NATIONAL STRATEGIC PLAN FOR TUBERCULOSIS PREVENTION, CARE AND CONTROL IN Pakistan

January 2024 – December 2026

Ministry of National Health Services, Regulations and Coordination

Government of Pakistan

CONTENT

Acronyms and abbreviations

Foreword

Acknowledgments

Executive Summary

Demography

Administrative and Political Organization

Socio-economy

Pakistan Population Health Status

Heath Care System of Pakistan

Epidemiology of Tuberculosis in Pakistan

Tuberculosis Prevention, Care and Control Situation in Pakistan

Strengths, Weaknesses, Opportunities and Threats (S.W.O.T. Analysis)

Identified Gaps

Rational Behind the Development of this National Strategic Plan

Goal and Objectives

Strategic Interventions and Activities to be Developed and Implemented by Objective

ACRONYMS AND ABBREVIATIONS

ADM	Annual development program
aDSM	Active tuberculosis drug safety monitoring and management
AJK	Azad Jamu Kashmir
AKU	Aga Khan University
ART	Antiretroviral therapy
BHU	Basic health unit
BISP	Benazir income support program
BMU	Basic management unit
BSC	Biosafety cabinet
BSL	Biosafety level
C-19RM	COVID-19 Response Mechanism
CMU	Common management unit
COPD	Chronic obstructive pulmonary disease
CPT	Cotrimoxazol preventive therapy
CRD	Chronic respiratory disease
CRG	Community, rights and gender
DALYs	Disability-adjusted life years
DHIS	District health information system
DNC	Deputy national coordinator
DoMC	Department of malaria control
DOTS	A brand name for the WHO-recommended strategy for TB control; it constitutes the foundations for the Stop TB Strategy and End TB Strategy
DR	Drug resistant
DRAP	Drug regulatory authorities of Pakistan
DRS	Drug resistance survey
DS	Drug sensitive
DST	Drug susceptibility test/testing
DTC	District tuberculosis coordinator
DTO	District tuberculosis officer
ECF	Enhancing cases' finding
EMR	Eastern Mediterranean Region for the World Health Organization
EMR	Electronic medical reporting
EPTB	Extra-pulmonary tuberculosis
EQA	External quality assurance
FBO	Faith-based organization
GB	Gilgit Baltistan
GCC	Guld Corporation Council
GDF	Global Drug Facility
GDP	Gross domestic product
GF	Global Fund
GP	General practitioner
GSSM	Green Star Social Marketing
HIV	Human immunodeficiency virus
HMIS	Health management information system
HVAC	Heating, ventilation and air-conditioning

ICT	Islamabad Capital Territory
IDP	Internally displaced person
IHN	Indus Hospitals Network
IOM	International Organization for Migration
JPRM	Joint program review mission
KP	Khyber Pakhtunkhwa
LHW	Lady health worker
LIMS	Laboratory information management system
LPA	Line probe assay
LTBI	Latent tuberculosis infection
MCH	Maternal child health
MDR-TB	Multidrug-resistant tuberculosis
MNCAH	Maternal, new born, child and adolescent health
MoNHSRC	Ministry of National Health Services, Regulation and Coordination
MTB	*Mycobacterium tuberculosis*
NACP	National Control HIV/AIDS Program
NC	National coordinator
NCD	Non communicable disease
NDMA	National disaster management authorities
NFM	New funding model
NGO	Nongovernmental organization
NRL	National reference laboratory
NRSP	National rural support program
NSP	National strategic plan
NTP	National Tuberculosis Programme
PAL	Practical approach to lung health
PATA	Pakistan Anti-Tuberculosis Association
PBM	Pakistan's *Bait-ul-Mal*
PC	Planning commission
PCS	Pakistan Chest Society
PDMA	Provincial disaster management authorities
PHC	Primary health care
PLHIV	People living with HIV
PMDT	Programmatic management of drug-resistant tuberculosis
PMTPT	Programmatic management of tuberculosis preventive treatment
PPA	Pakistan Pediatric Association
PPM	Public-private mix
PR	Principal recipient
PRL	Provincial reference laboratory
PSM	Procurement and supply chain management
PSP	Provincial strategic plan
PTB	Pulmonary Tuberculosis
PTP	Provincial tuberculosis program
QMS	Quality management system
RHC	Rural health centre
Rs.	Rupees
RR-TB	Rifampicin-resistant tuberculosis

RSP	Regional strategic plan
RTP	Regional tuberculosis program
SEAR	South-Est Asia Region for World Health Organization
SORT IT	Structural operation research initiative
SOP	Standard operating procedures
SPPO	Senior provincial program officer
SSP	*Sehat Sahulat* Program
SWOT	Strengths, weaknesses, opportunities and threats
TB	Tuberculosis
TDR	Tropical Disease Research
TPT	Tuberculosis preventive treatment
UNHCR	United Nation High Commissioner for Refugees
Union	International Union against Tuberculosis and Lung Disease
UNODC	United Nations Office on Drugs and Crimes
USAID	United States Agency for International Development
WHO	World Health Organization
WPR	West Pacific Region for World Health Organization

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List of contributors	
CMU/NTP	Mr. Mustafa Jamal Kazi (National Coordinator, CMU) Dr. Mutahir Shah (Deputy Coordinator, TB) Dr. Razia Fatima Dr. Abdul Ghafoor Dr. Sabira Tahseen Dr. Basharat Javid Mr. Zaheer Ahmad Dr. Sobia Faisal Dr. Yasir Waheed Ms. Aashifa Yaqoob Mr. Athar Shabbir Dr. Faheem Jan Mr. Sajid Bashir Mr. Naveed Chaudry
WHO	Dr. Khawaja Laeeq Ahmad Dr. M Aamir Safdar
USAID	Dr. Ejaz Qadeer Dr. Shabir Chandio Dr. Ismail Virk Dr. Ahmad Ismail
STOP TB	Dr. Syed Karam Shah
DOPASI Organization	Kinz-ul-Eman
Mercy Corps	Dr. Farah Noureen Ms. Amna Rashid Dr. Adeel Tahir Mr. Abdullah
ASD	Mr. Muhammad Amir Khan
Punjab	Dr. Sarmad Wahaj Siddiqui Dr. M Bashir Nadeem Dr. Usman Rasool Lodhi Mr. Muhammad Junaid
Sindh	Dr. Ali Akber Dahri Dr. Samreen Ashraf Dr. Abid Ali Dr. Afshan Isani Dr. Syed Saleem Hassan Kazmi Mr. Samiullah

KP	Dr. Muddassar Shahzad Dr. Faisal Siraj Dr. Haroon Latif Dr. Akhtar Hussain Mr. Jamil Durrani
Balochistan	Dr. Asif Shawani Dr. Irfan Ahmed Raisani Dr. Sher Afgan Dr. Ababagar Baloch Mr. Fareed Ahmed
GB	Dr. Saleem Uddin Dr. Khurshid Ahmad Dr. Lal Wali Dr. Yasmin Jillani Mr. Muhammad Kamal
AJK	Mr. Farooq Ahmed Mr. Kamal
ICT	Dr. Zaeem Dr. Rashida Batool
Consultants	Dr. Salah-Eddine Ottmani Dr. Hussain Hadi Dr. Furqan Ahmed Mr. Afzaal Shakir

INTRODUCTION

Tuberculosis (TB) is a major problem of public health and is one of the top health priorities in Pakistan. Pakistan ranks fifth at global level in terms of TB burden. The last estimates of the World Health Organization (WHO) highlighted that approximately 611,000 persons were affected with TB in this country in 2021, which represented, per capita, 264 new TB cases per 100,000 population. The number of TB deaths was estimated, for the same year, at 50,100 with a mortality rate of 21 per 100,000 population.

TB prevention, care and control are organized in the framework of a TB Program. This program was established by the national health authorities in July 2000. It has a central unit at national unit and is well represented at province, region and district levels. In each province there is a TB Program unit which is in charge of the programmatic management, supervision, monitoring and evaluation of TB interventions and activities which are developed and implemented in the provincial territory. It has adopted all the strategies to prevent and control TB recommended by WHO, namely DOTS Strategy, Stop TB Strategy and End TB Strategy.

TB Program services are provided to population through a network of more than 1,500 basic management units (BMUs) across the national territory. It has successfully implemented a TB laboratory network which has significantly extended its activities in Pakistan under the leadership of the national reference laboratory (NRL). As a result, the number of persons who are identified as having a presumptive TB and, then, bacteriologically assessed has significantly increased. The number of new TB cases detected across the country has significantly increased over time. In 2021, it increased by 24% in comparison to 2020 then by 25% in 2022 compared to 2021; 424,599 patients with active TB were reported by TB Program for the year 2022. The TB treatment coverage rate increased from 56% in 2021 to 69 in 2022. Although these efforts in enhancing TB case detection, the quality of TB diagnosis is still questionable, hardly 50% of pulmonary TB cases and 2 to 4% of extrapulmonary TB patients are bacteriologically confirmed. The TB treatment success rate has consistently been more than 90% since 2012; the last cohort analysis showed a 94% treatment success rate for the year 2020.

TB Program of Pakistan has developed significant capacities and expertise to manage patients with MDR/RR-TB. The number of drug-resistant TB patients who are diagnosed significantly increased from 888 in 2012 to 3,878 in 2022. Among these 3,878 drug-resistant TB patients, nearly 90% were treated and followed in PMDT sites. The last cohort analysis reported that 72% of drug-resistant TB patients are successfully treated.

This National Strategic Plan (NSP) is in the continuation of the previous 2020-2023 NSP. It includes the full expression of Pakistan's needs in controlling TB; it identifies and describes the actions that need to be taken to meet those needs between 2024 and 2026. The NSP will guide the interventions that Pakistan will undertake, through the engagement all the stakeholders, to improve, enhance and sustain TB prevention, care and control across the national territory. It takes into account the context of the national health system - both private and public sectors – and government health policies and strategies. It is backed by an up-to-date understanding of the epidemiology of TB in Pakistan, and the recommendations of the Joint Pakistan Review Mission (JPRM) carried out in November 2022.

This national strategic plan (NSP) covers the period from January 2024 to December 2026. Its goal is to reduce the TB mortality rate by 35% in 2026 compared to 2015. It has defined operational objectives to achieve this goal with a focus on increasing the detection and treatment success of drug-sensitive TB cases, improving and strengthening the management of MDR/RR-TB cases, enhancing collaborative TB/HIV activities and expanding the programmatic management of tuberculosis preventive treatment. To reach these objectives the programmatic management needs to be improved and strengthened. It also aims at maintaining the crucial TB activities in an acute phase of complex emergency that may occur.

This NSP includes a core component which describes in details the foundations of the plan. It has an operational component which specifies how each intervention and activity will be developed and/or implemented. The budget needed for the operationalization of these interventions and activities has been also established. The monitoring and evaluation component of the NSP defines the indicators that should be used to monitor the development and implementation of the interventions and activities and to evaluate their impact, outcomes and outputs. The technical assistance needed at national and international levels are clearly identified in the operational component of the NSP.

Strategic plans have been developed for each of the four provinces and each of the three regions along with the NSP. The objectives and interventions included in the provincial strategic plans (PSPs) and regional strategic plans (RSPs) are consistent with those of the NSP.

The interventions and activities specified in the NSP are those that should be developed or implemented at national level, which often deal with policies, strategies and governance and management issues. On the other hand, the interventions and activities identified in the PSPs and RSPs are those that should be undertaken at provincial, regional, district, health facility and community levels. Each PSP and RSP has its own operational and budget plans.

The overall budget, needed to develop and implement the interventions and activities specified in the NSP, the four PSPs and the three RSPs, is estimated at 599.5 million US$. Seventy-five percents of this budget will cover the PSPs of Punjab (40%) and Sindh (35%) Provinces.

GEOGRAPHY

Pakistan, officially the Islamic Republic of Pakistan, is in South Asia. It is the 33rd largest country in the world and 2nd largest in South Asia, spanning 881,913 square kilometers. It has a 1,046-kilometer coastline along the Arabian Sea and Gulf of Oman in the south and land boundaries of 7,257 kilometers. Pakistan is bordered by India to the east, Afghanistan to the west, Iran to the southwest, and China to the northeast. It is separated from Tajikistan by Afghanistan's Wakhan Corridor in the north, and also shares a maritime border with Oman.

Pakistan is a blend of landscapes varying from plains to deserts, forests, and plateaus ranging from the coastal areas of the Arabian Sea to the mountains of the Karakoram, Hindukush and Himalaya ranges in the north. It geologically overlaps both with the Indian and the Eurasian tectonic plates. The country territory is geographically divided into three major areas: the northern highlands, the Indus River plain in the center and east, and the Balochistan Plateau in the south and west. The highest elevation point is at 8,611 meters, known as Mount Godwin-Austen or K2.

Islamabad is the political and administrative capital of the country while Karachi, the largest city, is the business and financial capital.

DEMOGRAPHY

Pakistan is the world's fifth-most populous country, with a population of approximately 230 million people[1], and has the world's second-largest Muslim population just behind Indonesia[2]

The demographic history of Pakistan emerges from the ancient Indus Valley Civilization, one of the oldest in the world and dating back at least 5,000 years. During the second millennium B.C., remnants of this culture fused with the migrating Indo-Aryan peoples. The area underwent successive invasions in subsequent centuries from the Persians, Greeks, Scythians, Arabs, Afghans, and Turks. As a result, Pakistan has presently a multicultural, multilinguistic, and multiethnic society. Despite Urdu being Pakistan's national language, the country's three largest ethno-linguistic groups are the Punjabis (making up 39% of the total population), the Pashtuns (18%), the Sindhis (15%), Saraikis (8%) and Baloches (3 to 4%).

The Indus River and its tributaries attract most of the settlement, with Punjab province the most densely populated.

The fertility rate has decreased for the last 40 years; it was estimated at 6.5 children born per woman in 1981 then decreased year by year to 3.3 children per women in 2022[3]. The

[1] Pakistan Bureau of Statistics. Pakistan Demographic Survey – 2020. Government of Pakistan, Ministry of Planning, Development and special Initiatives, Pakistan Bureau of Statistics. Islamabad; November 2022.

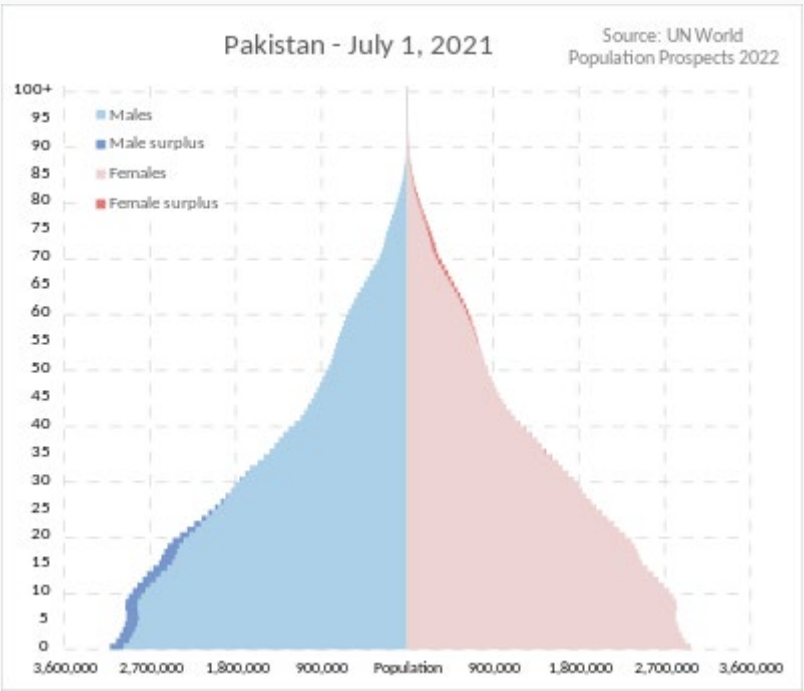
[2] https://www.cia.gov/the-world-factbook/countries/pakistan

[3]https://www.google.com/search?sxsrf=ALiCzsabrS6NaBX_X1PrOk5IFKRP4Q20ZQ:1672074414234&q=fertility+rate+in+pakistan&spell=1&sa=X&ved=2ahUKEwil9f3L4pf8AhWTKQEHfnbDZEQirwEKAB6BAgMEAE&biw=1920&bih=937&dpr=1

population size of Pakistan increases with 1 person every seven second. The population growth rate is presently estimated at approximately 2% per year. This rate has also declined over the last 40 years. It was estimated at 4% per year in 1983; it is expected that it will reach 1.24% per year in 2050. The demographic previsions indicate that the population size of Pakistan will be approximately 368 million in 2050 and 464 million in 2080[3].

The Pakistan population has a broad-based young age composition (see diagram hereafter), with 36% under the age of 15 years and 12% under the age of 5 years. Approximately 55% of the population is aged less than 25 years while 10% is 55 years and more and 4.4% 65 years and more[2]. The median age is estimated at 22 years (22.1 years in females and 21.9 in males). The sex ratio is estimated at 106 males per 100 females. The percentage of female population is 48.54% compared to 51.46% male population. Pakistan has 6.57 million more males than females[4].

Demography of Pakistan



Population Pyramid of Pakistan as of July 1, 2021

The life expectancy has increased from 37.5 years in 1950 to 67.8 in 2020; it is presently estimated at 68.9 in women and 66.8 in men[5]. Approximately 35% of Pakistan population lives in urban areas versus 65% in rural settings; these percentages were 20 and 80% respectively in 1955[5].

[4] https://datareportal.com/reports/digital-2022-pakistan
[5] https://www.worldometers.info/demographics/pakistan-demographics/#life-exp

Pakistan's population is distributed unevenly, with approximately half (51 to 52%) of the country's people living in the Punjab province. On the other hand, Balochistan, which is the largest province of the country is the least populated.

Pakistan has 10 cities with populations exceeding one million, but the two largest are Karachi and Lahore with populations of approximately 15 and 11 million respectively. The third largest is Faisalabad, with a population of slightly more than 3 million. About 50% of Pakistanis live in a place where at least 5,000 other persons reside as well[6]. Pakistan has one the highest rate urban-rural migration of South Asia contributing to an extension of poor housing settlements, especially in big cities; it is estimated that more than 40% of urban population of Pakistan is residing in slums[7].

According to the United Nations Department of Economic and Social Affairs, Pakistan has the 6th largest diaspora in the world[8]. Approximately 8.8 million Pakistanis live abroad, with the vast majority, over 4.7 million, residing in the Middle East. The second-largest community, at around 1.2 million, live in the United Kingdom; followed in third place by the United States[9]. In 2021, overseas Pakistanis sent record remittances with a growth at 26 percent and levels reaching 33 billion US$ in 2021[10].

Nearly 60% of Pakistan population aged 15 years and over can read and write (47% in females and 69% in males).

ADMINISTRATIVE AND POLITICAL ORGANIZATION

Pakistan is currently a multi-party democracy, but has passed through several phases of military government since independence from Britain in 1947. The country is a federal parliamentary republic in which, since the 18th Amendment, passed in 2010, provincial governments enjoy a high degree of autonomy. Executive power is vested with the national cabinet which is headed by the prime minister. The nominal head of state is the President who is elected by an electoral college for a 5-year term, but whose major powers were stripped away by the 18th amendment. Since then, Pakistan has a purely parliamentary government.

The administrative units of Pakistan comprise:

i) Four provinces : Punjab, Sindh, Khyber Pakhtunkhwa (KP), and Balochistan,

ii) One federal territory : the Islamabad Capital Territory (ICT), and

iii) Two federally administered regions of Azad Jammu and Kashmir (AJK) and Gilgit–Baltistan (GB).

All Pakistan's provinces and territories/regions are subdivided into divisions, which are further subdivided into districts, and then *tehsils* (or *talukas* in Sindh Province), which are

[6] http://worldpopulationreview.com/countries/pakistan-population/

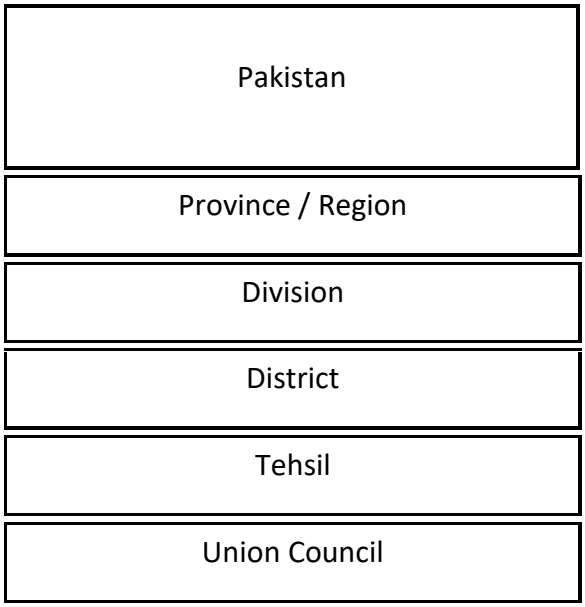
[7] https://medium.com/@sohanisar/slums-in-pakistan-a9810819fdd6

[8] The Tribune. India has largest diaspora population in world: UN. January 15th 2016

[9] https://en.wikipedia.org/wiki/Overseas_Pakistani

[10] https://www.worldbank.org/en/news/press-release/2021/11/17/remittance-flows-register-robust-7-3-percent-growth-in-2021

again further subdivided into union councils[11]. The diagram hereafter outlines the five tiers of the administrative structure of Pakistan:



As a federal republic, Pakistan has three tiers of government: national, provincial and local. Local government is protected by the constitution in Articles 32 and 140-A, and each province also has its own local-government-enabling legislation and ministries responsible for the implementation of policies. District councils and metropolitan corporations are respectively the highest rural and urban tiers of local government in the provinces[12].

The four provinces, the ICT and the two federally administered regions of Pakistan are all together subdivided into 38 administrative "divisions". The Divisional Commissioner who is appointed by the government of Pakistan from Pakistan Administrative Service, is the administrative head of a division[13].

The District represents the third-order administrative division, below province and division, but forming the first-tier of local government. In total, there are 169 districts, including ICT[14]. A district is further divided into *Tehsils* (or *Talukas* in Sindh Province). The District Coordination Officer is the administrative head of the District Administration and has a wide-ranging responsibility for overseeing, improving and directing the approved plans of the District Government; her/his function is similar to district governor or prefect[15].

[11] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/ attachment_data/file/931591/Pakistan_Toponymic_Factfile_2019__1_.pdf
[12] https://en.wikipedia.org/wiki/Local_government_in_Pakistan
[13] https://en.wikipedia.org/wiki/Divisions_of_Pakistan
[14] https://en.wikipedia.org/wiki/Districts_of_Pakistan
[15] https://web.archive.org/web/20130430030015/http://www.nrb.gov.pk/local_government/district_government_05.htm

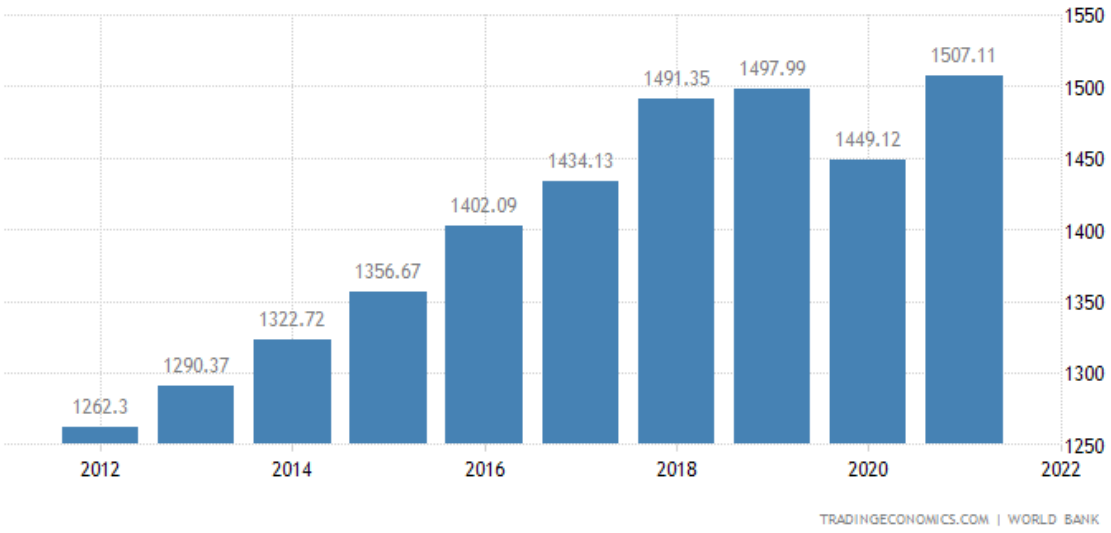
A *Tehsil* (or *Taluka* in Sindh Province) is the second-tier of local government. *Tehsil* government is the second tier. It is where the functions, responsibilities, and authorities of districts government are divided into smaller units. The head of the *Tehsil* government is "*Tehsil Nazim*" who is assisted by the T*ehsil Naib-Nazim*. There are 404 *Tehsils*/*Talukas* across the national territory[16].

A Union Council refers mainly to a village council in rural areas. This term may be used for localities that are part of cities. An Union Council is an elected local government body consisting of 21 councilors, and headed by a *Nazim,* which is equivalent to a mayor or chairperson, and a *Naib Nazib* (vice chairperson). There are more than 5,300 union councils across Pakistan. They form the third-tier of local government and fifth tier overall[17].

SOCIO-ECONOMIC DEVELOPMENT

Pakistan is a low income developing country. Its economy is the 23rd largest worldwide in terms of Gross Domestic Product (GDP) based on purchasing power parity and has been increasing in size since 1990, with several plateaus relating to political events.

GDP per capita for last 10 years



According to a 2021 estimate, the nominal GDP per capita was 1,658 US$ (177th worldwide) with purchasing power parity GDP per capita of 6,662 US$(168th worldwide)[18]. The proportion of Pakistan's informal sector has remained consistently above 70% of total employment for over a decade. This undocumented sector of Pakistan economy is estimated at about 40% of its overall economy, which is not taken into consideration when calculating

[16] https://citypulse.com.pk/pakistangis/tehsil-boundaries-of-pakistan/
[17] https://en.wikipedia.org/wiki/Union_councils_of_Pakistan
[18] https://www.imf.org/en/Publications/WEO/weo-database/2022/October/weoreport?c=564,&s=NGDPD,PPPGDP,NGDPDPC,PPPPC,PCPIEPCH,&sy=2020&ey=2022&ssm=0&scsm=1&scc=0&ssd=1&ssc=0&sic=0&sort=country&ds=.&br=1

per capita income. It is generally associated with lost tax revenues, unfair competition, low productivity, labour rights abuses, and environmental degradation[19].

Pakistan has a semi-industrial economy. Primary export commodities include textiles, leather goods, sports equipment, chemicals, carpets/rugs and medical equipment and instruments. The majority of the population, directly or indirectly, dependent on agricultural sector. This sector contributes to about 19% of GDP and accounts for 37% of employed labor force in 2021 and is the largest source of foreign exchange earnings[20]. The industrial sector accounts for approximately 19% of GDP[21]; it recorded a growth of 3.57% in 2021 as compared to 2020.

The growth poles of Pakistan's economy are situated along the Indus River; the diversified economies of Karachi and major urban centres in Punjab, co-existing with lesser developed areas in other parts of the country. The Pakistani economy has suffered in the past from internal political turmoil and a rapidly growing population. Foreign exchange reserves are bolstered by steady worker remittances, but a growing current account deficit—driven by a widening trade gap as import growth outstrips export expansion—could draw down reserves and dampen GDP growth in the medium term. Pakistan is currently undergoing a process of economic liberalization, including the privatization of all government corporations, which is aimed at attracting foreign investment and decreasing budget deficits.

As of May 2021, the Pakistani government has predicted that future growth rates will be 5%, one the highest in South Asia[22]. According to the World Bank, the levels of poverty in Pakistan fell from 64.3 percent in 2001 to 21.9 percent in 2018. As of 2017, estimates largely based on income and the purchase of consumption goods, suggested that as many as 42% of Pakistan's population may belong to the upper and middle classes[23]. The government spent over about 16.7 billion US$ on poverty alleviation programs during the past four years, cutting poverty from 35% in 2000–01 to 29.3% in 2013 and 17% in 2015[24]. The property sector has expanded 33-fold since 2001, particularly in big cities like Lahore and Karachi[25]. Rural poverty remains a pressing issue, as development there has been far slower than in the major urban areas.

Significant progress in taxation and business reforms has ensured that many firms now are not compelled to operate in the underground economy[26].

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[19] https://www.dawn.com/news/1709073#:~:text=The%20proportion%20of%20Pakistan's%20informal,rights%20abuses%2C%20and%20environmental%20degradation

[20] https://www.sbp.org.pk/reports/stat_reviews/Bulletin/2020/Feb/NationalAccounts.pdf

[21] https://www.pbs.gov.pk/sites/default/files/tables/national_accounts/2021-22/Table_7a.pdf

[22] https://www.wionews.com/south-asia/pakistan-will-achieve-5-per-cent-gdp-growth-in-next-fiscal-finance-minister-387073

[23] https://www.sbp.org.pk/MpMG/progress.html

[24] https://data.worldbank.org/country/pakistan

[25] https://www.brecorder.com/index.php?id=484346&currPageNo=2&query=&search=&term=&supDate=

[26] https://web.archive.org/web/20160422083303/https://www.cia.gov/library/publications/the-world-factbook/rankorder/2129rank.html

The country's proving macroeconomic position had led the Moody's Investors Service to upgrade Pakistan's debt outlook to "stable"[27]. After the change of government in April 2022, Moodys downgraded it to CAA1 outlook negative[28].

The current account deficit is one of the challenges that the country's economy is facing after hikes in the prices of international commodities. By May 2019, the Pakistani rupee had undergone a year-on-year depreciation of 30 percent compared to the United States Dollar. Pakistan ranked 57th in the world, with respect to the public external debt to various international monetary authorities (owing ~$107 billion in 2019), with a total of 67.1% of GDP (in 2017)[2]. The year 2020 saw the beginning of Phase 2 of the China–Pakistan Economic Corridor, with new billion-dollar agreements.

The recent floods that occurred in 2022 have heavily affected the national economy. The cost of the rehabilitation associated with these floods is estimated at 17 billion US$.

POPULATION HEALTH STATUS

The crude birth and death rates per 1,000 population are estimated, for the year 2022, at 26.5 births and 6.0 deaths respectively[2] while the infant and maternal mortality rates are at 56.9 deaths per 1,000 live births (2022 estimates)[29] and 140 deaths per 100,000 live births (2017 estimates)[30] respectively. The neonatal infant mortality declined from 87 deaths per 1,000 lives births in 1960 to 40 in 2020[31] while the under-five mortality rate decreased from 140 deaths per 1,000 live births in 1990 to 65 in 2020[32].

Pakistan is facing both demographic and epidemiological transitions and, therefore, coping with the burdens of communicable and noncommunicable diseases which are much higher in the poor[33]. The burden of communicable diseases, maternal, perinatal and nutritional conditions, which accounted for more than 65% (40,962 disability adjusted life years (DALYs) lost per 100,000 population) of the total burden of diseases in 2000, declined to 49.9% (21,004 DALYs lost per 100,000 population) in 2019. However, the burden of noncommunicable diseases (NCDs) which accounted for 30% (18 869 DALYs lost per 100 000 population) of the total burden in the year 2000 increased to nearly 44% (18,385 DALYs lost per 100 000 population) in 2019. The share of burden of injuries increased from 4.7% (2,958

[27] https://www.moodys.com/credit-ratings/Pakistan-Government-of-credit-rating-600014774/reports?category=Ratings_and_Assessments_Reports_rc%7CIssuer_Reports_rc&type=Rating_Action_rc%7CAnnouncement_rc%7CAnnouncement_of_Periodic_Review_rc,Credit_Opinion_ir_rc%7CIssuer_in_Depth_rc

[28] https://www.moodys.com/research/Moodys-downgrades-Bed-Bath-Beyond-to-Ca-outlook-changed-to--PR_470134

[29] https://www.macrotrends.net/countries/PAK/pakistan/infant-mortality-rate#:~:text=The%20current%20infant%20mortality%20rate,a%201.88%25%20decline%20from%202020.

[30] https://www.macrotrends.net/countries/PAK/pakistan/infant-mortality-rate#:~:text=The%20current%20infant%20mortality%20rate,a%201.88%25%20decline%20from%202020.

