients notified, two thirds were identified in 4 of the 10 states, namely: Central Equator State (38%),

Warrap State (12%), Northern Bahr El Ghazal State (11%) and Upper Nile State (5%).

The incidence of notified smear-positive pulmonary TB cases was 37 per 100,000 population at national level in 2014. This notified incidence was significantly higher in males than in females in all the age groups except for those aged less than 15 years or more than 64 years (see graphs below). In the age group 25 to 44 years, males are approximately 2 times more likely to be notified for smear-positive pulmonary TB than females.

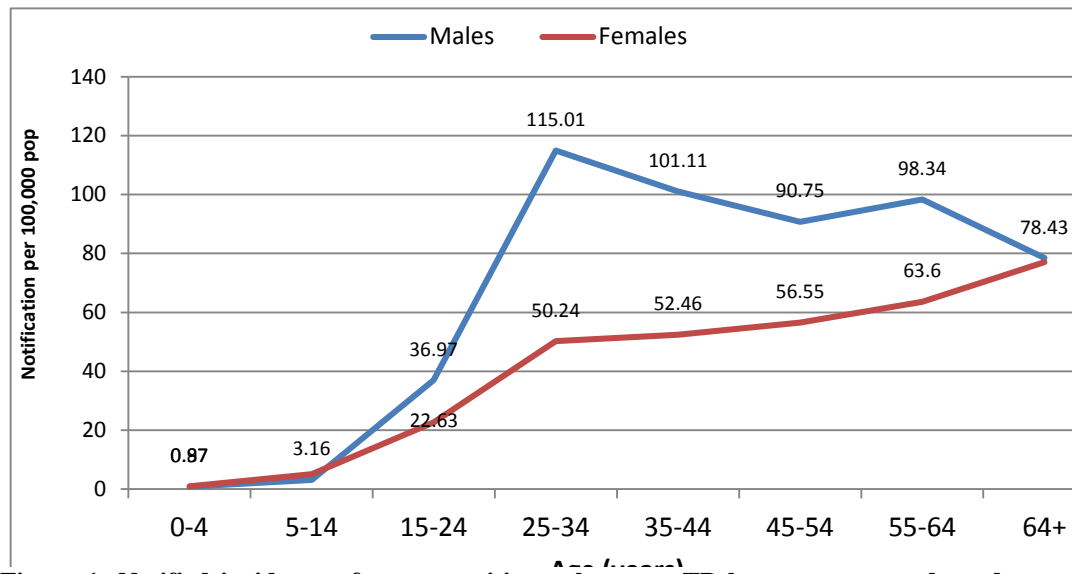


Figure 1: Notified incidence of smear-positive pulmonary TB by age group and gender, South Sudan, 2014

Even though the notified incidence of smear-positive TB is low in the age group below 15 years, it is important to highlight that 20% of TB cases, all forms, notified in 2014 belong to this age group.

The highest notified incidence of smear-positive pulmonary TB was in four states: Central Equator State, Western Bahr El Ghazal State, Northern Bahr El Ghazal State and Warrap State.

The HIV and AIDS epidemic is generalized in South Sudan. In 2012, the prevalence of HIV infection was estimated at 2.6% among the persons aged 15 to 49 years and the total number of PLHIV at 152,000. The occurrence of TB among PLHIV is still unknown in South Sudan. Consistent data from the NTP and a survey carried out in 10 states in 2011, suggest that the prevalence of HIV infection in patients with TB is approximately 15% (13% in 2014). Also, the cohort analysis of PLHIV who are treated for TB within the existing NTP network indicates that death rate was 11% in 2012 and 10% in 2013.

According to the WHO, the burden of MDR-TB among newly notified pulmonary TB and TB re-treatments was 225 MDR-TB cases in 2014. The WHO estimates the prevalence of MDR-TB among new TB cases and retreatment TB cases at 2.2% and 11% respectively.

Chapter 2: HEALTH SYSTEM OF SOUTH SUDAN

According to Health Facility Mapping 2011, there are 1,147 functional health facilities across the national territory. These health facilities includes:

- 3 teaching hospitals,
- 7 state hospitals,
- 27 county hospitals,
- 284 primary health care centres (PHCC),
- 792 primary health care units (PHCU),
- 10 private medical facilities,
- 14 specialized hospitals/clinics and
- 10 police and military health facilities¹.

A PHCC is the first referral health facility which is intended to receive the patients who are referred from the PHCUs located in its catchment area. A PHCU is the most peripheral health facility that is in close contact with communities and directly deals with the community health workers, especially the home health promoters.

It is estimated that 44% of the population are settled within a 5-kilometer radius from a health facility. The patient's attendance is not well balanced; for instance, half of the demand of care takes place in the three teaching hospitals (Wau, Malakal and Juba), 25% in the PHCCs and county and state hospitals, and the rest in the PHCUs.

Community health workers, which include community midwives, maternal and child health workers and home health promoters, provide health services in the community. These community health workers, especially home health promoters are closely linked to the PHCU network. The key role of the home health promoters is to ensure basic health services within the communities. Community health workers are mainly employed by the non-governmental organizations (NGO) that provide health services in the country. It is important to highlight that the provision of primary health care (PHC) services, free of charge at the point of care, is the key strategy adopted by the Ministry of Health and developed in the Health Sector Development Plan 2012-2016.

The government intends to fund its development agenda through the mobilization of different sources of funding including government own funds, donors and community resources. The government of South Sudan has a policy of devolution of power to the state level structures to address service delivery at county and lower levels. Approximately 4% of the annual government budget is allocated to health.

¹ South Sudan July 2011 the Basic Package of Health and Nutrition Services /in the Secondary/Tertiary Health Care Basic Package of Health Services, South Sudan, 2011

Chapter 3: ORGANIZATION OF TUBERCULOSIS CONTROL IN SOUTH SUDAN

TB control in South Sudan is organized in the framework of a national health programme which includes not only the control of TB but also that of leprosy and Buruli Ulcer. This programme was established in 2006 and is under the responsibility of the Directorate of Preventive Health Services within the Ministry of Health.

The NTP has a managerial structure that covers all the three key health levels. This structure ensures the organization, coordination, implementation and delivery of TB prevention, care and control services.

Goal of the NTP: To contribute towards reduction of TB prevalence from 257/100,000 (WHO estimate, 2012) to 180/100,000 (30%) by the year 2030

To this end, mid-term objectives have been defined and specified in the 2015-2019 National Strategic Plan (NSP). These objectives are:

- **Objective 1:** To increase the number of notified TB cases to at least 24,000 in 2019.
- **Objective 2:** To increase treatment success rate of bacteriologically confirmed TB cases from 72% in 2012 to at least 85% by 2019.
- **Objective 3:** To achieve a treatment success rate of at least 75% among enrolled MDR-TB patients by 2019.
- **Objective 4:** To reduce death rate during TB treatment in TB/HIV co-infected patients from 11% to less than 5% by 2019.
- **Objective 5:** To strengthen the overall capacity of NTP management.

3.1 STRATEGY TO CONTROL TB

DOTS strategy was initiated at very low scale in 2002 with 12 health facilities which provided TB diagnosis and treatment services. The NTP adopted the WHO Stop TB Strategy in 2006 which focused on the extension of basic DOTS services and the implementation of TB/HIV collaborative activities. TB control has been supported to date mainly by the Global Fund (GF), United State Agency for International Development (USAID), TBREACH, Management Sciences for Health (MSH) and WHO. Many NGOs and faith-based organizations (FBO), such as Arkangelo Ali Association, Catholic Diocese of Torit, COSV or Doctors With Africa (CUAAM) are closely collaborating with NTP in its TB control efforts. Until 2014, TB services have been implemented

in 87 TB diagnosis and treatment centres; none of the 792 PHCUs that are available across the country is ensuring any TB services.

In early 2015, the NTP adopted the WHO End TB Strategy to achieve the objectives identified in the 2015-2019 NSP. In line with this new WHO strategy for TB control, the NTP is intending, in the coming years, to:

- i) expand TB diagnosis and treatment services in the hospitals and PHCCs and implement basic TB services in PHCUs with a priority for the underserved areas,
- ii) extend and strengthen collaborative TB and HIV activities
- iii) implement the programmatic management of drug-resistant TB (PMDT)
- iv) provide and strengthen TB services for high risk groups and vulnerable populations, including refugees and displaced people
- v) ensure an efficient coordination among partners involved in TB control in South Sudan
- vi) improve the technical and managerial capacities of the NTP at all levels of the health system
- vii) ensure an efficient information system regarding TB surveillance and monitoring and evaluation of TB control activities.

3.2 STRUCTURE OF THE NTP

The structure of the NTP has 2 entities: one for programmatic management and the other for the provision of TB prevention, care and control services.

3.2.1 Programmatic management

The programmatic management is carried out at three levels:

3.2.1.1 The Central Unit of the NTP

This unit is hosted within the Directorate of Preventive Health Services of the Ministry of Health. It includes various staff headed by the NTP manager.

The Central Unit is responsible for:

- The definition and formulation of the national strategy to prevent and control TB in South Sudan;
- The development of guidelines and standard operating procedures (SOP) to implement TB prevention, care and control interventions and activities within the existing health care network;
- The establishment of NSPs to implement these interventions and activities as identified in the national strategy and as specified by the guidelines and SOPs;
- The elaboration of annual operational plans;
- The mobilization of resources to implement the various components of the NSPs;

- The organization of the training of health workers, including the establishment of training programmes and the development of the various training modules;
- The procurement and supply chain management, particularly TB drug management;
- The organization of the supervision of TB services implementation and provision at all levels;
- The coordination with the National Reference Laboratory to implement and extend TB diagnosis within the existing health facilities' network;
- The coordination with the National HIV and AIDS control Programme;
- The establishment of mechanisms to ensure the coordination with all partners involved in TB control in South Sudan;
- The provision of technical support to the State Coordination Units of NTP;
- The coordination of NTP activities with and among the state coordination units of NTP;
- The organization of the provision of support to NGOs and FBOs ensuring TB services in high risk groups and vulnerable populations such as refugees or incarcerated persons;
- The collaboration with all the categories of care providers, especially those practicing in the private sector;
- The implementation of an efficient monitoring and evaluation system at all health levels;
- The analysis of the data generated through the monitoring and evaluation system and the diffusion of the results of this analysis to those who need to be informed;
- The establishment of an operational research agenda on TB and TB prevention and control in South Sudan;
- The mobilization of financial resources from potential funding sources at national and international levels or through bilateral or multilateral cooperation channels;
- The advocacy for TB control in order to keep its visibility among the top health priorities of the country;
- The development of appropriate, coherent and standardized health education messages on TB and TB prevention and control.

3.2.1.2 The State Coordination Unit of the NTP

The State Coordination Unit of the NTP is hosted in the State Ministry of Health of each of the states of South Sudan. It is headed by a State TB Coordinator who works under the leadership of the NTP Central Unit.

The State TB Coordinator is responsible, at state level, for:

- The implementation of the national guidelines and SOPs issued by the NTP Central Unit;

- The development of annual operational plan for TB prevention, care and control activities to be implemented across the state territory in coherence with the NSP;
- The training of the health staff involved in TB prevention, care and control in the state;
- The provision of support to and in close coordination with the TB unit coordinators of the counties located in the state;
- The supervision of the implementation of TB prevention, care and control interventions and the monitoring of their quality in the state;
- The management of TB drugs and other supplies;
- The implementation of the monitoring and evaluation system as specified in the NTP strategy;
- The collection, compilation and analysis of the data generated by the monitoring and evaluation system across the state;
- The communication and coordination with the NTP Central Unit;
- The coordination with and support to the TB laboratory technician in charge of the management of state TB laboratory network;
- The monitoring and evaluation of the external quality control of TB laboratory activities carried out;
- The coordination and collaboration with NGOs, FBOs and other partners involved in TB activities across the state;
- The coordination and close collaboration with the State Coordinator for NACP activities;
- The coordination and close collaboration with the State Director for preventive health services
- The organization of the quarterly meetings on TB control situation in the State;
- The promotion of the visibility of TB control among the top health priorities of the State Ministry of Health The provision of support to the research activities conducted in the state by NTP Central Unit.

3.2.1.3 The County TB Unit

This unit is located in the County Health Department and headed by a County TB Coordinator who reports to the State TB Coordinator. The County TB Unit is responsible for:

- The implementation of TB prevention, care and control activities in the county health facilities in line with the NTP requirements and the annual operational plan established by the NTP State Coordination Unit;
- The appropriate supply of county health facilities with TB drugs, TB laboratory supplies;
- The supervision of the implementation of TB services and the monitoring of their quality in the health facilities;

- The availability of the recording and reporting tools in the health facilities;
- The collection, compilation and analysis of data generated by the monitoring and evaluation system and the submission of the quarterly reports to the NTP State Coordination Unit;
- The supervision of the TB services provided by the health home promoters operating in the communities as well as the assessment of the quality of these services;
- The coordination of TB and HIV collaborative activities;
- The coordination and close collaboration with the NTP State Coordination Unit;
- The coordination with the County Health Department;
- The collaboration with the NGOs operating within the county territory.

3.2.2 Provision of TB prevention, care and control services

One of the key roles is to ensure the provision of TB services to population. Most of these services are offered, broadly, in three categories of health facilities.

3.2.2.1 Tertiary hospital

The tertiary hospital deals with TB and respiratory patients who are severely ill or in need of further investigations and/or treatment. Many of these patients are referred from state and county hospitals.

All patients with MDR-TB should be managed and followed by the tertiary hospitals in line with the NTP guidelines on PMDT and in close collaboration and coordination with the relevant NTP state coordination units and TB diagnosis and treatment centers as well as with the NTP Central Unit.

The tertiary hospitals should also ensure TB diagnosis and treatment services on outpatient basis like any health facility which offers such services. They should register TB patients who are treated and followed at their level, and report on quarterly basis to the NTP the required data on TB cases identified and TB treatment outcomes.

3.2.2.2 TB diagnosis and treatment centre

The TB diagnosis and treatment centre is the basic health unit for TB diagnostic and treatment. Most of state and county hospitals have a health centre which provides such services; in addition, many PHCCs ensure TB diagnosis and treatment services. The following elements are required for a TB diagnosis and treatment centre to be appropriately functional:

- The health workers who are ensuring TB services must be, beforehand, trained by the NTP through the NTP state coordination units;
- There is a functional TB microscopy laboratory;
- TB drugs are available for the expected number of patients;
- TB laboratory supplies are available;

- The recording and reporting forms required in the NTP strategy are available;
- There are clear linkages with PHCUs.

The role of TB diagnosis and treatment centre is to:

- Identify patients with a presumptive TB;
- Perform sputum smear microscopy for TB diagnosis;
- Refer patients with TB or presumptive TB for further management;
- Ensure, when indicated, “**Xpert testing**”, if Xpert machine is available if not through: i) the transportation of patients’ specimens or ii) the referral of patients to Xpert site;
- Administer TB treatment to patients according to the NTP guidelines
- Use the registration system required by the NTP (register of presumptive TB patients, request form for TB laboratory testing, TB microscopy register, TB treatment register, TB index case form for contact investigation, transfer and referral forms);
- Refer patients to receive their TB treatment in the relevant PHCUs whenever needed;
- Provide TB treatment to patients who need to receive their TB medicines from the TB diagnosis and treatment centre and ensure the direct supervision of treatment;
- Ensure HIV screening and testing to all TB patients identified and registered;
- Ensure that the TB patients who are identified HIV-positive are registered in the HIV and AIDS registration system of the NACP;
- Ensure that TB/HIV patients are receiving their co-trimoxazol antiretroviral (ARV) treatments either in the same TB diagnosis and treatment centre or in the closest ART sites;
- Trigger TB contact investigation around the identified index TB cases;
- Ensure reporting on quarterly basis as required by the NTP policy to the County Health Department on TB notification, TB treatment outcomes and smear conversion at the end of the intensive phase of TB treatment as well as reporting on TB drug availability and needs;
- Closely collaborate with and provide support to the relevant PHCUs.

3.2.2.3 Primary Health Care Unit

The PHCU is the most peripheral health facility of the health system and, therefore the closest to communities. One of the main roles of PHCU is to ensure TB treatment services to patients.

A PHCU is adequately involved in TB services’ provision if:

- The health workers, in charge of health care provision, are appropriately trained by the NTP through the State Coordination Unit and the County Health Department;

- There is a regular TB drug supply ensured by the County Health Department and the relevant TB diagnosis and treatment centre;
- The required registers and forms are available;
- There are strong and appropriate linkages with the local home health promoters' network.

The role of PHCU is to:

- Identify patients with presumptive TB;
- Register patients with a presumptive TB in the Presumptive TB Patients' Register;
- Refer presumptive TB patients to the closest and relevant TB diagnosis and treatment centre for sputum smear microscopy;
- Ensure the provision of TB treatment as prescribed by the relevant TB diagnosis and treatment centre as well as the direct supervision of anti-TB drugs' intake;
- Refer TB patients who are on treatment to the relevant TB diagnosis and treatment centre whenever required (ex.: at the end of the intensive phase of treatment, at the 5th month of treatment and at the end of treatment or because of anti-TB drug side effects);
- Use the required information tools, such as the Presumptive TB Patient Register, TB laboratory test request forms, TB treatment card (which remains in the PHCU), TB identity card (which remains with the patient) and TB contact investigation forms;
- Ensure that TB contacts are identified and screened as per the NTP policy;
- Trace and catch up TB patients who have interrupted their treatment;
- Closely collaborate and coordinate with the relevant TB diagnosis and treatment centre;
- Closely collaborate with and supervise home health promoters involved in TB prevention, care and control activities in local communities;
- Ensure reporting, whenever required, on patients' treatment outcome, TB contact investigation activities undertaken and TB drugs' availability and needs.

3.2.2.4 Home health promoter

The key role of home health promoter is to provide basic health services within community. Their contribution to TB prevention, care and control is to make some TB services as close as possible to patients. An appropriate involvement of home health promoter in TB services' provision requires:

- An adequate training by the NTP through the County Health Department;
- Strong linkages with the relevant PHCU.

The role of home health promoter is to:

- Identify patients with a presumptive TB;

- Refer the identified patients with a presumptive TB to the relevant PHCU;
- Provide TB treatment to patients as required by the relevant PHCU as well as ensure the direct supervision of this treatment;
- Refer TB patients who are on treatment to the PHCU whenever required;
- Fill and complete the TB treatment card and TB identify card as needed;
- Contribute to the identification and screening of TB contacts in community and refer TB contacts, who must be referred, to the relevant PHCU as required by the NTP policy;
- Trace and catch up, within community, TB patients who have interrupted their treatment;
- Closely collaborate with the relevant PHCU;
- Ensure reporting, whenever required, on patients' treatment outcome, TB contact investigation activities undertaken and TB drugs' availability.

3.3 THE TB LABORATORY NETWORK

The TB laboratory network is an important component of the NTP of South Sudan. It includes a TBNRL and TB microscopy laboratories. There are, to date, 87 functional TB microscopy laboratories across the country; it is planned to significantly increase their number within the coming years.

3.3.1 TB National Reference Laboratory

The TB NRL is a component of the NTP Central Unit and is assisted by the National Working Group for TB Laboratory. The role of the TB NRL is to:

- Develop appropriate TB laboratory network in South Sudan through:
 - The development of strategic and operational plans to expand TB laboratory network;
 - The procurement of adequate TB laboratory equipment;
 - Adequate management of TB laboratory supplies and consumables (eg.: reagents or sputa containers);
 - The maintenance of TB laboratory equipment (eg.: microscopes);
 - The implementation of functional information system regarding TB laboratory activities and performance;
 - Efficient linkages with the TB laboratories operating at state level;
- Ensure efficient TB laboratory activities through:
 - The development of national guidelines and SOPs to carry out TB laboratory activities;
 - The training of laboratory staff performing sputum smear microscopy, Xpert testing and culture;
 - The implementation of efficient external quality control for TB microscopy;
 - The organization of the supervision of TB laboratory activities;

- The implementation of drug susceptibility testing (DST) activities;
- The evaluation of TB laboratories activities through the data generated by the laboratory information system;
- Ensure TB drug resistance surveillance through:
 - The organization of regular TB drug resistance surveys;
 - The monitoring of rifampicin resistance through Xpert MTB/RIF testing activities.

3.3.2 State TB laboratory

The State TB laboratory is an important component of the State Coordination Unit of the NTP. It is usually located in a TB diagnosis and treatment centre within a state hospital.