[31] https://data.worldbank.org/indicator/SH.DYN.NMRT?locations=PK

[32] https://data.unicef.org/country/pak/

[33] Government of Pakistan. National Health Vision 2016-2025.

DALYs lost per 100 000 population) to 6.4% (2,669 DALYs lost per 100 000 population) over the same period[34].

In 2019, the proportionate mortality rate attributable to NCDs accounted for 55% of all deaths, while that attributable to, together, communicable diseases, maternal, neonatal and nutritional conditions was 39% of total deaths; the share of injuries was 5.69%[34]. The top 10 causes of deaths in Pakistan in 2019 are shown, below, in Table 1.

Table 1. 10 top causes of deaths in Pakistan, 2019

	Cause of Death
1	Neonatal disorders
2	Ischemic heart disease
3	Stroke
4	Diarrheal disorders
5	Lower respiratory infections
6	Tuberculosis
7	COPD
8	Diabetes
9	Chronic kidney disease
10	Cirrhosis

	Premature Deaths
1	Neonatal disorders
2	Ischemic heart disease
3	Lower respiratory infections
4	Diarrheal disorders
5	Tuberculosis
6	Stroke
7	Congenital defects
8	Cirrhosis
9	Typhoid & Paratyphoid
10	Chronic kidney disease

	Years Lost with Disability
1	Dietary Iron deficiency
2	Depressive disorders
3	Headache disorders
4	Low back pain
5	Other MSK
6	Gynaecological diseases
7	Diabetes
8	Age related Hearing loss
9	Neonatal disorders
10	Anxiety disorders

	Risk
1	Malnutrition (MCH)
2	Air pollution
3	High systolic BP
4	Dietary risks
5	Tobacco
6	Unsafe WASH
7	High fasting plasma glucose
8	High body-mass index
9	High LDL cholesterol
10	Kidney dysfunction

Communicable diseases, maternal health issues and malnutrition dominate and constitute about half of the burden of disease[33]. In young children, diarrhea and respiratory illness remain as the major killers[35]. Maternal deaths due to preventable causes like sepsis, hemorrhage and hypertensive crises are common. Pakistan is one of the two remaining countries, with Afghanistan, where poliomyelitis is still endemic[36]. Furthermore, Pakistan is an endemic country for hepatitis B and C; the overall prevalence of hepatitis B surface antigen (HBsAg) and anti-hepatitis C virus (HCV) of 2.5% and 4.8%, respectively, results in a combined infection rate of 7.6% in general population, suggesting an ongoing high burden of chronic liver disease in country[37]. Tuberculosis (TB) is widespread across the national territory with an estimated incidence of 264 new cases per 100,000 population in 2021. At global level, Pakistan is included in the list of the 30 high TB countries as well as in the list of the 30 high multi-drug resistant/rifampicin resistant (MDR/RR) TB countries[38].
The prevalence of HIV in general population is estimated at less than 0.2%[39] and the number of people living with HIV (PLHIV) is estimated at 210,000 individuals[40]. Until November 2022,

[34] World Health Organization. Country Cooperation Strategy for WHO and Pakistan 2020–2025. Cairo: World Health Organization. Regional Office for the Eastern Mediterranean, 2021.
[35] http://data.unicef.org/child-mortality/under-five.html
[36] Initiative. http://www.polioeradication.org/Keycountries.aspx
[37] Qureshi H, Bile KM, Jooma R, Alam SE, Afridi HU. Prevalence of hepatitis B and C viral infections in Pakistan: findings of a national survey appealing for effective prevention and control measures. Eastern Mediterranean Health Journal 2010; 16 (Suppl): S15-S23.
[38] World Health Organization. Global Tuberculosis Report 2022. WHO; Geneva 2022.
[39] https://www.cia.gov/the-world-factbook/countries/pakistan/#people-and-society
[40] UNAIDS. Global AIDS Monitoring Report 2022..

53,718 PLHIV have been registered in the National AIDS Control Program (NACP), up from 4,500 in 2013. Among these registered 53,718 PLHIV, 32,912 (61.4%) are receiving antiretroviral therapy (ART)[41]. HIV epidemic is concentrated in high-risk groups in Pakistan.

Pakistan has a focal geographical area of malaria endemicity which has worsened with the flooding that has recently occurred and taken place in Balochistan, Sindh and South Punjab where 38 million people have been directly affected. From July to early October 2022, over 540,000 malaria cases have been identified and reported. Other health threats include increasing cases of diarrheal diseases, dengue fever outbreaks, measles and diphtheria along with limited access to safe water and sanitation. There is a serious threat of severe acute malnutrition in the flood-affected districts[42].

Pakistan has one of the highest prevalence of under-weight children in South Asia. Similarly stunting, micronutrient deficiencies and low birth weight babies contribute to already high level of mortality in mothers and children. In addition, Pakistan has one of the lowest rates of immunization among developing nations, with a 60% total vaccination rate[43].
However, it is estimated that 94% of the overall population in Pakistan has access to drinking water source and nearly 79% to a sanitation facility[2].

NCDs along with injuries and mental health disorders, account for 50% of the burden of disease, causing more disabilities and premature deaths among economically productive adult age groups. The common underlying factors for NCDs including lifestyle, nutrition and smoking have not been addressed adequately. Injuries account for more than 11% of the total burden of disease, and are likely to rise with increasing road traffic, urbanization and conflict[44]. According to the International Diabetes Federation, in 2022, 26.7% of adults in Pakistan are affected by diabetes making the total number of cases approximately 33,000,000[45]. A survey enrolling 7,366 adults, reported that 78.5% of them were never checked for diabetes[46]. It is estimated that hypertension affects 18% of adults and 33% of those who are above 45 years old. It is also reported that only 50% of the people with hypertension are diagnosed while only half of those diagnosed are treated[47]. The prevalence of hypertension increases with age in both genders and reaches 60% and even more in individuals aged 60 years and over; this prevalence is slightly higher in females than in males

[41] NACP Data, November 2022.
[42] https://news.un.org/en/story/2022/11/1130082#:~:text=Multiple%20disease%20threats&text=%E2%80%9CFrom%20July%20to%20early%20October,rates%20of%20severe%20acute%20malnutrition.
[43] https://healthwire.pk/healthcare/common-health-issues-in-pakistan/
[44] National Institute of Population Studies & Macro International. Pakistan Demographic & Health Survey 2006-7. Islamabad: 2008.
[45] https://idf.org/our-network/regions-members/middle-east-and-north-africa/members/43-pakistan.html
[46] Ministry of National Health Services, Regulation and Coordination, Pakistan Health Research Council and World Health Organization. Non-communicable diseases risk factors Survey, Pakistan 2014-2015. Pakistan Health Research Council, Islamabad 2016.
[47] Fahad Saleem, Azmi Ahmad Hassali and Asrul Akmal Shafie. British Journal of General Practice 2010; 60 (575): 449-450. DOI: https://doi.org/10.3399/bjgp10X502182.

in the age groups above 45 years[48]. The prevalence of smoking has been stagnating at slightly more than 20% since 2018; however, this prevalence significantly declined from 37.5% in the year 2000[49]. Recent estimates pointed out that, among adults aged 15 years and above, 27.0% males and 5.5% females have been identified as daily tobacco users. Also, males who smoke tend to live in urban areas (36%) while rural Pakistani women are found to be more involved in smoking (9.62%) in comparison to urban women (7.34%)[50].

Rising but still not estimated, the burden of cancers and chronic obstructive pulmonary disease (COPD) remain largely unaddressed areas. Poverty, low literacy, unemployment, gender discrimination, and huge gaps in healthcare services have led to an invisible burden of mental health problems in the society. Furthermore, almost three decades of exposure to socio-political instability, economic uncertainty, violence, regional conflict, and social dislocation have contributed to the emergence of mental health disorders[51]. It is estimated that more than 2 million people are living across the country with blindness or visual impairment[52]. Disability due to blindness or other causes is also high, and services for disabled people are limited, including provision of assistance devices to improve their quality of life[33].

The burden of disease has worsened by an increasing population; Pakistan is presently the sixth most populous country in the world[53]. Decline in population growth rate has been slow while contraceptive prevalence is only 35%, far below than the other countries of the region. The birth spacing is around 25%. Only one third of women make the required minimum number of antenatal visits while the number postnatal visits decreases further[33].

It is important to highlight that Pakistan tends to be affected by natural disasters, especially earthquakes, droughts and floods. It is also prone to be stricken by cyclones on the coastal line. Pakistan also experiences the adverse effects of climate change, such as extreme temperatures, melting glaciers, landslides, salinity intrusion, heavy monsoon rains and river erosion. These disasters trigger outbreaks of communicable diseases, mainly waterborne diseases, as well as malnutrition and injuries. They have a disproportionate impact on women and children, who account for 70% of disaster-affected populations.

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[48] https://cdn.who.int/media/docs/default-source/country-profiles/hypertension/pak_en.pdf?sfvrsn=79fa29fd_9&download=true.

[49] https://www.macrotrends.net/countries/PAK/pakistan/smoking-rate-statistics.

[50] Faiqa Zubair, Muhammad Iftikhar ul Husnain, Ting Zhao, Hasnat Ahmad & Rasheda Khanam. A gender-specific assessment of tobacco use risk factors: evidence from the latest Pakistan demographic and health survey. BMC Public Health volume 22, Article number: 1133; 2022. https://doi.org/10.1186/s12889-022-13574-2.

[51] Tazeen H Jafar, Benjamin A Haaland, Atif Rahman, Junaid A Razzak, Marcel Bilger, Mohsen Naghavi, Ali H Mokdad, Adnan A Hyder. Non-communicable diseases and injuries in Pakistan: strategic priorities. Lancet 2013; 381: 2281–90 Published Online May 17, 2013 http://dx.doi.org/10.1016/ S0140-6736(13)60646-7.

[52] https://www.hollows.org/us/where-we-work/south-asia/pakistan-2?gclid=Cj0KCQiAtbqdBhDvARIsAGYnXBPQsIgBpUWF0gRwAnq9sW5BPXGQ59bTBWPU73x_NKIqDInB-q0O1V0aAvcbEALw_wcB.

[53] Population Reference Bureau. World Population Data Sheet. New York: 2015.

The rate of urbanization is presently estimated at 2.1% per year[2]. As a result, urbanization has sharply increased in Pakistan and resulted in significantly large urban populations living in peri-urban, marginal and at-risk areas. Vulnerability to disasters is growing in both urban and rural areas, placing ever more lives at risk. Pakistan has continued to host the largest number of refugees in the world over the last four decades. Most recent figures from 2018 show that there are 1.4 million Afghan refugees registered in the country[54]. Of the total registered refugees, 40% live in refugee villages and 60% live in urban areas in Balochistan, KP, and Punjab provinces and Karachi area. The most pressing health need is access to emergency and basic health care services, such as vaccination, treatment for infectious diseases, malnutrition, psychosocial support, safe maternity care, and safe drinking-water and sanitation to prevent the spread of waterborne diseases[34].

HEALTH CARE SYSTEM

Pakistan is striving to improve care services' provision through the implementation of universal health coverage (UHC) packages and financial risk protection for its population. The commitment to achieving UHC is one of the innovative approaches to addressing key health care issues, including equity and community engagement. Pakistan is developing the Essential Universal Health Coverage Package in line with the 3rd Edition of Disease Control Priorities[55]. This will contribute to the reorganization of health services across the country and will eventually be linked with health insurance.

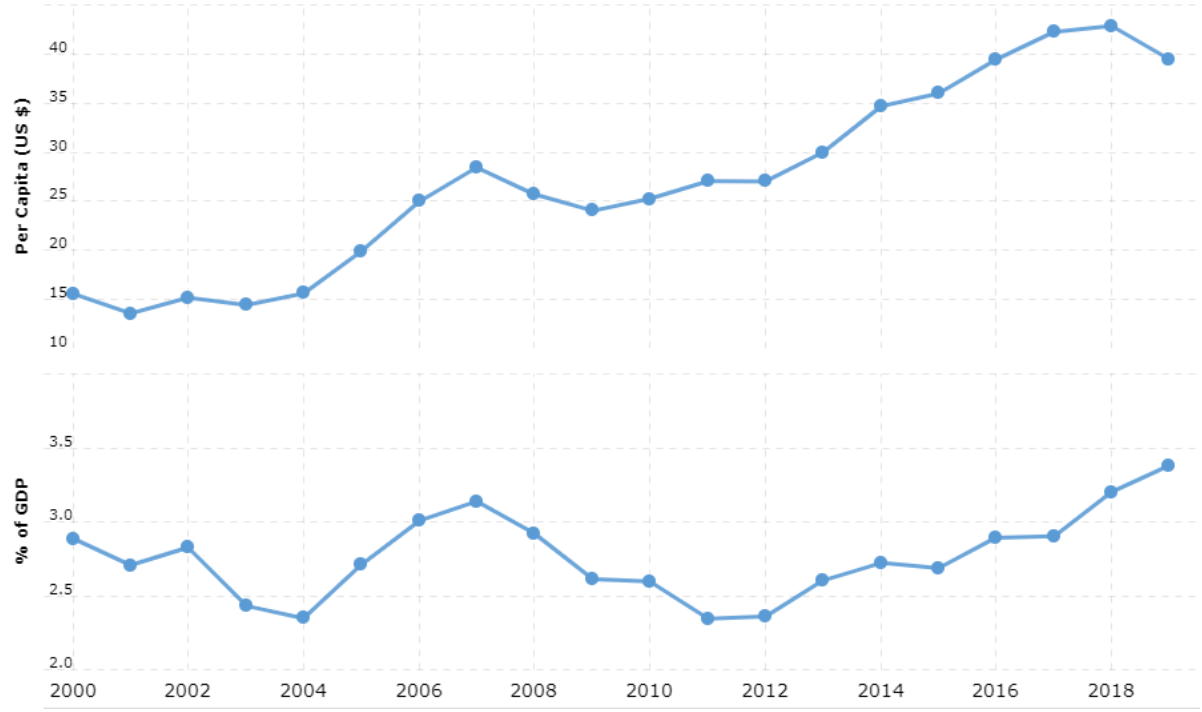
However, the country faces multiple challenges, as highlighted above, in improving efficiency and quality across health. Low expenditure on health and human resources are key bottlenecks. Expenditure on health is approximately 40 US$ per capita and accounts for 3.4% of GDP[56]. Both health expenditure per capita and as percentage of GDP increased since early 2000s (Graph 1). Government spending on health has been always less than optimal; most often its contribution is less than 1% of GDP[33], contrary to the World Health Organization (WHO) recommendation to allocate at least 5% of GDP spending on health[57].

The government expenditure on health accounts for 32% of total health expenditure; it represents 4.9% of general government expenditure. It is estimated at 15 US$ per capita. The private expenditure accounts for 61% of the total health expenditure, out of which 88% is out of pocket health expenditures by households. Out of pocket health expenditure in Pakistan is therefore approximately 54% of total health expenditure; it has declined from 78% in 2006 to 54% in 2019 (Graph 2). Social health insurance represents 0.8% of health expenditure and voluntary health insurance 1%[58]. It is important to highlight that the Prime

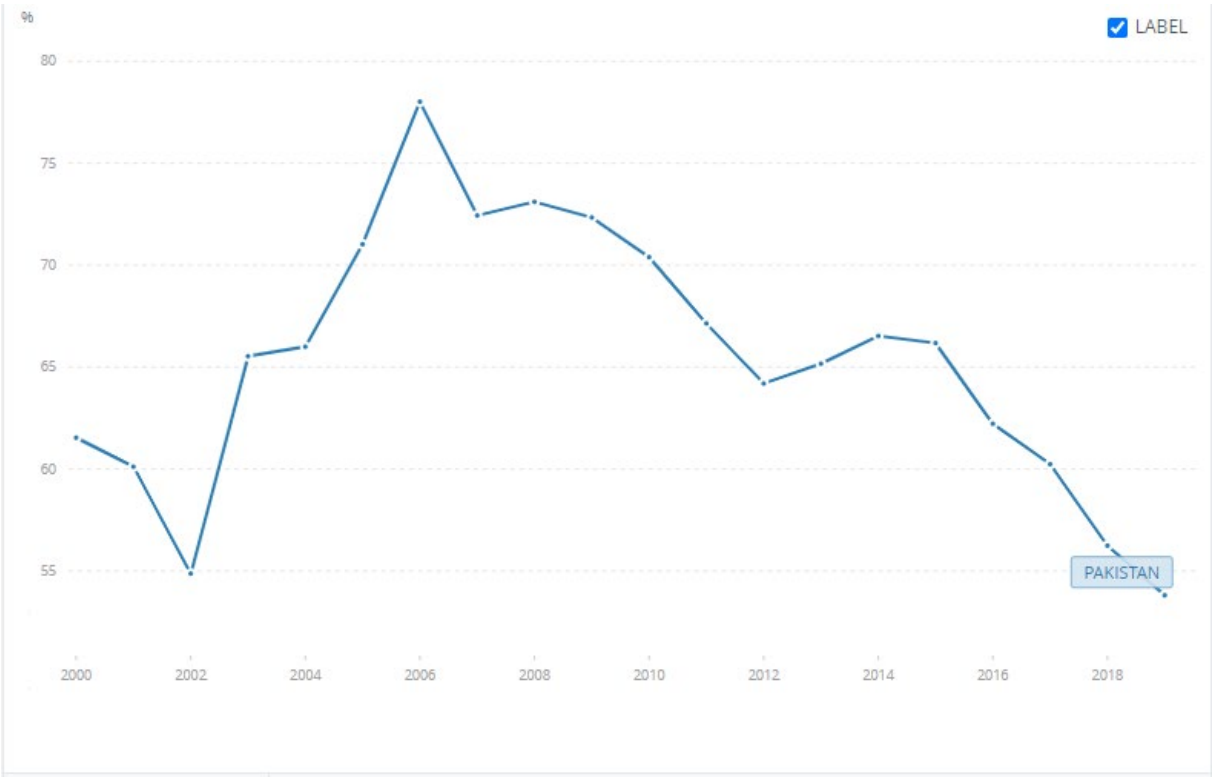
[54] Global focus. In UNHCR operations worldwide. Pakistan. https://reporting.unhcr.org/pakistan.
[55] Disease Control Priorities. DCP3. http://dcp-3.org/ Accessed 14th December
[56] https://www.macrotrends.net/countries/PAK/pakistan/healthcare-spending
[57] World Health Organization. How much should countries spend on health? WHO; 2003.
[58] https://knoema.com/atlas/Pakistan/topics/Health/Health-Expenditure/Out-of-pocket-expenditure-as-a-share-of-current-health-expenditure#:~:text=In%202019%2C%20out%20of%20pocket,2000%20to%2053.8%20%%20in%202019.

Minister Health Insurance Program has been initiated to cover secondary and tertiary care for more than 2.5 million poor at the initial phase in 24 districts.

Graph 1: Health expenditure per capita and as percentage of GDP, Pakistan, 2000-2019



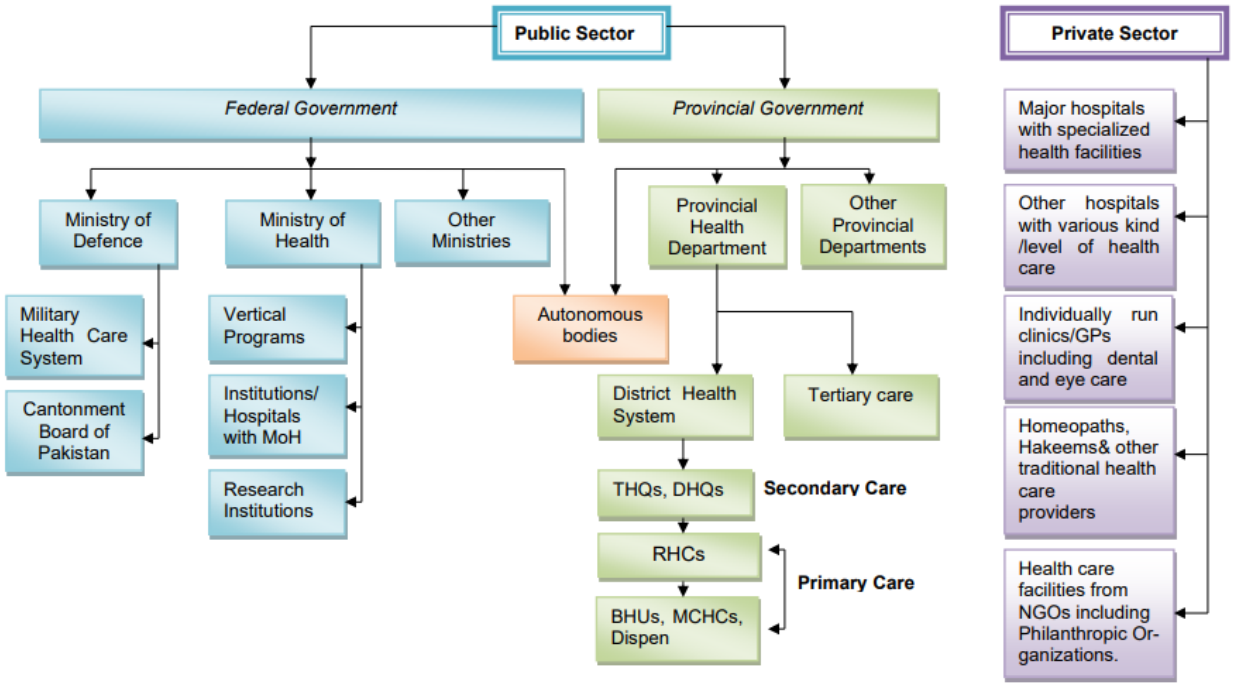
Graph 2: Out of pocket health expenditure in Pakistan, 2000-2019.



Most part of the allocations to health is consumed by the secondary and tertiary care, leaving merely 15% for the preventive and primary health care.
Pakistan is spending the lowest on health in the Eastern Mediterranean Region[59]. At the same time, however, health departments are not able to disburse the totality of their financial resources. A significant amount of budget stays unspent at the end of the fiscal year. For which unnecessarily lengthy bureaucratic and legal processes are often incriminated in procedural delays.

The health system in Pakistan has been devolved to provinces through the 18th constitutional amendment of 2010, whereby strategic planning also has become a provincial responsibility. As a result, the healthcare delivery system includes healthcare subsystems of federal government and provincial governments competing with formal and informal private sector healthcare systems[60]. Healthcare is delivered mainly through vertically managed disease-specific mechanisms. The different institutions that are responsible for this include: provincial and district health departments, parastatal organizations, social security institutions, non-governmental organizations (NGOs) and private sector (Fig. 1).

Fig. 1: Overview of Healthcare System in Pakistan:

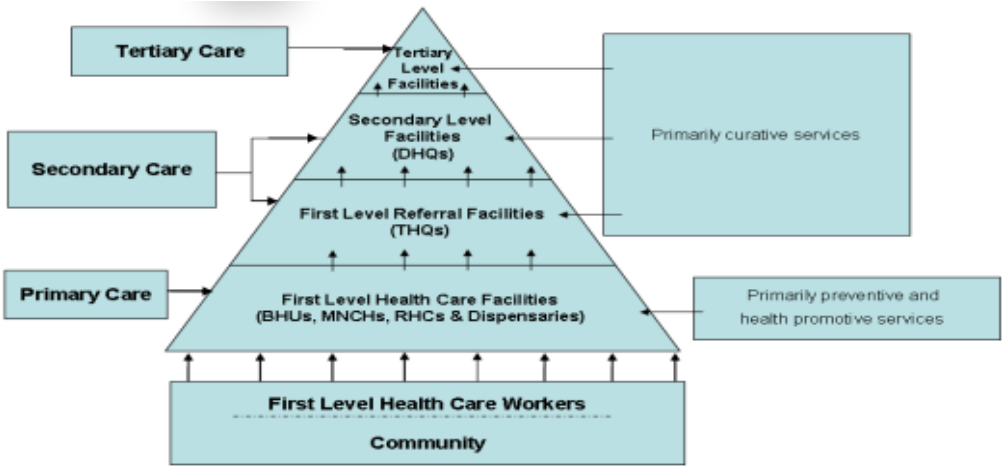


The country's health sector is also marked by urban-rural disparities in healthcare delivery and an imbalance in the health workforce, with insufficient health managers, nurses,

[59] Inter-ministerial health and population council meeting, June 2019.
[60] Javed, Saad Ahmed; Liu, Sifeng; Mahmoudi, Amin; Nawaz, Muhammad (2018-08-30). "Patients' satisfaction and public and private sectors' health care service quality in Pakistan: Application of grey decision analysis approaches". The International Journal of Health Planning and Management. 34 (1): e168–e182.

paramedical professionals and skilled birth attendants in the peripheral areas. Under the constitution, health is a primarily responsibility of the provinces, except in the federally administrated areas, such as AJK, GB and ICT. Service delivery is organized through preventive, promotive, curative and rehabilitative services. The curative and rehabilitative services are being provided mainly at the secondary and tertiary care facilities. Preventive and promotive services, on the other hand, are mainly provided through various national programs; and community health workers' interfacing with the communities through primary healthcare facilities and outreach activities (Fig. 2).

Fig. 2: Provincial health care system in Pakistan



Adapted from: S Siddiqi et al. The effectiveness of patient referral in Pakistan. Health Policy and Planning; 16 (2): 193 – 198

The public health care system is characterized by an extended outreach primary health care (PHC), involving, at the community level, approximately 90,000 lady health workers (LHWs), and a significant number of community midwives (CMWs), and other community-based workers. This system is implemented mainly through a chain of primary, secondary and tertiary level health facilities. The PHC facilities include civil dispensaries, basic health units (BHU), rural health centres (RHC), maternal and child health (MCH) Centres, urban health units and urban health centres (see hereafter Table 2). The secondary level health care facilities comprise *tehsil* (or *taluka*) hospitals and district hospitals. Tertiary level health care is provided through teaching and specialized hospitals.

Table 2: Health facilities in Pakistan

Type	Number	Beds
Hospitals	1,289	114,841
Dispensaries	5,849	1,077
Basic Health Unit	5,472	6,594
Rural health centers	719	10,726
T.B. Clinic	412	141
Maternity & Child Welfare Centres (MCHCs)	752	328

Source: Pakistan Statistical Year Book 2019 & Social Indicators of Pakistan 2021

Public healthcare institutions that address critical health issues are often only located in major towns and cities. Due to the absence of these institutions and the cost associated with transportation, impoverished people living in rural and remote areas tend to consult private doctors[61]. Studies have shown that Pakistan's private sector healthcare system is outperforming the public sector healthcare system in terms of service quality and patient satisfaction, with 70 to 85% of the population being served by the private health sector. The private health sector operates through a fee-for-service system of unregulated hospitals, medical practitioners, nurses, pharmacists, laboratory technicians, homeopathic doctors, drug vendors, *hakeems*, and other spiritual healers and unqualified practitioners[62]. Some public-private partnerships have been established and are contributing to health care delivery, such for TB prevention and care services. However, very few mechanisms exist to regulate the quality, standards, protocols, ethics, or prices within the private health sector, which has resulted in disparities in health services.

Approximately 10% of the population receives health services from semi-public health organizations or corporate health sector such as armed forces, Pakistan International Airlines, the Water and Power Development Authority, Railways, Fauji Foundation, Employees' Social Security Institution, K-Electric, the Pakistan Steel Mills, Karachi Port Trust, Sui Southern Gas Company, Pakistan Petroleum Limited, Oil and Gas Development Corporation and others which provide care services to their employees and their dependents.

NGOs and the philanthropic sector are also involved in delivering health services.

It is estimated that, in Pakistan, there are, presently, 274,135 physicians, approximately

[61] Akram, Muhammad (2007). "Health Care Services and Government Spending in Pakistan". *Pakistan Institute of Development Economics Islamabad*: 1–25.

[62] Shaikh, Babar (2015). "Private Sector in Health Care Delivery: A Reality and Challenge in Pakistan". *J Ayub Med Coll Abbottabad*. **27** (2): 496–498.

120,000 registered nurses and 44,693 midwives[63, 64]. However, many Pakistani physicians and medical professionals chose to migrate to other countries, contributing to a brain drain and chronic skills shortage in the country. It is estimated that there are more than 20,000 medical doctors of Pakistan origin in United States alone.

The health system faces challenges of verticalized service delivery and low performance accountability within the government, creating efficiency and quality issues. The public sector is inadequately staffed and job satisfaction and work environment are weak. The overall health sector also faces an imbalance in the number, skill mix and deployment of health workforce, and inadequate resource allocation across different levels of health care. The National Health Vision 2016-2025 strives to provide a responsive national direction to confront various health challenges, **keeping UHC as its ultimate goal as well as contributing to fulfilling the Sustainable Development Goals.** The principle values include: i) good governance, ii) innovation and transformation, iii) equity and pro-poor approach, iv) responsiveness, v) transparency and accountability and vi) integration and cross sectoral synergies[33].

SOCIAL PROTECTION FOR HEALTH

There are few prepayment mechanisms in Pakistan, and low government spending has made it challenging to ensure that public health services provide effective health care at affordable cost, while most health services are provided by the private sector. However, government employee schemes run by federal and provincial governments are in place, which are currently the largest social health insurance schemes for those in formal employment. Furthermore, a momentum has been initiated to improve social health protection, particularly for the poor and those in the informal economy through specific programs.

The *Sehat Sahulat* program, Pakistan's *Bait-Ul-Mal* and Benazir Income Support Program represent key components of the efforts undertaken in Pakistan to develop and implement social protection interventions. They are fully in line with the National Health Vision 2016–2025 which envisions a health system that provides universal access to quality essential health services without financial burden, with a focus on vulnerable groups[33].

The *Sehat Sahulat* Program (SSP)

The Ministry of National Health Services, Regulation and Coordination (MoNHSRC), in collaboration with provincial governments, has started a social protection initiative for health care, the *Sehat Sahulat Programme*, previously known as the Prime Minister's National Health Programme. It was launched in 2016, constituting Pakistan's first large-scale social health protection scheme (besides the specific programs run for government and

[63] Pakistan Medical Commission, 2022 Statistics.

[64] https://dailynurse.com/letter-from-pakistan-brain-drain-the-exodus-of-nurses-to-wealthier-countries-is-killing-us/#:~:text=According%20to%20the%20Pakistan%20Economic,Survey%2C%202020%2D2021).

military employees)[65]. The objective is to lead a path towards UHC in Pakistan, with special focus towards those living below the poverty line in the country. The program is being implemented in a phased manner.

By February 2019, this program was covering 38 districts and had contracted 154 public and private hospitals. When fully rolled out the SSP should cover over 50% of the Pakistani population. For now, the program does not cover primary care. The identification of beneficiaries is based on household poverty surveys where every household is scored between 0 and 100, with 0 being the poorest and 100 the richest. A score of 16 is equivalent to a daily income of one US$.

In Phase I of the SSP each enrolled family is insured for up to 50,000 Rupees (Rs.) per year for secondary care treatment and up to 250,000 Rs. per year for 7 priority care treatments – which do not include TB, as TB treatment is already supplied free of charge. Patients who have consumed their limits will be provided with additional limits by Pakistan *Bait-ul-Mal*. In Phase II, the benefit package of each enrolled family will be raised to 120,000 Rs. per year for secondary inpatient care and treatment and up to 600,000 Rs. per year for treatment related to 8 priority diseases or illnesses, among which TB is not included.

SSP is a cashless scheme in which no cash assistance or cash transfers will be provided to the beneficiary except in-patient health care services and a traveling allowance of 350 Rs. per discharge, for a total of 3 discharges per year, from residence to hospital and back. In Phase-II of SSP, this will be increased to 1,000 Rs.

SSP is implemented in Punjab, ICT, GB, AJK and Tharparkar, in Sindh Province, and operating in more than 90 districts. As of December 30th 2022, a total of nearly 37.3 million families had been enrolled in the SSP and more than more than 5 million individuals have been treated for various illnesses in more than 1 thousand empanelled hospitals across Pakistan[66]. The SSP is being implemented through the State Life Insurance Corporation of Pakistan, hired through an open and transparent bidding process. Services are delivered to the beneficiaries by empanelling secondary and tertiary level health care facilities, both in the public and private sectors, in all involved districts and metropolitan cities.

Pakistan's *Bait-Ul-Mal* (PBM)

Pakistan's *Bait-ul-Mal* is a charity and social welfare organization to help the poor and needy in Pakistan. It is a semi-autonomous body set up through a 1992 act of the Government of Pakistan and provides financial help to "deserving poor people" earning less than 10,000 Rs. per month. Funded largely by the Government, it has an annual budget of about of 5 to 6 billion Rs. It is present in every district in which a team checks eligibility of the possible beneficiaries using a standard check list. Beneficiaries receive support that does not exceed 600,000 Rs. per patient. Interestingly for TB, PBM also has residential accommodation in

[65] https://www.social-protection.org/gimi/RessourcePDF.action;jsessionid=Fdqnv19TCIR-6FfKkUZTz3s9f7MJm4mmQLVwgxP5RFxv6Pb89bxm!-915126135?id=57662.
[66] https://www.pmhealthprogram.gov.pk/

shelter homes for the deserving homeless and abandoned elderly people. Also, PBM has set up free hospitals and rehabilitation centres for the poor to provide free medical treatment, sponsors and promotes self-employment schemes and provides relief to the needy and poor during natural disasters[67]. No real linkages have been established between PBM and provincial or regional TB services.

Benazir Income Support Program (BISP)

Initiated in 2008, the BISP is a cash transfer program that reaches about 5.2 million women across Pakistan. Each woman receives about USD 40 every quarter. Through this program, nearly 60 million people (the women and their families) are reached. The beneficiaries are identified through poverty surveys as in the PBM program and the program has a dynamic registry. The Government of Pakistan spends about 1.2 billion US$ on this program with 86% of the funding coming from domestic sources. The other donors include World Bank/Asian Development Bank and the United Kingdom's Department for International Development. A major focus of this program is addressing malnutrition. The cash transfers are currently non-conditional but there are plans to explore conditionalities through complementary opportunities which may include cash transfers for educational programs in which the beneficiary is given an incentive to take her child to school.

EPIDEMIOLOGY OF TUBERCULOSIS

According to WHO, 611,000 people developed a new episode of TB (including relapse) in Pakistan in 2021 which represented an estimated incidence rate of 264 new TB cases per 100,000 population. The number of deaths from TB is estimated, for the same year, at 50,100 with a mortality rate of 21.9 TB deaths per 100,000 population. The most recent epidemiological evaluation of TB in Pakistan[68] reported that the trends of estimated TB incidence rate was relatively stagnant between 2000 to 2015, with a mild reduction between 2015 and 2020, and an increased estimate in 2021. It was estimated that the TB incidence rate declined, in overall, by 2.2% between 2015 and 2021; this suggests that the estimated incidence has, on average, declined by 0.4% per year.

There has been no real decline in TB mortality. The last epidemiological review highlighted that there is a 1.8% overall increase in total number of TB deaths between 2015 and 2021. However, the estimated mortality rate tends to slightly decline with a decrease rate of nearly 1% per year from 2015 to 2021.

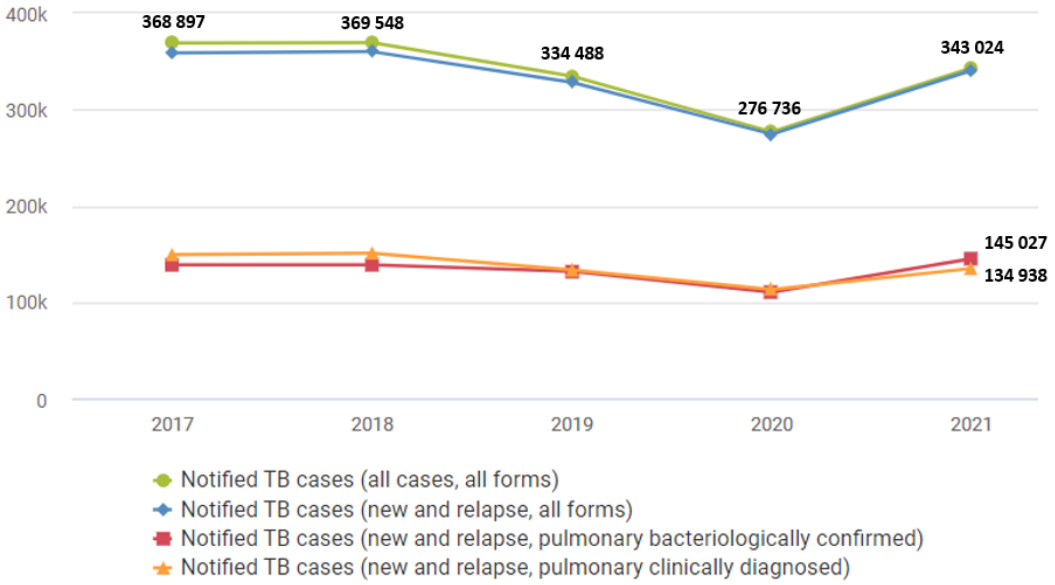
[67] https://en.wikipedia.org/wiki/Pakistan_Bait-ul-Mal

[68] Cicilia Gita Parwati, Francis Mhimbira, Babis Sismanidis. Epidemiological Review in Pakistan, August 15-26, 2022. WHO mission report; 2022.

The information system of TB Program reported that 339,256 cases of new episodes of TB were notified in 2021 across the 4 provinces (Punjab, Sindh, KP and Balochistan) and the 3 federally administered regions (AJK, GB and ICT). Among them, 40.4% were bacteriologically confirmed pulmonary TB (PTB) cases, 38.9% clinically diagnosed PTB cases, 17.6% extrapulmonary TB (EPTB) cases and 3.1% TB relapse cases. The total number of TB cases (new TB episodes and other previously treated TB cases) notified in 2021 was 343,024. The preliminary data for the year 2022 (not yet validated by WHO) show that 424,599 new TB cases were notified within that year.

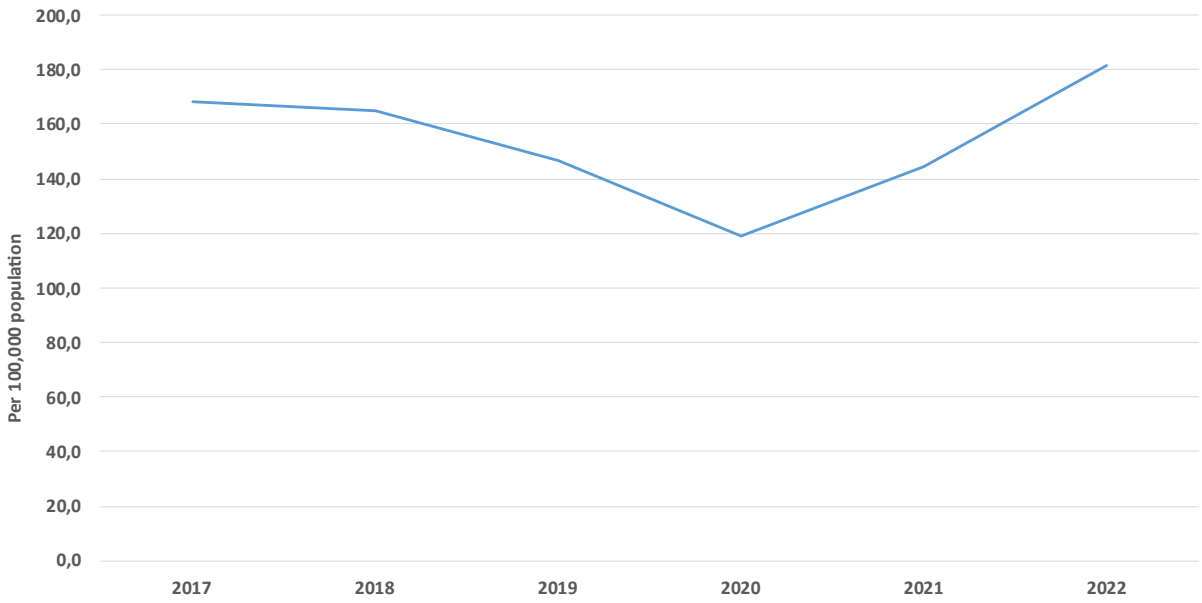
A substantial decline in the number of notified TB cases occurred in 2020 (Graph 3) because of the COVID-19 pandemic. However, national notification in 2021 reached the 2019 pre-COVID period; this increase in notification seems to be maintained in 2022.

Graph 3: Number of TB cases notified in Pakistan every year in 2017 to 2021



The last notified incidence in Pakistan was nearly 145 new TB cases per 100,000 population in 2021 (and 181/100,000 in 2022 – preliminary data). The notified incidence tends to decrease from 169 cases per 100,000 population since 2017 with a sharp decline to 119 / 100,000 in 2020 because the COVID-19 pandemic (Graph 4).

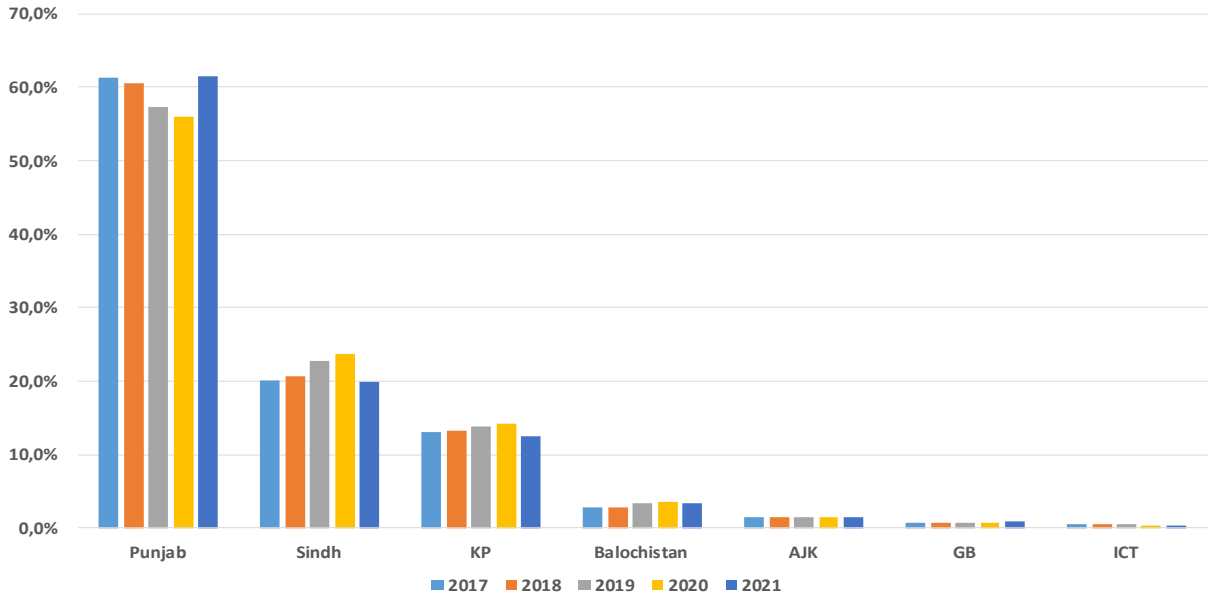
Graph 4: Notified TB incidence in Pakistan in 2017 to 2022



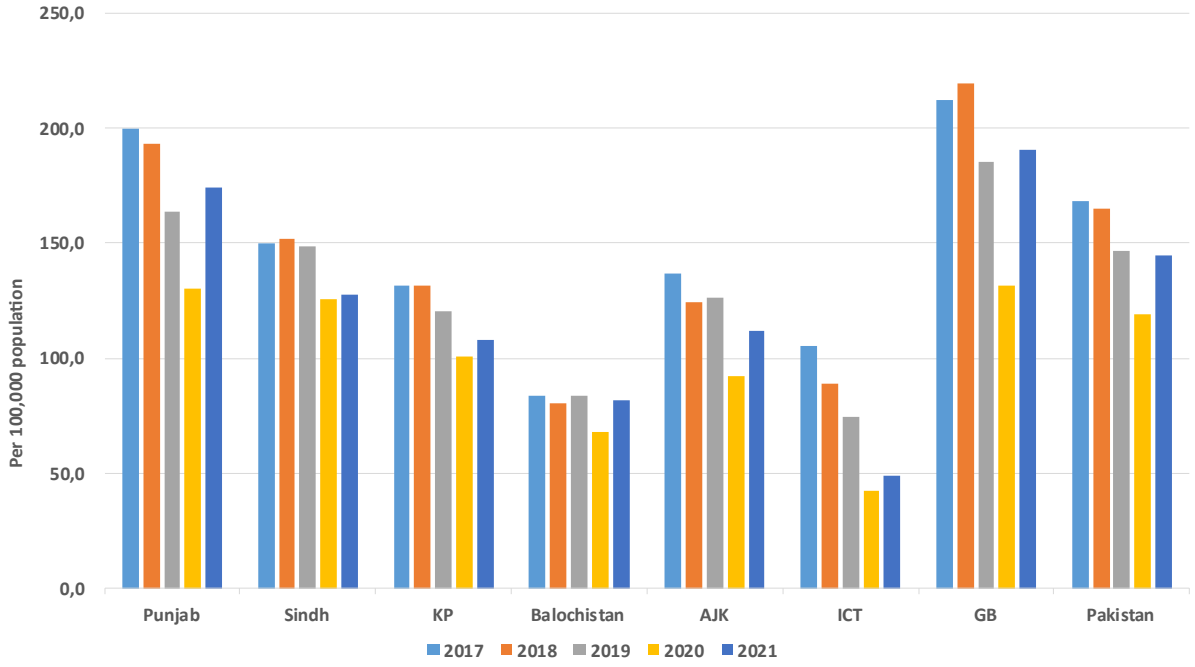
The data collected by TB Program in 2017 to 2021 show that, constantly and on average, nearly 60% of the number of TB cases are notified in Punjab, 21% in Sindh, 13% in KP, 3% in Balochistan, 1.5% in AJK, 0.8% in GB and finally 0.5% in ICT (Histogram 1).

Besides the 2020 year of COVID-19 pandemic during which the TB notification significantly decreased in all the seven provinces and regions, the notified TB incidence varies across the provinces and regions (Histogram 2). Every year, the highest incidence was observed in GB Region; it was 191 new cases per 100 000 population in 2021; it was even more than 210 per 100,000 population in 2017 and 2018. Punjab province was at the 2nd rank with a notified TB incidence of 175 cases per 100,000 population in 2021; it was more than 190 per 100,000 population in 2017 and 2018. The lowest notified TB incidences were reported in Balochistan and ICT; the rates were respectively 82 and 49 per 100,000 population in 2021.

Histogram 1: Distribution in percentage of TB notification by province and region in Pakistan, 2017-2021

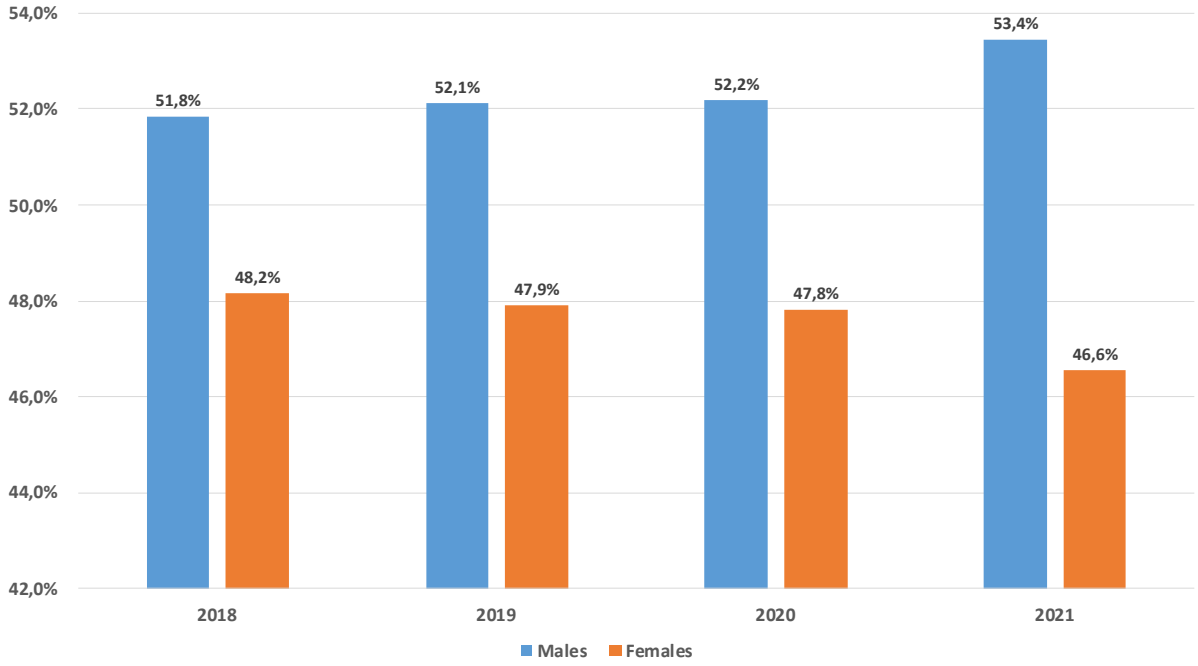


Histogram 2: TB incidence by province and region of Pakistan, 2017-2021



Among TB cases notified in 2018 to 2021, the proportion of males was constantly and slightly higher in comparison to females; each year, males accounted for 52 to 53% of the number of TB cases notified (Histogram 3).

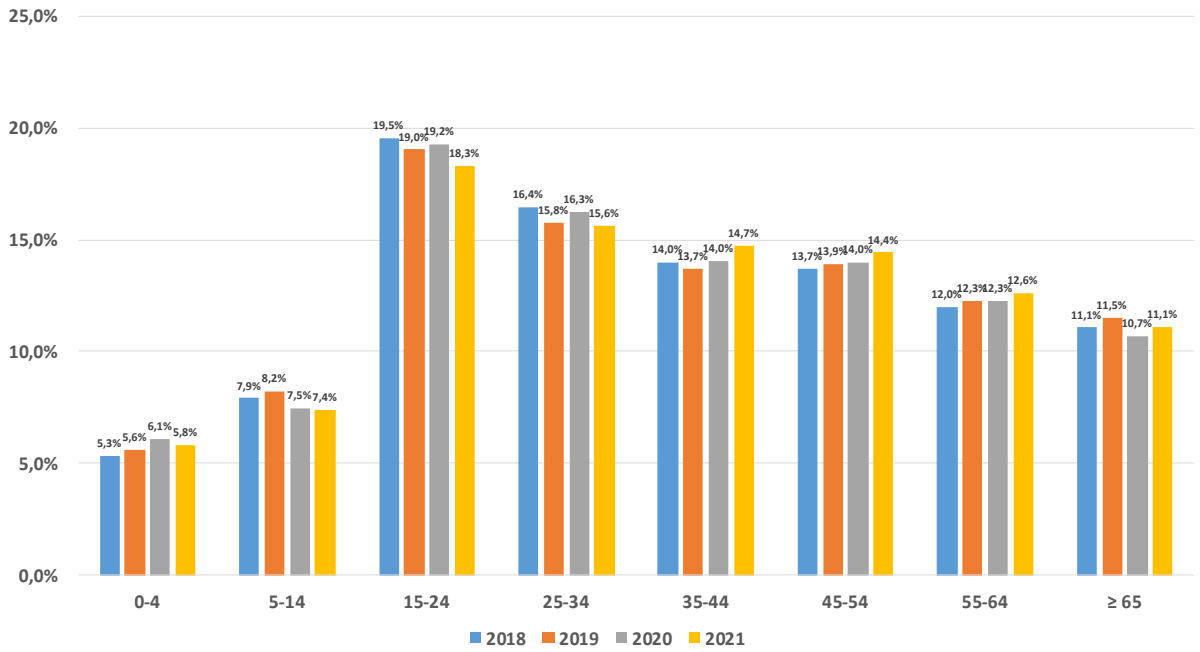
Histogram 3: Percentage of females and males among notified TB cases in Pakistan, 2018-2021



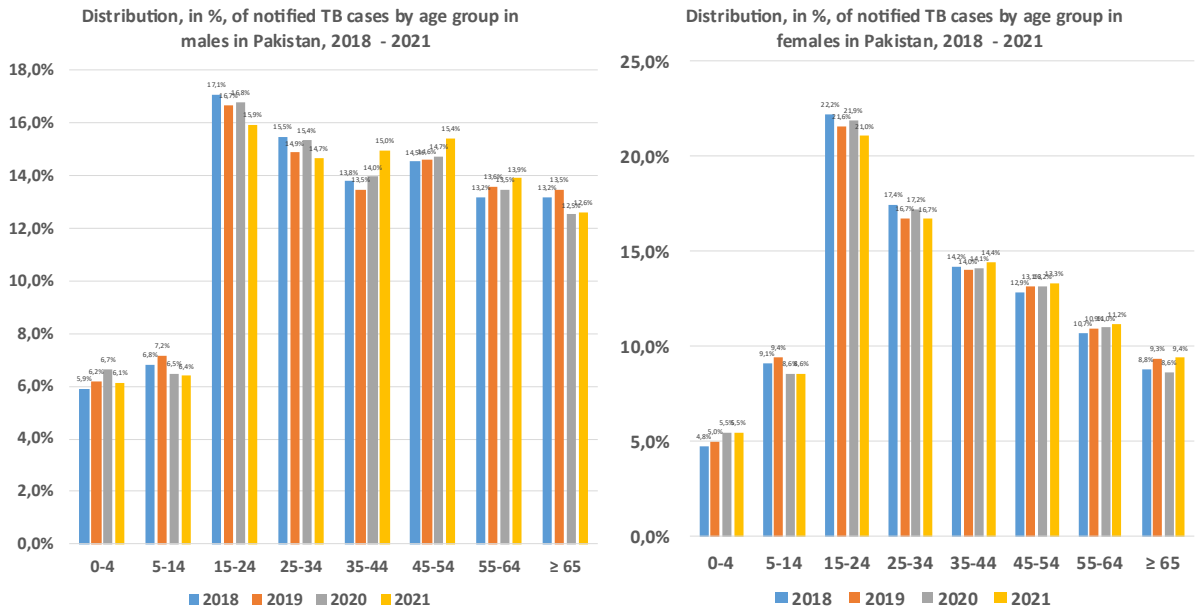
In general, the male to female notification ratio is 1.1; however, the estimated ratio among estimated incidence is 1.4. This contrast may suggest that there is a gap in TB notification among adult males compared to adult females. Therefore, it is likely that there are more underreported or underdiagnosed cases among adult males than adult females, more especially among those aged 65 years and over as pointed out in the 2010-2011 prevalence survey which reported a prevalence of 1,369 TB cases for 100,000 persons aged 65 years and more. The TB Program data collected in 2018 to 2021 show that: i) 5 to 6% of notified TB cases are aged less than 5 years, ii) 13 to 14% less than 15, with no clear decline in notification, iii) the highest proportion of notified TB cases is represented by the 15-24 age group with nearly 20% of the notifications and nearly 50% of notified new TB cases are aged less than 35 years (Histogram 4). These data suggest that the TB transmission is still ongoing in general population of Pakistan.

The distribution of the number of notified TB cases is slightly different in males and females. The 0-4 age group is slightly more represented among males (6 to 7%) than among females (5%) while the proportion of girls aged 5 to 14 accounts for approximately 9% in contrast to 6 to 7% in males. The 15-24 age group represents up to 22% of the TB cases notified in females while in males this age group accounts for approximately 17% (Histogram 5). These data suggest that females are affected with TB at slightly younger age compared to males. The calculation of the average age TB patients in 2018 to 2021 shows that the average age is 37 years; but the average age in males is 38 to 39 years while that of females is 35 years (Graph 5).

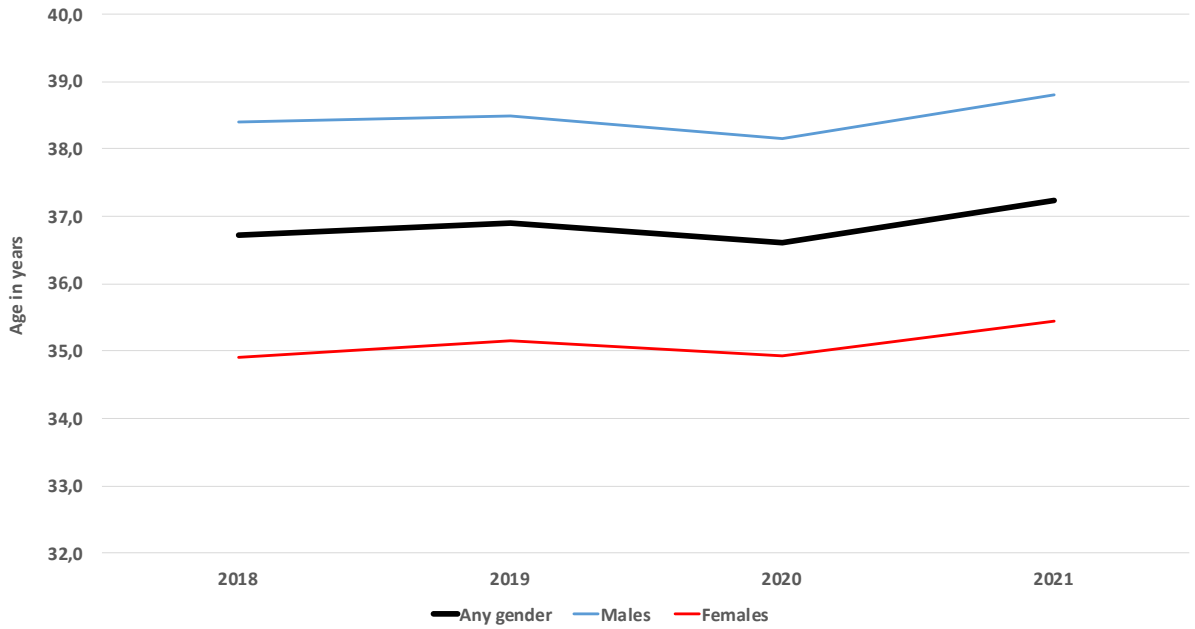
Histogram 4: Distribution, in percentage, of notified TB cases by age group in Pakistan, 2018 - 2021



Histogram 5: Distribution of notified TB cases by age group in males and females, Pakistan, 2018-2021

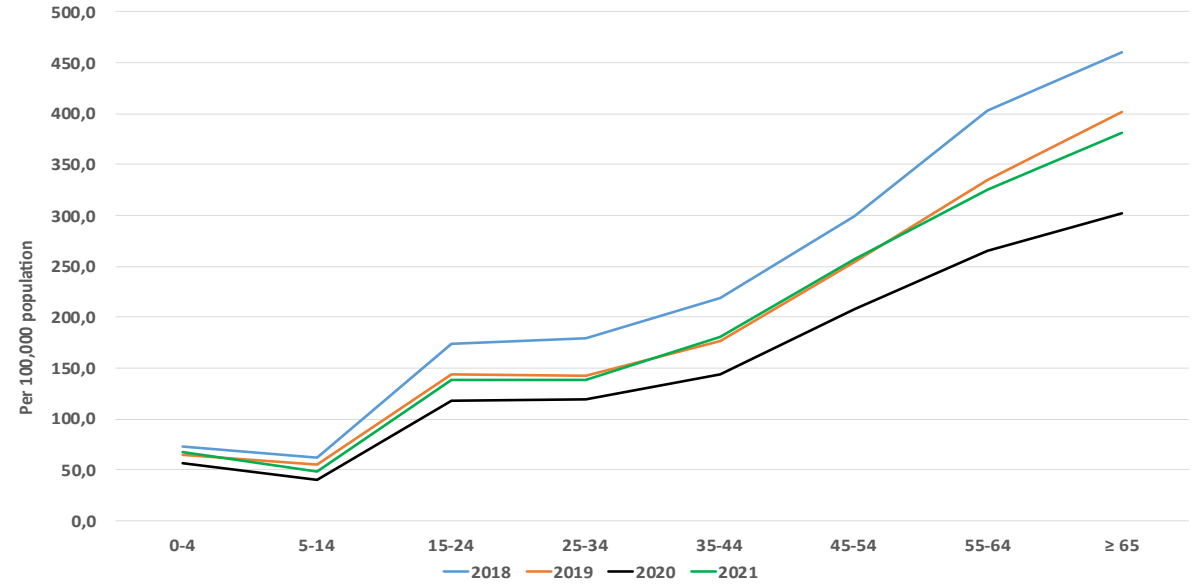


Graph 5: Average age of notified TB cases by gender in Pakistan, 2018 - 2021

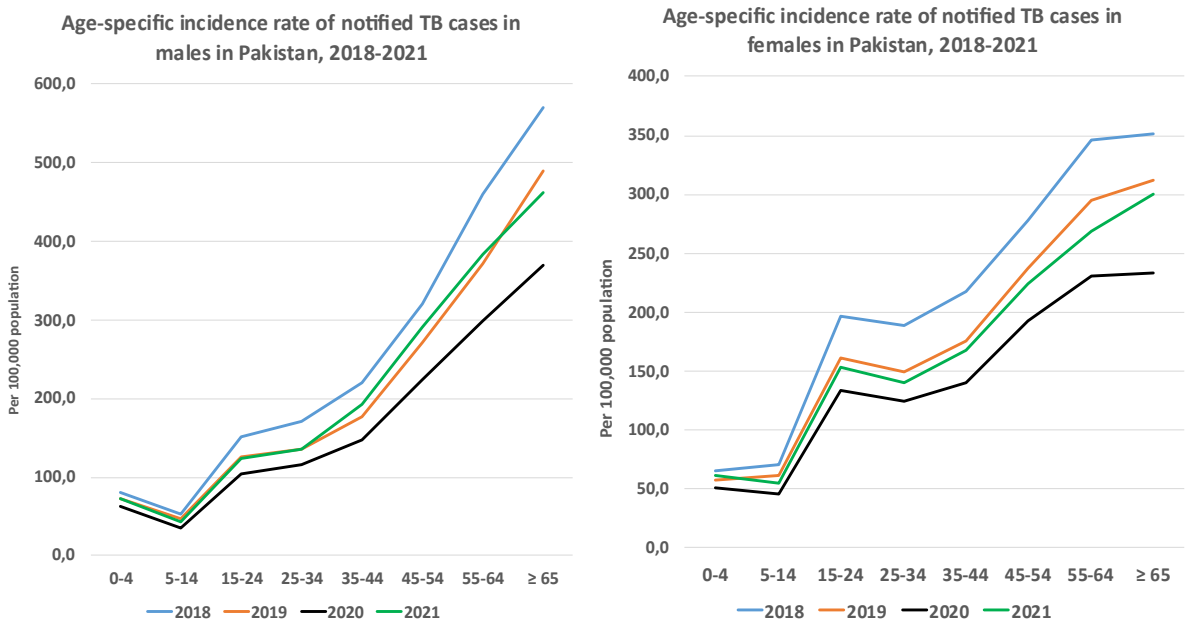


The last TB prevalence survey carried in 2010-2011 highlighted that the frequency of TB increases with age and is at the highest level in elderlies. This finding is corroborated by the data routinely collected by TB program. These data show clearly that the notified incidence significantly increases with the age and consistently across the years 2018-2021 (Graph 6). It reached 300 cases per 100,000 populations in the individuals aged more than 45. It even reached 570 cases per 100,000 populations in males aged 65 and above. The notified incidence increases with the age in both genders, as shown in Graph 7.