The role of the State TB Laboratory is to:

- Ensure sputum smear microscopy for the patients identified with presumptive TB;
- Perform Xpert MTB/RIF testing for the eligible patients;
- Contribute to the training organized by the TB NRL for the microscopists for TB diagnosis and treatment centres located in the state;
- Contribute to ensuring the external quality control of TB microscopy activities carried out in the TB laboratories of the counties' TB diagnosis and treatment centres located in the state;
- Ensure the supervision of TB laboratories' activities of the counties' TB diagnosis and treatment centres located in the state;
- Ensure the transfer of specimens that have shown a rifampicin resistance through Xpert MTB/RIF testing;
- Ensure the data collection of TB laboratory activities at state level using the required information system of the TB NRL and establish the reports required by the TB NRL;
- Appropriately manage the supplies needed for the activities to be undertaken within the state TB laboratory network;
- Closely collaborate with the TB NRL and the State Coordination Unit of the NTP.

3.3.3 County TB laboratory

The County TB laboratory is usually located in a TB diagnosis and treatment centre which could be within a county hospital.

The role of the County TB Laboratory is to:

- Ensure sputum smear microscopy for the patients identified with presumptive TB in line the guidelines issued by the TB NRL;
- Ensure the availability of reagents and consumables to carried out the expected laboratory activities;
- Collaborate with the State TB Laboratory to ensure appropriate external quality control;

- Ensure the transfer of specimens of patients who are eligible for Xpert MTB/RIF testing;
- Collect the appropriate data using the information system developed by the TB NRL and establish the required reports;
- Appropriately manage the supplies needed for the activities to be undertaken in the county TB laboratory;
- Closely collaborate with the State TB laboratory and the County TB Unit.

3.4 THE NATIONAL TECHNICAL WORKING GROUP FOR TB CONTROL IN SOUTH SUDAN

The National Technical Working Group (NTWG) for TB Control in South Sudan is a consultative body. It assists the NTP Central Unit to elaborate the national policy for TB prevention, care and control. It contributes to evaluating the outcomes of the interventions developed and implemented by the NTP and helps in identifying and defining the NTP strategic orientations.

Also, the NTWG for TB control in South Sudan includes two sub-groups:

- The National Working Sub-Group for TB laboratory which assists the NTP Central Unit and the TB NRL in developing and strengthening the national TB laboratory network and improving the services providing within this network;
- The National Working Sub-Group for Childhood TB which helps the NTP Central Unit in defining strategic orientations and developing national guidelines and SOPs regarding childhood TB in South Sudan.

The NTWG closely collaborates with National TB/HIV Coordinating Committee (see paragraph 8.1.1).

3.5 THE PARTNER NETWORK FOR TB CONTROL IN SOUTH SUDAN

The NTP has many partners involved in TB control efforts in South Sudan. Significant part of the TB prevention, care and control services are provided to the population through NGOs and FBOs which ensure many health care services including those for TB. In addition, many international agencies such as MSH and WHO provide technical assistance and international donors, such as GF and USAID are financially supporting TB control in South Sudan.

In addition, there is a national coordination mechanism for TB control in refugees and displaced populations in South Sudan. All NGOs and partners involved in TB and TB/HIV collaborative activities in settings with refugees and displaced persons are represented in this mechanism; the roles and responsibilities of each stakeholders are specified in a national framework document (see “Framework for TB and TB/HIV prevention, care and control in refugees and internally displaced populations in South Sudan”).

Chapter 4: DIAGNOSIS OF TUBERCULOSIS

TB is usually identified in persons who seek care for symptoms compatible with this disease. However, it may be detected in some particular circumstances such as through TB contact investigation or active screening for TB in PLHIV, in incarcerated people or in miners exposed to silica dusts. TB can affect all the organs and tissues of the body; lungs are more frequently affected. The diagnosis of TB is usually established after a clinical assessment and bacteriological testing.

4.1 PRESUMPTIVE TB

It refers to patient who presents with symptoms or signs suggestive of TB. The most important symptom that should lead to a sputum examination is a productive cough of duration of more than 2 weeks.

The following symptoms and signs are also suggestive of TB:

- Significant weight loss;
- Persistent evening fever;
- Night sweats;
- Haemoptysis;
- Chest pain
- Tiredness;
- Loss of appetite;
- Gibbus;
- Enlarged non painful cervical lymph nodes with or without discharge ;
- Pleural effusion;
- Distended abdomen with ascites, typically in female adolescent or young woman;
- Phlyctenular conjunctivitis;
- Erythema nodosum.

4.2 TOOLS TO ESTABLISH TB DIAGNOSIS

The confirmation of the diagnosis of TB needs bacteriological examinations, because only bacteriological evidence can confirm the diagnosis of TB. These examinations are carried out on specimens which can be: i) sputum, ii) effusion fluid, iii) purulent fluid from adenopathy or discharge fistula or iv) fragment of tissue (biopsy).

The diagnosis of TB may also be established without any bacteriological confirmation, on the basis of clinical assessment.

The key rule is: all patients who have been coughing for 2 weeks and more must be asked to provide at least 2 sputum samples for smear microscopy examination (see Annex). The provision by the patient and the sputum examination should be carried out on the same day in such way, if the microscopy shows acid-fast bacilli (AFB), TB treatment can be started during the patient's visit to a health-care facility.

Also, PLHIV who have one or more of the following symptoms: current cough (any duration), fever, weight loss or night sweats should be evaluated for TB.

4.2.1 Sputum smear microscopy

The sputum smear microscopy is the most available bacteriological test to confirm TB in South Sudan; it is carried out in all the TB diagnosis and treatment centres. All the patients whose sputa were examined must be registered in the TB Laboratory Register and the results of their smear microscopy specified in this register.

The methods used for sputum smear examination are the Ziehl-Neelsen stain with light microscopy and the fluorochrome stain with fluorescence microscopy (using light emitting diodes (LED) illumination).

Microscopy can visually distinguish mycobacteria by their thick lipid containing cell walls from the other microorganisms. The examination of two sputum specimens can identify 95 to 98% of smear-positive TB patients.

As the NTP of South Sudan has been implementing and expanding the external quality control of sputum smear examination and in line with the WHO recommendations, a sputum smear positive TB case is defined as patient with at least one positive smear ieat least 1 acid-fast bacillus in at least 100 microscopic fields.

The sensitivity of sputum-smear microscopy is relatively not optimal since at least 5000 bacilli per ml of sputum are required for a positive result. The sensitivity is further reduced in patients with extra pulmonary TB (EP TB), children and PLHIV.

The diagnostic accuracy of fluorescence microscopy using LED illumination surpasses by approximately 10% that of conventional Ziehl–Neelsen microscopy.

The results of sputum smear examination must be reported as shown, hereafter, in Table 1:

Table 1: Reporting results of sputum examination

Findings	Results	Grading
No AFB per 100 immersion fields	Negative	0
1-9 AFB per 100 immersion fields	Positive	Record exact number (1-9)
10-99 AFB per 100 immersion fields	Positive	1+
1-10 AFB per 1 immersion field in at least 50 fields	Positive	2+
>10 AFB per 1 immersion field in at least 20 fields	Positive	3+

All the patients who are identified with smear-positive TB must be registered in the TB Treatment Register and immediately put on treatment.

4.2.2 Culture

TB bacilli can be cultured only in the TB NRL of South Sudan.

This test can be performed on solid or liquid medium. A positive mycobacterial culture should result in the identification of *M. tuberculosis* complex which provides a definitive diagnosis of TB. Culture can increase the number of TB cases identified by 30 to 50% in comparison to microscopy. Culture using liquid medium increases the case yield by approximately 10% in comparison to culture using solid media.

Culture provides the necessary isolates to carry out the conventional DSTs.

4.2.3 Xpert MTB/RIF assays

Xpert MTB/RIF assays can be performed in most of the state TB laboratories of South Sudan.

This bacteriological test aims at detecting *M. tuberculosis* and rifampicin resistance in less than 2 hours. When compared to liquid culture, Xpert MTB/RIF testing has approximately 90% sensitivity and 99% specificity. For the detection of rifampicin resistance, the sensitivity is 95% and the specificity 98%. In smear-negative culture-positive TB, Xpert testing has nearly 70% sensitivity.

Xpert MTB/RIF tests must be carried out in adults and children who are:

- Retreatment TB cases;
- TB patients who are still positive at the end of the intensive phase of treatment;
- Contacts of MDR-TB cases (or suspected MDR-TB cases);
- PLHIV who need to be evaluated for TB;
- Persons with unknown HIV status who present a strong clinical evidence of HIV infection or belong to a high risk group for HIV and who have signs or/and symptoms compatible with TB;
- Patients suspected of having TB meningitis in whom Xpert MTB/RIF testing needs to be performed on cerebrospinal fluid specimens.

Whenever and wherever possible, Xpert MTB/RIF testing needs to be undertaken to establish the diagnosis of:

- TB in children (ex.: using gastric fluid);
- EPTB, using non respiratory specimens (ex.: lymph node discharge fluid or tissue biopsy specimens).

When and where possible, Xpert MTB/RIF testing can be used in patients with presumptive TB in whom sputum smear microscopy did not identify any TB bacilli.

4.2.4 X-ray

The diagnosis of TB cannot be established on X-ray alone. Some radiological lesions may suggest TB, but there is no lesions which are absolutely typical for TB. However, patients in whom chest X-ray (CXR) shows any radiological abnormality must be evaluated for TB through bacteriological and clinical examinations.

X-ray is useful for the identification of the site of TB. It can provide a significant and additional argument for the establishment of the diagnosis of TB in patients with symptoms and clinical signs compatible with TB and in whom bacteriological examinations (ex.: sputum smear microscopy) are negative.

X-ray film should be read by qualified and skilled health workers.

4.2.5 Tuberculin skin test

Tuberculin is purified protein derivative from attenuated mycobacteria. It reacts positively to a person who has been infected by TB bacilli. Tuberculin skin test (TST) measures immune response and not the presence or the absence of bacilli. Therefore, it should not be used as a diagnostic test for TB. Moreover, TST is not specific to *M. tuberculosis*, it can be positive in people who had Bacille Calmette-Guérin (BCG) vaccination as well as in those who are infected by environmental mycobacteria other than tuberculosis. Also, TST can be negative in TB patients with HIV coinfection, miliary or malnutrition as well as in patients with other forms of immunosuppression. TST can be used as an adjunct in diagnosing TB in children with symptoms and signs of TB and in conjunction with other diagnostic tests. It can be also used as an adjunct for the diagnosis of TB in patients with symptoms and signs compatible with TB along with the results of other clinical tests but in whom there is no bacteriological confirmation for TB.

The TST should be undertaken by trained health workers using the Mantoux method and carefully proceeding to adequate reading of the skin induration.

A TST is positive in children when the induration has more than 10 mm diameter. However, in children who are immunosuppressed or severely malnourished, a TST is positive when the induration has a diameter of more than 5 mm.

4.2.6 Interferon-gamma release assays

Interferon-gamma release assays (IGRAs) measure immune response to specific *M. tuberculosis* antigens. They are more specific than TST and BCG does not cause a false-positive result. However, IGRAs are more expensive and do not perform better than TST.

A positive IGRA, like a positive TST, indicates TB infection only and not, at all, the presence of active TB. Similarly, a negative IGRA, like a negative TST, does not rule out the diagnosis of TB.

IGRAs are not available in South Sudan and they cannot be used in the process of establishing the diagnosis of TB.

4.2.7 Histopathology

Histopathology has not been yet commonly performed in South Sudan. It is important to highlight that it cannot provide evidence which confirms the diagnosis of TB. The elementary histopathological lesion is characterized by follicular granulomas.

Follicular granulomas form when the immune system attempts to wall off substances (ex.: infectious organisms such as TB bacilli) it perceives as foreign but is unable to eliminate. They include epithelioid macrophages, Langhans giant cells and other various elements such as lymphocytes, neutrophils, eosinophils, multinucleated giant cells, fibroblasts and collagen.

Follicular granulomas can be observed in a wide variety of diseases, both infectious and non-infectious, such as tuberculosis, leprosy, cryptococcosis, coccidioidomycosis, blastomycosis, sarcoidosis, Crohn's disease, berylliosis, Churg-Strauss syndrome and others.

TB-related granulomas tend to contain necrosis (called "caseating tubercles"), but non-necrotizing granulomas may also be present.

Histopathological evidence can be used as an adjunct to establish the diagnosis of TB in patient who has symptoms, signs and other clinical features compatible with TB. Histopathology can be helpful in setting the diagnosis of EPTB.

4.3 FORMS OF TUBERCULOSIS

There are many ways for categorizing the various forms of TB. For practical purpose, this guidelines highlight three forms of TB

4.3.1 Pulmonary TB

Pulmonary TB is the most frequent form of TB. Its clinical feature is characterized by a persistent cough with expectoration. The patient may present other symptoms such as chest pain, haemoptysis, fever, night sweats or loss of weight. If chest X-ray is performed, it shows radiological lesions in one or both

lungs; the lesion is typically located in the upper right lobe with cavity formation. However, the observation of any lesion at the chest X-ray cannot at all confirm the diagnosis of pulmonary TB.

A pulmonary TB can be confirmed only by bacteriological tests: sputum smear microscopy, culture or Xpert MTB/RIF assays.

If the sputum microscopy shows that at least one smear is positive, then the pulmonary TB is also bacteriologically confirmed like with positive culture or positive Xpert testing. Sputum smear-positive pulmonary TB accounts for 50 to 60% of all forms of TB and is the most important source of TB infection in the communities.

A pulmonary TB may not be confirmed even though many attempts have been made using the bacteriological tests.

In the context of South Sudan, the diagnosis of pulmonary TB can be also made, without a bacteriological confirmation, when:

- Either:
 - the sputum microscopies made (at least 2) are smear-negative,
 - radiographic abnormalities consistent with active pulmonary TB as determined and assessed by a medical officer,
 - no laboratory nor clinical evidence of HIV infection,
 - no improvement in response to a course of broad-spectrum antibiotics (excluding anti-TB drugs, fluoroquinolones and aminoglycosides),
 - decision made by a medical officer to treat with a full course of TB chemotherapy,
- or:
 - the sputum microscopies made (at least 2) are smear-negative,
 - radiographic abnormalities consistent with active pulmonary TB as determined and assessed by a medical officer,
 - there is laboratory or clinical evidence of HIV infection,
 - decision made by a medical officer to treat with a full course of TB chemotherapy,
- or:
 - the sputum microscopies made (at least 2) are smear-negative,
 - radiographic abnormalities consistent with active pulmonary TB as determined and assessed by a medical officer,
 - patient severely ill,
 - decision made by a medical officer to treat with a full course of TB chemotherapy.

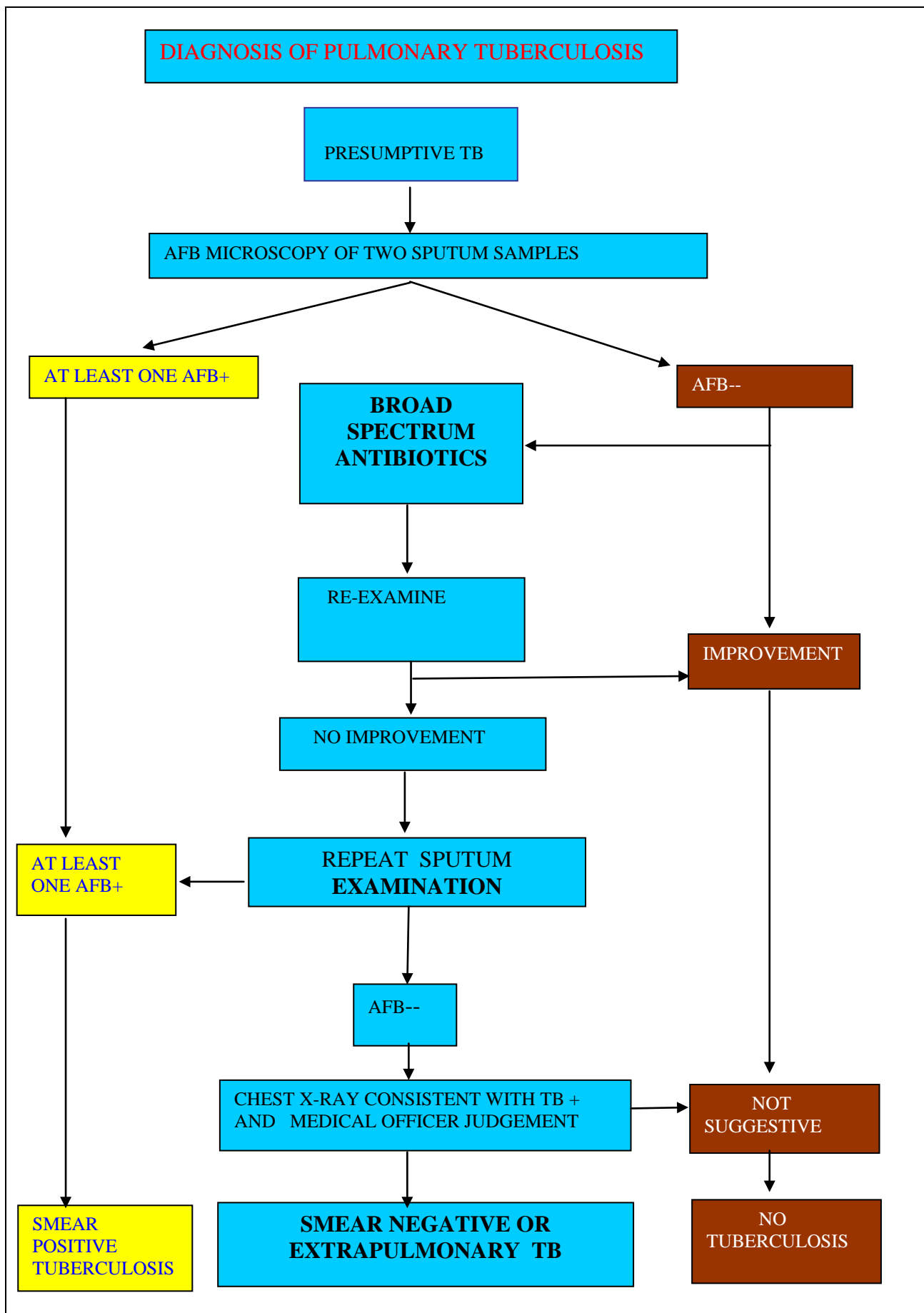


Figure 2: Flow chart for diagnosis of tuberculosis in South Sudan

4.3.2 Extra pulmonary TB

EPTB is a TB which involves organs or tissues other than lung parenchyma. It accounts for 10 to 20%, and even more of all notified cases depending on the countries. The extra pulmonary organs and tissues that are most commonly affected with TB are pleura and lymph nodes, followed by joints and bones, digestive and genitourinary tracts, skin, meninges and others. Diagnosis should be based on at least one specimen with confirmed *M. tuberculosis* (eg: culture or Xpert-testing) or histological or strong clinical evidence consistent with active EPTB, followed by a decision made by a medical officer to treat with full course of TB chemotherapy.

As most EPTB forms are paucibacillary, the smear microscopy of specimens coming from pleural effusion, urine, ascites fluid, lymph node discharge fluid or biopsy fragments is not commonly positive. All EPTB cases who are coughing should have at least two sputum smear examinations; if one of them is positive, the TB should be categorized as bacteriologically confirmed pulmonary TB. If TB is affecting several extra pulmonary organs/tissues, the disease will be categorized according to the most severely affected site.

4.3.3 Childhood TB

The diagnosis of TB in children relies on thorough assessment of all the evidence derived from a careful history of exposure, clinical examination and relevant investigations such as tuberculin skin test, X-ray, sputum smear microscopy and Xpert MTB/RIF testing.

Most children with TB have pulmonary TB. Bacteriological confirmation of TB is most often difficult to obtain in children; however, it should be sought whenever possible by microscopy, culture or Xpert testing. It is important to highlight that a trial of treatment with anti-TB drugs must not be undertaken as method of diagnosing TB.

The key risk factors for TB in children are:

- Household and close contact with a case of bacteriologically confirmed pulmonary TB;
- Age < 5 years;
- HIV infection;
- Severe malnutrition.

The establishment of TB diagnosis in children should follow the hereafter approach:

4.3.3.1 Careful assessment of the history of contact

A child living in the same household or in frequent contact with a patient with smear-positive pulmonary TB (index TB case) is exposed to a significant source

of TB infection. Index TB cases that are sputum smear-negative but culture-positive/Xpert testing-positive are also infectious, but to a much lesser degree. A household contact is often found to be the source of infection in children under 5 years of age with TB.