Graph 6: Age-specific incidence rate of notified TB cases, in both genders, in Pakistan, 2018-2021

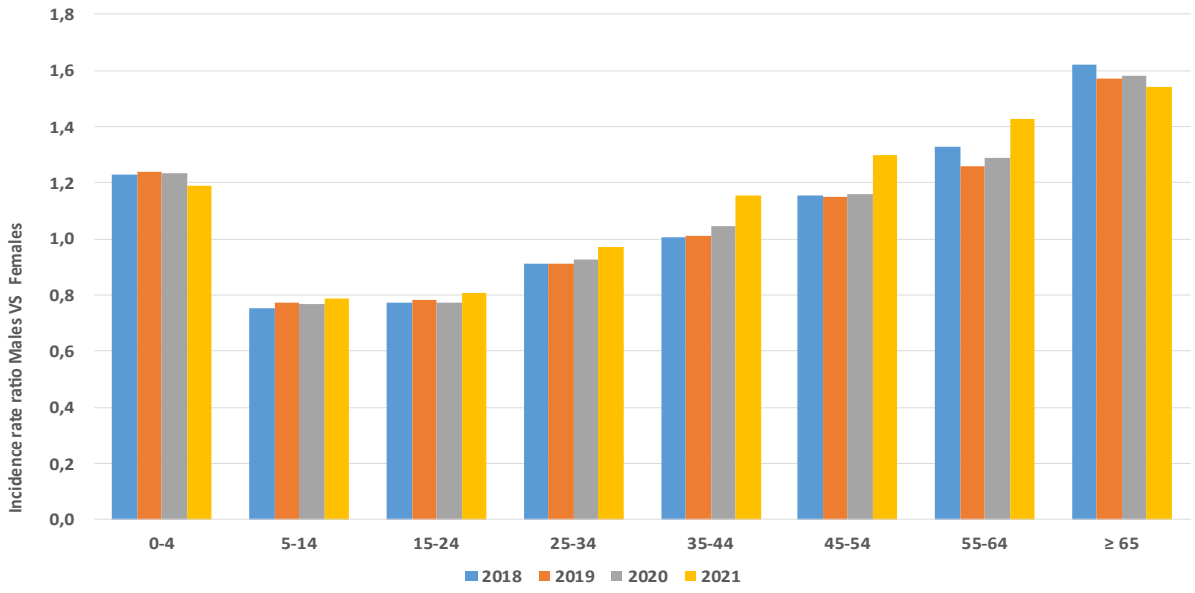


Graph 7: Age-specific incidence rate of notified TB cases in males and females in Pakistan, 2018-2021



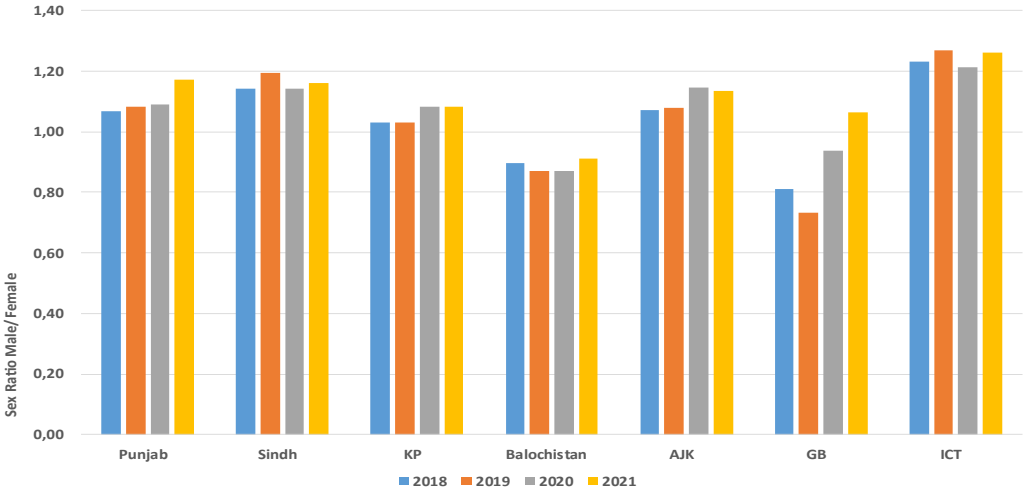
The comparison of notified TB incidence between males and females shows some characteristics which is constant across the years 2018 to 2021 but shows also some differences across the age groups. Indeed, the notified TB incidence is 20% higher in males than females in the 0-4 age group. But, the incidence becomes constantly higher by 10 to 30% in females than males in the age groups between 5 and 34 years. Then the incidence becomes higher by 20 to 60% higher in males than in females in the age groups 45 and above (Histogram 6). In the age group 65 and over, the incidence ratio (males *versus* females) is at least 1.5 in 2018 to 2021.

Histogram 6: Age-specific incidence rate ratio males *versus* females in Pakistan, 2018-2021



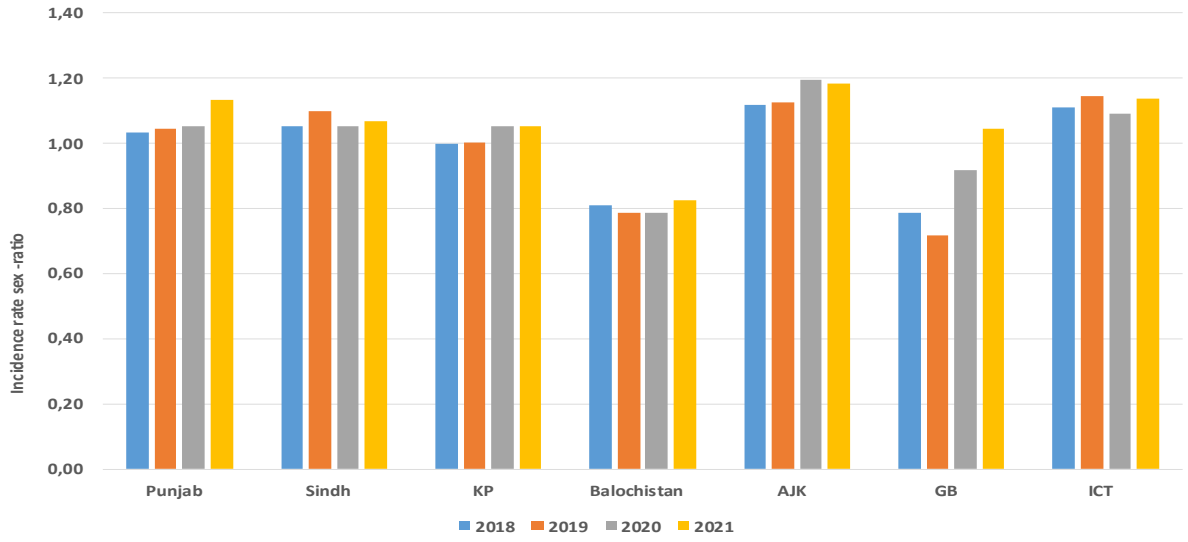
The sex-ratio of the number of TB cases notified in 2018 to 2021 was consistently more than one in all the provinces and regions except in Balochistan and somewhat in GB. The number of cases reported in females is 10 to 15% higher than that notified in males in Balochistan. In contrast, the males with diagnosed TB outnumbered females by 15 to 20% in ICT (Histogram 7).

Histogram 7: TB notification ratio male/female by province and region in Pakistan, 2018-2021



The ratio of notified TB incidence rate is not quite uniform across the provinces and regions. The incidence rate is slightly higher in males than in females in Punjab, Sindh and KP but seems to be significantly higher by 10 to 20% in males compared to females in AJK and ICT. In contrast, the incidence rate is 20 to 25% higher in females than in males in Balochistan (Histogram 8).

Histogram 8: Male to female ratio of notified TB incidence rate by province and region in Pakistan, 2018-2021

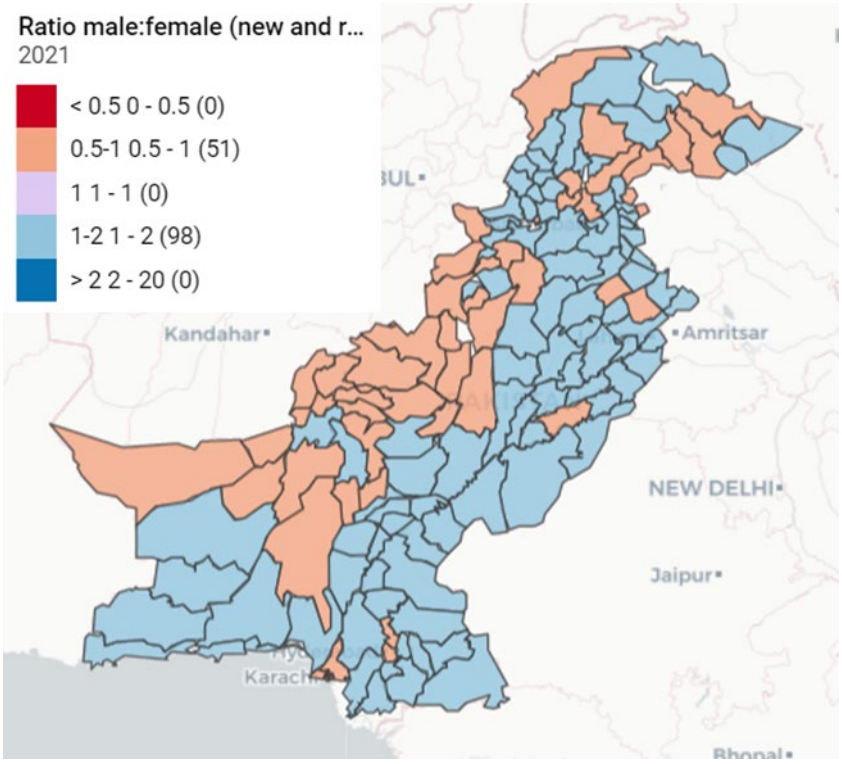


At district level: It is also reported that the number of notified TB cases is higher in females than in males in 51 districts, especially in Balochistan and KP provinces which have the same ethno-cultural populations (Pashtuns, Baloshs, Hazaras) as in Afghanistan where notified TB cases in females outnumber those in males (Map hereafter, with orange color representing a higher TB notification in females than in males).

Furthermore, the districts with the highest notified TB cases are also those with the highest populations sizes. The five districts with the highest notifications in 2021 were Lahore, Faisalabad, Multan, Gujranwala and Rawalpindi while the highest populated districts were Lahore, Faisalabad, Rawalpindi and Gujranwala.

However, in the district of Mandi Baha Ud Din, the population size is much less (1.7 million) and the number of notified TB cases was 4,400 in 2021, resulting in a notified TB incidence of 258 cases per 100,000 population; this incidence was the highest in Pakistan.

Map. Male to female ratio among new and relapse notified cases at district level, 2018

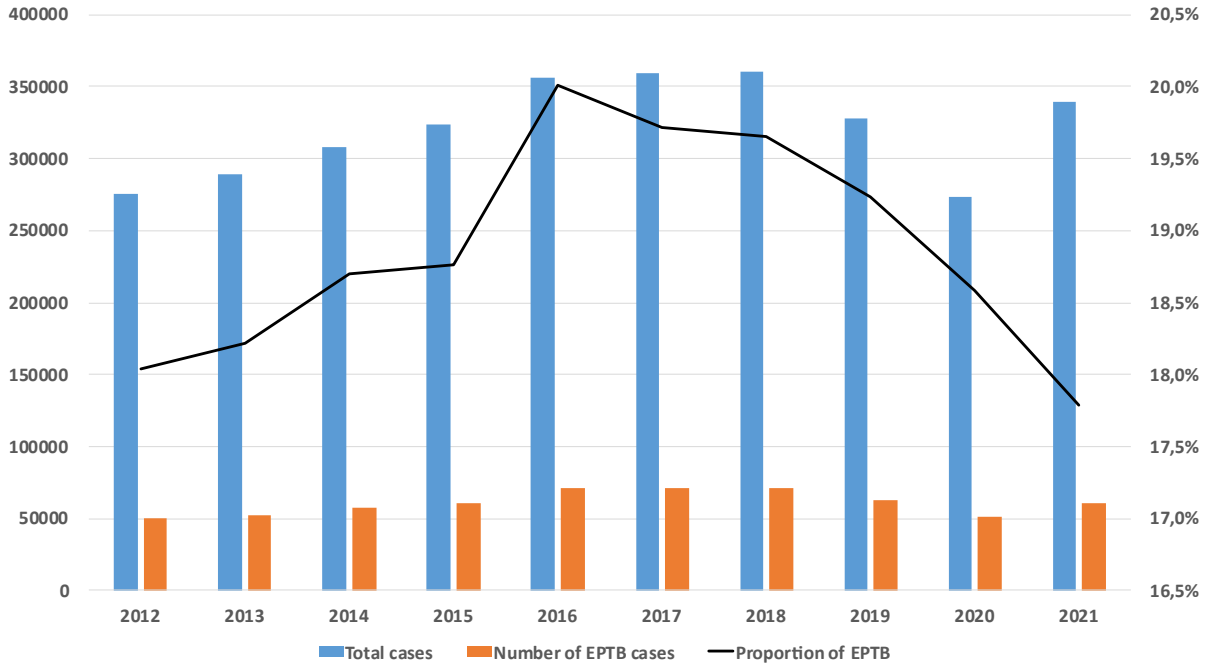


Every year, 50,000 to slightly more than 70,000 EPTB cases are notified in Pakistan. They account for 18 to 20% of the total number of new episodes of TB reported at national level (Histogram 9). However, this proportion significantly varies across the provinces and regions. In 2021, the highest proportions were reported in KP and ICT (34.4 and 32.7% respectively) and the lowest in Punjab with 13.4% (Histogram 10). The reasons why there are these differences in EPTB proportion among provinces and regions are not clear and need to be investigated. There are various hypotheses such as that in ICT there are big and well-equipped

tertiary hospitals which receive patients from all over the national territory and where the diagnosis of EPTB is established. It is also raised that the high proportion EPTB cases in KP might be associated with the excess in the diagnosis of childhood TB, especially in children with chronic diarrhea. The variation of EPTB cases' proportion might be associated with different clinical approaches that are taking place in the districts and provinces, given that there are no clear guidelines for the management of patients with EPTB.

The proportion of previously treated TB cases among the total number of notified TB cases and the proportion of TB relapse cases among the number of registered new episodes are quite low. These proportions are 4 and 3% respectively at national level in 2021. They vary across the provinces and regions; but, they are in general quite low, except for ICT, and even very low (Table 3) such as in GB (0.4% for both proportions) and in Balochistan (1.9% for the first proportion and 1.4% for the second). These low proportions need to be explained; it might be due to a misclassification of patients with previously treated TB as new cases (never treated). This might be also related to a mis-utilization of TB case definitions when TB cases are identified and registered. In addition, drug susceptibility testing (DST) that must be undertaken in priority in previously treated patients might not have been carried out for some misclassified TB cases.

Histogram 9: Number of extrapulmonary TB (EPTB) cases and their proportion among all notified TB cases in Pakistan, 2012-2021



Histogram 10: Proportion of EPTB cases among all notified new TB cases in Pakistan, 2021

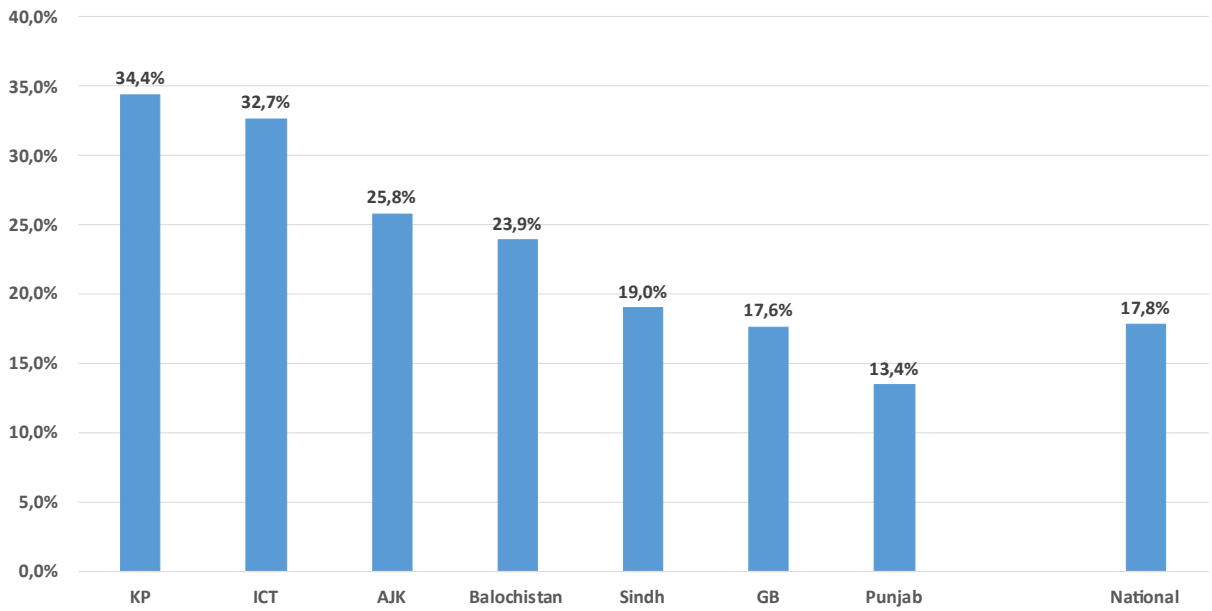


Table 3: Proportions of retreated TB cases among notified in Pakistan, 2021

	Total number of notified TB cases (1)	**Number of previously treated TB cases** (2)	**Proportion of previously treated cases** (1)/(2)	**Total number of new TB episodes** (3)	**TB relapses** (4)	**Proportion of TB relapses** (3)/(4)
Punjab	209885	8246	3,9%	208470	6831	3,3%
Sindh	69338	4018	5,8%	67413	2093	3,1%
KP	42889	1338	3,1%	42574	1023	2,4%
Balochistan	11692	219	1,9%	11632	159	1,4%
AJK	4883	225	4,6%	4852	194	4,0%
GB	3133	14	0,4%	3130	11	0,4%
ICT	1202	86	7,2%	1185	69	5,8%
National	343022	14146	4,1%	339256	10380	3,1%

Over the past five years, the proportion of registered children and adolescents diagnosed with TB (less than 15 years of age) were within the expected range of 5-15% among new and relapse

cases. However, this proportion significantly varies across the provinces, regions and districts. For instance, a high proportion was observed in KP Province and GB Region while a low proportion was reported in AJK. In addition, there are many districts with a high proportion of notified childhood TB cases, such as the districts of Diamer (72%), Gilgit (63%), Khyber (56%), Peshawar (51%), Fr Tank/Di Khan (48%), Swat (46%) and Ghizer (44%).

The burden of MDR/RR-TB in general population of Pakistan is estimated by WHO at 16,000 cases in 2021, with an incidence rate of 6.8 per 100,000 population[69]. The prevalence of drug-resistant TB cases is estimated at 2.5% in new cases (never received any TB medicines) and 4.9% in previously treated TB patients. Based on the prevalence highlighted above for new cases and previously treated patients, the number of MDR/RR-TB cases among all the notified TB cases in 2021 is estimated at 7,422. The TB Program has developed non negligible capacities for the programmatic management of drug-resistant TB (PMDT). In 2021, 3,373 pharmaco-resistant TB patients were identified; they accounted for 45% of those estimated among all notified TB cases. Of these 3,373 drug-resistant TB cases, 2,878 (85.3%) were treated with second line TB medicines by TB Program in line with the PMDT requirements. This number indicates that only 18% of MDR/RR-TB cases that appear in general population of Pakistan are treated.

Pakistan is a low HIV burden country where HIV epidemic is concentrated in high-risk groups. The burden, across the country, is estimated at 210,000 PLHIV in 2021[40] with a prevalence at 0.2% in general population[39]. If we consider this estimated 0.2% HIV prevalence and if the risk of TB occurrence is 20 times higher in a PLHIV than in a person with no HIV infection, then the population risk for TB attributable to HIV infection is 3.7%[70]. This means that hardly 22,600 TB cases that appear in population is associated with HIV epidemic. If the risk of TB is 30 times higher in a PLHIV than in a HIV-negative person and the HIV prevalence remains the same (0.2%), then the population risk for TB attributable to HIV is 5,4%; this means that 33,500 of the estimated incident TB cases are related to HIV infection. Given the high burden of TB in general population (611,000 in 2021), the findings of these calculations suggest that, *a priori*, a minor part of TB burden in Pakistan is related to HIV infection in population.
Besides HIV infection, there are other risk factors that are associated with TB occurrence, namely undernourishment, smoking, diabetes mellitus and alcoholism. It is estimated that 53 000 incident TB cases are associated with tobacco use, 122,000 with undernourishment, and 30 000 with diabetes mellitus. It seems that, in Pakistan, alcoholism is a less important risk factor compared with undernutrition, smoking, diabetes and HIV infection.

Conclusion: The last WHO estimates highlighted that 611,000 people in Pakistan were affected with a new TB episode in 2021; however, only 55% of them were detected and

[69] Tuberculosis profile: Pakistan. WHO Global Tuberculosis Report 2022.
[70] Poppulation Attributable Risk % = Prev(RR-1)/[Prev(RR-1)+1]

notified to TB Program. These data show clearly that the burden of TB is very high in the general population.

According to the last epidemiological review, the estimated TB incidence is declining very slowly. The TB data collected by the TB program does not suggest any reduction in TB transmission in the population. The fact that nearly 50% of notified TB cases are aged less than 25 years strongly suggest that the decline in TB transmission has not at all started. In addition, the TB data highlight that TB is highly prevalent in elderlies for whom specific actions should be developed and implemented.

TUBERCULOSIS PREVENTION, CARE AND CONTROL SITUATION

TB prevention, care and control has been organized in the framework of the National Tuberculosis Program (NTP) for more than two decades. The NTP was established in July 2000 for country wide implementation of internationally recommended strategies to prevent and control TB.

1. Strategies and planning

The DOTS Strategy of WHO was adopted and included in the national health policies of the Government of Pakistan as early as the year 1995. In 2001, the government declared TB as a National Emergency through the "2001 Islamabad Declaration", giving the NTP the mandate to design and regulate TB control activities in the country utilizing both domestic and donor resources. The program was decentralized to provincial and district levels and integrated in PHC services, including the involvement of LHWs and it was also moving towards integration in secondary and tertiary care services.

In 2006, the WHO-recommended Stop TB Strategy was adopted by the NTP to improve and consolidate the achievements of DOTS Strategy, organize and expand the TB laboratories' network across the national territory, improve TB case detection, develop and extend private-public mix (PPM) interventions and initiate and strengthen PMDT development. With the process of political and administrative devolution to the provinces associated with the 18th Constitutional Amendment in 2011, the provincial governments are mainly responsible for dealing with health-related matters in their jurisdiction, and their Provincial TB Programs (PTPs) are since then responsible for the organization and management of provincial TB services.

In 2016, the NTP has adopted the WHO End TB Strategy as national policy for TB prevention, care and control in Pakistan.

The last national strategic plan (NSP), that was developed for Pakistan, covered the years 2020 to 2023. It included an overarching component and seven attached provincial strategic plans (PSPs) and regional strategic plans (RSPs). Each province and each region established its own PSP and RSP respectively.

The goal of TB Program, as specified in the NSP, was to put Pakistan on the road towards achieving universal access to TB diagnosis and treatment by 2030**.** To this end, the following objectives were established for the four years covered by the NSP and for the overall country:

i) To treat successfully 1.6 million drug-sensitive TB patients, among whom 200,000 children;
ii) To treat successfully 35,000 MDR/RR-TB cases;
iii) To provide 1.6 million courses of tuberculosis preventive treatment (TPT).

In coherence with these three national objectives, the NSP clearly identified the objectives that should be achieved in each province and region through their respective PSP and RSP, as indicated, hereafter, in the Table 4.

The strategic interventions and activities that should be developed and implemented to achieve these objectives are identified in the NSP and its seven attached PSPs and RSPs components. The budget needed for the implementation of the overall NSP was estimated at approximately 621 million US$.

Table 4: Treatment targets for drug sensitive (DS) patients, children, drug resistant (DR) cases, and preventive treatment, and total costs of the PSPs, 2020-2023

Province/region/ Territory	DS adults treated	DS children treated	DR patients treated	Preventive treatments	Total cost US$ million
AJK	24,569	3,509	567	25,976	8.894
BAL	53,963	7,709	1,242	56,726	26.821
FATA	23,098	3,301	410	17,838	14.214
GB	10,293	1,471	99	6,216	4.192
ICT	9,266	1,325	219	8,773	3.773
KP	208,944	29,849	4,518	202,758	48.945
PJB	840,709	120,101	18,119	931,839	374.411
SND	337,274	48,182	10,102	380,076	124.777
Federal Unit	-	-	-	-	14.767
Total	**1,508,116**	**215,447**	**35,276**	**1,630,202**	**621.209**
	DS adults and children combined 1,723,563				

Source: The Islamic Republic of Pakistan. National Strategic Plan for Tuberculosis Control, 2000 - 2023

2. Structure and organization of TB Program

The TB Program of Pakistan is structured and is represented at each level of the public health system.

2.1 Central level

The TB Program was reinforced through a Ministry of Inter-Provincial Coordination notification of the Government of Pakistan dated 14th October 2011. From that date until 30th June 2016, the TB Program functioned as a National Programme. Then, a joint planning commission (PC)-1 was approved for the period 1st July 2016 to 30th June 2019, extended until June 2020, to create the Common Management Unit (CMU) to manage Global Fund (GF) grants for HIV/AIDS, TB and malaria activities. The CMU was established on January 2018 with the start of the 2nd tranche of the new funding model (NFM) grant of GF. Nominally, TB Program (or NTP) is a technical unit of the CMU, as are the NACP and the Department of Malaria Control (DoMC). The GF-related support functions like finance, procurement and supply chain management (PSM), audit, monitoring and evaluation, surveillance and research were integrated for the three diseases. The CMU is under the responsibility of a National Coordinator (NC) who is assisted by three Deputy National Coordinators (DNC): one for TB Program, one for NACP and one for DoMC. TB Program also functions as a subordinate department of the MoNHSRC.

From the central level, the TB Program collaborates with several technical and implementing partners, notably the WHO, the US Agency for International Development (USAID), the International Organization for Migration (IOM), the National Rural Support Programme (NRSP), the Pakistan Chest Society (PCS), the Pakistan Paediatric Association (PPA), Mercy Corps and their partners, Indus Hospital Network (IHN) and their partners, the Aga Khan University (AKU), Green Star Social Marketing (GSSM), the Pakistan Anti TB Association (PATA) and other national NGOs.

The NTP has taken some key steps for TB prevention, care and control in Pakistan, namely:

- TB care provision: Free anti-TB medicines are provided to TB patients in more than 5,000 public sector health facilities along with free TB diagnosis through the development of an extended TB laboratory network across the national territory (see below the section on TB laboratory network).

  The NTP has succeeded, since 2009, to ensure PMDT services to drug-resistant TB patients in 33 special centers, including the provision of a social support.

  In collaboration with NGOs, NTP has implemented valuable PPM activities; as matter of fact, approximately 6,400 private general practitioners (GP), more than 300 private hospitals and nearly 3,000 private pharmacies have been engaged in TB prevention, care and control efforts in line with the national policy.
- TB management information system: The NTP has succeeded to collect a significant amount of data for TB notification, epidemiologic surveillance, evaluation and programmatic management purposes. The move from the paper-based model to the digitalized information system is proceeding. District Health Information System (DHIS-2) for HIV, TB and Malaria has been developed and is on the process of implementation. DHIS-2 for aggregated data on TB has been implement in 153 districts (out of 169) while it is implemented only in 44 districts for HIV/AIDS and in 60 for

malaria. In addition, more than 90% of Xpert sites are connected by the automated GeneAlert system.

- TB Legislation: the NTP has assisted PTPs with developing and implementing "Mandatory TB Case Notification" Bills/executive order, which have been passed by Provincial Assemblies and bylaws have been developed (ex.: Sindh Province).
- Research in TB: There is, within the CMU, a specific unit devoted to the development of research in TB prevention, care and control in Pakistan. As of 2016, this unit initiated the Structured Operation Research Training IniaTive (SORT IT) course in collaboration with Tropical Diseases Research (TDR), the International Union against Tuberculosis and Lung Disease (Union), GF, and other partners. As a result, a good momentum for research has been taking place with a focus on various aspects of TB prevention, care and control in Pakistan. More than 60 studies have been, so far, conducted and published on TB in this country.

At federal level, the core responsibilities retained with the NTP, include strategic planning, formulation of policy guidelines, organization of training for health staff, technical support to PSPs and RSPs and other implementing entities, adaptation and implementation of new technologies, coordination with and inter-provinces, disease surveillance and dissemination of data to national and international stakeholders, monitoring and supervision of program activities, coordination and communication with national and international partners, including bilateral and multilateral agencies and donors. However, a critical mass of TB experts is needed at the central level to carry out all these functions. In addition, The NTP at the CMU has established two functional coordination platforms including an inter-principal recipient (PR) coordination committee and a PMDT coordination committee. A third committee for the coordination of collaborative TB-HIV activities has been established but is not yet fully functioning.

Current staffing levels at the federal level of the TB Program includes:

- One deputy national coordinator (DNC) for TB Program (or NTP manager);
- Two PMDT specialists;
- One medical officer for TB activities in AJK, GB and ICT;
- One advisor for TB laboratory;
- One monitoring and evaluation and surveillance specialist;
- One chief research and surveillance;
- One chief finance and administration;
- One chief PSM;
- One chief auditor for internal audit.

Only the salary of the DNC is covered by the Federal Government; the salaries of the other six TB professional staffs are ensure by GF or USAID.

It is important to highlight that there is a *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan which is a consultative body and provides technical support to CMU/TB Program Central Unit.

2.2 Provincial level

The PTP is a component of the Department of Health at provincial level and is under the guidance of a PTP manager who reports to the Director General of Health Services of the province who, himself, reports to the Provincial Secretary of Health. The PTP manager is assisted in her/his tasks by a deputy PTP manager. Their role is technical and their tasks consist of implementing and managing TB activities in line with the national policy. Their salaries are covered by the Provincial Health Secretariat.

At province level, there is also a GF Program Manager who is in charge of the monitoring of the GF spending in the province and the activities financially supported by GF grants. The GF Program Manager reports directly to CMU and works in coordination and collaboration with the PTP manager. Her/His salary is covered by GF.

In each province, there are at least 2 senior provincial program officers (SPPO) who are supervised by both the PTP manager and the GF Program Manager. Their salaries are paid by GF. They supervise the District TB Officers (DTO) who are operating, specifically for TB activities, in each district.

Furthermore, there is two TB advisers at province level: one in KP and one in Punjab; their salaries are covered by respectively USAID and WHO.

PTP and RTP services are implemented in 155 districts across the national territory; they are responsible for the care delivery processes including planning, training of care providers, cases' detection and management, monitoring and supervision. The PTPs and RTPs provide the districts with overall technical and material support including drugs, laboratory supplies, hardware etc..

Inter-district meeting to discuss TB issues and the results of the quarterly reports used to be organized on quarterly basis at province level; but, since recently this meeting is held every six months.

2.3 District level

In each district, there is a full-time DTO who is responsible for TB services' provision through a network of TB Basic Management Units (BMU) and RHCs. The salary of DTO is covered by GF. The DTO is working closely with a District TB Coordinator (DTC) whose salary comes from the provincial government.

In each BMU/RHC, there are usually: i) a TB focal point who is a medical officer, ii) a DOTS facilitator and iii) a laboratory technician. The BMUs/RHCs are the most peripheral health facilities of NTP in public sector and constitute the fundamental pillar for the provision of TB services to population. Each BMU is assumed to cover together 4 to 6 BHUs; however, in practice, the number of BHUs actively and formally engaged with the PTPs is very small (Table 5).

In general, the health sub-system below the level of the RHC is not involved in TB services provision, representing a lost opportunity to bring these services closer to the community and the affected persons.

In Pakistan, there are more than 1,400 BMUs, including those implemented in hospitals and parastatal hospitals; in addition, 15 military hospitals are hosting operational BMUs. Slightly more than 6,400 GPs are engaged with NTP through very active NGOs. The number of PMDT sites is 33. There are also 52 health facilities which provide HIV care, including ART services; it is planned that this number will increase soon to 72 sites.