The following measures are important to establish the diagnosis of TB in children:

- All children aged 0–4 years, with and without symptoms, and children aged 5 years and above who are symptomatic, who have been in close contact with a TB index case, must be screened for TB.
- Children of all ages living with HIV who have been in close contact with a TB case must be evaluated for TB.
- When any child is diagnosed with TB, efforts should be made to detect the source case (if not already identified) and any other undiagnosed cases in the household.
- If a child presents with infectious TB, child contacts must be sought and screened, as for any smear-positive source case. Children should be regarded as infectious if they have sputum smear-positive pulmonary TB or cavitary TB on chest X-ray.

All children aged less than 5 years and all HIV-infected children (less and more than 5 years of age) who were exposed to an index TB case and in whom TB assessment did not identify any active TB should receive isoniazid preventive therapy.

4.3.3.2 Identification of symptoms compatible with TB

In most cases, children with symptomatic TB develop chronic unremitting symptoms, for example: symptoms that persist for more than 2 weeks without sustained improvement or resolution following appropriate treatment for other potential diagnoses. The most common symptoms are:

- Cough;
- Fever;
- Not eating well (anorexia);
- Weight loss or failure to thrive;
- Fatigue, decreased activity.

It is useful to look at the child's growth chart if it is available.

Other or additional symptoms will be present in various forms of EPTB and will depend on the site of the disease e.g. enlarged lymph nodes, distended abdomen, Kyphosis (back swelling) and seizures.

4.3.3.3 Clinical examination (including growth assessment)

Although there are no specific features on clinical examination that can confirm that the presenting illness is due to pulmonary TB, the following physical signs are important:

- Gibbus, especially of recent onset (resulting from vertebral TB)

- Non-painful enlarged cervical lymphadenopathy with fistula formation;
- Meningitis not responding to antibiotic treatment, with a subacute onset or raised intracranial pressure
- Pleural effusion
- Pericardial effusion
- Distended abdomen with ascites
- Non-painful enlarged lymph nodes without fistula formation
- Non-painful enlarged joint

Children who are receiving therapeutic nutritional treatment or nutritional supplementation but are still not gaining weight, or are continuing to lose weight, should be considered as having a chronic disease, such as TB.

4.3.3.4 Tuberculin skin testing

The TST can also be used as an adjunct in diagnosing TB in children with signs and symptoms compatible with TB.

A TST should be regarded as positive as follows:

- In high-risk children (including HIV-infected children and severely malnourished children, i.e. those with clinical evidence of marasmus or kwashiorkor): ≥ 5 mm diameter of induration;
- In all other children (whether they have received a BCG vaccination or not); ≥ 10 mm diameter of induration.

4.3.3.5 Bacteriological confirmation whenever possible

Every effort should be made to confirm the diagnosis of TB in a child using whatever specimens and laboratory facilities are available. Appropriate specimens from the suspected sites of involvement should be obtained for microscopy and, wherever and whenever possible for culture and Xpert MTB/RIF testing (and also for histopathological examination). Appropriate clinical samples include sputum, gastric aspirates, pleural effusion liquid and other material (e.g. lymph node biopsy or any other material that is biopsied).

In young children, TB is usually paucibacillary, meaning that culture and Xpert MDT/RIF testing are much more likely than microscopy to yield a positive diagnosis.

Bacteriological confirmation is especially important for children who have:

- Suspected drug-resistant TB;
- HIV infection;
- Complicated or severe TB;
- An uncertain diagnosis;
- Been previously treated for TB.

It is important to highlight that TB in older children and adolescents is often similar to adult-type disease (and therefore is not paucibacillary). In this age group, sputum is often readily available and may be AFB positive.

4.3.3.6 Chest radiography

Chest X-ray significantly helps in establishing the diagnosis of TB in children. In the majority of cases, children with pulmonary TB have radiological lesions suggestive of TB. The commonest picture is that of persistent opacification in the lung together with enlarged hilar or subcarinal lymph nodes. A miliary pattern of opacification in HIV-uninfected children is highly suggestive of TB. Adolescents with TB have radiographic changes similar to those observed in adult patients, with large pleural effusions and apical infiltrates with cavity formation being the most common findings. Adolescents may also develop primary disease with hilar adenopathy and collapse lesions.

4.3.3.7 HIV testing

Routine HIV testing should be offered to all children with TB (see paragraph 8.3.1).

Chapter 5: DEFINITIONS

The diagnosis of TB refers to the recognition by health workers of an active case of TB. However, it is crucial that TB cases be registered and notified according to well established case definitions, appropriately treated and their treatment outcomes evaluated.

The notification of TB cases and their treatment outcomes must be reported to the NTP of South Sudan. The analysis of the data included in these reports helps NTP Central Unit and the State Coordination Unit of NTP to monitor the trend of TB notification and evaluate the effectiveness of TB activities in country.

5.1 WHY ARE DEFINITIONS NEEDED?

The utilization of uniform criteria to define TB cases and treatment outcomes are essential for:

- The standardization of the process of data collection for TB control;
- Proper patient registration and case notification;
- The selection and utilization of appropriate standard treatment regimens;
- The description of the distribution of TB cases according to site, bacteriology, treatment history and other variables such as demographic variables;
- The cohort analysis to evaluate treatment outcomes;
- The monitoring of TB notification trends and evaluation of the effectiveness of TB control strategy at county, state and national levels.

NTP should use standardized and sound case definitions to establish efficient information system on TB and TB control. The data generated through this information system will help not only describe the trends and the characteristics of notified TB but also provide important information for the management of NTP.

5.2 TB CASE DEFINITIONS

TB case definitions are divided into two groups:

- **Bacteriologically confirmed TB case**
It is a TB case from whom a biological specimen is positive by smear microscopy, culture or WHO-approved rapid test, such as Xpert MTB/RIF assays.
- **Clinically diagnosed TB case**
It is a case who does not fulfil the criteria for bacteriological confirmation but has been diagnosed with active TB by a medical practitioner who has decided to give the patient a full course of TB treatment. This definition

includes cases diagnosed on the basis of X-ray abnormalities, histology and extra pulmonary cases without laboratory confirmation.

Clinically diagnosed cases subsequently found to be bacteriologically positive (before or after starting TB treatment) should be reclassified as bacteriologically confirmed.

Furthermore, bacteriologically confirmed or clinically diagnosed cases of TB are also classified according to the following criteria:

- The anatomical site affected with TB;
- History of previous TB treatment;
- HIV infection status;
- TB drug resistance status.

It is important to highlight that all TB cases identified should be notified, regardless of whether TB treatment has started or not.

5.2.1 Classification according to the anatomical site affected with TB **Pulmonary tuberculosis case**

This refers to any bacteriologically confirmed or clinically diagnosed case of TB involving the lung parenchyma or the tracheobronchial tree. Miliary TB is classified as pulmonary TB because there are lesions in the lungs. Tuberculous intra-thoracic lymphadenopathy (mediastinal and/or hilar) or tuberculous pleural effusion, without radiographic abnormalities in the lungs, constitutes a case of EPTB.

A patient with both pulmonary and EPTB should be classified as a case of pulmonary TB.

- **Extrapulmonary tuberculosis case**

This refers to any bacteriologically confirmed or clinically diagnosed case of TB involving organs or tissues other than the lung parenchyma, e.g. pleura, lymph nodes, abdomen, genitourinary tract, skin, joints and bones, meninges etc.

5.2.2 Classification according to the history of previous TB treatment

This classification take only the history of previous treatment regardless of the bacteriological confirmation or the site affected with TB.

- **New patients**

These are patients who have never been treated for TB or have taken anti-TB drugs for less than 1 month.

- **Previously treated patients**

These are patients who have received more than 1 month of anti-TB drugs in the past. They are further classified by the outcome of their most recent course of treatment (see paragraph 5.3) as follows:

1. **Relapse patients** are those who have previously been treated for TB, were declared cured or treatment completed at the end of their most recent course of treatment, and are now diagnosed with a recurrent episode of TB (either a true relapse or a new episode of TB caused by reinfection).
2. **Treatment after failure patients** are those who have previously been treated for TB and whose treatment failed at the 5th month or the end of their most recent course of treatment.
3. **Treatment after loss to follow-up patients** are those who have previously been treated for TB and were declared lost to follow-up at the end of their most recent course of treatment.
4. **Other previously treated patients** are those who have previously been treated for TB but whose outcome after their most recent course of treatment is unknown or undocumented.

- **Patients with unknown previous TB treatment history**

These refer to the patients whose TB treatment history status does not fit into any of the categories listed above.

It is important to note that new and relapse cases of TB are incident TB cases.

5.2.3 Classification according to the HIV infection status

- **HIV-positive TB patient**

This refers to any bacteriologically confirmed or clinically diagnosed case of TB who has a positive result from HIV testing conducted at the time of TB diagnosis or other documented evidence of enrolment in HIV care, such as enrolment in the pre-ARV treatment register or in the ARV treatment register once ARV treatment has been started.

- **HIV-negative TB patient**

This refers to any bacteriologically confirmed or clinically diagnosed case of TB who has a negative result from HIV testing conducted at the time of TB diagnosis. Any HIV-negative TB patient subsequently found to be HIV-positive should be reclassified accordingly.

- **HIV status unknown TB patient**

This refers to any bacteriologically confirmed or clinically diagnosed case of TB who has no result of HIV testing and no other documented evidence

of enrolment in HIV care. If the patient's HIV status is subsequently determined, he or she should be reclassified accordingly.

5.2.4 Classification according to the TB drug resistance status

Cases are also classified in categories based on DST of clinical isolates confirmed to be *M. tuberculosis*:

- **Monoresistance**

This refers to a resistance to one first-line anti-TB drug only.

- **Polydrug resistance**

This is a resistance to more than one first-line anti-TB drug (other than both isoniazid and rifampicin).

- **Multidrug resistance**

This is a resistance to at least both isoniazid and rifampicin.

- **Extensive drug resistance**

This refers to a MDR with in addition a resistance to any fluoroquinolone and to at least one of the following three second-line injectable drugs: capreomycin, kanamycin or amikacin.

- **Rifampicin resistance**

This refers to resistance to rifampicin detected using phenotypic or genotypic methods, with or without resistance to other anti-TB drugs. It includes any resistance to rifampicin, whether monoresistance, MDR, polydrug resistance or extensive drug resistance (XDR).

These categories are not all mutually exclusive. When enumerating rifampicin-resistant TB, for instance, MDR-TB and XDR-TB are also included.

5.3 TB TREATMENT OUTCOME DEFINITIONS

These definitions refer to patients who do not have evidence of TB drug resistance (i.e.: rifampicin resistance) and are treated with first-line anti-TB medicines.

The treatment outcome definitions of patients treated with second-line anti-TB drugs for drug-resistant TB are not considered in this document; these definitions are included in the national guidelines' document on the PMDT.

All bacteriologically confirmed and clinically diagnosed TB cases should be assigned an outcome from the list hereafter except those with rifampicin-resistance TB or MDR-TB, who are placed on a second-line drug regimen.

The outcomes' definitions are as follows:

- **Cured**
This refers to a pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment who was smear-negative in the last month of treatment and on at least one previous occasion.
- **Treatment completed**
This refers to a TB patient who completed treatment without evidence of failure but with no record to show that sputum smear results in the last month of treatment and on at least one previous occasion were negative, either because sputum smear examination was not done or because the result was not available.
- **Treatment success**
This is the sum of cured and treatment completed.
- **Treatment failed**
This refers to a TB patient whose sputum smear is positive at month 5 or later during treatment.
- **Died**
This refers to a TB patient who dies for any reason before starting or during the course of treatment.
- **Lost to follow-up**
This refers to a TB patient who did not start treatment or whose treatment was interrupted for 2 consecutive months or more.
- **Not evaluated**
This refers to a TB patient for whom no treatment outcome is assigned. This includes cases "transferred out" to another treatment unit as well as cases for whom the treatment outcome is unknown to the reporting unit.

Patients found to have a rifampicin-resistant TB or MDR-TB strain at any point in time should be managed according to the national guidelines on PMDT. These cases need to be excluded from the main TB cohort when calculating treatment outcomes and included only in the second-line TB treatment cohort analysis as specified in PMDT. However, if treatment with a second-line drug regimen is not possible, the patient is kept in the main TB cohort and assigned an outcome from among those defined above in this paragraph.

Chapter 6: TREATMENTS REGIMENS

The treatment of TB is a fundamental intervention in TB control. TB treatment regimens should be standardized and use efficient-quality-assured anti-TB medicines; also, they should be adequately administered to patients.

6.1 AIMS OF TB TREATMENT

The aims of the treatment of TB are to:

- Cure the patient and restore his/her quality of life and productivity;
- Prevent death from TB or its late effects;
- Prevent relapse of TB;
- Reduce transmission of TB in community;
- Prevent the development and transmission of drug resistance.

6.2 RULES TO RESPECT IN TB TREATMENT PROVISION

When TB treatment is provided to patients, some rules must be respected, namely:

- i. Direct supervision of TB treatment during the intensive phase as well as during the continuation phase through the involvement of health facilities' staff, home health promoters and community treatment supporters;
- ii. Utilization of TB drugs in fixed-dose combination (FDC);
- iii. Adequate doses of anti-TB medicines;
- iv. Regular and steady anti-TB drugs intake by patient;
- v. Single intake of all anti-TB medicines prescribed (not fragmented during the day);
- vi. TB treatment administration during the full required duration;
- vii. Appropriate monitoring of the treatment administration by the treating health workers as required;
- viii. Monitoring by health workers of anti-TB drugs side effects.

6.3 ESSENTIAL ANTI-TB MEDICINES

The NTP of South Sudan is using the formulations of anti-TB drugs in FDCs in line with the WHO recommendations. The anti-TB drugs used throughout the NTP network are quality-assured.

There are five essential first-line anti-TB drugs: isoniazid (H), rifampicin (R), pyrazinamide (Z), ethambutol (E) and streptomycin (S).

Isoniazid and rifampicin are the most powerful bactericidal anti-TB medicines; they are active against all population of TB bacilli.

Pyrazinamide is bactericidal and active in an acid environment against TB bacilli inside macrophages.

Streptomycin is also bactericidal and active against rapidly multiplying TB bacilli in an extracellular environment.

Ethambutol is a bacteriostatic TB drug which should be used in association with more powerful bactericidal medicines to prevent the emergence of drug-resistant bacilli.

The dosages of the essential first-line anti-drugs for adults are presented, hereafter, in Table 2.

Table 2: Doses of first line anti TB in adults

Anti-TB drug	Daily dose	
	Dose (mg/kg body weight) and range	Maximum (mg)
Isoniazid	5 (4-6)	300
Rifampicin	10 (8-12)	600
Pyrazinamide	25 (20-30)	--
Ethambutol	15 (15-20)	--
Streptomycin*	15 (12-18)	1,000

*Patients aged over 60 years may not be able to tolerate more than 500–750 mg daily; in that case the dose needs to be reduced to 10 mg/kg per day.

6.4 FIXED DOSE COMBINATION

The use of FDCs has several advantages over individual drugs. First, the prescription errors are likely to be less frequent as dosages that should be used are more straightforward and the adjustment of doses according to patient weight is easier. Secondly, the number of tablets to be ingested is fewer and thus may encourage patient adherence. Thirdly, if treatment is not observed, patients cannot be selective in the choice of anti-TB drugs to ingest.

6.5 STANDARDIZED REGIMENS

Standardized treatment means that all patients in a defined group receive the same treatment regimen. Standard regimens have the following advantages over individualized prescription of drugs:

- Errors in prescription, and thus the risk of development of drug resistance, are reduced;
- Estimating drug needs, purchasing, distribution and monitoring are facilitated;
- Staff training is easier;
- Costs are reduced;

- Maintaining a regular drug supply when patients move from one area to another is made easier;
- Outcome evaluation is convenient and results are comparable.

6.6 TB TREATMENT CATEGORIES

The TB treatment regimens are available for two categories of cases:

- new TB cases and
- previously treated TB cases

The new TB cases should be treated with a standardized regimens using 4 then 2 first-line anti-TB drugs. The previously treated TB cases need to be treated with a standardized regimens including 5, 4 and then 3 first-line anti-TB medicines and possibly with specific regimen for MDR-TB (or extensively drug-resistant (XDR) TB) using second-line anti-TB drugs. In some very particular circumstances, new cases might be treated for MDR-TB or XDR-TB.

6.6.1 Treatment of new TB cases

The regimen which should be used to treat new TB patients includes at start 4 first-line anti-TB drugs and have two consecutive phases.

In the initial (or intensive) phase, isoniazid, rifampicin, pyrazinamide and ethambutol, in FDCs, are administered daily to patient for 2 months.

Then during the continuation phase, isoniazid and rifampicin, in FDCs, are administered daily to patient for 4 months.

2HRZE/4RH

In the two phases, the daily treatment should be administrated in single intake, as highlighted above.

The treatment administration in adult newly affected with TB is presented, below, in Table 3.

Table 3: Treatment administration in new patients (adults⁰, South Sudan

Pre-treatment weight	2 month initial phase	4 month continuation phase
	Number of HRZE* tablets in FDCs	Number of RH** tablets in FDCs
<33 kg	2	2
33-50 kg	3	3
51 kg+	4	4

*: H75mg/ R150mg/Z400mg/E275mg

** : R150mg/H75mg

All new TB cases should be treated with this regimen whether they are bacteriologically confirmed or clinically diagnosed and regardless of the anatomical site of the disease and their HIV infection status. However, in very few circumstances, new cases might be Xpert-tested (eg.: contacts of MDR-TB patients) and in whom a rifampicin-resistant TB is identified; these particular cases should not be treated with this regimen for new TB patients but treated and managed according to the NTP guidelines on PMDT.

The treatment regimen administered to the new TB cases will be monitored according to the form of TB (see Chapter 7 on monitoring during treatment).

6.6.2 Treatment of previously treated TB patients

The NTP information system indicates that 5 to 8% of all notified TB cases are patients who were previously treated. Most of them have usually bacteriologically confirmed pulmonary TB.

Previously treated cases include patients who have already received a course of TB treatment only once and those who have already received it more than once (eg.: patients who were already treated for TB 2 or 3 times and even more). With respect to her/his most recent course of treatment, a previously treated patient may have: i) failed at this treatment, ii) relapsed after this treatment or iii) lost to follow-up during this treatment.

6.6.2.1 Key action to undertake

Given that retreatment cases have a high risk for drug-resistant TB, especially MDR-TB, all the previously treated TB cases must have Xpert MTB/RIF testing. It is important to note that the risk of MDR-TB is much higher in previously treated patients who failed their last treatment and in those who have received several courses of TB treatment.

If Xpert MTB/RIF testing shows a TB with rifampicin resistance, the patient must be treated with second-line anti-TB drugs and managed in line with the NTP guidelines on PMDT. The patient should have DST to identify further anti-TB medicine resistance (particularly isoniazid resistance). When the DST results become available, the treatment regimen with the second-line anti-TB drugs will be adjusted accordingly.

6.6.2.2 Retreatment regimen using first-line anti-TB medicines

If Xpert MTB/RIF testing does not identify any rifampicin resistance, then the patient should be treated with the retreatment regimen which has to be administered in two consecutive phases. :

- In the initial (or intensive), streptomycin, isoniazid, rifampicin, pyrazinamide and ethambutol are provided to the patient for 2 months followed by isoniazid, rifampicin, pyrazinamide and ethambutol for 1 month (without streptomycin). All the drugs should be administered daily in FDCs (for HRZE).

- Then, in the continuation phase, isoniazid, rifampicin and ethambutol are administered daily, in FDCs, for 5 months.

The administration of the retreatment regimen must be monitored by the treating health workers (see Chapter 7 on monitoring during treatment).

2SHRZE/1HRZE/5RHE

In the two phases, the daily treatment should be administered in single intake. The administration of TB retreatment in adult is presented, below, in Table 4.

Table 4: Administration of TB treatment in adults

Pre-treatment weight	3 month initial phase with 2 month SHRZE + 1month HRZE		5 month continuation phase
	Streptomycin	Number of HRZE* tablets in FDCs	Number of RHE** tablets in FDCs
<33 Kg	500mg	2	2
33-50 Kg	750mg	3	3
51 Kg+	1g	4	4

*: H75mg/ R150mg/Z400mg/E275mg

** : R150mg/H75mg/E275mg.

6.6.3 Treatment of TB in children

The principles of treatment of TB in children are the same as for the treatment of TB in adults.

TB in children regardless of the category of the disease will be treated with a 4-first-line anti-TB drug regimen consisting of 2-month initial phase of isoniazid, rifampicin, pyrazinamide and ethambutol followed by 4 months continuation phase of isoniazid and rifampicin using the following dosages specified hereafter in the Table 5.

Table 5: Daily doses of first-line anti-TB drugs for children

Anti-TB drug	Dose (mg/kg body weight) and range	Maximum (mg)
Isoniazid	10 (7-15)*	300
Rifampicin	15 (10-20)	600
Pyrazinamide	35 (30-40)	--
Ethambutol	20 (15-25)	--

*: The higher end of the range for isoniazid dose applies to younger children; as the children grow older the lower end of the dosing range becomes more appropriate.

The same rules for treatment of new cases and retreatment apply in treatment of TB in children.

Infant aged 3 months and less with clinically diagnosed or confirmed TB should be promptly treated with the standard treatment regimen. Treatment may require dose adjustment to reconcile the age effect and possible toxicity. The decision to make this adjustment should be taken by a clinician experienced in managing paediatric TB.

Children with clinically diagnosed or confirmed tuberculous meningitis or osteoarticular TB should be treated with isoniazid, rifampicin, pyrazinamide and ethambutol (HRZE) for 2 months, then with isoniazid and rifampicin (RH) for 10 months. Therefore, the total duration of treatment being 12 months. The doses used should be the same as those for the other forms of TB in children.

2HRZE/10RH

The anti-TB drugs in paediatric formulation should be used as indicated, hereafter, in Table 6.

Table 6: Administration of TB treatment in children (<25kg body weight)

Number of tablets			
Pre-treatment weight	Initial phase		Continuation phase
	RHZ*	Ethambutol (100mg)	RH**
4-6 kg	1	1	1
7-10 kg	2	2	2
11-14 kg	3	2	3
15-19 kg	4	3	4
20-24 kg	5	4	5

*: R60mg/H30mg/Z150mg

** : R60mg/H30mg.

6.6.4 Treatment of extra pulmonary TB

EPTB should be treated with the same regimens as those used in the treatment of pulmonary TB. Given the serious risk of disability and mortality, TB meningitis must be treated for at least 9 and ethambutol should be replaced by streptomycin during the intensive phase in this form of TB. Also, 9 months of treatment are required for TB of bones or joints. Adjuvant corticosteroid treatment need to be used for TB meningitis and pericarditis.

Although sometimes required for diagnosis, surgery plays little role in the treatment of EPTB. It is reserved for management of late complications of disease such as hydrocephalus, obstructive uropathy, constrictive pericarditis and neurological involvement from Pott’s disease (spinal TB). For large, fluctuant lymph nodes that appear to be about to drain spontaneously, aspiration or incision and drainage can be beneficial.

6.7 PROVISION OF TB TREATMENT TO PATIENT

The administration of TB treatment to the patient must be carried out in the best conditions possible for the patients as well as for the health workers. TB patient cannot be cured without treatment which must be undertaken at the appropriate doses, on daily basis, steadily, in single intake and during the required duration. All the steps required for the administration of the treatment must be respected by patients as well as by health workers. All TB patients, irrespective of the form of disease must be treated, free of charge in the health facilities belonging or linked to the NTP network. The patients who are severely affected by TB must be hospitalized until their general health condition improves.

During the intensive phase of the treatment, the daily anti-TB drugs' intake should be directly supervised by the health workers either in inpatient ward for those who are hospitalized, on ambulatory basis in TB diagnosis and treatment centres or PHCUs or in their communities through home health promoters or other community treatment supporters. Patients who are severely ill or residing far from any health facility and cannot come every day to take their medicines need to be hospitalized during the initiation of treatment.

During the continuation phase, the TB treatment intake will be directly supervised on daily basis by either TB diagnosis and treatment centre/PHCU staff, home health promoters or community treatment supporters. The supervision of TB treatment will be more strengthened for children and patients who are retreated. It is clear that the home health promoters must be trained by the County TB Unit on the procedures for providing and supervising TB treatment.

Each daily dose of TB treatment provided to patient must be ticked in the TB treatment card and TB identity card.

All the TB patients who are treated must be assessed during the course of treatment in line with the NTP policy. For instance, sputum smear examination must be performed for bacteriologically confirmed pulmonary TB patients at:

- i) the end of the initial phase of treatment,
- ii) the 5th month of treatment,
- iii) the end of treatment (see Chapter 7 on monitoring during TB treatment).

The results of the sputum smear examination should be recorded in the patient treatment form, TB treatment card and TB management unit register (TBMU).

Furthermore, the treatment outcome of all TB patients who are treated must be established and specified in the patient treatment form, TB treatment card and TB management unit register

Chapter 7: MONITORING DURING TB TREATMENT

The monitoring is an important component of: i) the follow-up of the patient during the TB treatment and ii) the assessment of the effect and outcome of treatment.

7.1 MONITORING TB PATIENT

All TB patients must be monitored and evaluated by the treating health workers during the treatment course. Regular monitoring of patients facilitates treatment completion and allows the identification and management of adverse drug reactions. The quality of patient support and supervision must be regularly assessed. The treatment records of patient need to be regularly reviewed with the responsible health care worker.

7.1.1 Monitoring practices for all patients irrespective of their form of TB

The health workers ensuring TB treatment provision should monitor the evolution of the signs and symptoms. They should ask patients on their tolerance to anti-TB drugs and instruct them to report the occurrence of any symptom (that might be associated with an adverse effect of anti-TB drugs). Health care workers should record and report any treatment interruption.

Patient weight should be monitored each month, and dosages may need to be adjusted if weight changes.

A written record of all medications given, bacteriological response and adverse reactions should be maintained for all patients on the TB treatment card and TB identity card.

7.1.2 Monitoring according to the form of TB

7.1.2.1 Bacteriological confirmed pulmonary TB patient

All pulmonary TB patients whose disease was bacteriologically confirmed either by microscopy, culture or Xpert MTB/RIF testing must have sputum smear microscopy at:

- The 2nd month of treatment (end of the initial phase):
 - If the smear microscopy is negative, the patient will be administered the continuation phase of TB treatment (4RH);
 - If the smear microscopy is positive, the patient will also be administered the continuation phase of TB treatment (4RH). It is important to highlight that additional month in the intensive phase (HRZE) is not required anymore when smear microscopy is positive at the end of the intensive phase. However, the following actions must be taken:
 1. Xpert MTB/RIF testing must be performed. If Xpert testing shows a rifampicin resistance, the patient must be treated and managed according to the NTP guidelines on PMDT.

The presence of *M. tuberculosis* without rifampicin resistance at Xpert MTB/RIF testing may be related to pieces of dead bacilli and therefore should not trigger any change in the TB treatment.

2. If Xpert MTB/RIF testing does not show any rifampicin resistance, a sputum smear microscopy must be performed again at the 3rd month of treatment.
 - If the smear microscopy is negative, then the TB treatment will be maintained in its continuation phase;
 - If smear microscopy is still positive, an Xpert MTB/RIF testing should be carried out again;
 - If it shows a rifampicin resistance, then patient will be treated and managed in line with the NTP guidelines on PMDT;
 - If it does not show any rifampicin resistance, then a culture and DST must be undertaken at the TB NRL.
- The 5th month of treatment:
 - If the smear microscopy is negative, the continuation phase will be maintained until the end of treatment;
 - If the smear microscopy is positive, then the treatment outcome is “Treatment failed” which should be specified in the TB treatment card, TB identity card and TB management unit register. In addition, Xpert MTB/RIF testing must be performed:
 1. If Xpert testing shows a rifampicin resistance, then the patient will be treated and managed according to the NTP guidelines on PMDT;
 2. If Xpert testing does not show any rifampicin resistance, then the patient will have culture and DST and will be registered as “Treatment after failure patient” in the TB treatment register and retreated with the regimen 2SHRZE/1HRZE/5RHE while waiting for the results of DST.
 - The end of treatment:
 - If the smear microscopy is negative, the TB treatment is over and the treatment outcome will be specified, in the TB treatment card, TB identity card and TB treatment register, as: “Cured” if smear microscopy was already negative at the 2nd and/or 5th month of treatment;
 - If the smear microscopy is positive, then the treatment outcome is “Treatment failed” which should be specified in the TB treatment card, TB identity card and TB treatment register. In addition, Xpert MTB/RIF testing must be performed:

1. If Xpert MTB/RIF testing shows a rifampicin resistance, then the patient will be treated and managed according to the NTP guidelines on PMDT;
2. If Xpert MTB/RIF testing does not show any rifampicin resistance, then the patient will have culture and DST and will be registered as “Treatment after failure patient” in the TB treatment register and retreated with the regimen 2SHRZE/1HRZE/5RHE while waiting for the results of DST.

7.1.2.2 Clinically diagnosed pulmonary TB patient

All clinically diagnosed pulmonary TB patients must have sputum smear microscopy at the 2nd month of treatment (end of the initial phase):

- If the smear microscopy is negative, the patient will be administered the continuation phase of TB treatment (4RH);
- If the smear microscopy is positive, then 2 actions need to be taken:
 1. Xpert MTB/RIF testing must be undertaken:
 - If Xpert MTB/RIF testing shows a rifampicin resistance, then the patient should be treated and managed according to the NTP guidelines on PMDT.
 - If Xpert MTB/RIF testing does not show any rifampicin resistance, then culture and DST must be performed;
 2. The patient should not be put on the continuation phase of 2HRZE/4RH regimen which will be stopped and the treatment outcome of the patient will be “Treatment failed”. Then, if there is no rifampicin resistance at the Xpert MTB/RIF testing, the patient will be re-registered in the TB treatment register as “Treatment after failure patient” and will receive retreatment regimen (2SHRZE/1HRZE/5RHE) while waiting for the results of DST.

7.1.2.3 Previously treated TB patient

Most previously treated TB patients are usually bacteriologically confirmed either by microscopy, culture or Xpert MTB/RIF testing.

It is important to highlight that all previously treated TB patients must have Xpert MTB/RIF testing when they are identified. If Xpert MTB/RIF testing shows rifampicin resistant, then the patient will be treated and managed in line with the NTP guidelines on PMDT. If there is no rifampicin resistance, then the patient will be given a retreatment regimen (2SHRZE/1HRZE/5RHE); however, culture and DST must to be performed, particularly for patients who failed their last treatment.

Sputum smear microscopy must be carried out at:

- The 3rd month of retreatment regimen (end of the initial phase):
 - If the smear microscopy is negative, the patient will be administered the continuation phase of retreatment (5RHE);
 - If the smear microscopy is positive, the continuation phase of retreatment will be initiated (no need to extend anymore the intensive phase by 1 month) and Xpert MTB/RIF testing must be performed.
 1. If Xpert test shows a rifampicin resistance, the patient will be, then, treated and managed according to the NTP guidelines on PMDT.
 2. If Xpert MTB/RIF testing does not show any rifampicin resistance, a sputum smear microscopy must be performed again at the 4th month of treatment.
 - If the smear microscopy is negative, then the TB retreatment will be maintained in its continuation phase;
 - If smear microscopy is still positive, an Xpert MTB/RIF testing should be carried out again;
 - If it shows a rifampicin resistance, then patient will be treated and managed in line with the NTP guidelines on PMDT;
 - If it does not show any rifampicin resistance, then a culture and DST must be performed.
- The 5th month of retreatment regimen:
 - If the smear microscopy is negative, the continuation phase will be maintained until the end of treatment;
 - If the smear microscopy is positive, then the treatment outcome is “Treatment failed” which should be specified in the TB treatment card, TB identity card and TBMU register. Also, Xpert MTB/RIF testing must be performed:
 1. If Xpert MTB/RIF testing shows a rifampicin resistance, then the patient will be treated and managed according to the NTP guidelines on PMDT;
 2. If Xpert MTB/RIF testing does not show any rifampicin resistance, then the patient will have culture and DST and will be registered as “Treatment after failure patient” in the TB treatment register and retreated again with the regimen 2SHRZE/1HRZE/5RHE while waiting for the results of DST.
- The end of treatment:
 - If the smear microscopy is negative, the TB treatment is over and the treatment outcome will be specified in the TB treatment card,

TB identity card and TBMU register as “Cured” if smear microscopy was already negative at the 3rd and/or 5th month of treatment;

- If the smear microscopy is positive, then the treatment outcome is “Treatment failed” which should be specified in the TB treatment card, TB identity card and TBMU register. Also, Xpert MTB/RIF testing must be performed:
 1. If Xpert MTB/RIF testing shows a rifampicin resistance, then the patient will be treated and managed according to the NTP guidelines on PMDT;
 2. If Xpert MB/RIF testing does not show any rifampicin resistance, then the patient will have culture and DST and will be registered as “Treatment after failure patient” in the TBMU register and retreated with the regimen 2SHRZE/1HRZE/5RHE while waiting for the results of DST.

7.1.2.4 Patient with EPTB

The treatment assessment response in EPTB patient should be mainly clinical. The weight of the patient must be monitored at each assessment visit.

7.1.2.5 Child with TB

Each child with TB should be assessed at least at the following intervals: 2 weeks after the start of treatment, at the end of the intensive phase, and every 2 months until completion of treatment.

The assessment should include, as a minimum:

- Symptom assessment;
- Assessment of treatment adherence;
- Enquiry about any adverse events;
- Weight measurement.

The dosages of anti-TB medicines should be adjusted to take account of any weight gain. Adherence should be assessed by reviewing the TB identity card. A follow-up sputum sample for smear microscopy at 2 months after the start of treatment should be obtained from any child who was smear-positive at diagnosis.

7: Box 1 Possible reasons for positive presumptive sputum smear microscopy at the end of the initial phase of TB treatment

- The initial phase of treatment was poorly supervised and patient adherence was poor;
- Poor quality of anti-TB drugs;
- Doses of anti-TB drugs are below the recommended range;
- Resolution is slow because the patient had extensive cavitation and a heavy initial bacillary load;
- There are co-morbid conditions that interfere either with adherence or with response;
- The patient may have drug-resistant *M. tuberculosis* that is not responding to first-line treatment;
- Non-viable bacteria remain visible by microscopy

7.2 RECORDING THE TREATMENT OUTCOMES

The monitoring of TB patients must result in establishing the outcomes of TB treatment, using the standardized definitions of NTP (see paragraph 5.3 on TB treatment outcome definitions). The treatment outcomes need to be specified for all registered and notified TB patients in the TB treatment card, TB identity card and TBMU register.

7.3 COHORT ANALYSIS OF TREATMENT OUTCOMES

A cohort is a group of patients diagnosed and registered for treatment during a specific time period (usually one-quarter of a year).

Cohort analysis is the key management tool used to evaluate the effectiveness of NTP. It enables the identification of problems for which appropriate actions can be taken to overcome them and improve programme performance. The definitions of outcomes to be analyzed in the cohort analysis are specified above in the paragraph 5.3. The cohort analysis must be established on quarterly and yearly basis at all levels for patients who are not managed through PMDT. It should be performed for the TB cases registered in the quarter that ended 12 months ago; for instance, the treatment outcomes of patients registered from January 1st to March 31st 2015 will be analyzed as of April 1st 2016. The cohort analysis must be carried out for the following categories of TB patients:

- New bacteriologically confirmed TB patients;
- New cases of clinically diagnosed TB (smear-negative, smear not done and EPTB);
- TB relapse cases;
- Treatment failure cases;

- Treatment after lost to follow-up cases;
- Other previously treated cases;
- HIV-positive TB patients (all types of TB).

The cohort analysis must be carried in each TB diagnosis and treatment center. The cohort analysis reports established in these centers should be, after verification, compiled and consolidated at county level. Then, the State Coordination Unit of NTP should compile and consolidate, after verification and correction, the cohort analysis reports of all the counties of the State and establish a cohort analysis at State level for each category of TB patients highlighted above. Then, the NTP Coordination Units of all the states should submit their reports to NTP Central Unit. Then, the Central Unit will establish a national cohort analysis for each category of TB patients.

The cohort analyses performed, for each quarter, from January to December every year need to be consolidated in order to establish an annual evaluation of TB treatment outcomes.

The evaluation of outcomes will help identify counties and states that are performing well and allows for positive feedback to be provided to staff; successful practices can then be replicated elsewhere.

The cohort analysis of the patients treated and managed through PMDT are established annually by the NTP Central Unit.

7.4 SIDE EFFECTS OF ANTI-TB DRUGS AND THEIR MANAGEMENT

The majority of TB patients who receive first-line anti-TB drugs complete their treatment without any significant adverse effects. However, adverse reactions may occur during TB treatment. Most of them are minor but there are major reactions that need specific and urgent measures. The health workers providing TB treatment should know how to prevent, monitor and manage the adverse reactions that may appear during the treatment.

7.4.1 Prevention of adverse reactions associated with anti-TB medicines

Health personnel can prevent some drug-induced side-effects, for example isoniazid-induced peripheral neuropathy. This usually presents as numbness or a tingling or burning sensation of the hands or feet and occurs more commonly in pregnant women and in people with the following conditions: HIV infection, alcohol dependency, malnutrition, diabetes, chronic liver disease, renal failure. These patients should receive preventive treatment with pyridoxine, 10 mg/day along with their anti-TB drugs.

7.4.2 Monitoring and recording adverse effects

Given that few patients may experience anti-TB drug-associated side effects, it is important that patients be clinically monitored during treatment so that adverse effects can be detected promptly and managed properly.

Health personnel can monitor adverse drug effects by teaching patients how to recognize the symptoms of common effects and urging them to report if they develop such symptoms as well as by asking about symptoms when patients come to collect drugs. Adverse reactions to drugs should be recorded on the TB treatment card and TB identity card.

The treating health workers should inform TB patients that their urine will be coloured red or orange during treatment because of rifampicin intake.

7.4.3 Symptom-based approach to managing side-effects of anti-TB drugs

The adverse effects of first-line anti-TB drugs are described in Annex. Table 7 shows a symptom-based approach to the management of the most common side effects. In general, a patient who develops minor adverse effects should continue the TB treatment and be given symptomatic treatment. If a patient develops a major side-effect, the treatment or the responsible drug must be stopped and the patient urgently referred to a clinician for appropriate management in TB diagnosis and treatment centre or hospital.

7.4.3.1 Management of cutaneous reactions

If a patient develops itching without a rash and there is no other obvious cause, the recommended approach is to try symptomatic treatment with antihistamines and skin moisturizing, and continue TB treatment while observing the patient closely. If a skin rash develops, however, all anti-TB drugs must be stopped.

Once the reaction has resolved, anti-TB drugs are reintroduced one by one, starting with the drug least likely to be responsible for the reaction (rifampicin or isoniazid) at a small challenge dose, such as 50 mg of isoniazid. The idea of starting with a small challenging dose is that if a reaction occurs with a small dose, it will not be a major one as with a full dose. Therefore, the dose needs to be gradually increased over 3 days. This procedure is repeated, adding in one drug at a time. A reaction after adding in a particular drug identifies that drug as the one responsible for the skin reaction. The alternative regimens listed in the following paragraph 7.4.3.2 are also applicable when a particular drug cannot be used because it was implicated as the cause of a cutaneous reaction.

7.4.3.2 Management of drug-induced hepatitis

Of the first-line anti-TB drugs, isoniazid, pyrazinamide and rifampicin are the most commonly responsible for drug-induced hepatitis; in contrast, ethambutol is rarely involved in liver damage. Rifampicin can cause asymptomatic jaundice without evidence of hepatitis. It is important to try to rule out other possible

causes (eg.: viral hepatitis) before deciding that the hepatitis is induced by the TB regimen.

If it is thought that the liver disorder is caused by the anti-TB drugs, all drugs should be stopped. However, if the patient is severely ill with TB and it is considered unsafe to stop TB treatment, he/she should be hospitalized and a non-hepatotoxic regimen consisting of streptomycin, ethambutol and a fluoroquinolone should be started.

If TB treatment has been stopped, it is necessary to wait for liver function tests to revert to normal and clinical symptoms (nausea, abdominal pain) to resolve before reintroducing the anti-TB drugs. If it is not possible to perform liver function tests, it is advisable to wait an extra 2 weeks after resolution of jaundice and upper abdominal tenderness before restarting TB treatment. If the signs and symptoms do not resolve and the liver disease is severe, the patient must be hospitalized and the non-hepatotoxic regimen consisting of streptomycin, ethambutol and a fluoroquinolone should be started.

Once drug-induced hepatitis has resolved, the drugs are reintroduced one at a time. If symptoms recur or liver function tests become abnormal as the drugs are reintroduced, the last drug added should be stopped. Rifampicin should be reintroduced first because it is less likely than isoniazid or pyrazinamide to cause hepatotoxicity and is the most effective agent. After 3–7 days, isoniazid may be also reintroduced. In patients who have experienced jaundice but tolerate the reintroduction of rifampicin and isoniazid. It is preferable not to re-administer pyrazinamide to these patients.