Table 5: Numbers of BHUs formally engaged with the RTP or PTP/NTP. ***Source: NTP***

Province	Number of engaged BHUs	Total Number of BHUs
Punjab	6	2500
Sindh	48	810
Balochistan	39	688
KP	7	769
AJK	12	227
ICT	3	16
GB	6	23
KP (including Tribal Districts)	3	169
Total	**124**	**5202**

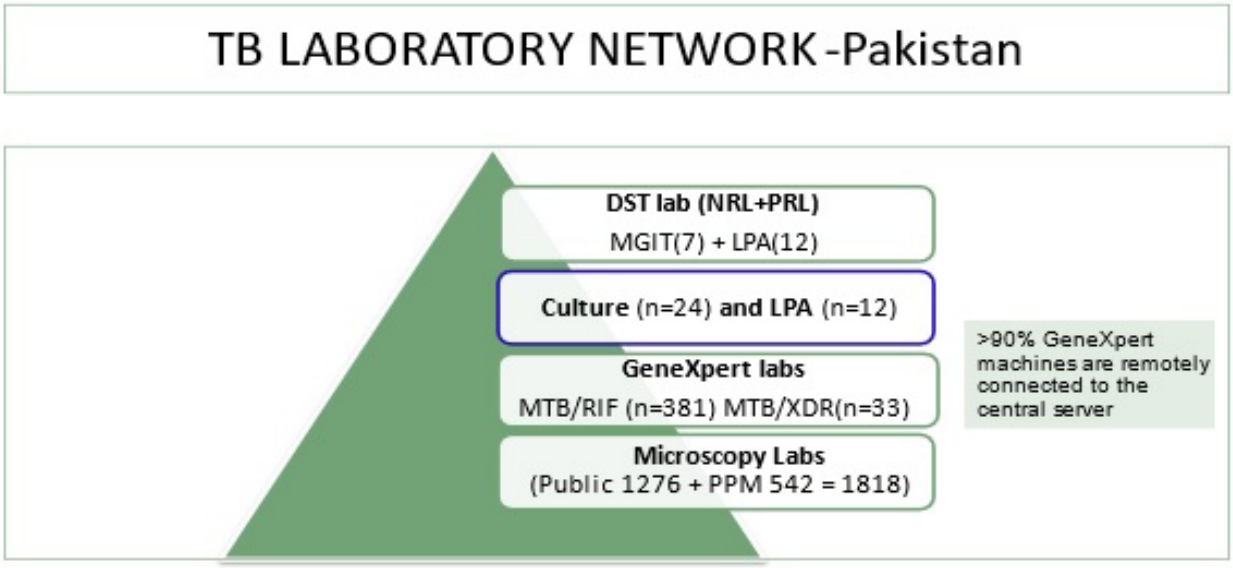
In Pakistan, there is a network of nearly 90,000 LHWs who operate in communities to deliver PHC services with a focus on reproductive, maternal, newborn and child health (MNCH) for up to 1,500 residents per LHW[71]. LHWs used to be involved somehow in the provision of TB services; but, their role has significantly declined regarding TB, because of other health priorities, except in Sindh Province.

2.4 Laboratory Network

The TB laboratory network is a fundamental component of Pakistan TB Program. It has significantly expanded in the last decade. It includes 1,818 TB microscopy laboratories; 542 of them are in the private sector. The ratio per population is 1 microscopy laboratory per 127,000 population. There are 475 operational Xpert machines which ensure Xpert testing in 424 sites across the country using both 4-module and 16-module machines; 33 of these are XDR machines (Fig. 3). Most Xpert machines are installed in tertiary care hospitals as well as in district and tehsil headquarters' hospitals. Thirty three Xpert machines have been implemented in the private health sector. The diagnosis of TB is still mainly based on smear microscopy because of the limited coverage of Xpert testing, and partial use of specimen transport systems.

[71] Governmenet of Pakistan, Ministry of National Health Services, Regulations and Coordination. Pakistan's Lady Health Worker Program; 5th Third Party Evaluation Report. Oxford Policy Management and UNICEF. September 2019.

Fig. 3: The pyramid of laboratory services in Pakistan



Provincial reference laboratories (PRL) are available in KP, Punjab, Sindh and Balochistan provinces. They ensure the DSTs needed (except for the Balochistan PRL) for the patients enrolled in PMDT. These laboratories have facilities for automated liquid culture and line probe assay (LPA). Beside the PRL, 21 culture laboratories have been established across the country to provide services to monitor the response to the treatment of drug-resistant TB patients. In AJK and GB regions, culture laboratories have been established while the DST services needed are covered by the national reference laboratory (NRL). There are two TB laboratories having DST capacities in the private sector both located in Karachi – the Indus and AKU hospitals. The NRL, hosted in the National Institutes of Health in Islamabad, is technically supporting and supervising the activities undertaken in the whole national TB laboratory network. It is a strong laboratory arm for TB Program, under the administrative control of CMU. The NRL has sufficient infrastructure, skilled human resources, equipment, information system, and logistical capabilities of a sophisticated reference laboratory. Over the past decade, it has developed well recognized diagnostic and surveillance capacities (for WHO-recommended technologies). In addition, this laboratory has established linkages with the Supra National TB Reference Laboratories of Milan, Italy, and Antwerp, Belgium, for quality assurance and technical assistance.

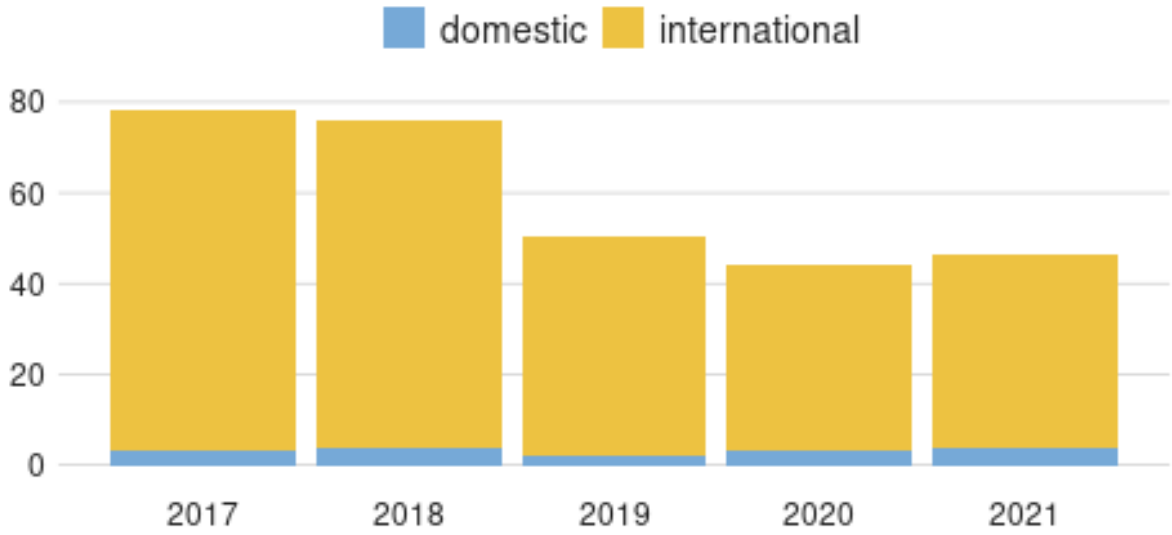
The crucial functions of the NRL, at federal level are: the provision of technical support, the development of standards, coordination, training, supervision, the organization of external quality control (EQA) across the TB laboratory network, drug resistance surveillance, the implementation of new technology, data quality assurance, and others.

Pakistan has been struggling in the area of Quality Assurance of drugs by having the random sampling through an ISO 17025 or WHO pre-qualified laboratory, yet these indigenous services are not available in Pakistan. NTP plans to hire services for it early in year 2024 and complete the process by the year end.

3. Funding of TB Program

The 2020-2023 NSP for TB prevention, care and control was costed at USD 621 million US$. In 2021, the NTP reported, in the 2022 WHO Global TB Report, that only a small proportion of the NTP budget was from domestic sources (Histogram 11).

Histogram 11: Source of funding for TB activities in Pakistan in 2017 to 2021 (in million of US$)



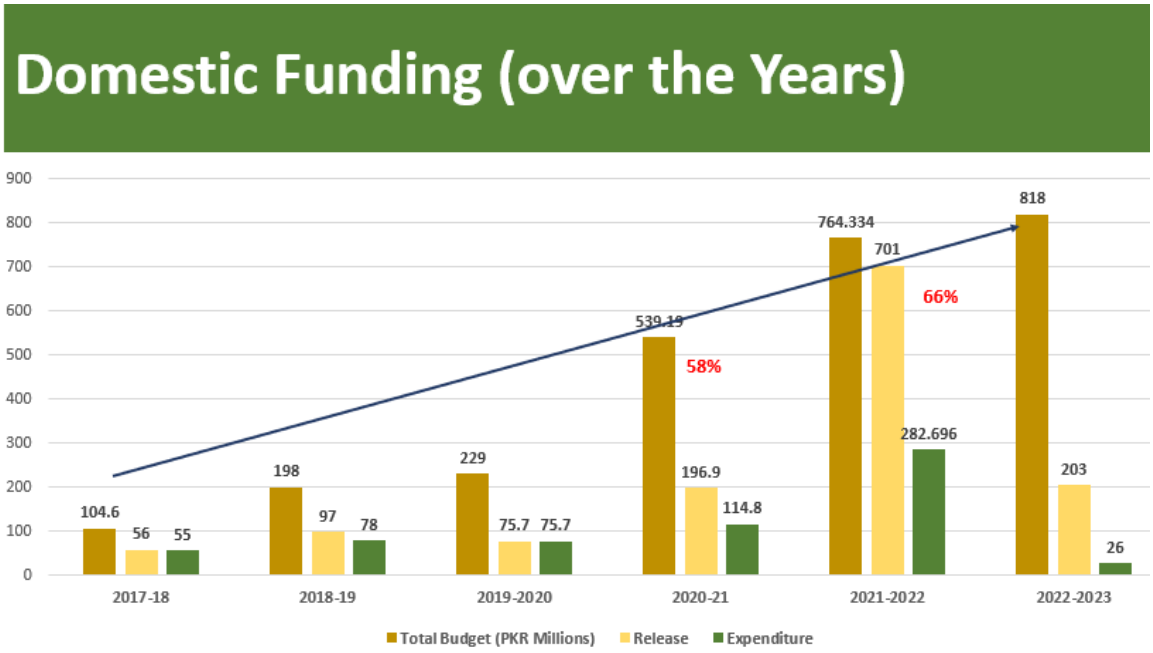
Source: 2022 WHO Global TB report

3.1 Government

Government funds come through the Annual Development Program (ADP), managed by the Provincial Planning Commissions, and this is the main mode of mobilizing resources from the Government for TB activities in the provinces (the so-called PC-1 funding mechanism). It is a project-based mechanism in which funds are approved in principle but released subject to availability, usually only partially and after delays.

For instance, in Sindh, there has been a steady and significant increase in the amount of funds allocated to TB, however, expenditure has lagged behind because of bureaucratic procedures (Histogram 11).

Histogram 11: Funding for TB care and prevention in Sindh province 2017/18 -2022/23



Source : 2022 JPRM Report

The ADP funds do not include staff salaries and infrastructure costs which are covered in the provincial and regional regular budgets.

Through PC-1 nearly 3.9 million US$ have been allocated from federal level for TB activities for the years 2022 to 2025 (Table 6).

Table 6: PC-1 budget allocation from federal level for TB activities for the years 2022 to 2025, Pakistan

Areas of work	Budgeted allocation (in US$)
National Reference Laboratory activities	1,005,654
Monitoring and evaluation	155,672
Inter-provincial coordination	38,889
Social mobilization	92,622
Federal priority activities	2,567,403
AJK Region	1,226,222
GB Region	815,273
ICT	525,908
Overall (PC-1 TB)	3,860,239

3.2 Global Fund

The GF is the major source of funding for the TB Program of Pakistan. In the ongoing NFM-III which covers the years 2021-2023, nearly 178 million US$ are allocated for TB prevention, care and control interventions. The focus of this grant is: i) expanding TB services within the PHC network, ii) PPM, iii) TB laboratory services, iv) specimens' transport, v) enhancing X-ray use, vi) childhood TB, vii) contact investigation, viii) collaborative TB/HIV activities, ix) TB services for high-risk groups and vulnerable populations, x) TB drug procurement, xi)

expanding PMDT activities, xii) infection control, xiii) programmatic management of TB preventive therapy (PMTPT), xiv) multisectoral approach, xv) sustaining TB programmatic management, xvi) reinforcing TB Program information system, including mandatory notification and xvii) enhancing operational research. The Government and Mercy Corp are the principal recipients of this GF grant. Approximately 30 million US$ have been allocated to Mercy Corp to engage care providers practicing outside the TB Program network.
In addition, slightly more than 90 million US$ were allocated by GF, in the framework of COVID-19 Response Mechanism to TB Program to cope with the impact of COVID-19 pandemic on the provision of TB services in Pakistan.

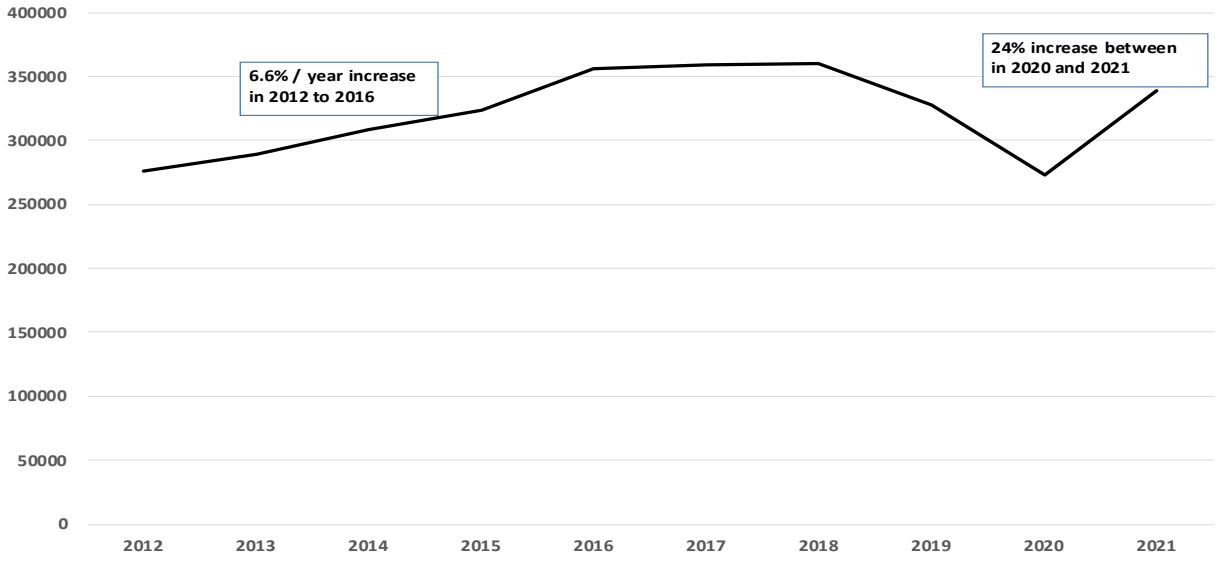
3.3 Other

In 2022, Gates Foundation released 3.3 million US$ to enhance and strengthen the engagement of all care providers and one million to develop and implement digital information system for TB Program.
Furthermore, the World Bank has an agreement with the Government of Pakistan to fund a National Health Support Program whose objective is to strengthen equitable delivery and quality of essential health services at the primary care level in support of UHC.

4. Outcomes and potential impact of TB prevention, care and control in Pakistan

The number of notified TB cases has significantly increased during the last decade. It has increased from 275,738 new cases in 2012 to 339,256 in 2021, suggesting an increase of 2.4% per year on average. However, the increase was not regular at all over time. In fact, the increase in notification was nearly 7% per year between 2012 and 2016; then, there was nearly a stagnation in 2017 and 2018; then a significant drop in 2019 and 2020. In 2021, the notification increased by 24% in comparison to the previous (Graph 8). The preliminary data for the year 2022 (not yet validated by WHO) show an increase in notification of 25% in comparison to 2021.

Graph 8: Number of notified new drug-sensitive TB cases in Pakistan, 20212-2021



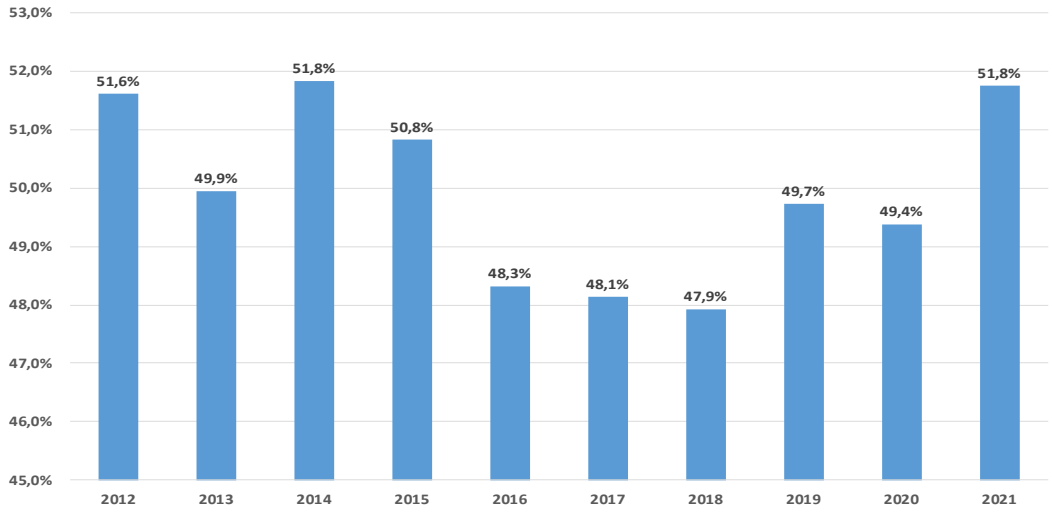
The care providers operating outside the TB Program network have significantly contributed to the overall TB notifications in Pakistan. Their contribution increased from 120,000 notified TB cases (33% of the total notified) in 2018 to 140,000 (41% of the total notified) in 2021 and is expected to reach 170,000 (nearly half of the expected total number of notified cases) in 2022. This increase is due to the significant engagement of private GPs, whose notifications have increased 5-fold from 26,000 in 2015 to an expected 134,000 in 2021. The number of GPs notifying at least one case per year has increased from 3,000 in 2018 to at least 6,000 in 2022. During the first three quarters of 2022, 283 private hospitals notified slightly more than 18,000 TB patients. Hospitals with screeners notified an average of 6.2 TB patients per month, compared with 2.8 patients per month for engaged hospitals without assigned screeners. A recent TBREACH-funded strategic intervention has resulted in the notification of nearly 15,000 TB patients who were identified through nearly 3,000 pharmacies within 1 year, in 4 districts of Punjab Province.

However, the TB Program data show that 1,647,587 individuals with presumptive TB were identified and managed in health facilities. Meanwhile, 269,169 PTB cases were identified and registered. This points out that, on average in Pakistan, only 6 presumptive TB persons were identified and assessed to diagnose 1 PTB case. In most of the provinces, this ratio is low, except for Balochistan (14 presumptive TB cases for 1 notified PTB patient); it reaches even 5 presumptive TB patient for 1 PTB case in KP Province. The 2022 preliminary data show that only 5 persons with presumptive TB were assessed per PTB case for overall Pakistan. This low ratio of presumed TB patients' number per notified PTB case strongly suggests that there is some form of selection of presumed TB patients and therefore not all eligible presumed TB individuals are identified and assessed for active TB.

Even though the notification of patients with TB has increased over time, only 56% of the estimated number of TB cases in general population are identified and treated; therefore, 44% of the estimated cases were not been notified in 2021.

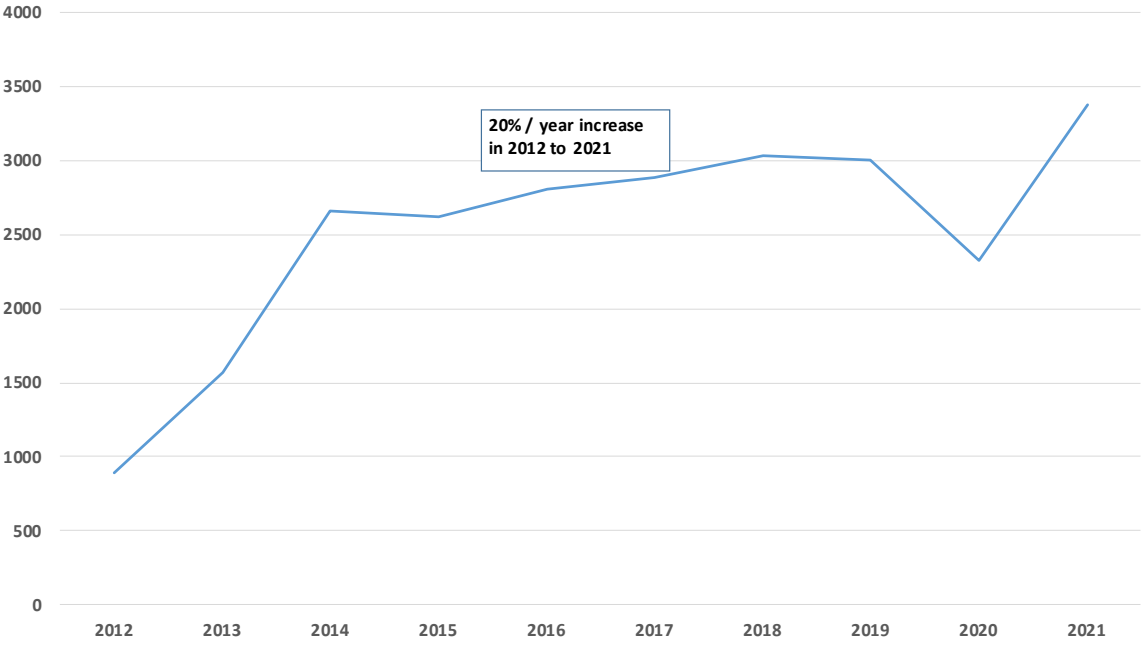
Although, the TB laboratory network has successfully expanded and the number Xpert machines increased, the proportion of patients with bacteriologically confirmed PTB remains low and did not make any progress during the last decade. It has remained around 50% (Histogram 12).

Histogram 12: Proportion of bacteriologically confirmed PTB cases, in Pakistan, 2012 - 2021



TB Program has developed significant capacities and expertise in the provision of PMDT services. It has implemented, to date, 32 PMDT sites across the national territory. The number of drug-resistant TB patients who were diagnosed, in Pakistan, significantly increased from 888 in 2012 to 3,373 in 2021; even the increase was not fully steady over years, the average increase was 20% per year (Graph 9).

Histogram 9: Number of MDR/RR-TB cases detected in Pakistan, 2012-2021

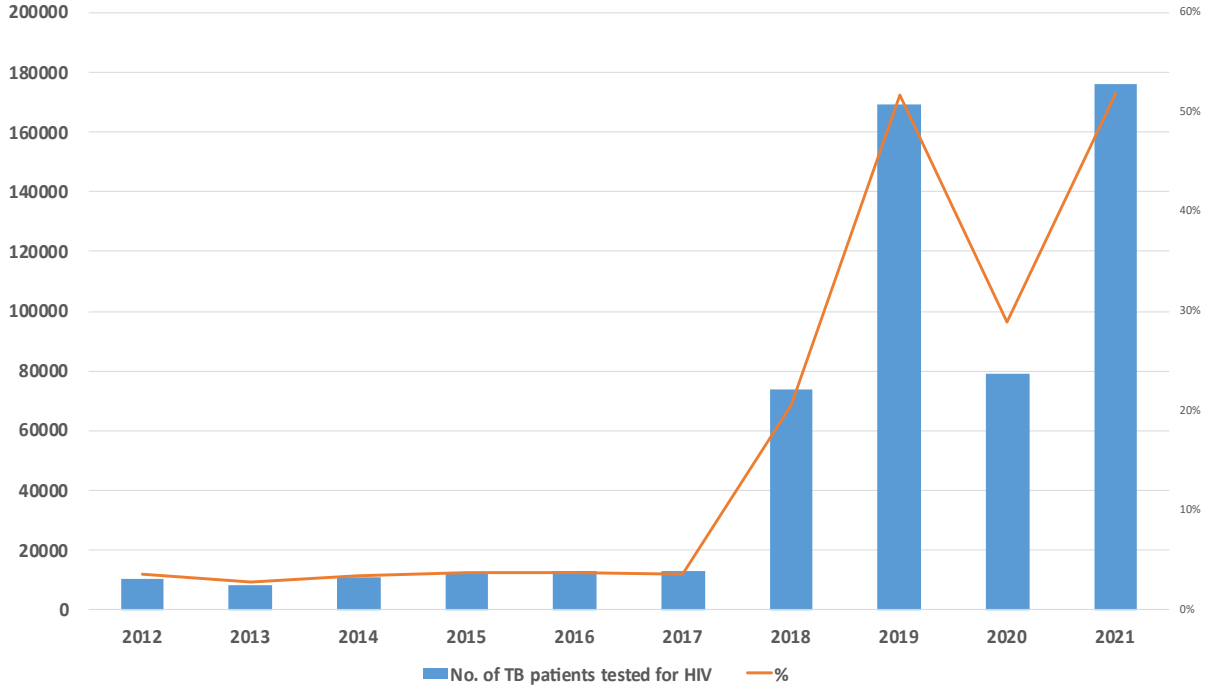


Among the 3,373 drug-resistant TB patients diagnosed in 2021, 85% were treated with second line TB medicines. However, these 3,373 cases accounted for: i) 38% of the expected number of drug-resistant TB cases among all notified TB patients and ii) 18% of those who appear in general population.

Significant progress has been made in HIV-testing in notified TB patients. The number of TB patients who were tested for HIV infection increased from 10,423 in 2012 (4% of notified TB

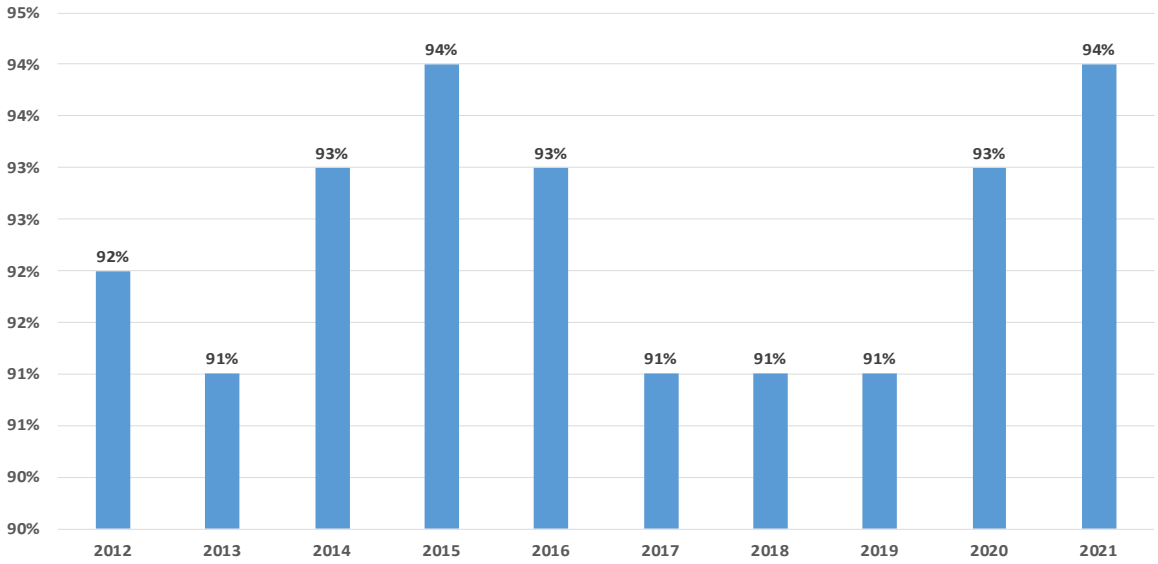
cases) to 175,872 in 2021 (52% of notified cases) (Histogram 13). In most of the years, the proportion of TB patients who were HIV-positive was less than 1%.

Histogram 13: Number and percentage of notified TB patients tested for HIV infection in Pakistan, 2012-2021



TB Program of Pakistan has succeeded to maintain a treatment success rate very high among drug-sensitive TB patients. It is constantly above 90% every year during the last decade (Histogram 14). In 2021, this rate was 94% among new cases, 84% among previously treated TB patients, 82% among HIV-positive TB cases, 73% among MDR/RR-TB patients and 67% among pre-XDR/XDR-TB cases.

Histogram 14: Treatment success rate of notified TB cases in Pakistan, 2021-2021



STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (S.W.O.T. ANALYSIS)

The SWOT analysis detailed below is based on: i) the results of the last joint Program review mission (JPRM) carried out during the second half of November 2022 in the four provinces of Pakistan and ii) the discussions held in the inception meetings, on NSP, PSPs and RSPs development, organized, in Islamabad on 5 and 6 December 2022 and in Lahore, Karachi, Quetta and Peshawar on 12 to 20 December 2022. All these meetings were attended by staff from the TB Program Central Unit, PTPs and RTPs as well as by representatives of WHO, Stop TB Partnership, Mercy Corp, GSSM, DOPASI Foundation, ASD, ACD, AKU, and other partners. The TB Program of Pakistan has many strengths that need to be enhanced and challenges that should be addressed. Also, there are opportunities that need to be considered and some threats that must be taken into account in the development of these NSP and PSPs/RSPs.

1. **Strengths**

- TB prevention, care and control are included in the national health agenda of MoNHSRC. Their activities are organized in the framework of a well-established TB Program. Funding is released by provincial ministries of health to cover mainly the cost of first line TB medicines and salaries of health staff ensuring TB services. TB Program has non negligible capacities to raise funding at international level. As matter of fact, it successfully mobilized almost 178 million US$ through the NFM-III of GF for the years 2021-2023 and also nearly 90 million US$ in the framework of COVID-19 Response Mechanism.

- The TB Program is structured with a functional Central Unit and PTPs and RTPs with competent and committed staff at provincial and regional levels. In districts, TB activities are under the leadership of DTOs and DTCs who are supervising and monitoring TB activities carried out in BMUs. In Pakistan, there is a widespread network of more than 1,400 BMUs which provide TB services directly to population across the national territory. All the TB services are free of charge for the patients in the BMUs.
- The NTP has adopted, since 1995, all the WHO-recommended strategies for TB prevention, care and control, namely DOTS Strategy, Stop TB Strategy and End TB Strategy.
- The *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan is a consultation body for the Central Unit; it includes key stakeholders and provides technical support to TB program.
- The TB Program has succeeded to establish a network of national and international partners, including GF, WHO, IOM, UNDP, USAID, Mercy Corp, DOPASI Foundation and others.
- Stop TB Partnership was established more than 10 years ago and has created a significant network of partners. Its activities consist of frequent coordination meetings, workshops and symposia focusing mainly on advocacy and reducing the stigma of the disease. Stop TB Partnership, along with DOPASI Foundation, are developing significant activities on community, rights and gender (CRG) in Pakistan.
- TB Program developed and produced national guidelines; it has issued various national guidelines' documents focusing on different areas of TB activities such as drug-susceptible TB cases' management, TB laboratory tests, childhood TB, PMTPT or infection control.
- TB Program has succeeded to implement a widespread TB laboratory network across the national territory, with 1,818 microscopy laboratories, 425 Xpert sites and 21 laboratories which perform culture and 3 laboratories which ensure DSTs. There is a reference TB laboratory (provincial reference laboratory) at the level of each province and a national reference TB laboratory (NRL) which coordinates and monitors all the TB laboratory activities carried out in the provinces and regions. The NRL has developed an outstanding technical expertise.
- Xpert testing, culture, drug susceptibility testing and TB laboratory quality control are proceeded within the NTP laboratory network under the leadership of the NRL.
- PTPs have initiated models of specimens' transport mainly in Punjab and Sindh Provinces. These models need to be evaluated, improved and then duplicated after adaptation to the local environment.