Alternative regimens depend on which drug is implicated as the cause of the hepatitis and are as follows:

- If rifampicin is implicated, a suggested regimen without rifampicin is 2 months of isoniazid, ethambutol and streptomycin followed by 10 months of isoniazid and ethambutol.
- If isoniazid cannot be used, 9 months of rifampicin, pyrazinamide and ethambutol can be considered.
- If pyrazinamide is discontinued before the patient has completed the intensive phase, the total duration of isoniazid and rifampicin therapy may be extended to 9 months.
- If neither isoniazid nor rifampicin can be used, the non-hepatotoxic regimen consisting of streptomycin, ethambutol and a fluoroquinolone should be continued for a total of 18–24 months.

FDCs are used in the treatment of TB in South Sudan. In order to cope with anti-TB drug-induced hepatitis that may occur in TB patients, the NTP should make available small quantities of anti-TB medicines in loose tablets. These

loose tablets will be used in the process of reintroducing one TB drug at a time. If the loose tablets are not available, the following actions can be taken in the event of jaundice occurrence:

- *When hepatitis with jaundice occurs during the intensive phase of TB treatment with isoniazid, rifampicin, pyrazinamide and ethambutol: once hepatitis has resolved, restart the same drugs EXCEPT replace pyrazinamide with streptomycin to complete the 2-month course of initial therapy, followed by rifampicin and isoniazid for the 6-month continuation phase.*
- *When hepatitis with jaundice occurs during the continuation phase once hepatitis has resolved, restart isoniazid and rifampicin to complete the 4-month continuation phase of therapy.*

Table 8: symptom-based approach to managing side effects of anti TB drugs

Side-effects	Drug(s) probably responsible	Management
Major		<i>Stop responsible drug(s) and refer to clinician urgently</i>
Skin rash with or without itching	Streptomycin, isoniazid, rifampicin, pyrazinamide	Stop anti-TB drugs
Deafness (no wax on otoscopy)	Streptomycin	Stop streptomycin
Dizziness (vertigo and nystagmus)	Streptomycin	Stop streptomycin
Jaundice (other causes excluded), hepatitis	Isoniazid, pyrazinamide, rifampicin	Stop anti-TB drugs
Confusion (suspect drug-induced acute liver failure if there is jaundice)	Most anti-TB drugs	Stop anti-TB drugs
Visual impairment (other causes excluded)	Ethambutol	Stop ethambutol
Shock, purpura, acute renal failure	Rifampicin	Stop rifampicin
Decreased urine output	Streptomycin	Stop streptomycin
Minor		<i>Continue anti-TB drugs, check drug doses</i>
Anorexia, nausea, abdominal pain	Pyrazinamide, rifampicin, isoniazid	Give drugs with small meals or just before bedtime, and advise patient to swallow pills slowly with small sips of water. If symptoms persist or worsen, or there is protracted vomiting or any sign of bleeding, consider the side-effect to be major and refer to clinician

		urgently.
Joint pains	Pyrazinamide	Aspirin or non-steroidal anti-inflammatory drug, or paracetamol
Burning, numbness or tingling sensation in the hands or feet	Isoniazid	Pyridoxine 50–75 mg daily
Drowsiness	Isoniazid	Reassurance. Give drugs before bedtime
Orange/red urine	Rifampicin	Reassurance. Patients should be told when starting treatment that this may happen and is normal
Flu syndrome (fever, chills, malaise, headache, bone pain)	Intermittent dosing of rifampicin	Change from intermittent to daily rifampicin administration

CHAPTER 8: TUBERCULOSIS, HIV and AIDS

HIV infection epidemic is generalized in South Sudan. The prevalence of HIV infection is estimated at 2.6% in the population aged 15-49 years. HIV prevalence is much higher in high risk groups such as commercial sex workers, men having sex with men or men/women in uniform. The occurrence of HIV infection seems also to be clustered along the main trading roads.

It is well known that persons who are infected with HIV, irrespective of their age, have much higher risk of developing TB than those who are not. This risk is estimated at 20 to 37 times higher. TB is one of the leading causes of death in PLHIV and is associated with an excess in mortality in TB patients who are HIV-infected in comparison to those who are not. PLHIV are more likely to develop smear-negative pulmonary TB and EPTB than HIV-negative persons. This is likely to contribute to a delay in establishing the diagnosis of TB, and subsequently to an excess in death in PLHIV.

PLHIV constitute a key affected population that is targeted in priority by NTP efforts. To make these efforts successful a close collaboration between the NTP and NACP has been developed and established. All health workers should support and contribute to this collaboration at all levels of the health system. In order to make this collaboration efficient, the NTP, NACP and the relevant stakeholders developed national guidelines on the collaborative TB/HIV activities for South Sudan as recommended by WHO. The health care workers are highly encouraged to use these guidelines in their daily work when dealing with TB patients and PLHIV.

8.1 STRENGTHENING THE MECHANISMS FOR DELIVERING INTEGRATED TB/HIV SERVICES

8.1.1 Maintaining and strengthening the existing coordination mechanism for TB/HIV Collaborative activities

There is a coordination mechanism for collaborative TB/HIV activities at all levels in South Sudan.

- At national level, there is the National TB/HIV Coordinating Committee which includes the NTP, NACP, South Sudan AIDS Commission (SSAC) and other key stakeholders. This committee should also include NGOs dealing with TB and/or HIV in South Sudan and patients' representatives. Its role is to:
 - Provide and discuss the general policy on TB/HIV collaborative activities;
 - Define the new strategic orientations that are needed;
 - Contribute to planning TB/HIV interventions and activities
 - Contribute to defining the strategies for capacity-building, including training;

- Help in assessing progress made in implementing TB/HIV activities and evaluating their outcomes and impact;
- Mobilize resources at national and international level;
- Ensure consistent and coherent communications with partners and decision makers about TB and HIV;
- Ensure the involvement of civil society, NGOs and community organizations.

The NTP must be fully represented in this national committee through the staff of its Central Unit, NTP state coordination units and county TB units. NTP representatives must contribute to establishing the annual work plan of the National TB/HIV Coordinating Committee and undertaking its activities. The NTP must be represented in all the meetings planned or held on *ad hoc* basis.

- At the level of each state, there is a Sub-National Committee for TB/HIV Activities Coordination. It includes the state coordinators of NTP, NACP and SSAC. The National TB/HIV Coordinating Committee will make sure that the relevant stakeholders at state level are represented in each sub-national committee, such as the affected communities and NGOs operating locally. The role of the sub-national committee is to:
 - Adapt the national TB/HIV strategies to local context;
 - Establish an annual work plan for joint TB/HIV collaborative activities;
 - Monitor and discuss the progress made in the implementation of interventions;
 - Identify and discuss the financial and budget issues;
 - Identify and discuss the issues of coordination among NTP, NACP and SSAC as well as the actions that need to be taken to address these issues;
 - Ensure appropriate coordination with the National TB/HIV Coordinating Committee.

The NTP state coordinators must contribute to the development and implementation of all the activities of the sub-national committees of their respective states.

- In all the health facilities where both TB and HIV services are available, a coordination committee must be constituted to review the progress of TB/HIV collaborative activities and resolve routine matters through monthly meetings. This coordination committee should develop and sustain linkages with the communities through the home health promoters and community workers.

Health workers in charge of TB prevention, care and control in these health facilities must be fully involved in the activities of these local coordination committees.

8.1.2 Ensuring the surveillance of HIV infection among TB patients and TB among PLHIV

Sound data on HIV infection among TB patients and TB among PLHIV are essential for planning and implementation of the interventions and activities defined by NTP and NACP.

NTP must collaborate and support NACP to establish and update appropriate information on both diseases through the existing routine information systems of the 2 programmes and whenever needed through surveys and relevant sentinel surveillance systems.

8.1.3 Undertaking joint TB/HIV planning to integrate TB and HIV services

The implementation of joint TB/HIV collaborative activities must be planned with both the NTP and NACP to avoid an unnecessary duplication of efforts. Both programmes must together establish a joint training agenda and plan on joint TB/HIV collaborative activities targeting all the categories of health workers.

The expansion of the interventions of both programmes must be coordinated by the central units of NTP and NACP in order to ensure effective implementation of joint TB/HIV collaborative activities.

Both programmes should coordinate their approaches to involve NGOs and civil society organizations in developing and strengthening joint TB/HIV activities.

Both programmes must use coherent and consistent messages in their communication with national and international stakeholders and decision makers, in line with the approach established by the National TB/HIV Coordinating Committee.

8.1.4 Monitoring and evaluating TB/HIV collaborative activities

The NTP of South Sudan has adopted the new recording and reporting system of WHO in which HIV data on TB patients are included. However, to have full information on TB/HIV activities, NTP must have access to the information generated by the monitoring and evaluation systems for HIV Care/ARV treatment and MCH/PMTCT.

Both programmes must collaborate to exchange information and jointly monitor and evaluate TB/HIV collaborative activities.

8.2 REDUCING THE BURDEN OF TB AMONG PLHIV

8.2.1 Intensifying TB case-finding and ensuring high-quality anti-TB treatment

South Sudan has adopted the internationally recommended clinical algorithm to screen PLHIV for TB if the patient is reporting one of the following symptoms: current cough (of any duration), fever, weight loss or night sweats.

To this end, the NTP staff working at all levels should support the NACP to enhance the capacity building of the staff practicing in HIV and AIDS health facilities (eg.: HIV counselling and testing sites, prevention of mother to child transmission sites and ARV treatment centres) as well as the home health promoters and community workers of NGOs involved in HIV and AIDS issues in communities. This capacity building should focus on TB screening and TB management in PLHIV and people at high risk of HIV infection. Any PLHIV who has one of these symptoms must be evaluated for TB.

If HIV and AIDS health facility is also ensuring TB diagnosis services, then the TB assessment should be carried out in the facility. If it is not, then the PLHIV should be referred to the closest health facility which ensures TB diagnosis and treatment. Sputum may be taken from PLHIV in HIV and AIDS site and forwarded to TB facility for Xpert MTB/RIF testing, if not for sputum smear examination.

8.2.1.1 TB Diagnosis in PLHIV

All the PLHIV who were screened positive with the clinical algorithm must have an Xpert MTB/RIF testing.

- If the Xpert machine is accessible and the test can be carried out reasonably without delay, then the test may show that:
 - There is no active TB, then the patient should be managed for other possible infectious diseases in the HIV and AIDS site if there is no need for hospitalization;
 - There is an active TB :
 - If the test does not show any rifampicin resistance then the PLHIV will be treated and managed for active TB in line with the NTP guidelines;
 - If the test shows a rifampicin resistance then the patient must be urgently referred to the appropriate health facility for treatment and management in line with the NTP guidelines on PMDT;
- If Xpert machine is not accessible or Xpert testing cannot be carried out, then the management should be undertaken as follows:
 - If there is one or more of the following danger signs:
 - Unable to walk unaided;
 - Respiratory rate more than 30 per minute;
 - Fever > 39°C ;
 - Pulse rate > 120 per minute

Then, the clinical condition of the patient should be considered as severe, and the patient should be immediately referred to hospital for appropriate management.

If immediate referral of the patient is not possible, apply the algorithm (Fig 2)

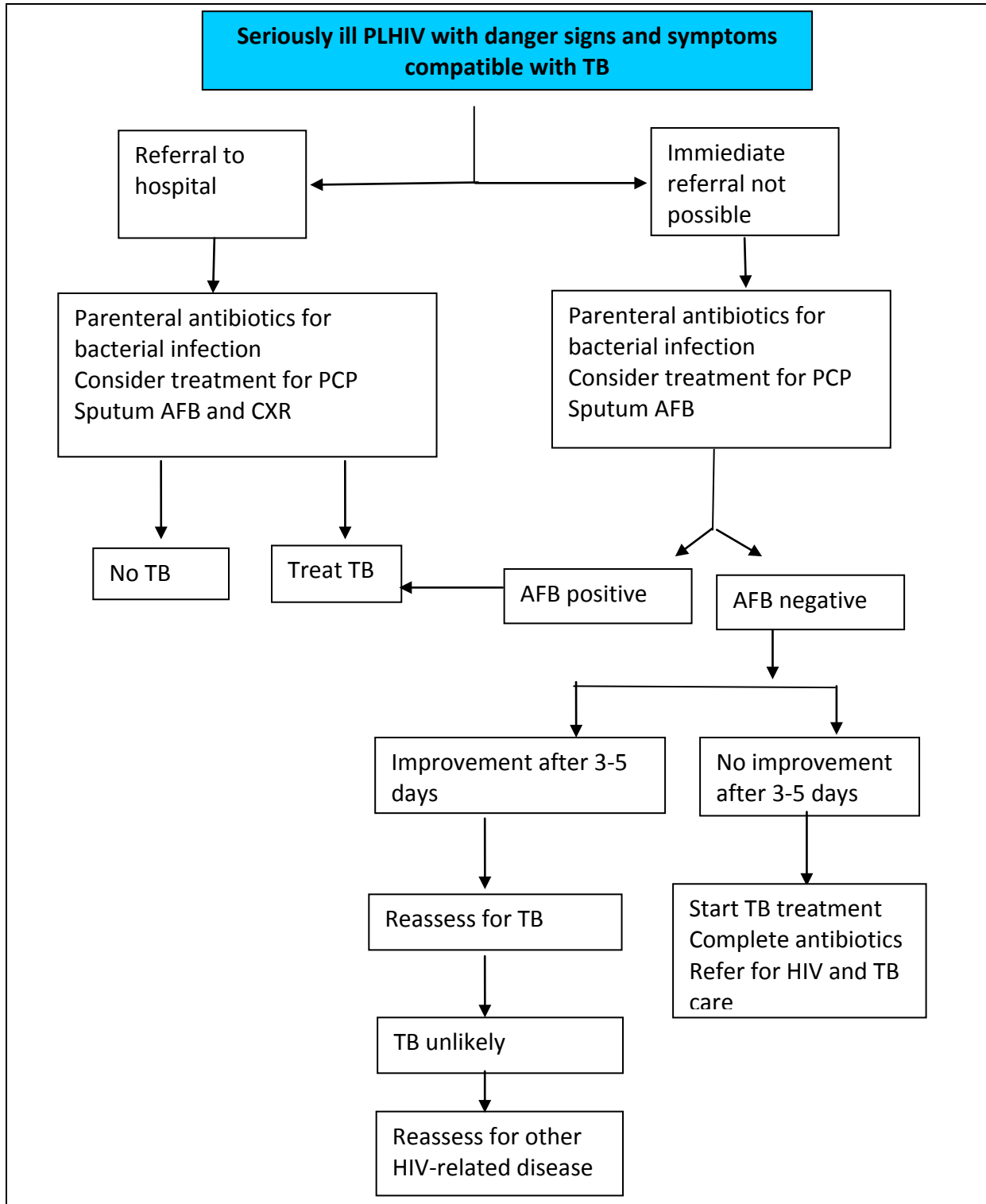


Figure 3: Diagnosis of TB in seriously ill HIV positive patient

- If there are no danger signs, then the following algorithm (Fig 4) should be applied:

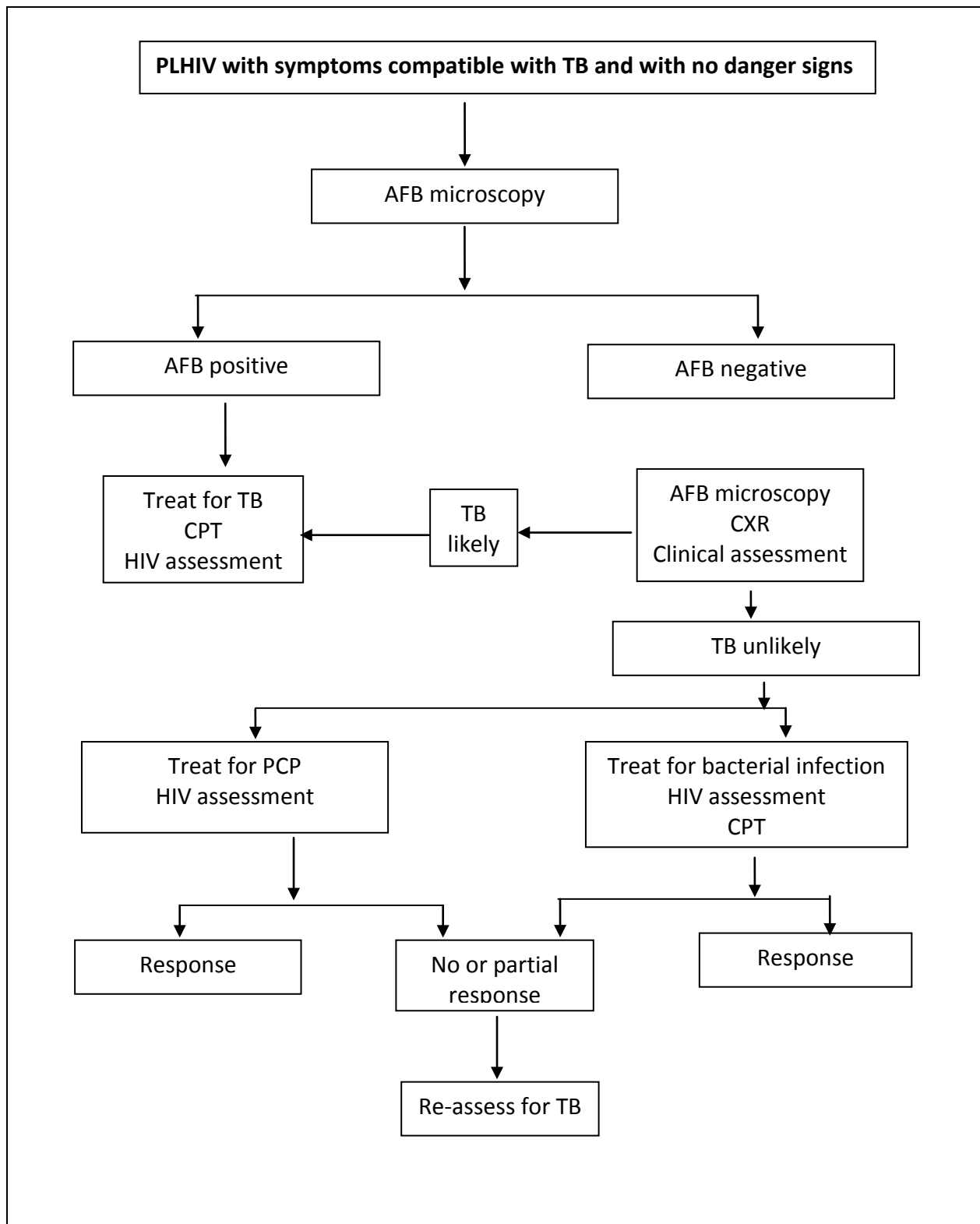


Figure 4: Diagnosis of TB in PLHIV in ambulatory settings

It is important to note that EPTB is more common in PLHIV than in HIV-negative patient. The commonest forms are pleural effusion and lymphadenopathy TB; severe forms of EPTB may be observed, such as pericardial, meningeal, haematogenous (disseminated or miliary) TB.

In addition, children living with HIV who have any of the following symptoms: poor weight gain, fever, current cough or contact history with a TB case, may have TB and should be evaluated for this disease and other conditions. If the evaluation shows no active TB, children should be offered isoniazid preventive therapy (IPT) regardless of their age.

All PLHIV who are diagnosed with active TB must be treated with the standardized regimen of NTP (2HRZE/4RH) and monitored in line with the national guidelines.

8.2.1.2 Isoniazid preventive therapy

There is strong evidence that IPT is effective in reducing the incidence of TB and death from TB in PLHIV. The provision of IPT to PLHIV does not increase the risk of developing isoniazid-resistant TB.

Adults and adolescents living with HIV, who have none of the following symptoms: current cough, fever, weight loss or night sweats, are unlikely to have active TB and should be treated with IPT. Isoniazid needs to be given for at least 6 months as part of a comprehensive package of HIV care for all eligible PLHIV irrespective of the degree of immunosuppression, ARV use, previous TB treatment and pregnancy. Information about IPT should be made available to all people living with HIV. Providing IPT as a core component of HIV preventive care should be the responsibility of NACP and HIV and AIDS service providers.

Children living with HIV, aged more than 12 months, who do not have poor weight gain, fever nor current cough and no contact with a TB case should receive six months of IPT (10mg/kg/day) as part of a comprehensive package of HIV prevention and care services.

Children living with HIV, aged less than 12 months, who have contact with a TB case and in whom systematic screening and evaluation did not show any active TB should receive 6 months IPT (10mg/kg/day).

In addition, all children living with HIV after successful completion of treatment for TB disease should receive isoniazid for an additional 6 months.

8.2.1.3 TB infection control in health care facilities

The NTP has developed national guidelines on TB infection control (see document entitled “Tuberculosis infection control guidelines for South Sudan”). Health workers are encouraged to refer to these guidelines.

Staff, working in health facilities providing TB and HIV services, should prioritize, during the triage, the identification of patients with symptoms compatible with TB, quickly proceed to their TB assessment and promptly treat them if they have active TB. Infectious TB patients must be separated from the other patients in ambulatory settings and in hospital wards.

Masks must be given to patients with respiratory symptoms and to TB patients when they attend health facilities ensuring TB and HIV services. Appropriate ventilation must be ensured in these health facilities.

HIV-positive health workers who are dealing with TB patients’ management should not be involved in undertaking such task and need to be removed to duties others than those associated with TB services.

Further measures to ensure adequate infection control are detailed in the national guidelines’ document on TB infection control.

8.3 REDUCING THE BURDEN OF HIV IN PATIENTS WITH TB

8.3.1 Providing HIV testing and counselling to TB patients

The NTP in collaboration with the NACP should make available rapid tests for HIV screening and HIV infection confirmation for patients with diagnosed TB.

HIV testing and counselling must be offered to all TB patients attending TB diagnosis and treatment centres as well as to partners of known HIV-positive TB patients. The approach to test patient should be provider-initiated-counselling-testing.

TB patient who has HIV-negative test, but is potentially exposed to HIV or has a high risk for HIV infection needs to be re-tested after 4 weeks from the time of initial testing.

8.3.2 Introducing HIV prevention interventions for patients with TB

Health workers dealing with co-infected TB/HIV cases in TB diagnosis and treatment centres must coordinate their efforts in treating and managing these patients with the HIV and AIDS units located in the same health facilities or elsewhere.

They should also provide to their patients appropriate and coherent health education messages and information in line with the policy established by both NTP and NACP.

In addition, health workers of TB diagnosis and treatment centers should refer all HIV-positive pregnant women, with whom they are dealing, to health

facilities which provide services for prevention of vertical transmission of HIV. It is worthwhile to note that for HIV-positive pregnant women who do not need ARV treatment for their own health, prophylaxis with ARV medicines is needed to prevent HIV transmission and should be continued until one week after all infant exposure to breast milk has ended.

8.3.3 Providing co-trimoxazole preventive therapy for TB patients living with HIV

Co-trimoxazole preventive therapy (CPT) must be provided to all TB patients who are HIV-infected, regardless of their CD4 cell count. It should be implemented as an integral component of the HIV chronic care package. Co-trimoxazole is a broad spectrum antimicrobial agent that prevents a range of secondary bacterial and parasitic infections in PLHIV.

CPT is a simple, well-tolerated and cost-effective intervention which can be administered concomitantly to ARV treatment. It reduces death rate in co-infected TB/HIV patients.

Health workers dealing HIV-infected TB patients in health facilities should coordinate their efforts with HIV and AIDS units to ensure CPT to these patients.

If TB services and HIV services are provided in 2 two different health facilities, CPT must be provided by the staff who provide anti-TB medicines until the completion of TB treatment; afterwards, the CPT should be continued through HIV and AIDS services.

8.3.4 Providing antiretroviral therapy for TB patients living with HIV

ARV therapy must be provided to all TB patients who are HIV-infected irrespective of their CD4 cell counts. MDR-TB cases who are treated with second-line anti-TB drugs should also receive ARV medicines.

ARV therapy greatly improves the survival and the quality of life of HIV-infected TB patients, prevents HIV transmission and should be considered part of HIV and TB treatment and prevention. TB diagnosis and treatment centers must coordinate their efforts with the most accessible and appropriate HIV and AIDS units to ensure ARV therapy to HIV-infected TB patients.

Anti-TB treatment needs to be initiated first, followed by ARV therapy as soon as possible within the first 8 weeks of TB treatment. However, co-infected TB/HIV patients with major immunosuppression (ex.: CD4 count < 50 cells/mm³) should receive ARV therapy immediately within the first 2 weeks of initiating TB treatment. However, caution is needed in HIV-infected patients with TB meningitis since more severe adverse reactions have been observed with immediate ARV therapy when compared with its initiation two months after the start of anti-TB treatment.

Patients should be closely followed-up to monitor and assess the occurrence of:
i) side-effects related to co-treatment and ii) TB associated immune reconstitution inflammatory syndrome, which is common in patients with TB started on ARV therapy, but usually self-limited.

8.3.5 Ensuring HIV prevention interventions, treatment and care for TB patients living with HIV

It is crucial that TB diagnosis and treatment centers and HIV and AIDS units joint their efforts to ensure integrated services for prevention, diagnosis, treatment and care of TB and HIV.

The provision of HIV prevention, treatment and care package must be continued for HIV-infected patients who completed their anti-TB treatment.

Chapter 9: DRUG-RESISTANT TUBERCULOSIS

The burden of drug-resistant TB, especially MDR-TB, is still unknown, since no anti-TB drug resistance survey has been, to date, undertaken in South Sudan. However, WHO estimates the prevalence of MDR at 2.2% among TB cases who never received any anti-TB medicines and 11% among retreatment TB cases; therefore, the number of MDR-TB was estimated at 225 among both new pulmonary patients and retreatment cases who were notified in 2014 in South Sudan.

MDR-TB cases are not commonly detected in South Sudan because of a lack of appropriate laboratory facilities and weak laboratory network, including inefficient TB sample referral system. However, it is expected that their identification will increase in the near future with the implementation of Xpert machines testing across the country. This is the reason why the PMDT and the relevant national guidelines are developed by the NTP.

The emergence of MDR-TB is a man-made issue to which the national TB control programmes of most countries have been confronted since the introduction of the first anti-TB medicine in the treatment of TB (streptomycin) in early 1940s. The occurrence of drug-resistance TB is a consequence of human errors that can take place in various circumstances, particularly those related to the management of TB patients (see hereafter Box 2). This is why it is important to have an in-depth discussion with the patient at the initiation of treatment in order to address or reduce the effects of some of the issues identified in the Box 2. In addition, the discussion can clarify the expectations of both patient and health care worker, help the patient try to overcome barriers to treatment adherence and assist in building a supportive relationship.

9: Box 2 Common errors that can contribute to the emergence of drug-resistant Tuberculosis

Most common medical errors leading to the selection of resistant bacilli:

- Prescription of inadequate chemotherapy (eg. three drugs during the initial phase of treatment in a new patient smear-positive with bacilli resistant to isoniazid).
- Adding one extra-drug in the case of treatment failure, or adding a further drug when the patient relapses.

Most common errors observed in the management of drug supply:

- Frequent or prolonged shortages of anti-TB medicines due to weak supply chain management system.
- Use of 2 or 3 first-line anti-TB drugs when 4 or 5 drugs should be given.
- Use of anti-TB drugs (or drugs in fixed-dose combinations) of unproven bioavailability.
- Poor management practices multiplying the risk of successive monotherapies and selection of resistant bacilli.
- Health care workers not ensuring a good relationship with the patient from the start.
- Insufficient knowledge of patient on treatment requirements due to inadequate information or misunderstanding.
- Poor case-management (eg: careless attitudes, lack of friendly support, treatment not directly observed).
- Frequent staff changes, with no focal point for ensuring correct management follow up of patient.
- Poor staff morale, compounded by lack of regular support and supervision.
- Poor record keeping, compounded by poor referral systems.

Patient-related factors:

- Weak patient cooperation or adherence, especially when the patient is homeless.
- Unemployment resulting in social instability.
- Previously unsuccessful TB treatment of patient or of a family member
- Difficult access to health care services.
- Alcohol or drug use.

9.1 IDENTIFICATION OF DRUG-RESISTANT TB

As highlighted above (paragraphs 7.1.2 and 6.6.2.1), the following patients should have Xpert MTB/RIF testing because they have higher risk of rifampicin resistance:

- all previously treated TB patients, with a priority for those who failed their last treatment;
- patients who are still smear-positive at the end of the intensive phase of TB treatment;
- contacts of known or suspected MDR-TB patients.

X-pert MTB/RIF testing may be performed for other patients, especially PLHIV who were screening-positive with the clinical algorithm (see paragraph 8.2.1.1).

Health workers in charge of TB services should refer the specimens of the relevant patients to the closest Xpert MTB/RIF testing site; patient may be referred when appropriate.

If the result of Xpert MTB/RIF test shows a TB with rifampicin resistance, the patient must be transferred for hospitalization in one of the PMDT sites (tertiary hospitals with PMDT ward, such as the teaching hospital of Juba and Wau). It is assumed that if there is a rifampicin resistance, the isoniazid resistance is highly probable and therefore the patient will be managed as MDR-TB case.

Once the diagnosis of rifampicin-resistant TB/MDR-TB is established, the patient should be registered in the MDR-TB register of the PMDT site and in the national register of MDR-TB cases which is held in the NTP Central Unit.

Before initiating treatment with second-line anti-TB medicines, other specimens will be transported to TB NRL for culture and DST to confirm the isoniazid resistance.

9.2 TREATMENT OF DRUG-RESISTANT TB

The patient will have a pre-treatment assessment at the baseline in the PMDT site. This assessment includes clinical examination, sputum-smear microscopy, chest X-ray, HIV screening, serum creatinine, serum potassium, liver serum enzymes, pregnancy test in women of childbearing age, and others (see NTP guidelines on PMDT).

South Sudan is adopting the WHO recommended standardized short course regimen for management of MDR-TB:

Intensive phase: duration of 4-6 months and consisting of 4 second-line drugs

Continuation phase: duration of 5 months consisting of 2 second-line drugs, supported by selected first-line TB drugs.

The recommended regimen is as follows:

4-6 Km-Mfx-Pto-Cfz-Z-H high-dose-E / 5 Mfx-Cfz-Z-E

Key:

Km=Kanamycin; Mfx=Moxifloxacin; Pto=Prothionamide; Cfz=Clofazimine; Z=Pyrazinamide; Hhigh-dose= high-dose Isoniazid; E=Ethambutol

In addition, individualized (“conventional”) MDR/RR-TB regimens will be used as follows:

Intensive phase:

Duration: Up to 8 months

Composition: 4 or more second-line drugs

Continuation phase:

Duration: 12 months or more

Composition: 3 or more second-line drugs, supported by selected first-line TB drugs

Indications for use of the conventional MDR-TB regimen include failing short course regimen, drug intolerance, return after interruption >2 months, pregnancy and extrapulmonary MDR-TB (see DR-TB guidelines for further information).

The administration of treatment must be fully supervised by health workers and home health promoters when appropriate.

The occurrence of adverse effects of second-line anti-TB drugs during the treatment of rifampicin-resistant TB/MDR-TB is relatively common. Close monitoring of patients is necessary to ensure that they are identified quickly by health care personnel. The ability to monitor patients for adverse effects daily is one of the major advantages of the direct supervision of treatment over self-administration of treatment with second-line anti-TB medicines.

Health workers ensuring direct supervision of treatment should be instructed on how to screen patients regularly for symptoms of common adverse effects: rashes, gastrointestinal symptoms (nausea, vomiting, diarrhoea), psychiatric symptoms (psychosis, depression, anxiety, suicidal ideation), jaundice, ototoxicity, peripheral neuropathy and symptoms of electrolyte imbalance

(muscle cramping, palpitations). They should also be trained on how to manage simple adverse effects and when to refer patients.

9.3 MONITORING OF DRUG-RESISTANT TB TREATMENT

Patients should be monitored closely for the signs of treatment failure. Clinically, the most important way to monitor response to treatment is through regular history-taking and physical examination. Cough, sputum production, fever and weight loss generally improve within the first few months of treatment and should be monitored frequently by health care staff. The recurrence of TB symptoms after sputum conversion, for example, may be the first sign of treatment failure.

The most important evidence of improvement is the conversion of sputum smear and culture to negative. It is important to note that sputum conversion is slower in drug-resistant TB than in drug-susceptible TB. Sputum smear and culture should be monitored closely throughout treatment and performed monthly before smear and culture conversion. A conversion is defined as two consecutive negative smears and cultures taken 30 days apart. After conversion, the bacteriological monitoring is monthly for smear and quarterly for culture

The patient will be discharged from hospital when his/her sputum converted bacteriologically to negative and the routine assessment indicates a tolerance to the second-line anti-TB medicines.

The ambulatory treatment of the patient should be administered in the closest TB facility to his/her home in coordination with the relevant PHCU. Home health promoters will be involved in the monitoring and direct supervision of the treatment of patient. The patient will visit the TB facility or PHCU on weekly basis and the PMDT site on monthly basis for the first six months after discharge from hospital and then on every two months. The monitoring and follow-up of the patients as well as the evaluation of the treatment outcome will be ensured by the relevant PMDT sites.

9.4 TREATMENT EVALUATION

The treatment outcome will be evaluated at national level by the NTP Central Unit.

A rifampicin-resistant TB/MDR-TB patient is defined as cured when the treatment is completed as specified in the NTP guidelines on PMDT without evidence of failure and three or more consecutive cultures taken at least 30 days apart are negative after the intensive phase.

A treatment completed is a treatment that has been achieved in line with NTP guidelines on PMDT without evidence of failure but no record that three or more consecutive cultures taken at least 30 days apart are negative after the intensive phase. Treatment success is the sum of cured and treatment completed.

CHAPTER 10: TREATMENT REGIMENS IN SPECIAL SITUATIONS

10.1 PREGNANCY

Health workers in charge of TB treatment provision should ask women in childbearing age before initiating the treatment whether they are pregnant. A pregnant woman with TB must be informed that successful treatment with standard regimen is important for successful outcome of pregnancy. Most of the first line anti-TB drugs are safe in pregnancy; however, streptomycin must not be given because of its ototoxicity for the foetus.

If a pregnant woman with TB was previously treated for TB, Xpert MTB/HIV testing must be performed. If there is a rifampicin resistance, the patient must be referred to PMDT site for appropriate management. If there is no rifampicin resistance, culture and DST must be undertaken and the pregnant patient will be administered the following treatment regimen: 3HRZE/5RHE while waiting DST results.

All pregnant women with TB should receive pyridoxine supplementation.

10.2 BREASTFEEDING

The breastfeeding mother with TB should receive full course of TB treatment. It is the best way to prevent transmission of TB bacilli from mother to baby. Mother and baby should stay together and the baby should continue to breastfeed.

After having ruled out active TB in the baby, the baby should be given IPT (10mg/kg/day) for 6 months. The BCG vaccination should be carried out after the IPT if BCG vaccination has not been already provided.

Breastfeeding mothers need to receive pyridoxine supplementation.

10.3 ORAL CONTRACEPTION

Rifampicin interacts with oral contraceptive pill, with a risk of decreased protective efficacy against pregnancy. Therefore, any woman receiving or considering using contraceptive medications should be advised either to receive contraceptive pills containing higher doses of oestrogen (50ug) or use another form of contraception.

10.4 LIVER DISEASE

This paragraph covers TB treatment in patients with pre-existing liver disease; for the detection and management of hepatitis induced by anti-TB drugs, see paragraph 7.4.3.2.

A patient with hepatitis virus carriage, positive past history of acute hepatitis and excessive alcohol consumption can receive anti-TB treatment provided he/she has no clinical evidence of chronic liver disease. However, patients with these conditions may develop reactions to anti-TB drugs.

In patients with unstable or advanced liver disease, liver function tests should be done at the start of treatment, if possible. The more unstable or severe the liver disease is, the fewer hepatotoxic drugs should be used.

Pyrazinamide should not be given to patients with chronic liver disease. The following possible regimens may be given according to the severity of the liver disease:

- Two hepatotoxic drugs are included in the treatment regimen (rather than the three in the standard regimen):
 - 9 months of isoniazid and rifampicin, plus ethambutol in the 2 months of intensive phase;
 - 2 months of isoniazid, rifampicin, streptomycin and ethambutol, followed by 6 months of isoniazid and rifampicin.
- One hepatotoxic drug is included in the treatment regimen:
 - 2 months of isoniazid, ethambutol and streptomycin, followed by 10 months of isoniazid and ethambutol.
- No hepatotoxic drug is included in the treatment regimen:
 - 18–24 months of streptomycin, ethambutol and a fluoroquinolone. (suggestion: 2 months streptomycin (daily) + ethambutol (daily) + fluoroquinolone (daily), then 16 months of ethambutol(daily) + fluoroquinolone (daily) + streptomycin 2 or 3 times a week + ototoxicity monitoring).

10.5 RENAL FAILURE

TB patients with renal failure or severe renal insufficiency will receive 2 months of isoniazid, rifampicin, pyrazinamide and ethambutol, followed by 4 months of isoniazid and rifampicin. Isoniazid and rifampicin are eliminated by biliary excretion, therefore, there will be no change in dosing of these anti-TB medicines. As there is a significant renal excretion of ethambutol and metabolites of pyrazinamide, these two drugs need to be given three times per week at the following doses: 25 mg/kg/day for pyrazinamide and 15 mg/kg/day for ethambutol. While receiving isoniazid, patients with severe renal insufficiency or failure should also be given pyridoxine in order to prevent peripheral neuropathy.

Because of an increased risk of nephrotoxicity, streptomycin should be avoided in patients with renal failure.

10.6 ADJUVANT STEROID THERAPY

Steroid therapy is beneficial to patients who have TB meningitis, pleural TB with large effusion and TB pericarditis. In this group of patients, 40-60 mg of prednisolone can be given for 4 weeks and then the dose is gradually decreased over several weeks. Other patients that may benefit from steroid therapy are those having:

- TB laryngitis with airway obstruction;
- Massive TB lymphadenopathy with signs of airway obstruction;
- TB of renal tract to prevent ureteric scarring;
- TB of the adrenal glands that may cause hypo-adrenalism;
- Severe hypersensitivity reaction to anti-TB drugs.

Chapter 11: ADHERENCE TO TREATMENT

The public health priority of the NTP is to detect and treat successfully all TB cases living in South Sudan, while preventing the emergence of drug resistance. To this end, adherence of TB patients to treatment must be ensured. TB is curable if patients are given a complete and uninterrupted adequate treatment in line with the NTP policy. However, poor adherence to TB treatment may occur and therefore can result in significant consequences such as:

- Prolonged illness and disability for the patient;
- Infectiousness of the patient causing continued transmission of TB in community;
- Development of drug-resistant TB;
- Death of patient.

TB is a complex disease that carries biological, social, economic and cultural ramifications for the patient. Health care providers should be mindful of the strong impact that this disease can have on all aspects of the patient's life and the need for a comprehensive approach to the management of the patient.

Although the necessary tools are available, the successful treatment of TB cannot be achieved by clinical medicine alone. Treatment success is influenced by the health care system as well as by the behaviors of both patients and health care providers.

Patients and health care workers share responsibility for treatment outcomes, therefore, the provider must do everything possible to educate, support, influence and persuade the patient to take their medication as prescribed and to complete treatment.

11.1 TREATMENT ADHERENCE

Adherence to treatment means following the recommended course of treatment by taking all the prescribed medications for the entire length of time necessary. Patients' adherence is a key factor in treatment success. The premature interruption of treatment generates problems for patients and their family members as well as for health workers.

Promoting adherence through a patient-centered approach, which includes facilitating access to treatment, choosing with the patient the most convenient time and place for direct supervision of treatment and, when possible, providing other social and medical services, is much more effective and rewarding than spending resources on defaulter tracing.

Facilitating access means:

- ensuring anti-TB medicines and laboratory services for diagnosis free of charge;
- reducing the time and cost to the patient to obtain treatment;
- providing good and rapid attention.

When patients receive self-administered treatment, there is a risk that they may take anti-TB drugs irregularly and even abandon his/her treatment. Tracing such patient is often difficult and may be unproductive.

Therefore, health staff and home health promoters must offer polite and efficient attention and consider the patient needs at every contact with him or her. Directly supervised treatment by these staff contributes significantly to ensuring the treatment adherence.

11.2 DIRECTLY OBSERVED TREATMENT

Directly observed treatment (DOT) or directly supervised treatment means that an observer watches the patient swallowing the anti-TB medicines. This ensures that a TB patient takes the right drugs, in the right doses and at the right intervals. DOT needs the presence of a treatment supporter who may be a health worker, a home health promoter or a trained and supervised community member. At the initiation of TB treatment, DOT that will be ensured by treatment supporter should be acceptable to patients. The TB drugs should remain with the treatment supporter and only given to the patient at the time of intake.

DOT also ensures the accountability of health care workers to ensure that patients take their TB treatment and helps prevent emergence of drug resistance.

In the entire intensive phase of TB treatment, DOT must be ensured daily. In the continuation phase, it should be as much as possible daily through the involvement of TB diagnosis and treatment centre/PHCU staff, home health promoters and relevant community treatment supporters.

TB treatment services must be organized as close as possible to patient home or workplace.

For those patients who live close to a health facility, they should be encouraged to take their treatment in this health facility. However, the TB patients who live far away from any health facility, treatment provision with DOT should be ensured by home health promoters and community treatment supporters. The involvement of a community member as a treatment supporter needs training, regular support, motivation, instruction and supervision by health staff to ensure treatment adherence.