- TB Program has developed capacities to train important number of health care workers.
- TB Program has developed a strong experience in involving healthcare providers, practicing outside its network, in TB prevention and care efforts. It has developed various PPM models adapted to different categories of health care providers. In 2021, 38% of notified TB cases were reported by private GPs owing to the collaboration with NGOs which built linkages between TB Program and GPs. In addition, TB Program, in collaboration with DOPASI Foundation, established procedures of mandatory TB cases' notification involving private pharmacists; this experience contributed to reporting approximately 15,000 patients with TB drugs' prescription.
- The number of notified TB cases, nation-wise, increased by 23% between 2012 and 2021. The TB Program data show that its capacities to increase TB notification can reach 6.5% per year (ex.: between 2012 and 2016, Graph 8). In 2021 and 2022, the notification increased even by 24% per year (the 2022 data have not yet validated by WHO).
- TB treatment is provided in the BMUs' network; it is free of charge for all patients diagnosed with TB. Effective drug procurement and distribution mechanisms have been put in place. The treatment success rate is high at national level; it was constantly more than 90% since 2012. It reached 93 and 94% in 2020 and 2021 respectively. The treatment success rate of retreatment TB patients is also high (84% for the year 2020).
- The prevention and management of TB in children are fully integrated in TB Program strategy. The PPA fully collaborates with TB Program at national level, is member of the *Strategic and Technical Advisory Group* for TB and contributed to the preparation and development of the national childhood TB guidelines. Pediatricians are involved at province and region levels, in childhood TB cases' management in inpatient and outpatient settings. TB medicines for pediatric use are available in the health facilities dealing with TB cases' management.
- Significant efforts have been made in diagnosing and treating patients with drug-resistant TB. In 2021, 92 and 84% of bacteriologically confirmed new PTB and previously treated PTB cases were respectively tested for rifampicin resistance. The number of drug-resistant TB patients who were identified, in Pakistan, significantly increased from 888 in 2012 to 3,373 in 2021; the increase was nearly 3 times more during the last decade. Patients with a drug-resistant TB are registered, treated, managed and monitored in 32 PMDT sites where, in all of them, Xpert MTB/XDR testing can be performed. TB Program has recently established, in different districts, 10 decentralized treatment facilities for drug-resistant TB patients. The last cohort analysis of MDR/RR-TB treatment was established for the year 2019 and showed a treatment success rate of 73% while that of preXDR/XDR 67%. TB Program Central Unit is assisted in its efforts by a PMDT Coordination Committee.

- Collaborative TB/HIV activities are a full component of the TB Program strategy; coordination meetings between NTP and National HIV/AIDS Program (NAP) have recently started at national level. The proportion notified TB patients who were tested for HIV infection increased from 4% in 2012 to 52% in 2021. Every year the prevalence of HIV infection is most often less than 1%. The TB patients who are identified HIV-infected are referred to the closest HIV care sites where they are registered and receive ART. Slightly more than 60% the co-infected TB/HIV patients registered in 2021 received ART. All the PLHIV newly registered in HIV care facilities are systematically screened for TB. All TB/HIV are registered and treated for TB. In 2020, 82% of registered TB/HIV patients were successfully treated.
- Improving TB detection and services in high-risk groups and vulnerable populations is considered in the TB Program policy. TB services are appropriately ensured to Afghan refugees through the collaboration with the Ministry of State and Frontiers of Regions in Balochistan and KP Provinces. During the acute phase of complex emergency associated with the recent floods in Sindh and Balochistan, PTPs succeeded to preserve the access to TB services for the displaced persons with TB who needed to continue their treatment. Partners, such as Mercy Corp, have developed appreciable experiences in proceeding to systematic TB screening through the so-called “chest camps” in socially disadvantaged urban and sub-urban areas.
- Contact investigation, as a strategic intervention, has a high visibility in TB Program policy and among BMUs’ health staff. The information system needed for contact investigation activities is available and integrated into the TB Program information system. Its tools can appropriately collect, on routine basis, the required data to monitor the implementation of contact investigation activities and evaluate their outcomes. Contact investigation is at an early stage of implementation in Pakistan. Its inherent monitoring and evaluation tools are used by health staff, and have initiated a process of data collection which can be appropriately used.
- TB Program has succeeded to develop a strong PSM system owing to the financial support of GF and the technical assistance of GDF/WHO. There is generally adequate coordination among the relevant staff belonging to PTPs, districts and BMUs. TB Program has established different governance and coordination mechanisms with appropriate staff from the different levels, regularly getting together to review data and make evidence-based decisions. A booklet with permanent contact information of provincial, district and health facility level positions and staff has been issued and is in use at provincial and district levels. Teams also use social media, such as WhatsApp, for easy communication. Most of the supply chain has remained functioning despite COVID-19 pandemic and the recent floods. No major stock out of TB medicines has been reported.
- TB Program has successfully implemented a sound information system to monitor the implementation of TB activities and interventions and evaluate their outcomes.

This system uses the WHO-recommended definitions, registers and forms and covers all the NTP network. TB Program has also established a digital case-based system using DHSI2. This system is still being piloted and will be expanded in the BMUs.

- The TB Program recognizes CRG as a key intervention area that facilitates joint participation, engagement and decision making between communities, civil society, NTP and PTP.
- TB Program has succeeded to initiate capacity-building to undertake operational research activities for TB prevention, care and control in Pakistan.

2. Challenges

- Pakistan is over- dependent on international financial support, especially GF, including for TB medicines' procurement. There is an inadequate level of political commitment to tackle the problem of TB and effectively address it. The national health insurance scheme does not currently cover outpatient services, yet TB associated costs are largely outpatient-based. But, this implies that people with TB are not currently protected from incurring catastrophic expenditures.
- The salaries of many TB staff at the TB Program Central Unit in the CMU and at the provincial and district levels are covered by the GF. The role of TB Program Central Unit is to implement and monitor the TB interventions and activities financially supported by GF and not really to manage a national TB program. There are limited number of coordination platforms for TB response and no focal staff to coordinate key elements of the TB response such as PPM, childhood TB, joint TB/HIV activities or PMTPT at national and provincial level. There is no clarity on the number of dedicated persons that are needed to coordinate and drive the TB response at the national, provincial and district levels.
- The missions of TB Program Central Unit and PTPs/RTPs Units are not clearly defined and the number of the staff needed to conduct the TB activities at these levels is by far insufficient even though the available health professionals are somehow technically competent but can cover limited areas of TB work. As a result, the programmatic management capacities of TB program are not fully optimal to ensure effective strategic and operational planning, implementation, monitoring and evaluation of TB prevention, care and control interventions and activities.
- Although the notification of TB cases has significantly progressed during the last decade, slightly more than 50% of the estimated incident TB cases are identified and treated (56% in 2021 and much more in 2022). The process of identification and management of PTB seems selective. Indeed at national level, only 6 presumptive TB patients are assessed per notified PTB case (only 5 in 2022 preliminary data); in KP Province, it is even 5 presumptive TB patients per 1 PTB case; only Balochistan has a ratio of 14 presumptive TB patients per 1 PTB case. Many strategic interventions are not fully or not at all implemented to improve TB case notification.

- NTP developed and issued quite valuable national guidelines' document on drug-susceptible TB case management. However, this document is not fully in line with the new WHO recommendations such as the 4-month TB treatment course or does not cover appropriately the process of contact investigation implementation.
- The existing LHWs' network which provides basis health services in the communities is not involved at all in the provision of TB services, except somewhat in Sindh Province.
- The BHUs which constitute, with its 5,200 facilities, the first line of contact of PHC services with population are nearly not ensuring any TB services provision. Only, 2.4% of the BHUs available in Pakistan are involved in some forms of TB activities.
- During the last decade 48 to 52% of PTB patients are bacteriologically confirmed (51.8% in 2021 and 50% reported in the 2022 preliminary data). In addition, hardly 2.4% of EPTB cases were bacteriologically confirmed in 2021. This data strongly suggest that a non-negligible number of patients are falsely diagnosed and treated as PTB or EPTB cases.
- The algorithm specified in TB Program guidelines to set the bacteriological diagnosis is not fully respected in its utilization by health workers. Even though the number of functioning Xpert machines has increased to 475 in Pakistan, the bacteriological diagnosis of TB still relies on smear microscopy in many health facilities where Xpert testing is used mainly to identify rifampicin resistant in smear-positive TB patients.
- Furthermore, the number of Xpert machines is insufficient across the country to use Xpert testing as first test to set the bacteriological diagnosis of TB. Also, given the 230-million population size of Pakistan, the number of 1,818 TB microscopy laboratories may not be sufficient to cover the needs; in fact, the ratio per population is only 1 TB microscopy laboratory per 127,000 population.
- Sputum specimen transport has been implemented in some districts of Punjab and Sindh. Challenges are emerging, such as long duration to transport specimens, limited pick up times and high cost to cover all the needs in specimens' transport.
- It is estimated that up to 85% of the population seeks care in the private health sector. In 2021, 38% of notified TB cases were reported by only 7% of the 197,000 GPs practicing in Pakistan. It is clear that the expansion of PPM activities is by far not yet optimal. In addition, the access to Xpert testing is quite limited for the patients attending the private medical sector; indeed, only 33 Xpert machines have been implemented in private laboratories; preliminary data suggest that the rate of utilization of Xpert testing is much higher in the private sector than in public sector.
- NGOs, such as Mercy Corp, which are implementing PPM activities, pay 50 Rs. (0.22 US$) to private microscopy laboratories for sputum smear microscopy and 400 Rs. (1.80 US$), as incentive, to private GPs for TB notification and successful treatment. These payment rates have not been adjusted since 2014 and, in addition, the Pakistan Rupee has lost more than half of its value against the US dollar.

- Some private practitioners are reluctant to participate in the training provided by TB Program. As a result, their knowledge on the various aspects of TB prevention, care and control are not at the same level as TB Program health professionals.
- There are many private laboratories ensuring TB diagnosis services which have no linkages with TB laboratory network established by the TB Program and NRL.
- PMDT is managed as a separate project and fully funded by GF; this raises questions on country ownership and sustainability regarding PMDT in Pakistan. The access to PMDT services is still limited since there are only 32 PMDT sites and 10 decentralized treatment sites in a country with more than 150 districts. In spite of decentralizing Xpert machines to *tehsil* level and transport systems, many TB patients do not have access to Xpert testing. The persistence of low detection and late diagnosis of drug resistant TB will continue to lead to early deaths. In 2021, 3,373 drug-resistant TB patients were diagnosed and notified; they accounted for: i) 38% of the expected number of MDR/RR-TB cases among all notified TB patients and ii) only 18% of those who appear in general population. Among these 3,373, 15% did not receive any treatment with 2nd line TB drugs. Diagnosis and treatment of drug-resistant TB in children is very limited in Pakistan. Approximately 40% of rifampicin resistant-TB patients in Pakistan have fluoroquinolone resistance, already 5% have resistance to bedaquiline, which has only been used few years, and also to linezolid.
- Even though overall HIV testing has improved in TB patients because of the high level of HIV testing (74% in 2021) in Punjab which accounts for nearly 60% of TB cases' notification, the proportion of TB patients who are tested for HIV infection remains low in ICT and the provinces of Balochistan, KP and Sindh. Although, some form of coordination between TB Program and NACP has started at national level, there is nearly no collaboration between the 2 programs at province and district levels. For the time being, there is no process of joint planning established by TB Program and NACP. There is no information on the activities of TB screening in PLHIV registered and followed in the 52 HIV care facilities (ART Centres) available across the country.
- Even though contact investigation has a visibility in TB Program, it is poorly or not at all implemented because of inappropriateness of the available guidelines and, therefore, because of the lack of training of health workers.
- Except for PLHIV and household contacts exposed to index TB cases, there is no clear prioritization of high-risk groups that need to be systematically screened for TB. There is no criteria clearly identified in TB Program to undertake systematic TB screening through chest camps.
- For the time being the provision of TB services to high-risk groups and vulnerable populations is poorly developed, especially in the framework of a formal policy of TB Program.

- The sale of TB medicines is not regulated in the private pharmacies; they are sold over counter without any medical prescription.
- TB Program has succeeded to implement a well-functioning information system. It has also developed a case-based DHSI2 program to collect and analyze data on TB notification, the implementation of TB activities and their outcomes. However, this is not fully used because of limited computer infrastructure and poorly trained staff on computer use; in addition, the absence of internet in BMUs does not allow the use of this program on line. Overall, the NTP data are not analyzed in-depth to make specific decisions for improving TB services and to raise hypotheses for operational research.
- TB Program data suggest that in some provinces TB tends to be more notified in big cities. For example, 35% of TB cases notified in Balochistan are registered in Quetta while 25% of those notified in KP and Sindh are reported in Peshawar and Karachi respectively. TB Program has not yet developed a strategy to identify zones (or "hot spots") with a high TB burden for which innovative and specific TB prevention, care and control interventions need to be developed, implemented and evaluated for further readjustment and/or expansion.
- Appropriate national guidelines on PMTPT have been recently developed which focus mainly on PLHIV and household contacts with no clear prioritization for the other high-risk groups. They propose 3 regimens pour PTP and do not specify the regimen that must be used in Pakistan for PMTPT. These guidelines have not been yet printed and, therefore, are not available in TB Program network. Nearly no PMTPT activities are implemented.
- Given there is no clear national programs for diabetes, chronic respiratory diseases, or NCDs in general, TB program services have not established any linkages with the existing entities that provide health care services to patients with NCDs
- TB is highly stigmatizing disease in Pakistan. This has negative consequences on TB detection, care and preventive activities such as contact investigation and PMTPT. The lack of funding is a major obstacle to develop appropriate communication interventions regarding TB issues.
- There is limited understanding among NTP and PTP staff on the contributions of CRG approaches to end TB.

3. Opportunities

- The fight against TB is fully included in the Sustainable Development Goals of United Nations Organization.
- Pakistan, through its National Health Vision 2016 – 2025, has included UHC in its national agenda; TB Program should seize this opportunity to include TB services in the so-called "Essential Universal Health Coverage Package".

- The availability of the LHWs' network is a major opportunity for TB Program to bring TB services within the communities.
- The availability of entities to fight and alleviate poverty, such as *Alkhidmat* Foundation, Pakistan Poverty Alleviation Fund, BISP, *Sehat Sahulat* Programme or Pakistan's *Bait-ul-Mal* can provide support to TB Program of Pakistan and/or include in their social protection programs TB patients or some specific categories of TB patients, such as drug-resistant TB cases or women, children or elderlies affected with TB.
- There is an important upcoming opportunity for TB Program to apply for the next window of GF in the framework of the NFM-IV.
- In the current context of post-flooding reconstruction, foreign countries are funding or willing to financially support, in the affected areas, the rehabilitation of public services, including those for health. TB Program has the possibility to mobilize resources through this opportunity.
- A new regional grant might be launched by GF for after the ongoing multi-country grant which will end up in 2024 to enhance health care services for IDPs, returnees and refugees in Afghanistan, Iran and Pakistan.
- The current devolution process of administrative decentralization at provincial level can be an opportunity to refine specifically planning of TB services and to mobilize resources for TB prevention, care and control at the level of Province Government.
- There are many civil society organizations and NGOs dealing with specific issues within communities in Pakistan. Most of them are involved in various humanitarian and development actions with a focus on vulnerable people, including women. However, few of these NGOs are dealing with health issues. TB program can take the opportunity to build linkages with these entities to promote TB services within communities.
- There are many national and regional professional societies or associations for medical sciences in Pakistan. They are promoting, in clinical settings, sound and evidence-based medical care practices, including for respiratory illnesses. Many physicians, including those practicing in the TB Program network, are affiliated to these professional societies and associations. TB Program has not yet established a sound approach to ensure a steady involvement and collaboration of these professional societies and associations in promoting TB Program policies.
- There is, within MoNHSRC, the Department of International Relations which can help the CMU/TB Program Central Unit to identify funding opportunities as well as the channels to use for requesting financial support through bilateral or multilateral cooperation mechanisms that are available for Pakistan.
- The burden of HIV infection is very low in Pakistan (prevalence < 0.2%); in contrast to many countries, HIV infection is not fuelling TB burden. It is estimated that at most less than 5% of TB burden in Pakistan population is associated with HIV. In contrast to high

HIV burden countries, this is an opportunity for TB Program and NACP to improve and strengthen, in the best conditions, the collaborative TB/HIV activities in the Pakistan.

- There are programs established by the provincial Ministries of Health for maternal, new born, child and adolescent health (MNCAH) and reproductive health; their activities are implemented in all PHC facilities. These programs can collaborate with the TB Program to address the issue of TB in children, adolescents and women.
- COVID-19 surveillance funding gave to the country an opportunity to establish a viral genomic unit at the National Institute of Health, on the same location where the NRL is. Surveillance of drug-resistant TB can benefit from access to Next Generation Sequencing.
- The commitment to CRG approaches to TB in Pakistan has the potential for impact, if institutionalized.

4. Threats

- The recurrent political crisis at government level which results in changes within the MoNHSRC is a potential threat towards keeping TB high in the health agenda and prioritizing NTP/PTPs activities in Pakistan
- Because of the epidemiological transition in Pakistan, chronic diseases may have higher priority than TB in the national and provincial health agenda; therefore, domestic funds may be allocated more to non-transmissible diseases than to transmissible illnesses.
- The political situation is still volatile in the conflict-affected areas where an acute phase of complex emergency may occur. This will severely affect public services in general and health services, including those for TB, in particular. Such acute event may also happen if there is a deterioration of the political situation in Afghanistan which will result in an influx of refugees in the provinces on the border with this country.
- The occurrence of a new wave of COVID-19 pandemic is still possible and, therefore, may affect seriously the provision of TB services to population like in 2020.
- There is no regulation on TB medicines' sales in Pakistan which contributes to their sales over counter and therefore to reinforcing the occurrence of TB drug resistance.

IDENTIFIED GAPS

The main gaps in TB control in Pakistan are in political commitment, the organization of TB Program and its managerial capacities, the case finding in both adults and children, the bacteriological diagnosis, the prevention and management of drug resistance, the provision of TB services to high-risk groups and vulnerable populations and monitoring and evaluation.

Even though TB is considered in the political health agenda of the MoNHSRC and provincial ministries, the political commitment to end TB remains low as witnessed by the important lack of funding. Nearly no financially support is ensured by the Government at national level

and funding released through the regular budgets of Provinces' Health Ministries covers a part of the procurement cost of first line TB medicines and salaries of some health staff involved in TB activities. The development and implementation of TB Program interventions and activities are heavily dependent on international funding support, especially the GF. Even the salaries of many health staff of TB Program operating at national, provincial and district levels are covered by the GF grants.

Because of the lack of funding, there is no real central unit which leads and manage a national TB Program. The existing central unit of TB Program is only a component of CMU whose function is to monitor and manage only the activities financially supported by GF. As a result, the staff of the CMU have to prioritize the work of the GF rather than respond to national priorities. In addition, the existing TB Program Central Unit of CMU is by far under-staffed. The available staff cover hardly very few areas of TB work. In fact, there is no staff that can adjust TB Program policy and formulate interventions' strategies, develop guidelines and SOPs, establish strategic and operational plans, coordinate and monitor the implementation of key strategic interventions such as PPM, collaborative TB/HIV activities, PMTPT and others.

Even though some NGOs are involved in the implementation of TB activities, no coalition has been built in the framework of a multisectoral approach to fight TB in Pakistan. In fact, TB Program and its few partners have not yet defined a clear strategy to establish and roll out this approach. TB Program has not established a strategy to mobilize resources at national and international level (except from GF); it has not approached the existing mechanisms to alleviate poverty or promoting social protection in Pakistan; such mechanisms would include TB patients in their programs.

One of the major gaps is the low TB notification. After an increase of 6.5% per year between 2012 and 2016, TB case notifications stagnated and even sharply declined with the COVID-19 pandemic in 2020, before increasing in 2021 at the level of the year 2019, and then seemingly in 2022. The last WHO estimates highlighted that only 55% of incident TB cases were notified and put on treatment in 2021. In fact, many key strategic interventions have not been defined, developed or implemented by TB Program. There is a network of LHWs operating in communities which has not been involved in TB prevention, care and control except somewhat in Sindh Province. TB services are not implemented in the BHUs which are the most peripheral health facilities and represent the first point of contact of the public health system with the communities, especially in rural areas and socially disadvantaged settings. Moreover, 70 to 85% of the population seek care in the private health sector which includes 197,000 private GPs and 700 private hospitals. In 2021, 38% of notified TB cases were identified through the engagement of only 7% of the GPs. It is clear, there is a room for significantly improve TB case notification by involving private healthcare providers in TB prevention, care and control efforts. However, the TB Program has not defined a clear national strategy to engage all care providers nor established an appropriate mechanism,

such as a specific working group, which can provide a technical support to develop and implement this strategy.

The TB laboratories network is widespread across the national territory with its 1,818 microscopy laboratories, 424 Xpert sites, 21 culture laboratories and 3 DSTs' laboratories. Even though there has been, during the last decade, an increase in the implementation of Xpert machines, Xpert testing is used, in some health facilities, more for the identification of rifampicin resistance in smear-positive PTB cases who have been already identified than for the bacteriological diagnosis of TB. Furthermore, the access to bacteriological diagnosis remains sub-optimal, especially in the private health sector. Only 52% and 2.4% of PTB and EPTB cases respectively are bacteriologically confirmed. The private laboratories are not fully engaged with TB Program. There are only 33 Xpert machines implemented in the private health sector. Significant proportion of PTB cases identified in the private medical sector are not bacteriologically confirmed. Given, these low percentage of bacteriological confirmation, it is likely that a non-negligible number of patients are wrongly diagnosed and notified as TB cases. Moreover, the TB program has not issued any guidance on how to set the diagnosis and to manage EPTB.

Xpert testing would be used more efficiently if the existing specimens' transport system between BMUs and Xpert sites was efficient. Various models of transport system are used in provinces but none of them is fully efficacious. The TB Program has not yet attempted to design and implement a standardized and logistically coordinated model that can be used across the country.

No overall national strategy has been established to address the issues associated with TB in high-risk groups and vulnerable populations. The collaborative TB/HIV activities are somehow implemented without a clear national guidance; in addition, the coordination mechanisms are not fully functioning. Although, PLHIV are systematically screened for TB and the HIV screening in TB patients has significantly progressed, there is no information on TPT in PLHIV with no active TB. TB contact investigation has a high visibility in TB Program policy; but, this intervention is nearly not implemented and no clear guidelines have been developed to implement it. Except for detainees, there are no clear actions to promote TB services for high-risk groups and vulnerable population, including those living in socially disadvantaged urban and sub-urban areas of big cities.

National guidelines on PMTPT have been developed but have not been implemented. There is nearly no PMTPT services provided in the TB Program network.

Childhood TB accounted for a proportion of 13% among all the TB cases notified at national level in 2021. However, this proportion varies very much among provinces and regions. It represents 7 to 8% in Punjab where nearly 60% of all notified TB cases (and only 30% of all childhood TB cases) are reported; but, it accounts for more than 30% in GB Region and KP Province. In 2021, the children with TB represented 58% of TB cases notified in GB Region. These variations suggest that there are significant practice differences in establishing the

diagnosis of childhood TB. In GB Region and KP Province, many children with persistent diarrhea are considered and treated as childhood TB cases. The childhood TB guidelines that have been recently prepared have not been yet distributed to the health staff.

Although the number of drug-resistant TB patients who are identified and treated has increased during the last years, this number accounts for 38% of the estimated number of MDR/RR-TB cases in the total number of TB cases notified and for 18% of the estimated number in general population. In addition, the number of PMDT sites is limited at 32 since 2018 and has not increased since then.

There are various digital monitoring and evaluation programs besides the usual paper-based system, which creates some confusions, while the implementation of the case-based DSHSI2 program is still lagging even though the funding to do so is available. A model of mandatory TB case notification has been developed and tested with an NGO, but its implementation is also lagging because of administration and legal issues that need to be sorted out.

TB Program has not been pro-active in building linkages with other programs such as those dealing with maternal and child health and reproductive health, organizations promoting women status politically and socially or national and provincial programs focusing on alleviating poverty or on social protection.

RATIONAL BEHIND THE DEVELOPMENT OF THIS NATIONAL STRATEGIC PLAN

Pakistan is a high TB burden. WHO estimated, for the year 2021: i) a number of incident TB cases at 611,000 cases, with an incidence at 264 new TB episodes per 100,000 population, ii) a number of TB deaths at 50,100, with a mortality rate at 21.9 TB deaths per 100,000 population and iii) a number of MDR/RR-TB cases at 16,000 with incidence at 6.8 MDR/RR-TB cases per 100,000 population.

TB has always had a high visibility in the health agenda of the former and current Ministries of Health of the country. The fight against TB has been organized in the framework of a National Tuberculosis Program since July 2000. This program is structured with a Central Unit and a strong representation in each province and region through the PTPs and RTPs as well as in districts. TB interventions, including laboratory activities, are implemented within a network of more than 1,400 BMUs which covers the overall national territory. Pakistan has adopted all the strategies recommended by WHO for TB prevention, care and control, namely: DOTS Strategy as early as 1995, Stop TB Strategy in 2006 and End TB Strategy in 2016.

TB Program of Pakistan has made major efforts to build its technical capacities to detect and appropriately treat all the patients diagnosed with TB in line with the WHO recommendations, along with implementing a strong TB laboratory network. The recent epidemiological evaluation suggests that there is no clear decline of TB transmission in the population even though the incidence increases with the age in both genders and is very high in individuals aged more than 55.

The last WHO estimates highlight that: i) the TB mortality rate declined from more than 23 deaths per 100,000 population in 2015 to 21 deaths per 100,000 population in 2021 (nearly 9% decrease) and ii) only 55% of the estimated incident TB cases are diagnosed and treated (treatment coverage rate).

The treatment success rate is more than 90% since 2012; the last cohort analysis, established for the year 2020, showed a 94%-treatment success rate. If only 55% of the incident TB cases are diagnosed and among whom 94% are successfully treated (2020 cohort analysis, all new cases), then hardly 52% of the incident TB cases that appear in the general population are successfully treated and, therefore, may probably not die. But in that case, there is theoretically no significant impact of TB Program activities on TB mortality in Pakistan. However, if TB notification increases at no less than 80% and the treatment success rate is at 90% and above, then 72% of the incident cases would probably not die from TB in general population; thus, reaching a high treatment coverage and maintaining a high treatment success rate are likely to have an impact on declining TB mortality.

After highlighting this observation, TB Program must upgrade, strengthen and sustain the current momentum to ensure appropriate and sound diagnosis and treatment services. TB services need to be expanded in communities through the LHWs' network and in PHC facilities. TB Program should involve all care providers in the TB prevention, care and control efforts, reinforce the laboratory activities and focus on providing and strengthening TB services for identified high risk groups, including diabetes patients, detainees, refugees, IDPs, vulnerable groups, populations of urban or sub-urban TB "hot spots" areas.

TB Program has developed a non-negligible experience and expertise in managing MDR/RR-TB cases; this experience should be upgraded and strengthened in order to establish strong capacities to detect and appropriately treat drug-resistant TB patients. MDR/RR-TB patients have a high rate of mortality. Thus, increasing their identification and treating them successfully will contribute to declining TB mortality.

TB is the first cause of death in PLHIV, therefore the collaborative TB/HIV activities must be upgraded and sustained in order to reduce death from TB in PLHIV.

In line with the commitment made by Pakistan in the UNHLM (November 2018) to expand tuberculosis preventive treatment; this intervention should be implemented and extended. The PMTPT will contribute to preventing active TB occurrence in individuals who, therefore, will not die from TB. PMTPT is likely to contribute to reducing TB deaths in general population.

To ensure that the planned TB activities and interventions are appropriately developed and implemented to achieve the objectives of this NSP, the managerial capacities of TB program need to be strengthened, especially at central, province, region and district levels.

Pakistan has been confronted to situations of complex emergencies during the last four decades, such as waves of refugees from Afghanistan and earthquakes, typhons or flooding episodes; therefore, an acute phase of complex emergency may always occur. To cope with a such event, TB Program should take the required actions to maintain the essential TB services in the complex emergency-affected areas.

The objectives, strategic interventions and activities specified in this NSP are expected to contribute to achieving the goal of the national policy for TB prevention, care and control in Pakistan.

This NSP covers the years 2023 to 2026; it describes the operationalization of the strategic interventions and activities that need to be developed or implemented; it establishes the budget needed for these strategic interventions and activities; it specifies the indicators to be used for the monitoring and evaluation and it identifies the technical assistance needs.

It will be parallelly developed with and will strongly support the strategic plans for TB services that will be implemented in the provinces and regions.

GOAL AND OBJECTIVES

Goal: To reduce TB mortality rate by 35% in 2026 compared to 2015.

Objective 1: To increase the number of notified new TB episodes to at least 528,600 by 2026 and to maintain TB treatment success rate at more than 90% from 2024 onwards.

Objective 2: To increase the number of detected and treated of MDR/RR-TB cases from 3,373 in 2021 to at least 9,560 by 2026 and their treatment success rate to at least 80% from 2024 onwards.

Objective 3: To increase the proportion of notified TB cases with known HIV status from 52% in 2021 to at least 95% by 2026 and to treat 100% of identified TB/HIV with ART every year.

Objective 4: To improve and enhance TB prevention through i) tuberculosis preventive therapy of, at least, 80% of household contacts and PLHIV identified with no active TB in 2024 to 2026 and ii) strengthening infection control.

Objective 5: To improve and strengthen the governance and the programmatic management capacities for the provision of TB services at national, provincial and district levels.

Objective 6: To preserve the key TB prevention, care and control services in the areas in acute phase of complex emergency.

STRATEGIC INTERVENTIONS AND ACTIVITIES TO BE DEVELOPED AND IMPLEMENTED BY OBJECTIVE

Objective 1: To increase the number of notified new TB episodes to at least 528,600 by 2026 and to maintain TB treatment success rate at more than 90% from 2024 onwards.

TB Program services, in Pakistan, are making substantial efforts to detect TB patients, but the number of notified TB case remains low in comparison to WHO estimates; only 55% of the estimated number of TB cases were detected and administered treatment in 2021.
In Pakistan, there are approximately 90,000 LHWs who deliver, within communities, PHC services with a focus on reproductive, maternal, newborn and child health. The involvement of LHWs in the provision of TB services has significantly declined and become quasi nil, because of other health priorities (ex.: polio vaccination), except in Sindh Province where about 10,000 LHWs are collaborating with Sindh PTP.

The TB Program services are provided in more than 1,500 BMUs. BMUs are implemented in RHCs and in the various categories of hospitals (*tehsil* hospitals, district headquarter hospitals, tertiary level healthcare hospitals, parastatal hospitals, military hospitals). However, most of the BHUs, which are the most peripheral level health facilities and represent the 1st contact level of the communities with the public health system, are not ensuring any TB services. Among the 5,202 BHUs existing in Pakistan, only 124 (2.4%) are engaged in the provision of some TB services; therefore, 97.6% of the BHUs are not at all involved in the ongoing TB prevention, care and control efforts. TB Program has successfully engaged more than 6,400 private GPs who contributed to the identification of 38% of patients notified with TB in 2021. But, they represented only 7% of the total number of GPs practicing across the national territory.
Because of the insufficient engagement of many PHC facilities (BHUs), the weak involvement of the LHWs' network and the turn-over of health workers, many health staff operating at the peripheral level of health system are not appropriately or not at all trained on the process of identification and management of patients with presumable TB nor on the provision of TB treatment. The TB Program data have shown that on average one PTB case was diagnosed per six presumed TB patients identified and assessed; in KP Province, this ratio was even 1 PTB case for 5 presumed TB patients evaluated. This suggests that: i) the process of identification and assessment of patients with presumptive TB is quite selective and, therefore, ii) not all patients who seek care in PHC facilities and who need to be managed as presumptive TB cases are in fact not identified and not assessed for a possible TB.
Even though, the TB laboratory network has significantly expanded and is widespread across country, the TB laboratory services do not cover fully the needs. The ratio per population is only 1 microscopy laboratory per 127,000 population. There are only 475 Xpert machines operational in 424 sites for the whole country; most of them are installed in hospitals. Hardly 33 Xpert machines have been implemented in private health sector. The proportion of bacteriologically confirmed PTB cases is significantly low; it was 51% in 2021 (20.5% by smear

microscopy and 30.5% by Xpert testing). Only 2.4% of notified EPTB cases were bacteriologically confirmed in 2021. This suggests that the quality of TB diagnosis is likely sub-optimal and, therefore, some of the patients may have a false TB diagnosis.

Furthermore, it is important to highlight that no clear strategy targeting TB high-risk groups and vulnerable populations has been yet clearly defined, developed and implemented.

In order to improve TB detection, diagnosis and treatment services and their implementation in Pakistan:

- TB prevention, care and control activities must be strengthened and upgraded in communities through LHWs and in the PHC network;
- the identification and management of patients with presumptive TB should be improved in such way that the number of patients with presumptive TB increases from 1,647,587 in 2021 to 5,899,274 in 2026 and the proportion of bacteriologically confirmed PTB increases from 51% in 2021 to 80% in 2024;
- TB detection and treatment services need to target, in priority, high risk groups and vulnerable populations;
- The engagement of the care providers practicing in the other health sectors, especially the private health sector, needs to be upgraded and enhanced;
- the treatment must be easily accessible and provided to all patients who are diagnosed with TB in order to ensure their cure.