Any willing person who is acceptable to the patient and answerable to the health system can be a treatment supporter.

11.3 INTERRUPTION OF TB TREATMENT

Some patients may fail to come to PHCU or to meet their health home promoter or community treatment supporter in order to take their drugs. These patients must be traced as soon as possible to resume TB treatment.

11.3.1 Prevention of interruption of treatment

Several measures must be taken to prevent the interruption of TB treatment, such as:

- The management of anti-TB drugs must be appropriately ensured at all levels;
- The required buffer stocks of anti-TB medicines must be available at central, state and county levels;
- All patients who are identified as TB cases must be registered in the TB treatment register and referred to the appropriate health facilities and right treating health workers;
- The treating health staff must establish for each TB patient a TB treatment card and TB identity card and collect all relevant information on the exact physical address and mobile number (personal or of a family member, neighbour or friend) to facilitate the location of the patient in case he/she defaults his / her treatment;
- Before initiating TB treatment, the treating health staff must explain to patient and family members:
 - Who will be in charge of his/her treatment (identification of the health worker and/or home health promoter or community treatment supporter);
 - The duration of each phase of TB treatment;
 - The steps needed to monitor the treatment course;
 - The absolute necessity to follow strictly the instructions of the health staff or home health promoter regarding TB treatment;
 - The consequences if the treatment is abandoned;
 - The absolute necessity to inform, ahead of time, health staff (or home health promoter) in case:
 - of planned absence or moving to other county or state
 - of physical address changein order to make the arrangements needed for the continuation of TB treatment;
- Treating health staff needs to identify any potential problems that may create obstacle for the treatment adherence, such as the incompatibility of the time of treatment provision and work hours;
- Patient must have regular follow up in the TB diagnosis and treatment centre or PHCU at most every month during the continuation phase;
- Any patient who did not take his/her treatment for 3 consecutive days during the intensive phase or for 1 week during the continuation phase

must be considered as potential defaulter and immediately traced through PHCU, home health promoters and community treatment supporters;

- Any patient who did not come to his/her monthly follow up session in the TB diagnosis and treatment centre/PHCU must be considered as potential lost to follow-up and immediately traced through the actors identified above;
- Tracing of lost to follow-up patient should be part of the weekly activity of any facility providing TB treatment services. The TB register and TB treatment cards should be checked on a fixed day of the week to find out patients who have not attended follow up session that week; these patients are the potential lost to follow-up who should be immediately traced.

11.3.2 Action to be taken when a patient is lost to follow-up

It is crucial that patients who do not come back for treatment should be traced as soon as possible. However, some of them may not be traced for long time while others return by themselves to the TB diagnosis and treatment centre or PHCU after months. For any patient who was lost to follow-up and found or who returned by him/herself, actions must be taken. These actions are identified, hereafter, in the Tables 10 and 11 and depend on the type of treatment, the duration of treatment interruption and the bacteriological evaluation.

Table 10: Management of new patients who interrupt treatment

Length of treatment	Length of interruption	Sputum result at return	Treatment outcome	Classification at return	Treatment action and registration
<1 month	<2 weeks	Not needed	-	-	Continue treatment at the point it was stopped
	2-7 weeks	Not needed	-	New	Start treatment
	≥8 weeks	Not needed	-	New	Start treatment
1-2 months	<2 weeks	Not needed	-	-	Continue treatment at the point it was stopped
	2-7 weeks	Smear +	-	-	Restart treatment
		Smear -	-	-	Continue treatment at the point it was stopped
≥8 weeks	Smear +/-	Lost to follow up	Treatment after loss to follow up	Start retreatment, perform Xpert/DST and give new number	
≥2 months	<2 weeks	Not needed	-	-	Continue treatment at the point it was stopped
	2-7 weeks	Smear +	Give new number	Other	Start retreatment, perform Xpert/DST
		Smear -	-	-	Continue treatment at the

					point it was stopped
	≥8 weeks	Smear +/-	Lost to follow up	Treatment after loss to follow up	Start retreatment, perform Xpert/DST, give new number

Table 11: Management of re-treatment patients who interrupt treatment

Length of treatment	Length of interruption	Sputum result at return	Treatment outcome	Classification at return	Treatment action and registration
<1 month	<1 month	Not needed	-	-	Continue retreatment at the point it stopped
>1 month	4-7 weeks	Smear +	-	-	Re-start treatment, perform Xpert/DST
		Smear -	-	-	Continue retreatment at the point it stopped, perform Xpert/DST
	≥8 weeks	Smear +/-	Lost to follow up	Treatment after loss to follow up	Restart the retreatment, give new number, perform Xpert/DST

11.3.3 Strategies to improve treatment adherence

11.3.3.1 Quality interaction with the patient

- Create a partnership;
- Ask patient whether they do take the anti-TB drugs and do not assume that they do;
- Give each patient adequate time at each visit;
- Be positive and do not intimidate or frighten the patient;
- Behave with respect with patient;
- Treat the person and not the disease;
- Understand and address different cultural beliefs and values;
- Adapt treatment to lifestyle;
- Link patient with NGOs and any entity which provide psycho-social support whenever needed.

11.3.3.2 Patient education

- Give the vital information, first in the patient interview;
- Be cautious and clear with instructions as the patient might be anxious; after having been informed on the nature of disease;
- Provide all the information needed on TB treatment to the patient, such as its duration;
- Use educational materials that the NTP has made available;
- Assess the patient's beliefs about TB and adapt the education messages to the patient beliefs;
- Review instructions, question patient to ensure his/her understanding;
- Clarify patient's questions and respond clearly.

11.3.3.3 Treatment

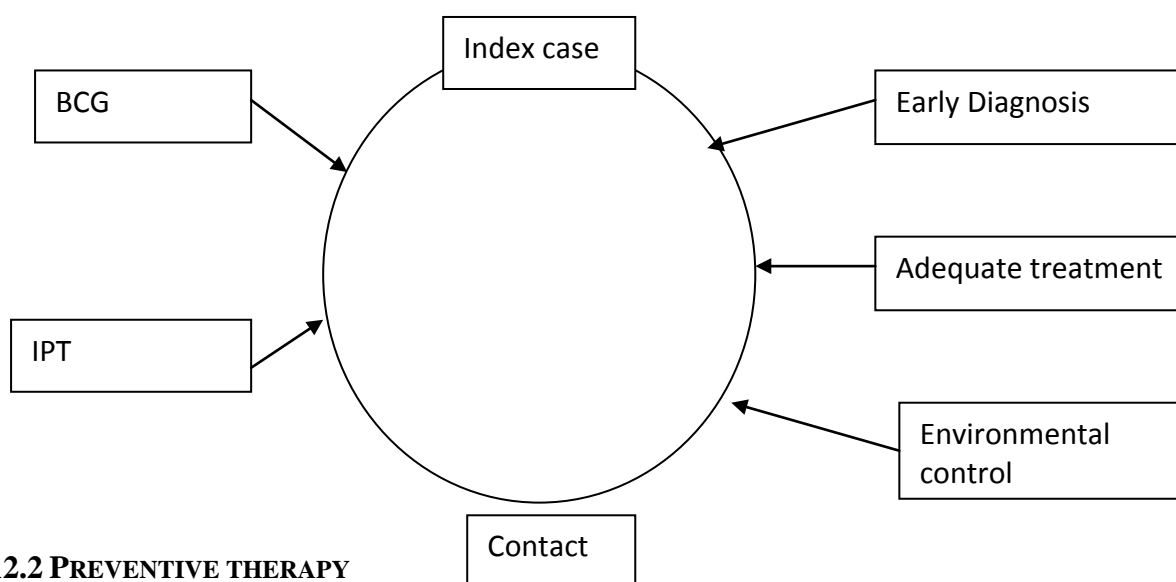
- Tailor the treatment plan to patient's suitability, and offer options;
- Give clear instructions about the side effects of TB medication;
- Ensure proper record keeping for each patient on treatment;
- Follow up quickly on missed appointments;
- Fast track patients coming for treatment and follow up;
- Ensure that staff is supportive to patients;
- Ensure that the physical environment is comfortable to patients;
- Ensure confidentiality.

Chapter 12: PREVENTION OF TUBERCULOSIS

TB is a preventable communicable disease if appropriate measures are taken. Its transmission chain revolves around the index case and exposed contacts. The following approaches are used to prevent:

- the contact from being infected which implies early diagnosis and adequate treatment of TB as well as environmental measures
- the infected contact from developing active TB through BCG vaccination and IPT.

12.1 Chain of TB transmission



12.2 PREVENTIVE THERAPY

IPT must be provided for 6 months at the dose of 10 mg/kg/day to:

- infants of breastfeeding mothers who are under TB treatment and
- children under the age of 5 years who have been exposed to index TB cases and in whom no active TB has been detected.

In addition, PLHIV who have no active TB must receive IPT for at least 6 months (children: 10 mg/kg/ day; adolescents and adults: 5 mg/kg/day).

12.3 BACILLE CALMETTE-GUERIN VACCINE

BCG is a live attenuated vaccine derived from *Mycobacterium bovis*. In most countries BCG vaccination is included in the Expanded Programme for Immunization. It is well established that BCG vaccination can protect young children against disseminated and severe forms of TB such as TB meningitis and military TB. It has no or little protection against the development of TB in adults. BCG can however give some protection against leprosy.

Because of the high prevalence of TB in South Sudan, BCG vaccine should be given to all neonates, regardless of their HIV status, immediately after birth but it should not be given to children showing clear signs and symptoms of HIV and AIDS or a neonate with congenital immunosuppression or receiving immunosuppressive.

12.4 TB CONTACT INVESTIGATION

TB contact investigation contributes to early detection and treatment of active TB cases and therefore reduces the duration of transmission of TB bacilli in community.

The index TB cases around whom contact investigation must be undertaken are: i) patients with bacteriologically confirmed pulmonary TB, ii) children with active TB, iii) co-infected HIV/TB patients and iv) rifampicin-resistant/MDR/XDR-TB cases. The contacts that must be systematically and actively screened in priority for TB are household members. The screening and the evaluation of contacts should involve home health promoters and health staff of PHCUs and TB diagnosis and treatment centres.

Children and PLHIV who are contacts but do not have any active TB must be treated with IPT.

12.5 PREVENTION OF TB TRANSMISSION IN LABORATORY

Laboratory workers are responsible for their own safety and that of their co-workers. Transmission of TB is common in laboratory setting if no precautions are taken. This essentially results from micro-aerosols, 1 to 5 microns in diameter, which carry TB bacilli and are sufficiently small to reach the lung alveoli but big enough to settle and adhere to the lining of the lung alveoli. If there are no safety measures, these bacilli can be transmitted to laboratory workers.

The control of TB infection in laboratory must aim at reducing the production of aerosols. This can be achieved by provision of the following:

- Laboratories with good ventilation. This is through locating windows and doors in such a way that airborne particles are blown away;
- Health staff must wash their hands each time they enter and leave laboratory;
- Wearing of protective clothing such as laboratory coats while doing work and leaving them in the lockers when going home;
- Access to laboratory must be allowed to the required staff only;
- Wearing of disposable gloves while preparing and staining smears;
- In cases where gloves are not available, soaking hands in 70% alcohol before washing with a detergent solution;
- Eating, drinking and smoking should be totally prohibited in laboratory;
- Sputum specimen should be collected outside but not in laboratory.

Sputum preparation and smearing does not increase the risk of transmission of TB but health workers must always be vigilante.

12.6 CONTROL OF TB IN HEALTH CARE SETTINGS

Although it is difficult to control TB infection in congregate setting in South Sudan, the following measures need to be taken whenever possible:

- **Administrative:** This include early recognition, diagnosis and treatment of suspected cases of pulmonary TB, separation of suspected and proven cases of pulmonary TB from others; patients should cover their mouths while coughing;
- **Environmental:** This includes maximizing natural ventilation and using ultraviolet radiation where possible;
- **Personal protection:** Protection of PLHIV from possible exposure to any TB source and offering IPT.

12.7 IMPROVEMENT IN HOUSING CONDITIONS

The community should be instructed to build well-ventilated houses and to reduce overcrowding in houses. These simple methods can contribute to reducing the transmission of TB in indoor environment and subsequently in community.

12.8 CONSUMPTION OF RAW MILK

Consumption of raw milk can lead to transmission of bovine TB. The community members must therefore be instructed to boil milk before consumption.

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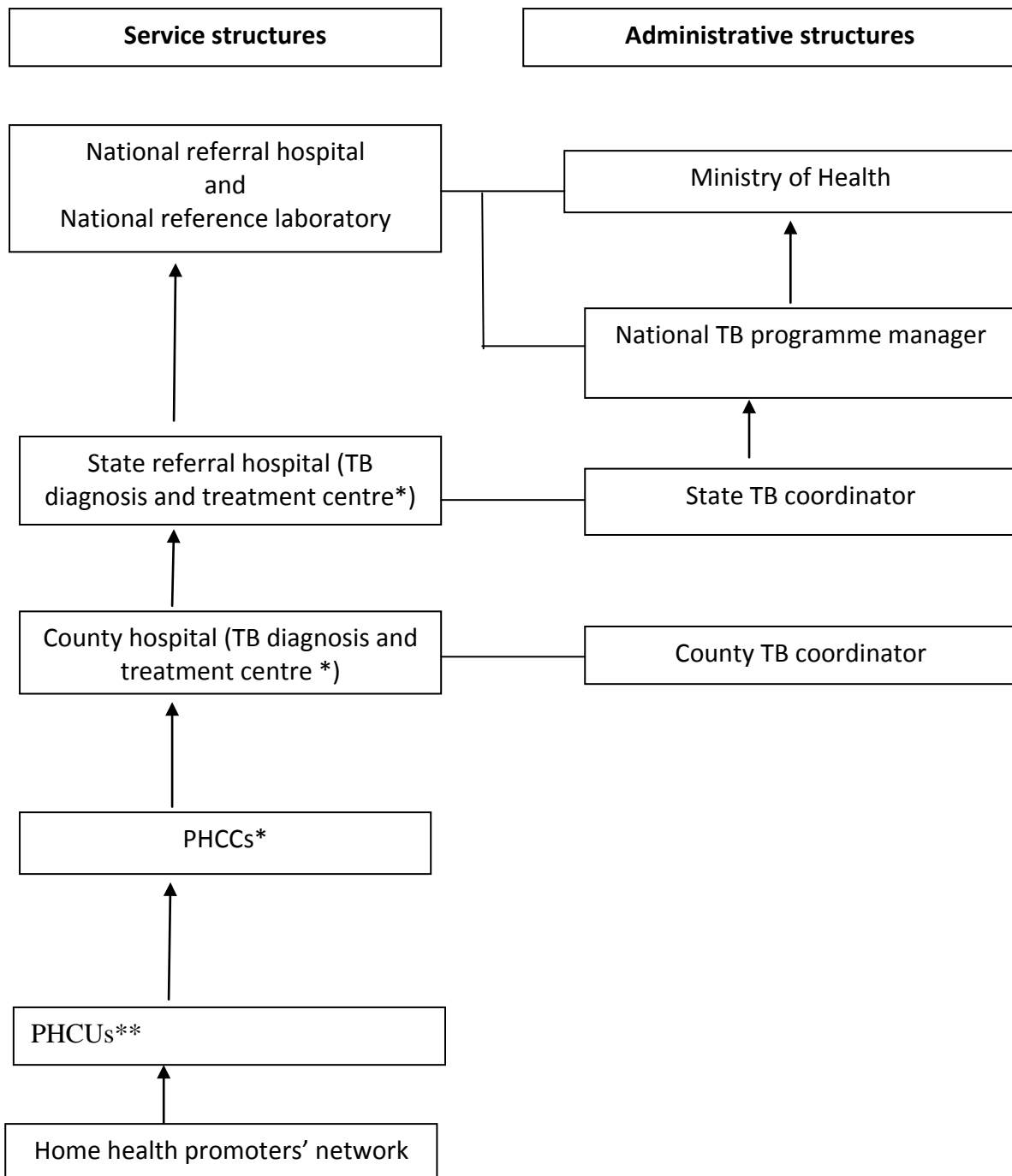
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ANNEXES

ANNEX 1: STRUCTURE OF THE NATIONAL TUBERCULOSIS PROGRAMME IN SOUTH SUDAN



*: A TB diagnosis and treatment centre provides TB diagnosis and treatment services and can be located in a state hospital, a county hospital or a PHC centre (PHCC) which provides a package of PHC services on ambulatory basis and refer, whenever needed, patients for hospitalization.

** : A primary health care centre unit (PHCU) ensures TB treatment services and refers presumptive TB patients to PHCC; it also provides a package of PHC services and has linkages with home health promoters

ANNEX 2: TECHNIQUES OF COLLECTING SPUTUM

General rules

- Specimen collected under the direct supervision of a laboratory staff is much better than specimen collected unsupervised;
- Sputum specimen collection should take place in an open air instead of closed space;
- Patients usually cooperate better in collection of sputum when they are out of sight from the other patients;
- Patients should rinse their mouth before collecting any sputum if they have just been taking food;
- Patients should briefly be explained the purpose of taking sputum specimen;
- The request form for the sputum examination should be properly filled;
- Write on the side and on the lid of the container the same number as written on the form.

How to collect sputum specimen

- Ask the patient to cough deeply. It is better to demonstrate it to the patient;
- Make sure nobody is standing in front of the patient while he/she is coughing;
- Make sure not to contaminate the outside of the sputum container and if it is contaminated, discard the container and take fresh specimen with new container;
- If the patient has not produced suitable specimen (saliva or less amount) ask the patient to repeat until suitable specimen is produced (not saliva, and amount of 3-5 ml).

When specimen is produced

- Place the lid on the container and close it firmly;
- Wash your hands thoroughly with soap;
- If specimen is to be sent to another laboratory, store it in a refrigerator or in cool, safe and dark place. Otherwise send specimen to the laboratory as soon as possible, not later than one week;
- Each specimen must be accompanied by duly filled form for sputum examination;
- Transportation of any sputum specimen must be the responsibility of any laboratory staff. The specimen must be suitably packed and as soon as possible accompanied by the laboratory request form.

ANNEX3: QUALITY ASSURANCE OF SPUTUM SMEAR MICROSCOPY

The quality assurance of sputum smear microscopy undertaken in TB laboratories located in TB diagnosis and treatment centre involves the TB NRL and the states' TB laboratories.

AFB laboratory centre

The AFB centres are established in PHCCs and hospitals which ensure TB diagnosis and treatment services. The main functions of an AFB centre are:

- Sputum smear microscopy for the diagnosis of TB;
- Collection and sending of sputum smears to referral centres for either smear microscopy, Xpert testing or cultures;
- Keeping sputum smears for quality assurance;
- Keeping the required records.

State referral laboratories

These laboratories are at state level. Their main functions are to:

- Carry out all functions of AFB laboratory centres;
- Perform quality assurance for the AFB centres;
- Conduct training of laboratory technicians who carry out sputum smear microscopy;
- Perform Xpert testing.

National Reference Laboratory

The main functions of the TB NRL are to:

- Perform AFB microscopy, Xpert testing and culture to establish TB diagnosis, genotyping of mycobacterium species and DST to clarify anti-TB drug resistance status in patients;
- Organize the training of technicians of TB laboratories;
- Contribute to and carry out research;
- Perform quality control of consumables produced or imported in South Sudan;
- Organize and perform quality assurance of TB laboratory activities undertaken in the national TB laboratory network;
- Ensure drug resistance surveillance.

Quality assurance of sputum smear microscopy is a fundamental component of TB control programme. This includes the whole process of: i) sputum collection, ii) smear preparation, staining, microscopy and reading and iii) reporting of findings. The purpose of quality assurance is to improve the efficiency and reliability of smear microscopy. It is divided into: i) quality control, ii) proficiency testing and iii) quality improvement.

Quality control

This is a process of effective and systematic internal monitoring. It aims to detect the frequency of errors against established limits of acceptance. It is a mechanism to validate competency in the laboratory services. Internal quality control of staining is mandatory. All new staining solutions must be tested. Rereading of the positive and few negative slides either by a second person in the laboratory or by sending them to be read in other laboratories must be done. Therefore, positive and negative slides must always be kept for this purpose.

Proficiency testing

This is external quality assessment. It allows participating laboratories to evaluate their capabilities by comparing their results with those obtained with the same specimens in other laboratories. This involves:

- Sending smears from the reference laboratory to the peripheral laboratory for reading and reporting;
- Monitoring the quality of sputum smear microscopy in all stages during supervisory visits;
- Collecting smears in the peripheral laboratories and sending them to reference laboratory for rereading (TB NRL or relevant state TB laboratory);
- Sampling smears of registered TB patients.