This Objective 1 will be achieved through the development and implementation of the following strategic interventions and activities:

1.1 Revising and updating policy and TB Program guidelines in line with the WHO recommendations

1.1.1 To revise and update the TB Program policy

1.1.1.1 To organize a 2-day meeting to revise and update the national policy on TB prevention, care and control in Pakistan on the basis of the most recent WHO recommendations. The relevant TB Program staff and key partners will attend this meeting.

1.1.1.2 To prepare the document on the revised and updated national policy on TB prevention, care and control in Pakistan based on the discussions held in the 2-day meeting. This document will be prepared by CMU/TB Program Central Unit staff.

1.1.1.3 To ensure that the policy document is validated by the *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan.

1.1.1.4 To print, by PTPs and RTPs, copies of the policy document; the copies will be widely distributed to all NTP and PTP staff and partners. A copy will be put on the website of the MoNHSRC.

1.1.2 To revise and update TB Program guidelines

The current TB Program guidelines' document needs to be revised and updated. The revision and update of the NTP guidelines document will briefly describe all the components of the TB Program strategy, the organization and management of TB Program network at national,

province and district levels; the document will provide comprehensive details on the identification and management of patients with presumptive TB, the TB diagnosis procedures, the prescription and follow-up of TB treatment, the monitoring and evaluation procedures that need to be used. Specific sections will summarize actions that need to be considered in collaborative TB/HIV activities, PMDT, childhood TB case management, TB contact investigation, programmatic management of TPT, infection control, drug management at province, district and health facility levels and other aspects inherent to TB prevention and control in Pakistan that need to be carried out by health workers irrespective of the health sector.

1.1.2.1 To revise and update the TB Program guidelines by a national consultant

1.1.2.2 To organize a meeting to validate the new TB Program guidelines by the *Strategic and Technical Advisory Group* for TB prevention, care and control.

1.1.2.3 To print, by PTPs and RTPs, copies of the new TB Program guidelines document.

1.1.2.4 To widely distribute the TB Program guidelines' document and to put it on the website of MoNHSRC.

1.1.3 To issue the required training material to implement the new TB Program guidelines

1.1.3.1 To develop, by the national consultant, the required training material to implement the newly reviewed and updated TB program guidelines.

1.1.3.2 To print this training material by PTPs and RTPs.

1.2 Involving the existing LHW network in TB services' provision

As highlighted above, there are about 90,000 LHWs who has not been fully engaged in the efforts of TB Program. They are operating in communities, constitute the first point of contact of the health system with the population and, therefore, can facilitate the access to TB services for the population.

LHWs used to be involved in the provision of TB prevention and care services; but, their role nearly stopped in most of the provinces and regions because of the emergence of other health priorities. Guidelines to be specifically used by LHWs were developed, with its inherent training material, by the NTP Central Unit.

The existing LHW network is, currently, almost not contributing to TB services provision. The last two joint reviews of TB Program of Pakistan, carried out in February 2019 and November 2022, strongly recommended that LHWs must be involved in the ongoing TB prevention, care and control efforts in order to make TB services accessible to population.

Therefore, the following actions will be undertaken:

1.2.1 To organize, by CMU/TB Program Central Unit, a 2-day meeting involving PTPs, RTPs and the Departments in charge of LHWs of the Ministries/Departments of Health of provinces and regions to discuss how the re-initiate the integration of specific TB services into the health services package offered to the population through LHWs. A document will be prepared in this meeting specifying the actions that will be taken by PTPs and RTPs and by the Department in charge of LHWs.

1.2.2 To establish a memorandum of understanding between PTP/RTP and the Department of Health in each province and each region in order to formalize the collaboration between these two entities regarding the integration of TB services into LHWs' activities.

1.2.3 To revise and update the previous LHWs guidelines document and its inherent training material by a national consultant in collaboration and coordination with the relevant staff of the Directorate General of Health. The revised and updated guidelines should be based on and consistent with the new national TB Program guidelines. These guidelines will support TB services' activities at community level and should specify:

- the health education messages that LHW should convey to patients and their family members,
- how to identify presumptive TB patients,
- how to collect and ensure appropriate specimens' transport to the relevant TB laboratory,
- how and when to refer presumptive TB patients to the appropriate health facility,
- the accurate role of LHW in TB treatment management and follow-up of patients,
- how to carry out the direct supervision of TB treatment,
- how to check whether a patient on TB treatment was tested for HIV infection,
- how to identify and refer to BHUs or BMUs contacts exposed to index TB cases,
- how to contribute to the provision of PMTPT,
- how to support and follow a patient treated for drug-resistant TB patient who is still on treatment,
- how to catch back TB patient who interrupted her/his treatment,
- when to refer to the relevant BHU or BMU a TB patient who is still on treatment,
- when and how to communicate with BHUs or BMUs,
- the inclusion of issues associated TB in the list of the topics that should be covered in the discussions held in the meeting of villages' committees organized for women and for men and
- others.

1.2.4 To develop by the national consultant the required training material needed for LHWs' training. This training material will be printed by the PTPs and RTPs.

1.2.5 To print, by PTPs and RTPs, copies of the revised and updated guidelines' documents on the involvement of LHWs in TB services' provision as well as copies of the training material.

1.2.6 To develop a simple document including the key health education messages to be provided by LHWs to TB patients and their family members. This document will allow the standardization of the messages to be conveyed. It will be prepared by the staff of CMU/TB Program Central Unit and printed in each province and region (No cost expected).

1.2.7 The actions that need to be taken to implement LHWs are detailed in the **attached PSPs' of the provinces and the RSPs of the regions**.

1.2.8 To evaluate at national level the outputs of LHWs' actions through the following indicators:

- Number of presumptive TB patients identified,
- Number of TB cases detected,
- Number of TB patients successfully treated,
- Number of household contact investigation carried out.

1.3 Improving and expanding the identification and management of presumptive TB patients in all public health facilities, including PHC centers, hospitals and others

The detection of TB cases intimately depends on the identification and management of patients with presumptive TB who seek care in PHC facilities, especially those which are the most peripheral in the health system. In Pakistan, the BHU network is widespread across the national territory; BHUs are the most peripheral health facilities and are in close contact with communities. However, as highlighted above, only 2.4% of the 5,202 BHUs available in the country are engaged in some form of TB activities. The last two reviews of TB Program strongly recommended the need for the involvement of PHC facilities in TB services' provision.

There is also urgent need to establish new BMUs at all levels including in selected BHUs and in outpatient departments of hospitals. Obviously, these efforts imply important training interventions that will target medical officers and paramedical staff practicing at all health care levels.

After training of health workers, the activities used to identify and manage patients with presumptive TB will be systematically monitored and assessed in all the supervision visits carried out in the health facilities of provinces and regions, through the following indicators:

- the number of patients who seek care for respiratory symptoms in PHC and district health facilities (HMIS Register);
- the number of patients with presumptive TB who are identified in the health facilities (Register of Patients with Presumptive TB)
- the number of patients with presumptive TB who are assessed for TB (CXR register and/or Laboratory Register for TB Microscopy and Xpert MTB/RIF)

- the proportion of bacteriologically confirmed TB cases among patients with presumptive TB who are assessed for TB (Laboratory Register for TB Microscopy and Xpert MTB/RIF)
- the proportion of PTB cases who are bacteriologically confirmed (TB Treatment Register).

The **attached PSPs and RSPs** describe in details the interventions and activities that will be undertaken to improve, enhance and sustain the provision of TB services through the involvement of PHC network and through all the categories of hospitals in the provinces and regions. (**For the details look at the PSPs and RSPs**)

To strengthen and sustain adequate coordination of TB services in hospital environment, a position of hospital TB liaison officer will be established in all hospitals; to this end, the following action will be taken at national level by the CMU/TB Program Central unit:

1.3.1 To develop, by CMU/TB Program Central Unit, guidelines to ensure appropriate coordination TB services within and outside hospital settings, especially with BMUs and PHC facilities. These guidelines will help the hospital TB liaison officer carry out her/his coordination activities among all the stakeholders interfering in TB services provision and interacting with TB patients within and outside hospital settings.

1.4 Improving and strengthening X-ray use, including digital X-ray

The network of digital X-ray is not developed in Pakistan and not easily used for patients with presumptive TB. X-ray is highly needed for its contribution to the diagnosis of childhood TB, the clinical evaluation of presumptive TB patients with no bacteriological findings and the assessment of patients with post-TB lung disease.

Many activities of active TB screening are expected to be undertaken during the years covered by this NSP and the PSPs and RSPs and for which digital X-ray equipment is highly needed.

To this end, all the provinces and regions are planning to acquire additional digital X-ray machines to strengthen their respective X-ray network. The PTPs and RTPs have specified their need in their PSPs and RSPs.

Details are included in the **attached PSP and RSP** of each province and region respectively.

1.5 Strengthening the existing TB diagnosis capacities and upgrading TB laboratory network

1.5.1 To revise and update the existing national guidelines, algorithms and SOPs on TB laboratory activities in 2024 and 2026:

The revised and updated version will include guidelines on TB microscopy, Xpert testing, culture, TB drug susceptibility testing, quality management (including EQA), laboratory biosafety, and equipment maintenance and others.

1.5.1.1 To revise the existing national TB laboratory guidelines' document in line with the most updated WHO guidelines; it will include all the aspects highlighted above. This revision will be undertaken by senior staff of NRL in 2024 and 2026.

1.5.1.2 To prepare, by NRL staff, updated TB diagnostic algorithms and SOPs in 2024 and 2026 based on the revised and updated national TB laboratory guidelines.

1.5.1.3 To widely distribute, through internet, the revised and updated national TB laboratory guidelines to the staff practicing in the provincial and regional TB laboratory networks, partners and academic institutions (medical and nursing schools) in 2024 and 2026.

1.5.1.4 To widely distribute the revised and updated SOPs and algorithms to the staff practicing in the provincial and regional TB laboratory networks in 2024 and 2026.

1.5.1.5 To put on the website of MoNHSRC, the new versions of the national TB laboratory guidelines as well as the new SOPs and algorithms, as of 2024 and 2026.

1.5.2 <u>To expand and strengthen the Xpert testing use</u>

The NTP laboratory network presently includes 600 Xpert machines (475 installed in 424 Xpert sites, 125 in process of installation); 33 of them have been installed in the private health sectors. This NSP aims at increasing the number of notified TB cases and improving the quality of TB diagnosis, and, therefore, enhancing the bacteriological confirmation. In addition, only 21% of MDR/RR-TB cases estimated in general population of Pakistan were identified in 2021; it is planned to, at least, double this percentage by 2026 in Pakistan. To reach this objective, the Xpert testing will drastically increase. The PTPs and RTPs are planning to acquire additional Xpert machines and to improve and sustain Xpert testing activities while ensuring good quality services.

The actions that will be taken to upgrade Xpert testing in the provinces and regions are detailed in their **respective attached PSPs and RSPs**.

However, the following interventions will be undertaken at national level, and specified in this NSP, to reinforce and bolster the quality of Xpert testing activities:

1.5.2.1 To implement EQA for Xpert testing:

1.5.2.1.1 To develop a guidance policy document including relevant SOPs with the technical assistance of an international consultant in order to build capacities for the preparation and validation of EQA panels for Xpert testing.

1.5.2.1.2 To pilot the process of preparation and validation of EQA panels in 4 districts in each of the 4 provinces and in 2 districts in each of the 3 regions.

1.5.2.1.3 To evaluate the outcomes of the districts piloting of the process of preparation and validation of EQA panels.

1.5.2.1.4 To organize one training workshop to develop provincial technical capacities to prepare, implement and evaluate EQA panel testing for Xpert testing. This workshop will take place in the NRL and will involve 12 participants and 2 facilitators.

1.5.2.1.5 To roll out the EQA process for Xpert testing by ensuring the transport of the EQA panels from NRL and PRL to Xpert sites.

1.5.2.1.6 To ensure the monitoring and evaluation of the EQA activities for Xpert testing.

1.5.2.2 To organize one training workshop per year for the provincial trainers regarding Xpert testing and microscopy. The workshop will take place in the NRL and involve 12 participants from the provinces.

1.5.3 To Improve and enhance TB microscopy activities (including EQA)

The TB microscopy laboratories' network has significantly expanded in the last decade. It currently includes 1,818 laboratories; of which 542 are in the private health sector. The ratio per population is only 1 microscopy laboratory per 127,000 population. The provincial and regional TB programs are planning to improve and strengthen their TB microscopy activities by increasing the number of microscopy laboratories, reinforcing the training of the laboratory staff, expanding and enhancing the existing quality control system, ensuring the required supplies to carry out appropriate TB microscopy activities, undertaking the necessary supervision of microscopy activities, ensuring appropriate monitoring and evaluation of these activities, and others.

The interventions and activities that will be carried out to improve and reinforce TB microscopy activities in 2024 to 2026 are specified in the **attached PSPs of the provinces and RSPs of the regions**.

1.5.4 To enhance culture activities for TB

Culture is mainly used for the bacteriological monitoring of treatment management of drug-resistant TB patients. It is also used to establish TB diagnosis in patients with presumptive TB in whom Xpert testing is not conclusive, especially in EPTB cases. Culture is presently performed in 21 TB laboratories, as follows: 8 in Punjab, 8 in Sindh, 2 in KP, 1 in Balochistan, 1 in AJK and 1 in Gilgit-Baltistan. The newly revised and updated TB laboratory guidelines' will include a joint document on culture and DST testing. This document and its inherent SOPs and algorithms will be made available for all the staff performing culture and DST activities including those belong to the other health sectors. The TB programs of provinces and regions are planning to reinforcing culture activities through implementing new culture laboratories, training of the required staff, supplying in consumables needed to carry out appropriate culture activities, ensuring calibration, maintenance and reparation of culture laboratories' equipment and improving the monitoring and evaluation of culture activities.

These activities are specified in the **attached PSPs of the provinces and RSPs of the regions**.

1.5.5 To strengthen capacity for universal drug susceptibility testing

DSTs are carried out in the PRL of Punjab, KP and Sindh and in the NRL. They are not yet performed in the PRL of Balochistan because of the instability of power influx and the incompatibility of the voltage. Capacity of new drug DST is currently available only at NRL which covers the need of all provinces along with ICT, AJK and GB regions. In all the laboratories, the DSTs are performed for 1st and 2nd line TB medicines on liquid and solid mediums.

The TB programs of provinces and regions are planning to expand and decentralize DST activities in order to increase and strengthen PMDT activities in their respective provinces and

regions, through including DST services in existing culture laboratories, acquiring new and additional equipment to perform DSTs, hiring new laboratory staff, ensuring the training of laboratory staff, procuring regularly the consumables necessary to undertake DSTs and to ensure the calibration, maintenance and reparation of the equipment and material.

These activities are specified in the **attached PSPs of the provinces and RSPs of the regions**.

To support and ensure the quality of the DST activities to be performed in the provinces, the following interventions will be conducted at national level by the NRL:

1.5.5.1 To revise and update the DST guidelines; these guidelines and the culture guidelines will be included in one document (cost covered in activity 1.5.1).

1.5.5.2 To organize initial training on DSTs for the laboratory staff newly appointed to ensure DSTs' activities in the province.

1.5.5.3 To organize refresher training on DSTs for 6 to 8 laboratory staff every year.

1.5.5.4 To organize initial training, for laboratory staff, on new laboratory technics and on testing new TB medicines.

1.5.5.5 To ensure the EQA of the DSTs carried out in the laboratories.

1.5.5.6 To ensure, every year, the supervision of the laboratories with DST activities along with the provision of on-site technical assistance.

1.5.5.7 To ensure, from the NRL, a remote technical assistance to the laboratories performing culture and DSTs.

1.5.5.8 To acquire 6 ultra-low freezers (-80^{0}C): 2 for the NRL and one for each of the four PRLs.

1.5.6 <u>To ensure the biosafety and infection control within TB laboratory network</u>

Biosafety in the NRL

The laboratory biosafety is the process of applying a combination of administrative controls, containment principles, practices and procedures, safety equipment, emergency preparedness, and facilities to enable laboratory staff to work safely with potentially infectious microorganisms. Biosafety also aims at preventing unintentional exposure to pathogens or their accidental release. Good laboratory practice in laboratories associated with good microbiological techniques is an essential component of TB laboratory biosafety to minimize the generation of infectious aerosols and prevent laboratory acquired infections.

Guidance is needed in addition to GLP on minimum requirements for performing different types of testing in the TB laboratory.

1.5.6.1 To hire a dedicated and full-time biosafety officer to ensure implementation of the biosafety in NRL. The biosafety officer will train and retrain staff in safety and ensures that safety practices are being carried out correctly, implements and maintains a safe work environment for all staff.

1.5.6.2 To upgrade negative pressure systems in biosafety level (BSL)-II and III containment room consistent with international standard.

1.5.6.3 To refurbish the BSL-III containment rooms with a building management system to control and monitor the large energy-consuming systems such as HVAC (heating, ventilation and air-conditioning), lighting, fire and security systems in NRL.

1.5.6.4 To ensure an annual certification of biosafety cabinets and BSL-III containment room

1.5.6.5 To cover the infrastructure maintenance cost of the NRL.

1.5.6.6 To build the capacity of NRL Biomedical engineer for certification of biosafety cabinets (BSCs) by training.

1.5.6.7 To ensure an adequate health surveillance for all the laboratory workers of the NRL; for new staff at time of enrolment, after any biohazard incident and at the onset of TB symptoms.

1.5.6.8 To ensure safe infectious waste disposal by installation of environmentally friendly incinerator.

1.5.6.9 To ensure an annual certification of the incinerator from certified laboratory of EPA (environmental protection agency).

The TB Programs of provinces and regions are planning to reinforce the infection control measures in 2024 to 2026. The equipment and consumables needed, to this end, are clearly specified **in their attached PSPs and RSPs**.

1.5.7 To ensure specimens' transportation

Specimens' transportation is an important mechanism to make TB diagnosis services accessible. It is highly needed between BMUs and Xpert sites and between Xpert sites and culture and DST sites. To improve and strengthen the specimens' transport, the following actions will be taken:

1.5.7.1 To develop, by the NRL, a training material for specimen collection, storage, packaging and safe transport of specimen.

1.5.7.2 To organize, by the NRL, a training of trainers on specimen collection, storage, packaging and transport.

1.5.7.3 To ensure the training on infectious substance shipment/DGR (Dangerous good registration) of NRL staff to sustain capacity of NRL.

1.5.7.4 To procure adequate quantity of cold transport boxes, temperature logger for specimen transport.

The TB Programs of provinces and regions provide, in their **respective attached PSPs and RSPs**, details on the number of necessary cool boxes and the number of specimens that need to be transported.

1.5.8 To improve and strengthen TB laboratory network information system

The information system used in the TB laboratory network of TB Program is in line with the WHO recommendations. More than 90% of the Xpert sites are connected through the GeneXpert Alert system. The NRL has developed and provided to the provinces and regions the software for Laboratory Information Management System (LIMS); but, its implementation is still lagging because of the lack of computers and the weak proficiency of the users or it is in the process of implementation.

1.5.8.1 To enhance the Laboratory Information Management System (LIMS) for NRL and culture and DST laboratories. The NRL implemented, in 2016, a cloud-based Laboratory

Management system for managing data for culture and DST laboratories. The system is currently functioning but needs to be upgraded to provide facility to referring sites to electronically enter information in requested forms, use bass codes and track specimen and receive web-based report. For up gradation, software will be updated with provision of tablets, barcode printers, barcode readers, data buckets, stickers etc.

1.5.8.2 To ensure real time monitoring of the diagnostic devices:

More than 90% of the Xpert machines installed in TB laboratory network are remotely connected to central server in 2021 using GeneAlert Platform. GeneAlert, is a medical device software that collects data from GeneXpert machines and shares it with relevant health staff and alert message is generated when drug resistant TB is detected by the GeneXpert machine. The intervention is aimed to reduce time to treatment by getting patients enrolled earlier and also provides real-time and complete disease surveillance and monitoring capabilities. By the end of 2021, GeneAlert was installed in 323 Xpert sites out of 390. NTP plan to expand connectivity to cover all existing and new machines planned for 2023-26

The TB Programs of provinces and regions provide, in their **respective attached PSPs and RSPs**, details on the actions that need to be taken, in terms of training and equipment, to improve the TB laboratory network information system and its utilization by the users.

1.5.9 To ensure the reparation and maintenance of laboratory equipment

1.5.9.1 To establish a service contract for equipment reparation and maintenance.

1.5.9.2 To establish an annual service contract for automated liquid culture and DST equipment (MGIT) including calibration kits.

1.5.9.3 To maintain a service contract with manufacturer for calibration, service and maintenance of GeneXpert machines.

1.5.9.4 To ensure a certification of air handling units.

1.5.10 To enhance the core capacities of the NRL by implementing quality management system (QMS)

1.5.10.1 To ensure the international accreditations of the NRL regarding TB microscopy, culture and DST. The NRL infrastructure and negative pressure system will be upgraded and equipment maintenance will be sustained. However, the technical assistance of an international expert will be ensured for at least 1 month. This expert will provide technical support to NRL staff in order to be accredited according to the ISO15189 norm.

A key intervention to strengthen laboratory services is the implementation of a QMS which is defined by the International Organization for Standardization (ISO) as the "management system to direct and control an organization with regard to quality". National TB Reference laboratory is in the process ISO 15189 certification in this regard a training was conducted, with a support from USAID

1.5.10.2 To appointment a full-time quality officer at the NRL

A dedicated and full-time quality officer will be hired for quality-related activities. She/he will ensure that all policies, processes and procedures contained in the laboratory quality manual are implemented and maintained. She/he will train all staff in QMS, as outlined in the laboratory quality manual.

1.5.10.3 To participate in Annual External Quality Assessment /PT programme (EQA)

For ISO certification it is mandatory that NRL maintains proficiency in all tests performed in the laboratory with documented evidence from participation in EQA for all test including AFB microscopy, Xpert testing, culture, phenotypic and genotypic drug susceptibility testing. In this regard, the NRL is regularly participating in the annual proficiency testing scheme for DST conducted by WHO collaborating center which will be continued. EQA panel will be procured form certified ISO 17043 panel providers for proficiency testing of smear microscopy, GeneXpert testing and culture.

1.5.10.4 To assist in establishing proficiency of provincial laboratories:

1.5.10.4.1 To organize on annual basis, by the NRL, a proficiency testing for smear microscopy, Xpert testing, culture for provincial laboratories.

1.5.10.4.2 To train the PRLs to conduct EQA for smear microscopy and Xpert services for districts laboratories.

1.5.10.4.3 To undertake bi-annual supervisory visits of all PRLs.

1.5.11 To strengthen human resource development for the NRL and TB laboratory network:

1.5.11.1 To sustain trained skilled staff in the NRL.

1.5.11.2 To develop the capacity of NRL in laboratory management (cost covered in activity 5.1.6).

1.5.11.3 To develop capacity of Provincial staff in laboratory management (cost covered in activity 5.1.6).

1.5.11.4 To develop a human resource development plan for TB diagnostic network including TORs, qualification, job description, retention, risk allowance and career development.

1.5.12 To strengthen the surveillance capacity for anti-TB drug resistance:

With the financial support of USAID, a protocol for sample size has been established and a drug resistance survey (DRS) protocol has been developed. Furthermore, six sites will be established for sentinel surveillance of ongoing resistance to isoniazid and fluoroquinolone in rifampicin sensitive patients.

The sequencing capacity at the National Institute of Health (NIH) of Pakistan will be strengthened through the C-19RM grant.

1.5.12.1 To conduct a national DRS.

1.5.12.2 To develop sequencing capacity for *Mycobacterium tuberculosis* (MTB) at central level. The NRL, in collaboration with NIH Pakistan, will develop and implement sequencing capacity for MTB.

1.5.12.3 To strengthen capacity for drug resistance surveillance by establishing a sentinel surveillance in selected sites across country (covered in intervention 2.9 under Objective 2).

1.6 Improving the management of EPTB cases.

The number of patients with EPTB notified at global level, between 2012 and 2021, has increased by 8% per year because of an increase in EMR, SEAR and WPR countries[72]. They account for approximately 15% of TB cases reported to WHO. The highest proportion of notified EPTB cases is 24% in both EMR and SEAR in 2021. The most frequently affected extrapulmonary tissue and organs are lymph-nodes and pleura, followed by joints; however, some forms of EPTB are life-threatening, namely TB meningitis and TB pericarditis; others may have major adverse physical and/or functional consequences, such as back-bone TB (Pott disease) which can results in neurological deficiencies or genital TB in women in whom it can leads to infertility. It is believed that bovine TB is associated with some forms of EPTB, especially lymph-node TB. It is admitted that where intensive dairy production is most common, notably in the milksheds of large cities this problem is exacerbated because of inadequate veterinary supervision, as it is the case in many developing countries.

In Pakistan, the proportion of EPTB cases notified in the last decade has been relatively stable and fluctuating between 18 and 20% every year. However, the national TB Program guidelines do not clearly specify how the diagnosis EPTB should be established and how to deal with some issues such as the paradoxical reactions during or after the treatment (mainly in lymph-node and pleural TB).

It is unclear how the diagnosis of EPTB is set by health workers in the TB Program network of Pakistan. The last TB Program data (2021) have shown that only 2.4% of notified EPTB are bacteriologically confirmed. It is likely that a certain number of EPTB patients are falsely diagnosed with TB.

Actions need to be taken at national level by CMU/TB Program Central Unit to address the lack of adequate national guidance on how to establish the diagnosis of EPTB and how to ensure sound treatment management of the concerned patients.

To this end, the following actions will be taken:

1.6.1 To improve the process of diagnosis and management of EPTB cases:

1.6.1.1 To hire a national consultant to conduct the following planned activities:

1.6.1.2 To undertake, by the national consultant, a descriptive study on the current EPTB notification in Pakistan. The study will describe the trend over time of the frequency of notified EPTB cases across the country and its distribution by forms, bacteriological status, gender, age groups, provinces, districts, HIV status, administrative status and others.

1.6.1.3 To organize a 1-day meeting with the members of the *Strategic and Technical Advisory Group* for TB prevention, care and control as well as with relevant members from

[72] Personnal data based on the WHO data for the years 2012 to 2021.

national academic institutions and professional medical associations or societies (including veterinary institutions). It will be facilitated by the national consultant. The results of the study specified above will be presented and discussed. Then, during the meeting an *ad hoc* committee to address the issue of EPTB diagnosis and management will be established under the umbrella of the *Strategic and Technical Advisory Group*.

1.6.1.4 To develop, by the *ad hoc* committee, a protocol to study the procedures currently used for the diagnosis and management of EPTB cases in Pakistan. This committee will be under the leadership of the national consultant and CMU/TB Program Central Unit.

1.6.1.5 To undertake the study on the procedures used to diagnose and manage EPTB. The study will be carried out under the supervision of the national consultant and CMU/TB Program Central Unit.

1.6.1.6 To organize a 2-day national workshop on procedures used to diagnose and manage EPTB. In the workshop, the results of the study will be presented and discussed and a national guidance document will be outlined. The workshop will last 2 days and facilitated by the national consultant.

1.6.1.7 To develop, by the national consultant, the national guidance document on the diagnosis and management of EPTB based on sound and standardized criteria. The document should include: i) general principles to diagnose and manage EPTB cases and ii) the process of diagnosis and management by form of EPTB, namely the most frequent forms (lymph node TB and pleural TB), the life-threatening forms (meningitis TB and pericarditis TB) and the forms which may results in adverse physical or functional consequences, (back bone TB, genital TB particularly in young women, peritoneal and intestinal TB). The document should clarify the issues associated with treatment management of EPTB cases; it should also define the indicators that should be monitored and evaluated on routine basis for EPTB notification.

1.6.1.8 To organize a 2-day meeting with the members of the *ad hoc* committee and *Strategic and Technical Advisory Group* in order to finalize and validate the national guidance document on the diagnosis and management of EPTB in Pakistan. The finalization of the document will be carried out by the national consultant.

1.6.1.9 To print 4,000 copies of the national guidance document on the diagnosis and management of EPTB.

1.6.1.10 To distribute the copies of the national guidance document on the diagnosis and management of EPTB. This document will also be put on the website of MoNHSRC.

1.6.1.11 To monitor and evaluate, through the information system of TB Program, the indicators specified in the national guidance document on the diagnosis and management of EPTB.

1.6.2 To tackle the issue of bovine TB

1.6.2.1 To establish a collaboration partnership between CMU/TB Program Central Unit and the relevant national veterinary institutions (ex.: University of Veterinary and Animal Sciences – Lahore) regarding the prevention and control of bovine TB.

1.6.2.2 To hire an international consultant to conduct the following planned activities:

1.6.2.3 To organize a 2-day national meeting on bovine TB. Will be invited 30 participants from the key departments of MoNHSRC, Ministry of Agriculture, Agronomic institutions, veterinary institutions, academic health sciences' institutions such as medical schools and colleges. This meeting will be facilitated by the international consultant (see activity 1.6.2.2).

1.6.2.4 To prepare a guidance document on the strategic orientations to fight bovine TB and its impact on population in Pakistan. This document will be developed on the basis of the discussions held and conclusions reached in the national meeting (see activity 1.2.6.3)

1.6.2.5 To establish between the MoNHSRC and the Ministry of Agriculture a collaboration protocol for the prevention and control of bovine TB in the population of Pakistan.

1.6.2.6 To define in collaboration with the key veterinary institutions and the Ministry of Agriculture the operational research orientations inherent to prevent and control bovine TB.

1.6.2.7 To undertake in collaboration with the Ministry of Agriculture and veterinary institutions a national survey on the prevalence of anthropo-zoonotic forms of EPTB with the sequencing of *Mycobacterium* strains involved.

1.6.2.8 To define and field test innovative interventions for the prevention and control of bovine TB.

1.6.2.9 To evaluate the field-testing of these innovative interventions.

1.7 Involving all care providers

There are various categories of health care providers who practice outside the TB Program network in Pakistan. The private health sector is huge and unregulated; it includes 197,000 private GPs, 700 private hospitals and 67,500 private pharmacies. Obviously, such capacity resources play a major role in delivering care services; it is estimated that up to 85% of the population seeks care in the private sector. Health care services are also delivered through NGOs such as PATA, Aga Khan Association or *Alkhidmat*. Non negligible proportion of the population seeks also care in the parastatal hospitals of corporate health sector.

The involvement of care providers operating outside the TB program network is a fundamental component of the national strategy for TB prevention, care and control in Pakistan. TB Program has developed a significant experience in implementing the PPM approach which was initiated in 2005 and started to be extended in 2009. TB Program developed 5 models: i) PPM 1 which focuses on engaging private GPs, ii) PPM 2 which targets health facilities of NGOs, iii) PPM 3 which deals with private hospitals, iv) PPM 4 which considers parastatal hospitals and v) PPM 5 which focuses on private pharmacies.

In 2021, 38% of TB cases reported in Pakistan were notified by only 7% of the 197,000 private GPs and 5% by 10% of the 700 private hospitals. It is clear that the private sector has a great potential in tremendously improving TB notification in Pakistan.

PPM approach constitutes a key intervention that has been and is being implemented in all the provinces and regions. The PTPs and RTPs consider the various aspects that need to be developed in the framework of this approach. They clearly describe in their **respective attached PSPs and RSPs**, the actions that should be taken to expand, strengthen and sustain PPM interventions to engage care providers practicing outside TB Program.

In Pakistan, there are two major regulatory bodies that are not fully involved in the PPM approach: i) Pakistan Medical and Dental Council which is a statutory regulatory authority that establishes uniform minimum standards of basic and higher qualifications in medicine and dentistry throughout Pakistan and ii) the provincial/regional Health Care Commission which aims at improving the quality of care service delivery through the implementation of Minimum Service Delivery Standards.

Some other specific actions are still missing at national level and need to be undertaken to enhance and sustain the engagement of all care providers across the national territory. To this end, the following actions are taken:

1.7.1 To assign, by CMU/TB Program Central Unit, a focal staff who will coordinate, develop, monitor and evaluate PPM activities in collaboration with partners.

1.7.2 To establish of a National PPM Steering Committee for TB prevention, care and control in Pakistan:

1.7.2.1 To organize, by the CMU/TB Program Central Unit, a 1-day meeting to prepare the establishment of the National PPM Steering Committee for TB prevention, care and control in Pakistan. Will participate in this meeting CMU/TB Program Central Unit, PTPs' provincial units' staff and the representatives of the key partners involved in the implementation of PPM activities. A work plan to establish the National PPM Steering Committee will be outlined and discussed in the meeting. The work plan should specify the eligibility criteria to be a member of the National PPM Steering Committee.