Quality improvement

This consists of correcting deficiencies in smear microscopy performance and reading by taking appropriate remedial actions.

ANNEX 4: SIDE EFFECTS OF ANTI-TUBERCULOSIS DRUGS AND THEIR MANAGEMENT

Adverse reactions of anti-TB drugs range from mild skin itching to severe problems like hepatitis. They are usually divided into two categories, namely minor and major effects. Generally patients who develop minor adverse effects should continue with their treatment while, sometimes at reduced doses. The patient can also be given symptomatic treatment. However, when patients develop major adverse reactions, the management depends on the nature of the reaction.

The majority of patients taking first-line anti-TB drugs complete their treatment without developing any significant side effects. Only few of them develop serious adverse reactions. Therefore, all TB patients must be educated and monitored to detect signs and symptoms which are associated with side effects of anti-TB drugs. All patients who develop major adverse reactions must be referred for appropriate management in hospital.

Isoniazid

Adverse effects:

- Peripheral neuropathy (tingling and numbness of the hands and feet).
- Hepatitis, more often in patients older than 35 years (rare);
- Generalized skin rash (occurs rarely);
- Fever;
- Joint pains;

Management:

- Mild itching: continue drug treatment, reassure the patient, give calamine lotion and if necessary antihistamine;
- Fever and generalized skin rash: stop all drugs and give antihistamine.
- Neuropathy: give 10 mg-25 mg of pyridoxine, daily;
- Drug-induced hepatitis: stop anti-TB treatment, do liver function tests. If there is a loss of appetite, jaundice and liver enlargement, do not give treatment for at least 1 week or until the liver functions have returned to normal (see paragraph 7.4.3.2). In most patients INH can usually be given later without the return of hepatitis.

Isoniazid inhibits the breakdown of epileptic drugs i.e. phenytoin and carbamazepine. Dosages of these drugs may need to be reduced during the treatment period.

Rifampicin

Adverse effects:

- Gastro-intestinal: nausea, anorexia and mild abdominal pain, diarrhea occurs less frequently;

- Cutaneous reactions: mild flushing and itchiness of the skin;
- Hepatitis: This is uncommon unless the patient has a history of liver disease or alcoholism (see paragraph 7.4.3.2);
- Serious side effects like influenza syndrome and shock may occur in patients who take the anti-TB medicines intermittently instead of daily; in these situations, stop TB treatment and refer patient;
- The patient should be warned that rifampicin colors urine, sweat and tears pink (urine looks orange-pink).

Drug interactions:

Rifampicin stimulates liver enzymes, which may break down other drugs more rapidly than expected, such as oral anticoagulants (warfarin), oral diabetic drugs (Hypoglycemic agent), digoxin, phenobarbitone and other anti-epileptics.

Contraception:

The dose of contraceptives should be increased in patients taking rifampicin. Depo-provera 150mg should be given 8 weekly instead of 12 weekly. Combined oral contraceptives with at least 0.05mg of ethinyloestradiol should be prescribed. The pill free interval should be shortened from 7 to 4 days. Intra Uterine Contraceptive Devices may be recommended.

The patient should be informed that the effect of rifampicin may last up to 2 months after the treatment is stopped.

Streptomycin

Adverse effects:

- Cutaneous hypersensitivity, rash and fever;
- Ototoxicity (damage to eighth cranial nerve). Damage to the vestibular (balancing) apparatus is shown by dizziness, sometimes with vomiting. Unsteadiness is more marked in the dark;
- Deafness;
- Anaphylaxis; streptomycin injection may be followed by tingling around the mouth, nausea and occasionally by sudden collapse. Treat as for any anaphylactic reaction and do not give streptomycin again;
- Deafness in unborn child. Streptomycin should be administered during pregnancy, it crosses the placenta.

Contra-indications:

Do not give to patients with existing renal disease, as it will impair renal function more. **Older people (>65 years) have reduced renal function and should not be given streptomycin.**

Management:

- Skin reactions: treat as for allergic skin reactions.
- Damage to vestibular apparatus: treatment must be stopped immediately.

- ringing in the ears or loss of hearing: if streptomycin is stopped immediately, the symptoms will usually clear over weeks, if not, the damage will be permanent.
- Avoid streptomycin to patient above 65 years and do not give it to pregnant women and young children.

Ethambutol

Adverse effects:

- Progressive loss of vision caused by retrobulbar neuritis, usually manifests first as loss of color vision and usually presents after the patient has been on treatment for at least two months. This is usually caused by excessive doses of ethambutol;
- Skin rash;
- Joint pains;
- Peripheral neuropathy.

Management:

If the patient complains about visual disturbance, stop treatment immediately. Skin rashes and joint pains usually respond to symptomatic treatment.

Pyrazinamide

Adverse effects:

- Liver damage: Anorexia, mild fever, tender enlargement of the liver and spleen may be followed by jaundice;
- Arthralgia: This is common and mild. The pain affects both large and small joints, the level of uric acid is increased and gout may occur;
- Skin rash on sun exposed areas.

Management:

- Hepatotoxicity: Do not give pyrazinamide again if severe hepatitis occurs.
- Arthralgia: Treatment with aspirin is usually sufficient. Allopurinol may be required for the treatment of gout.

ANNEX 5: DRUG MANAGEMENT

The objective of the NTP of South Sudan is to avail regular supply of anti-TB drugs and ensure that they are available and used appropriately.

- Anti-TB drugs in South Sudan are supplied by the MOH and must be provided free to all TB patients.
- Drugs are selected according to the WHO Model List of Essential Medicines; the forms of TB drugs that are used within the NTP network of South Sudan are mainly fixed-dose combinations; small quantities of loose anti-TB medicines are also used in case of adverse side effects of these drugs.
- Appropriate packaging of drugs must be used to protect, preserve and to make distribution of drugs easier.
- Quantity of drugs is ordered according to the number of cases in the different treatment categories notified in the previous year, the standardized treatment regimen and the required stocks. Reserve stock must be ensured for 6 months at national level and 3 months at state and county levels.
- Storage and distribution of anti-TB drugs is the responsibility of the Health Secretariat of the MOH in conjunction with the WHO Office in South Sudan.
- To ensure that quality-assured anti-TB drugs are supplied, the NTP must make sure that the drugs are produced in line with the Standard Manufacturing Practices as recommended by WHO; drugs are imported with WHO certificate and stored properly following good storage practices; the “first expiry – first out” principle is used.
- Anti-TB drugs are steadily distributed from the central level to states and county levels on quarterly basis.
- All drugs supplied to states and counties must be accounted for regularly.

The National Drug Regulatory Authority has the responsibility to monitor the rational supply and use of anti-TB medicines through their registration, quality control, inspection of storage sites, monitoring of side effects, monitoring of drug resistance and ensuring that their packaging and labelling are properly made.

ANNEX 6: TUBERCULOSIS RECORDING AND REPORTING TOOLS

List of Recording and Reporting Tools

Register 1: Register of Presumptive TB Patients

Register 2: Request for examination of biological specimen for TB

Register 3: TB Laboratory Register for Smear Microscopy and X-pert MTB/RIF

Register 4: TB Treatment Register

Register 5: Tuberculosis Treatment Card

Register 6: Quarterly report on TB case registration in TB diagnosis and treatment centre

Register 7: Quarterly report on microscopy sputum smear conversion

Register 8: Quarterly report on TB and TB/HIV Treatment outcomes

Register 9: TB Treatment Transfer

Register 10: TB Treatment ID card;

Register 11: TB Contact Register.

Year

**National Tuberculosis, Leprosy and Buruli Ulcer Control Programme
Register of Presumptive TB Patients**

Serial number	Date	Name	Age	Sex M/F	Duration of symptoms (in days)	Complete physical address and telephone number	Referred to laboratory		Patient referred to Xpert site (date)	Patient referred elsewhere (specify where, when and why)	Remarks / comments
							Sputum (date)	Patient (date)			

Request for examination of biological specimen for TB

Health facility: _____ Date of request: _____ Serial number²: _____

Patient name: _____

Age: _____ Sex: Male Female

Patient address: _____
 _____ Telephone: _____

Reason for examination:

Diagnosis. If diagnosis, presumptive Rifampicin-resistant TB/MDR-TB?: Yes No
 Or Follow-up. If follow up, month of treatment: _____

HIV infection? Yes No Unknown

Previously treated for TB? Yes No Unknown

Specimen type: Sputum Other (specify): _____

Test(s) requested (please circle): Microscopy Xpert MTB/RIF

Requested by (Name and signature): _____

Microscopy results (to be completed in the laboratory)

Date sample collected (filled by requestor)	Specimen type	Laboratory serial number(s)	Visual appearance (blood-stained, mucopurulent or saliva)	Result (tick one)				
				Negative (0 AFB/100 HPF)	1-9/100 HPF (scanty; report no. of AFB)	+(10-99 AFB /100 HPF)	++ (1-10 AFB/HPF)	+++ (>10 AFB/HPF)

Examined by (name and signature): _____

Date of result: _____

Xpert MTB/RIF test result (to be completed in the laboratory)

Date sample collected: _____

M. tuberculosis (circle): Detected Not detected Invalid / No result / Error
 Rifampicin resistance (circle): Detected Not detected indeterminate result

Examined by (name and signature): _____ Date of result: _____

² Serial number specified in the Presumptive TB Register or TB Treatment Register if patient is treated for TB and is on follow up

**National Tuberculosis, Leprosy and Buruli Ulcer Control Programme
TB Laboratory Register for Smear Microscopy and X-pert MTB/RIF**

Lab. serial number	Date specimen received ^a	Patient name	Sex M/F	Age	Patient address	Identification of referring health facility	Serial number specified in TB presumptive register or in TB treatment register	HIV infection (Y/N/Unk) ^b	Patient previously treated for TB ^c	Examination type (<i>tick one option</i>)		Examination results				Remarks	
										Diagnosis	Followup	Xpert ^e	Smear microscopy				
											Month ^d		Date	1	2		LED use (Y/N)

a For diagnostic testing employing serial sputa or other specimens this is the date of receipt of the first set of specimens.

b Y = Yes; N = No; Unk = unknown

c Y = previously treated; N = not previously treated; Unk = unknown

d Patient on TB treatment; indicate month of treatment at which follow-up examination is performed.

e If Xpert MTB/RIF indeterminate result, indicate error code or "invalid".

**National Tuberculosis, Leprosy and Buruli Ulcer Control Programme
TB Treatment Register – Left side of the register book**

Year _____

Registration Date	TB treatment register number	Name	Age	Sex	Referred by	Complete physical address and telephone	Treatment Health facility ¹	Site P / EP	Type of patient						Date treatment started	Treatment regimen
									N	R	F	TI	T	O		

^{i 1}Treatment health facility is the health centre which is responsible for TB treatment provision to the patient; the treatment and follow up of the patient may involve home health promoter and/or community treatment supporter.

P: pulmonary; EP: extrapulmonary; N: new case; R: relapse; F: treatment failure; TI: treatment interrupted; T: transferred “In”; O: other.

Year _____

Tuberculosis Treatment Card

TB Treatment Register – Right side of the register book

Results of sputum smear microscopy and other examination										Treatment outcome & date					TB/HIV activities		Moved to second-line treatment regimen	Remarks
Before treatment				2 or 3 months		5 months		End of treatment		Outcome ⁵					ART Y/N	CPT Y/N		
Sputum smear microscopy result	Date/Lab. No.	HIV result ² /Date	Xpert Result ³ /Date	Sputum smear microscopy result	Date/Lab. No.	Sputum smear microscopy result	Date/Lab. No.	Sputum smear microscopy result	Date/Lab. No.	Cure	Completed Treatment	Treatment Failure	Died	Lost to follow-up	Not evaluated	Start date		

²Documented evidence of HIV test performed before or during TB treatment should be reported here.

³If Xpert testing is carried out, specify whether the test is positive or not for both MTB and rifampicin resistance.

Name: _____

Sex: M F

Date of registration: _____

Date of Symptoms started _____

Age: _____

Health facility: _____

Address: _____

Name / address of community treatment supporter (if applicable) _____

Name and address of contact person: _____

I. INITIAL PHASE - prescribed regimen and dosages

CAT (I, II):

Number of tablets per dose and dosage of S:

(RHZE)

S

Cotrimoxazole

ARV

Other

Referral by :

- Self-referral
- Community member
- Public facility
- Private facility/provider
- Other, specify _____

Disease site (check one)

Pulmonary Extra pulmonary, specify _____

Type of patient (check one)

- New
- Relapse
- Transfer in
- Treatment after default
- Treatment after failure
- Other, specify _____

Sputum smear microscopy				Weight (kg)
Month	Date	Lab No.	Result	
0				
2				
3				
5				
End				

TB/HIV		
	Date	Result*
HIV test		
CPT start		
ART start		

* (Pos) Positive; (Neg) Negative; (I) Indeterminate; (ND) Not Done/unknown

Tick appropriate box after the drugs have been administered

Daily supply: enter ✓. Periodic supply: enter X on day when drugs are collected and draw a horizontal line (————●) through the number of days supplied. Ø = drugs not taken

Day Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

II. CONTINUATION PHASE

(RH)	(RHE)	Other

Number of tablets per dose

Daily supply: enter ✓ . Periodic supply, enter X on day when drugs are collected and draw a horizontal line (————●) through the number of days supplied. Ø = drugs not taken

Day Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	

X-ray (at start)
Date:
Results (-), (+), <i>ND</i>

HIV care
Pre ART Register No.
CD4 result
ART eligibility (<i>Y/N/Unknown</i>)
Date eligibility assessed
ART Register No.

Comments: _____

Treatment outcome
Date of decision _____
<input type="checkbox"/> Cure
<input type="checkbox"/> Treatment completed
<input type="checkbox"/> Died
<input type="checkbox"/> Treatment failure
<input type="checkbox"/> Lost to follow-up
<input type="checkbox"/> Transfer out

Quarterly report on TB case registration in TB diagnosis and treatment centre

Name of health facility: _____	Patients registered during ^a _____ quarter of year _____
Name of TB focal person: _____ Signature: _____	Date of completion of this form: _____

Block 1: All TB cases registered during the quarter^b

	New	Relapse	Previously treated (excluding relapse)	Previous treatment history unknown	Total
Pulmonary, bacteriologically confirmed					
Pulmonary, clinically diagnosed					
Extrapulmonary, bacteriologically confirmed or clinically diagnosed					

Block 2. All new and relapse cases (bacteriologically confirmed or clinically diagnosed) registered during the quarter by age group and sex

	0-4	5-14	15-24	25-34	35-44	45-54	55-64	>65	Total
Male									
Female									

Block 3: Laboratory diagnostic activity^c

Patients with presumptive TB undergoing bacteriological examination	Patients with presumptive TB with positive bacteriological examination result

Block 4: TB/HIV activities (all new and relapse TB cases registered during the quarter)

Patients tested for HIV at the time of TB diagnosis or with known HIV status ^d at the time of TB diagnosis	HIV-positive TB patients	HIV-positive TB patients on ART	HIV-positive TB patients on CPT

a Registration period is based on date of registration of cases in the TB register, following the start of treatment. Q1: 1 January – 31 March; Q2: 1 April – 30 June; Q3: 1 July – 30 September; Q4: 1 October – 31 December.

b “Transferred in” cases are excluded.

c Data aggregated from the TB laboratory register based on *Date specimen received*, and excluding patients examined for follow-up.

d Include all TB patients previously known to be HIV-positive (e.g. documented evidence of enrolment in HIV care such as enrolment in the pre-ART register or in the ART register once started on ART) or with a documented negative HIV test conducted at the time of TB diagnosis.

Quarterly Report on Sputum Smear Microscopy Conversion

Name of health facility: _____	Quarter ¹ ----- of year-----
Name and signature of TB focal person: _____	Date of completion of this form: _____

Number of new bacteriologically confirmed pulmonary TB cases registered in quarter recorded above ²	Sputum smear microscopy not done at either 2 or 3 months	Sputum smear microscopy conversion at:	
		2 months	3 months
Total converted at 2 or 3 months:			

¹ Quarter: This form applies to patients registered (recorded in the *TB treatment Register*) in the quarter that ended 3 months ago. For example, if completing this form at the beginning of the 3rd quarter, record data on patients registered in the 1st quarter.

² This number should match the number of new bacteriologically confirmed pulmonary TB cases in Block 1, Column 1, first row of the *Quarterly report on TB case registration in TB diagnosis and treatment centre* previously completed for patients registered in this quarter.

Quarterly Report on TB Treatment Outcomes in TB diagnosis and Treatment Centre

Name of health facility: _____	Patients registered during ¹ _____ Quarter of year _____
Name of TB focal person: _____ Signature: _____	Date of completion of this form: _____

Block 1: TB treatment outcomes

Type of case	Total number of patients registered during quarter *	Treatment outcomes						Total number evaluated for outcomes: (sum of 1 to 6)
		Cure (1)	Treatment completed (2)	Died (3)	Treatment failure ² (4)	Lost to follow-up (5)	Not evaluated (6)	
New bacteriologically confirmed TB cases								
New cases of TB clinically diagnosed (smear-negative + smear not done + extrapulmonary TB)								
Relapse								
Treatment after failure								
Treatment after default								
Other previously treated ³								

* These numbers are transferred from the *Quarterly Report on TB Case Registration* for the above quarter. Specify any exclusion.

Block 2: TB treatment outcomes of HIV-positive patients

Type of case	Total number of HIV-positive TB patients Block 3, Column (a)*	Treatment outcomes						Total number evaluated for outcomes: (sum of 1 to 6)
		Cure (1)	Treatment completed (2)	Died (3)	Treatment failure ² (4)	Default (5)	Transfer out (6)	
All TB cases								

* Of these TB/HIV patients, _____ (number), specify any exclusion:

Block 3: TB/HIV activities (same quarter analysed as Block 1)

	No. patients tested for HIV ⁴	No. patients HIV-positive(a) ⁴	No. patients on ARV treatment ⁵	No. patients on CPT ⁶
All TB cases				

1 Quarter: This form applies to patients registered (recorded in the *TB Treatment Register*) in the quarter that ended 12 months ago.

2 Include patients who turn out to be MDR-TB cases and referred to PMDT site for appropriate management.

3 Include pulmonary cases with unknown result of previous treatment, previously treated sputum smear microscopy negative pulmonary cases, or previously treated sputum smear microscopy not done pulmonary cases and previously treated extrapulmonary cases. 4. Documented evidence of HIV tests (and results) performed in any recognized facility before TB diagnosis or during TB treatment (until last day of TB treatment) should be reported here. 5. Includes TB patients continuing on ARV treatment started before TB diagnosis or those started during TB treatment (until last day of TB treatment). 6 Includes TB patients continuing on CPT started before TB diagnosis AND those started during TB treatment (until last day of TB treatment).

Tuberculosis Treatment Transfer (Complete top part in duplicate)

Date of transfer _____

Name/address of transferring facility

From sending health facility: _____

To receiving health facility: _____

Name of patient _____ Age _____ Sex: M F

Address of patient (if moving, future address): _____

Diagnosis: _____

(For Transfer) TB Treatment Register No. _____ Date TB treatment started: _____

*CAT I, II

Other (CPT, ART etc) :

Drugs patient is receiving _____

Remarks (e.g. side-effects observed): _____

Name / signature of person sending the patient _____

Documented evidence of HIV tests (and results) during or before TB treatment should be reported.

 For use by facility receiving transferred patient

Name of receiving health facility _____

TB Treatment Register Number in the receiving health facility _____

Name of patient _____

The above patient reported at this facility on _____ (date)

Name / signature of person receiving the patient _____ Date _____

Return this part to facility sending transferred patient as soon as patient has reported.

Tuberculosis Identity Card

Patient name _____ TB Treatment Register No. __

Patient Address _____ Date of registration: _____

Sex: M F Age _____ Date treatment start _____

Health facility name: _____

Supporter (name and address) _____

Sputum smear microscopy				Weight (kg)
Month	Date	Lab No.	Result	
0				

Disease site (check one)	
<input type="checkbox"/> Pulmonary	<input type="checkbox"/> Extrapulmonary, specify _____
Type of patient (check one)	
<input type="checkbox"/> New	<input type="checkbox"/> Treatment after lost to follow-up
<input type="checkbox"/> Relapse	<input type="checkbox"/> Treatment after failure
<input type="checkbox"/> Transfer in	<input type="checkbox"/> Other specify _____

I. INITIAL PHASE

CAT (I, II): (RHZE) S Other

Drugs and dosage: _____

II. CONTINUATION PHASE

Drugs and dosage: (RH) (RHE) Other

Appointment dates: _____

REMEMBER

Take care of your card