1.7.2.2 To prepare, by the PPM focal staff, a document on the actions that need to be taken and specified in the work plan outlined in the meeting (activity 1.7.2.1)

1.7.2.3 To establish, by the PPM focal staff, a list of the potential persons who can be member of the National PPM Steering Committee according to the eligibility criteria defined in the meeting. A representative of the Pakistan Medical and Dental Council should be included as a member of the Steering Committee.

1.7.2.4 To contact, through CMU/TB Program Central Unit, the potential members of the National PPM Steering Committee and to get their formal approval and adhesion.

1.7.2.5 To constitute, with the selected members, the National PPM Steering Committee and to propose it to the Minister of MoNHSRC for approval.

1.7.2.6 To organize the first meeting of the National PPM Steering Committee to discuss its mission, its working procedures and set its preliminary work plan for actions. The secretariat of the committee will be ensured by the PPM focal staff.

1.7.2.7 To ensure a 1-day meeting of the National PPM Steering Committee every six months and *ad hoc* basis whenever needed.

1.7.3 To develop a national policy on PPM approach development, implementation and sustainability in Pakistan:

1.7.3.1 To hire a national consultant who will prepare the document on the national policy on PPM approach development, implementation and sustainability in Pakistan.

1.7.3.2 To organize, by CMU/TB Program Central Unit, a meeting on the national policy on PPM approach development, implementation and sustainability in Pakistan. The meeting will be under the leadership of the National PPM Steering Committee and will involve staff from PTPs and RSPs and representatives of key partners and medical professional associations and/or societies. The meeting will last 2 days and involve 25 participants. The key elements to be included in the national policy document will be identified, discussed and outlined. The meeting will be facilitated by the national consultant.

1.7.3.3 To develop the national policy document on PPM approach development, implementation and sustainability in Pakistan on the basis of the discussions held in the meeting (activity 1.7.3.2). The development of this document will be ensured by the national consultant.

1.7.3.4 After validation of the national policy document on PPM approach by the National PPM Steering Committee, to print 1,000 copies of this document and to distribute them to PTPs, RSPs, partners and those who need to be informed and to put one copy on the web site of the MoNHSRC.

1.7.4 To promote the TB Program policy and strategies through the existing governmental mechanisms and regulatory bodies

1.7.4.1 To link with the provincial and regional Health Care Commissions:

1.7.4.1.1 To organize a 1-day meeting with the Health Care Commissions of provinces and regions in order to include TB program norms in the Minimum Services Delivery Standards established by these commissions.

1.7.4.1.2 To ensure that each provincial/regional Health Care Commissions officially issues a formal document informing all care providers that TB Program norms are a full component of Minimum Services Delivery Standards.

1.7.4.1.3 To ensure that each PTP and RSP has signed a memorandum of understanding with its respective provincial/regional Health Care Commission.

1.7.4.2 To promote the TB program norms and standards through Pakistan Medical and Dental Council:

1.7.4.2.1 To organize a meeting between the key members of the National PPM Steering Committee and the president of the Pakistan Medical and Dental Council to explore the possibilities to include the TB Program norms and standards in the

process of delivering the licenses of medical practice as well as in the curricula of the private medical schools and colleges.

1.7.4.2.2 To promote, through Pakistan Medical and Dental Council, the existing online training program on the TB Program norms and standards in the framework of delivering the licenses for medical practices.

1.7.4.2.3 To monitor and discuss, in the upcoming meetings of the PPM Steering Committee, the progress made in promoting the TB Program norms and standards through Pakistan Medical and Dental Council.

1.7.5 To strengthen the regulation of the availability of TB medicines in the private pharmacies.

1.7.5.1 To organize a half day meeting of the key members of the National PPM Steering Committee and the senior managers of the Drug Regulatory Authorities of Pakistan (DRAP) to explore the possibilities on the following elements:

- The availability of quality-assured TB medicines in the pharmacies across the national territory;
- Removing TB medicines from the category of drugs sold without prescription to the so-called "Schedule G";
- The sale of TB medicines in only category "A" pharmacies (characterized by a full-time presence of a pharmacist);
- The TB drugs in private pharmacies must be sold in fixed-dose combination in line with the TB Program policy;
- TB drugs sold in pharmacies must be packeted for the use of a full course of TB treatment as used in TB program;
- The pharmacovigilance system implemented by DRAP should include also anti-TB medicines (see intervention 5.19, under Objective 5).

1.7.5.2 To establish a work plan with DRAP staff to monitor the development of the actions to be conducted to improve the availability of TB medicines in the private pharmacies.

1.7.6 To organize the implementation of TB notification by private pharmacies

The legal process to make TB a mandatory notified disease has progressed. By law, TB is specifically considered as a disease that must be notified to the provincial health authorities in Sindh. In Punjab, KP, ICT and AJK a group of communicable illnesses, including TB, is under mandatory declaration regulation. In Balochistan, the legal regulation to make TB under mandatory notification is still proceeded while in Gilgit-Baltistan there is no clear legal framework to make TB a notifiable disease.

TB Program has attempted various experiences to involve private pharmacies in the referral of presumptive TB patients and TB cases' notification since 2012. In 2019, a field project implemented, in 5 districts, and funded by GF (NFM III) showed that TB notification increased by 11% through the engagement of 710 pharmacists and 935 private GPs. More recently, DOPASI Foundation developed and implemented, in 4 districts, a TBREACH-funded

project involving nearly 3,000 pharmacists who had to notify TB drug prescriptions through the utilization of a digital application, the so-called “e-Pharmacies”. This project speculated, from the medical prescriptions of TB medicines made in 2021, that 15,000 patients were eligible for notification as TB patients. Furthermore, because of its design, the project could not report any outcome in the patients who received of these drug prescriptions.

These field experiences indicate that it will be possible to appropriately design and construct a process of TB notification while engaging Category “A” private pharmacists and private healthcare practitioners.

To this end, the following actions will be taken in the framework of this NSP:

1.7.6.1 To hire a national consultant who will take the lead to establish, in the context of Pakistan, a system of TB notification involving private pharmacies and private healthcare practitioners. The terms of reference for the consultant should be specified by the National PPM Steering Committee and CMU/TB Program Central Unit.

1.7.6.2 To organize a 2-day consultation meeting on TB notification through the engagement of private pharmacies and private healthcare practitioners. This meeting will be under the leadership of the National PPM Steering Committee and CMU/TB Program Central Unit and will involve participants from PTPs and RSPs, private medical and pharmacy sectors, DRAP, provincial drug controllers, key partners implementing PPM activities in private health sectors (ex.: Mercy Corp), NGO (ex.: DOPASI Foundation) and representatives of any relevant institution or entity. The participants will identify the key elements that must be considered to prepare a national policy document on TB notification through the engagement of private pharmacies and private healthcare practitioners. The consultation meeting will be facilitated by the national consultant who will establish an outline of the national document at the end of the meeting.

1.7.6.3 To develop the national policy document on TB notification through the engagement of private pharmacies and private healthcare practitioners on the basis of the discussions held in the meeting (activity 1.7.6.2). The development of this document will be ensured by the national consultant.

1.7.6.4 After validation of the national policy document on TB notification through the engagement of private pharmacies and private healthcare practitioners, to print 1,000 copies of this document and to distribute them to PTPs, RSPs, DRAP, partners and those who need to be informed and to put one copy on the web site of the MoNHSRC.

1.7.6.5 To develop SOPs and algorithms in short and simple booklet of few pages to be used by private pharmacists and private healthcare practitioners. These SOPS and algorithms should be prepared by the national consultant on the basis of the content of the national policy document (see activity 1.7.6.3).

1.7.6.6 To print 20,000 copies of these SOPs and algorithms.

1.7.6.7 To proceed to the implementation of the national policy document through the existing field implementer of mandatory TB cases' notification in provincial and regional districts (ex.: Mercy Corp). The existing call centres of the implementers, such as that of Mercy Corp, will be used to channel the notifications. The copies of the SOPs and algorithms will be made available for the users by the implementers.

1.7.7 To promote, by CMU/TB Program Central Unit, TB program policy and strategies in the national conferences and congresses organized by the national medical professional associations or societies, such as Pakistan Medical Association, PPA, PCS or Pakistan Family Physicians' Association.

1.7.8 To create, by CMU/TB Program Central Unit, an online forum open to all healthcare professionals to present and discuss all issues inherent to TB.

1.8 Improving and strengthening TB services for high-risk groups and vulnerable populations

Some groups of people, such as PLHIV, diabetic patients, elderlies or contacts exposed to index TB cases, have a significantly higher risk for developing active TB than general population. TB high-risk groups are fueling TB burden in population; some of them are well known and identifiable, others are not.

Other persons are vulnerable because of the limitations of the procedures available and used for the management of patients such as establishing the diagnosis of TB in a child. Others are vulnerable because they are usually confronted to difficulties to access health care services due to their social status, gender, or administrative situation, such as the incarcerated persons, refugees or women.

TB Program has initiated, developed or implemented interventions that target high-risk groups such as household contacts exposed to index TB cases or diabetic patients and vulnerable persons such as incarcerated persons. To enhance these efforts the following actions will be taken:

1.8.1 To coordinate, at CMU/TB Program Central Unit level, the implementation of interventions targeting TB high risk groups and vulnerable populations, as follows:

1.8.1.1 To assign a focal staff in CMU/TB Program Central Unit who will organize and monitor the implementation of a strategy aiming at improving and strengthening TB Program interventions targeting high risk groups and vulnerable populations.

1.8.1.2 To establish, under the umbrella of the *Strategic and technical Advisory Group* for TB prevention, care and control in Pakistan, a consultation group whose secretariat will be ensured by the above-mentioned focal staff of CMU/TB Program Central Unit (in activity 1.8.1.1).

1.8.1.3 To establish a national policy on the provision of TB services to high-risk groups and vulnerable populations, as follows:

1.8.1.3.1 To hire a national consultant for the development of the following, below, activities (1.8.1.3.2 and 1.8.1.3.3)

1.8.1.3.2 To organize a 3-day meeting during which the members of this consultation group will:

- discuss the actions taken, so far, for TB high-risk groups and vulnerable populations as well as the outcomes of these actions,
- define criteria and specify procedures to identify high risk groups and vulnerable populations,
- establish a list, as comprehensive as possible, of high-risk groups and vulnerable population in the current context of Pakistan,
- identify the various possible approaches to provide appropriate TB services to these groups and populations,

At the end of the meeting, will be established the outlines of a framework document for the strategy to improve and strengthen TB services for high-risk groups and vulnerable populations. The meeting will be facilitated by the national consultant hired (activity 1.8.1.3.1).

1.8.1.3.3 To develop and finalize, by the national consultant, the framework document on the TB Program strategy regarding the issues inherent to high-risk groups and vulnerable populations.

1.8.1.4 To print 1,000 copies of the framework document on the TB strategy regarding the issues inherent to high-risk groups and vulnerable populations.

1.8.1.5 To distribute the copies of the framework document to those who need to be informed and put a copy on the website of MoNHSRC.

1.8.1.6 To organize, every year, a 1-day meeting of the consultation group to: i) evaluate the progress made in the implementation of the TB Program strategy regarding the issues inherent to TB high-risk groups and vulnerable populations and ii) readjust the relevant activities in the annual operational plans.

1.8.2 Improving and strengthening collaborative TB/HIV activities
(Covered in Objectives 3)

1.8.3 Improving and strengthening TB contact investigation

TB contact investigation is included in the national strategy for TB prevention, care and control. In the present TB treatment guidelines of TB Program, the section on contact investigation is weak, poorly developed and not fully in line with the WHO recommendations. This intervention is, in general, poorly implemented across the existing network of health facilities in Pakistan. To improve and expand TB contact investigation activities across the provinces and regions, the following actions will be taken:

1.8.3.1 To include a full chapter on TB contact investigation in the newly revised and updated TB Program guidelines document (see activity 1.1.2). The guidelines included in this chapter should be in line with the WHO recommendations and clearly:

- define the index TB case around whom contact investigation should be undertaken,
- define the contacts that need to be systematically and actively screened and then evaluated for TB,
- specify the algorithm and SOPs that should be used in systematic screening and assessment of contacts,
- describe the role of human resources that will carry out contact investigation activities (roles of the health staff of BMUs, RHCs, BHUs, LHWs and other community workers),
- highlight how the implementation of TB contact investigation will be monitored and its outcomes evaluated and
- specify the indications and provision of TPT that must be ensured in the context of TB contact investigation.

1.8.3.2 Based on these guidelines, to develop, by CMU/TB Program Central Unit, simple SOPs and algorithm which will facilitate the implementation of systematic TB screening and evaluation activities in contacts.

1.8.3.3 To print, by PTPs and RTPs, copies of these SOPs and algorithms.

1.8.3.4 To put, on the website of the MoNHSRC, the copies of SOPs and algorithm inherent to contact investigation procedures.

1.8.3.5 To maintain the existing information system inherent to contact investigation; this system is appropriate and can capture data for i) the monitoring of the implementation of TB contact investigation activities and ii) the evaluation of their outcomes.

1.8.3.6 To assess the relevant indicators on TB contact investigation activities, as follows:

- Number of contact investigations against the number of index TB case registered (ratio: Number of contact investigations / Number of index TB cases registered in TB Treatment Register);
- Proportion of identified contacts who were screened;
- Proportion of screened contacts who were assessed;
- Prevalence of active TB among the contacts who were screened and/or among those who were assessed;
- Proportion of active TB cases identified through contact investigation among registered TB patients.

The TB Programs of provinces and regions describe, in their respective **attached PSPs and RSPs**, the actions that need to be taken to develop and implement TB contact investigation in provinces and regions.

1.8.4 Implementing TB services for mining sector workers

Mining sector in Pakistan is managed by Pakistan Mineral Development Corporation under the responsibility of the Ministry of Petroleum and Natural resources. The country has a huge mineral potential which is yet to be fully explored. The mining sector is regulated through the National Mineral Policy that was issued in 1995 and amended in 2013. At present,

approximately 50 minerals are being mined on a small scale across country. The major production is coal, rock salt and industrial –construction materials. Pakistan has reserves of hundreds of millions of tons of metals besides a huge reserve of 186 billion tons of coal. Most of the mining activities are carried out Balochistan and KP provinces where the mining activities are regulated and under the responsibility of the Department of Mines and Minerals Development in each of these provinces.

The PTPs of Balochistan and KP describe, in their respective **attached PSPs and RSPs**, the activities that will be carried out to enhance TB services in the communities with mine workers of the two provinces.

However, the additional following actions will be taken:

1.8.4.1 To develop a national policy document on promoting and sustaining TB Program services in mining settings:

1.8.4.1.1 To hire a national consultant who will lead the development of the national policy document to promote and sustain TB Program services in mining settings.

1.8.4.1.2 To organize a consultation meeting involving the CMU/TB Program Central Unit, staff of Occupational department of the MoNHSRC, representatives of Pakistan Mineral Development Corporation, staff of the key department of the Ministry of Petroleum and Natural Resources, representatives of Labour and Human Resource Department, representatives of Pakistan Occupational Therapy Association and representatives of occupational health department of selected academies and universities. The participants will identify and discuss the elements that need to be considered to establish a national policy to improve and sustain TB services in mine workers' communities of Pakistan. The meeting will last 2 days and involve 25 participants; it will be facilitated by the national consultant (activity 1.8.4.1.1).

1.8.4.1.3 To develop, by the national consultant, the national policy document to promote and sustain TB Program services in mining settings.

1.8.4.2 To print, by CMU/TB Program Central Unit, 500 copies of the national policy document to promote and sustain TB Program services in mining settings.

1.8.4.3 To distribute these copies to the provinces and relevant districts and to the partners. To put one copy on the web site of the MoNHSRC.

1.8.4.4 To establish a formal collaboration convention between the TB Program and Pakistan Mineral Development Corporation to enhance the actions specified in the national policy document.

1.8.5 Developing and implementing joint TB and diabetes care services

Diabetes is a risk factor for TB and major problem of public health in Pakistan, with an estimated prevalence estimated at 12 to nearly 27%. There is no national health program to prevent and manage diabetes or NCD in Pakistan. Diabetes clinics are organized in many hospital outpatient medical departments and other ambulatory health facilities across the districts of the country. In many tertiary hospitals, diabetes clinics are incorporated in the department of internal medicine. There are many endocrinologists practicing across the national territory and many of them are affiliated to the Pakistan Endocrine Society.

The collaborative TB/diabetes activities are included in the national strategy of TB Program of Pakistan but no guidance document has been prepared so far by CMU/TB Program Central Unit. The last JPRM reported that collaborative TB/diabetes activities are nearly not implemented; they were observed in very few health facilities.

The TB Programs of provinces and regions describe, in their respective **attached PSPs and RSPs**, the actions that need to be taken to initiate the process of joint TB/diabetes activities.

However, the CMU/TB Program Central Unit is planning to develop a national guidance document on collaborative TB/diabetes activities in line with the WHO recommendations. To this end, the following actions will be taken:

1.8.5.1 To develop a national policy document on developing and implementing collaborative TB/diabetes activities in Pakistan:

1.8.5.1.1 To hire a national consultant who will lead the development of the national policy document on collaborative TB/diabetes activities.

1.8.5.1.2 To organize a consultation meeting involving the CMU/TB Program Central Unit, staff of the department in charge of NCD in the MoNHSRC, representatives of Pakistan Endocrine Society, Diabetic Association of Pakistan, Diabetes Institute Pakistan, National Association of Diabetes Educators of Pakistan and representatives of selected academies and universities. The participants will identify and discuss the elements that need to be considered to develop and implement collaborative TB/diabetes activities in Pakistan. The meeting will last 2 days and involve 25 participants; it will be facilitated by the national consultant (activity 1.8.5.1.1).

1.8.5.1.3 To develop, by the national consultant, the national policy document on collaborative TB/diabetes activities in Pakistan.

1.8.5.2 To print, by CMU/TB Program Central Unit, 4,000 copies of the national policy document on collaborative TB/diabetes activities in Pakistan.

1.8.5.3 To distribute these copies to the provinces and regions and to the partners. To put one copy on the web site of the MoNHSRC.

1.8.5.4 To establish a formal collaboration convention between the TB Program and i) Pakistan Endocrine Society and also ii) Diabetic Association of Pakistan to enhance the actions specified in the national policy document.

1.8.6 Enhancing TB services for incarcerated persons

According to World Prison Brief 2021, Pakistan has the 38th largest prison population in the world. The detainees' population has increased from 78,938 in 2000 to 85,670 in 2022 and is hosted in 116 carceral institutions whose capacity is for 64,100 prisoners; the prison occupation is estimated at 134%. There are 38 detainees for 100,000 population in Pakistan. Due to the overcrowded inmate population, several problems are encountered such as congestion in barracks, poor diet and inefficient health care management, poor sanitation and security and administrative issues.

The correctional system is under the responsibility of the Government of each province, through the Inspectorate General of the Prisons who depends on the Provincial Home Ministry.

Most of the prisons in Pakistan have a health unit which provides basic care services to detainees. The prisons' health units have some forms of linkages with the closest BMUs most often those of district headquarter hospitals. Incarcerated individuals with presumptive TB are referred to the BMUs for assessment; in some provinces, like KP, sputa are transported to the TB laboratory of BMU for bacteriological testing. Prisoners diagnosed with TB are registered there and prescribed TB treatment in line with the national guidelines. TB treatment is supplied by the district TB office and provided to the concerned detainee, most often, in the health unit of prison. Not all PTPs have attempted to establish BMUs in prisons; to date, Sindh and Punjab PTPs have implemented BMUs in respectively 2 and 32 carceral institutions.

There is no clear information on the NGOs that might operate in the prison system of provinces and regions which can collaborate with the PTPs and RTPs. There is some form of collaboration between Sindh PTP and United Nation Office on Drugs and Crimes (UNODC) for the provision of care services to prisoners with TB, HIV and hepatitis.

To date, there is no clear national policy document on TB services provision in correctional settings of Pakistan.

The TB Programs of provinces and regions are considering the issues associated with TB in prisons. They clearly identify, in their respective **attached PSPs and RSPs**, the actions that need to be taken to improve and sustain appropriate TB services in carceral systems of their provinces and regions.

However, the following actions need to be undertaken at national level:

1.8.6.1 To organize a meeting involving CMU/TB Program Central Unit, PTPs, RSPs and the senior staff in charge of the organization of health services in the prison system of each province and region. This meeting will focus on outlining a national document on the provision of TB Program services in prison settings; it will last 2 days and involve 25 participants and 2 facilitators from CMU/TB Program Central Unit.

1.8.6.2 To finalize, by CMU/TB Program Central Unit, the national document on the provision of TB Program services in prison settings.

1.8.6.3 To print 800 copies of the national document on the provision of TB Program services in prison settings.

1.8.6.4 To distribute to provinces and regions the printed copies of the national document on the provision of TB Program services in prison settings and to put a copy of this document on the web site of MoNHSRC.

1.8.7 Improving and strengthening TB services for children and adolescents

Childhood TB is an important component of TB prevention, care and control in Pakistan. The national guidelines on childhood TB have been revised and updated and will be officially issued in the coming weeks.

There are formal linkages, through a memorandum of understanding, between CMU/TB Program Central Unit and PPA which is represented in *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan. Key members of PPA contributed to reviewing and updating the national guidelines on childhood TB.

In 2021, nearly 45,000 children were diagnosed with TB; they accounted for 13% of the total number of TB cases notified in Pakistan. TB Program strongly suggest that there are different practices to set the diagnosis of TB in children across the provinces and regions. All childhood TB cases are registered and treated in line with the national policy.

The TB Programs of provinces and regions are considering the issues associated with childhood TB. They clearly identify, in their respective **attached PSPs and RSPs**, the actions that need to be taken to improve and strengthen TB services for children in their provinces and regions.

1.8.8 Promoting TB services for women

In Pakistan, the number of women with notified TB (any form) is lower by 7 to 13% than that of men. The overall notified TB incidence rate is slightly lower in females than in males; but, this rate is higher by 10 to 25% in females than in males in the individuals aged 5 to 34 years (see above Histogram 6). Among TB notified TB cases, females tend to be slightly younger than males; the average age women with TB is approximately 35 years while that of men is 38 to 39 (see above Graph 5). This may have an adverse effect on women reproductive health.

TB services need to be promoted for women, especially within health services devoted to women health. The TB Programs of provinces and regions are considering the issues of TB in women. They clearly identify, in their respective **attached PSPs and RSPs**, the actions that need to be taken to improve and strengthen TB services for women in their provinces and regions.

However, some specific actions should be undertaken at national in favor of women, as follows:

1.8.8.1 To ensure that a full chapter on TB and women is included in the reviewed and updated TB Program guidelines document (see activity 1.1.2).

1.8.8.2 To approach and meet the key members of the National Commission on the Status of Women and explore the possibilities of cooperation in order to promote at national level the visibility of TB issues in women and identify political actions which can result in protecting women with TB from vulnerability and improving their health and living conditions.

1.8.8.3 To establish, by CMU/TB Program Central Unit, a list of NGOs and partners which are developing and implementing actions aiming at promoting women politically and socially.

1.8.8.4 To identify, from this list, the NGOs and partners which can potentially collaborate with TB Program at national level.

1.8.8.5 To organize a 1-day meeting with these NGOs and potential partners to explore and discuss the areas of possible collaboration between CMU/TB Program Central Unit and

them regarding the issue of TB in women. This meeting will help establish operational working plan for joint activities.

1.8.8.6 To undertake, every year, a detailed analysis of the data generated at national level by the TB Program information system on women with notified TB. The analysis should generate hypotheses for operational research studies.

1.8.8.7 To invite the national and international NGOs and agencies, involved in the political and social promotion of women at national level to the meeting organized at national level by the CMU/TB Program Central Unit on World TB Day.

1.8.9 Strengthening the organization of TB services for IDPs and refugees

The political instability that has been affecting the neighbouring country, Afghanistan, for more than four decades has resulted in the displacement of a huge number of Afghan refugees to Pakistan, especially to KP and Balochistan provinces. Pakistan is hosting the largest refugees' population in the world. There are currently about 2,4 million Afghan refugees, of which 1.4 million are registered; 60% of the 2.4 million refugees are living in communities and 40% in camps. In KP Province, 530,000 of them are accommodated in 46 camps and in Balochistan 176,000 are in 10 camps. The camps are managed by the Chief Commissioners for Afghan refugees under the Ministries of State and Frontiers of KP and Balochistan Provinces. Key activities of these ministries include providing land for refugee camps, coordinating relief activities with international organizations, education and healthcare in refugee camps, and advice to Afghans living outside camps on a number of issues, including the access to education and employment. The provision of TB services for Afghan refugees are funded through a multi-country grant of Global Fund (NFM III) targeting displaced persons, refugees and returnees in Afghanistan, Iran and Pakistan. In each camp there is one health facility where 2 health workers are proceeding to TB activities in collaboration with the closest BMU. More than 2,000 TB cases have been detected in the camps of Balochistan and KP. The outcomes of the treatment management of Afghan refugees diagnosed with TB is highly satisfactory. The GF grant will be over in 2024; the funding support will be highly needed to continue TB activities during the coming years.

Many Afghan refugees are living in Sindh Province mainly within communities established in the slums of East-Karachi. The security in these poor neighbourhoods is very weak and are therefore avoided by staff providing public and social services. Presently, no BMUs, which can ensure the provision of TB services to the population, have been implemented in these neighbourhoods. Therefore, their population, especially Afghan refugees have difficult access to TB services.

Moreover, there are approximately 90,000 persons who have been displaced in Sindh because of the recent flooding that affected many areas. They lost most of their resources that ensured their daily livelihood and are presently living in the communities of many districts of Sindh.

During the acute phase of the complex emergency associated with the flooding, Sindh PTP staff took actions to ensure the continuation of treatment of patients who were already on

TB treatment among the displaced persons. Many of the displaced persons have started to return back to their original areas where they used to live.

The TB programs of Balochistan, KP and Sindh provinces are considering the provision of TB in refugees, IDPs and returnees. They clearly identify, in their respective **attached PSPs and RSPs**, the actions that need to be taken to improve and enhance TB services for these particularly vulnerable populations in their provinces.

However, some specific action will be conducted at national level in the framework of this NSP:

1.8.9.1 To assign, within the CMU/TB Program Central Unit, a focal point who, on part time basis, will monitor and coordinate, at national level, the TB activities in refugee and IDP settings.

1.8.9.2 To establish a memorandum of understanding between CMU/TB Program Central Unit and the relevant department of the Ministry of States and Frontier Regions in order to preserve and enhance the visibility of TB prevention, care and control among the health issues in refugees and IDP settings.

1.8.9.3 To develop a national framework document on how to tackle the issue of TB prevention, care and control in IDPs, refugees and returnees in Pakistan. This document will be developed by CMU/TB Program Central Unit in collaboration with the relevant stakeholders. The document must include a section that specify how to organize the transfer of Afghan refugees and IDPs who are still on TB treatment to respectively their home country or home areas. This document needs to be developed through the technical support of a **national consultant**.

1.8.9.4 To establish clear guidance on the actions that must be taken to maintain crucial TB services in the acute phase of complex emergency (see activities in Objective 6).

1.8.9.5 To develop, by CMU/TB Program Central Unit, simple SOPs on how to ensure appropriate TB services, in line with the TB Program policy, to IDPs, refugees and returnees. These SOPS will be based on the revised and updated TB Program guidelines (see activity 1.1.2) and on the key directives included in the national framework document developed and finalized by the consultant (see activity 1.8.9.3). These SOPs should specify the procedures of transfer of refugees and IDPs to home areas while there are still on TB treatment (see activity 1.8.9.3).

1.8.9.6 To print 1,000 copies of the SOPs on how to ensure appropriate TB services for IDPs, refugees and returnees.

1.8.9.7 To invite, every year, (a) relevant representative(s) of the Ministry of State and Frontier of Regions to at least one quarterly interprovincial meeting to present and discuss the issues associated with TB services provision to refugees, returnees and IDPs.

1.8.10 Promoting NTP services for elderlies

TB incidence is the highest in people aged 55 years and more in Pakistan. In 2021, the notified TB incidence (any form) reached more than 500 cases per 100,000 population in males aged

more than 65 (see above Graphs 6 and 7). It is clear that elderlies constitute a high-risk group for TB and, therefore, specific actions should be taken to improve TB services provision in this age group.

The TB Programs of provinces are considering the issues of high TB incidence in elderlies. They clearly identify, in their respective **attached PSPs**, the actions that need to be taken to improve and strengthen TB services for these age groups.

1.8.10.1 To organize a 1-day meeting on TB in elderlies in Pakistan with the key stakeholders and the representatives of relevant health facilities which provide care services to elderlies.

1.8.10.2 To develop SOPs and algorithms on TB screening and assessment in elderlies in the health facilities where they seek care for any reason. These SOPs and algorithms will be developed by the staff of CMU/TB Program Central Unit.

1.8.10.3 To print 5,000 copies of SOPs and algorithms on TB services provision for elderlies and put a copy on the web site of MNHSRC.

1.8.10.4 To include a section on the provision of TB services in national guidelines that will be renewed and updated by CMU/TB Program Central Unit (see activity 1.1.2). The national policy should give a priority to elderlies in all the approaches developed for active screening in high-risk groups and TB "hot spots" areas.

1.8.11 Tackling TB issues in Pakistani migrant workers in the Gulf Cooperation Council states

The migrant workers diagnosed with active TB in Gulf Cooperation Council (GCC) states usually receive TB treatment until they become non-infectious and then they are deported to their home country. Even migrant workers who are found having scarce at the systematic chest X-ray TB screening, which is usually made at the renewal of work permit, are also deported after having ruling out the possibility of active TB. Because of this regulatory process, non-negligible number Pakistani migrant workers, who are in these situations, are deported back to Pakistan without any possibility of coming back and resuming their work in GCC states.

The CMU/TB Program Central Unit will explore the possible actions that can be made to handle this issue:

1.8.11.1 To organize under the auspices of WHO/EMRO a virtual meeting on how to handle, at the best, the transfer of Pakistani migrant workers who are non-infectious and on TB treatment from GCC states to Pakistan.

1.8.11.2 To develop a joint document on how the process of transfer should be made from GCC states to Pakistan. This document must specify the TB treatment regimens that are used in Pakistan and each GCC state as well as the contact details of the TB Programs of Pakistan and each GCC state.

1.8.11.3 To establish a list of all the BMUs per district in Pakistan, with their contact details, in such way the deported migrant worker can continue her/his TB treatment in the best conditions. This list will be shared with the health authorities of each GCC state.

1.8.11.4 To establish, by CMU/TB Program Central Unit, a list of the Pakistani migrant workers who were deported. This list should be made on yearly basis.

1.8.11.5 To communicate, to the GCC states, the list of the deported migrant workers who have continued their treatment in Pakistan in order to assess whether all the deported migrants arrived and have been managed for TB treatment in Pakistan.

1.8.11.6 To ensure that the deported migrant workers with radiological scarce are appropriately evaluated for TB in Pakistan and treated if needed.

1.9 Organizing and strengthening NTP services in urban TB "hot spots" areas, including slum dwellers

Like many EMR countries, TB cases notified in Pakistan tend to be more clustered in some areas; for instance, nearly 60% of notified TB cases are identified in Punjab which is a highly overcrowded province. In Balochistan, 35% of notified TB cases are detected in Quetta and, in KP and Sindh Provinces, approximately 25% of reported TB cases are identified Peshawar and Karachi. TB Program data suggest that is TB highly frequent in poor sub-urban and urban areas, especially in socially disadvantaged neighborhoods where public services, including those inherent to health care, are deficient. In some neighborhoods, the occurrence of TB is clustered "in hot spots" where active screening interventions have shown that the prevalence of TB may reach more than 3% of the screened individuals[73].

The TB Programs of Balochistan, Punjab and KP provinces are considering the issues associated with urban TB "hot spots" areas. They are identifying, in their respective **attached PSPs**, the actions that need to be taken to tackle the issues of TB in these urban and sub-urban settings.

However, to enhance the interventions that will be conducted by the PTPs and RTPs in their provinces and regions, the following actions will be taken at national level by CMU/TB Program Central Unit:

1.9.1 To organize a national workshop to define a strategy to fight TB in urban areas and highly populated regions of Pakistan. This workshop will be held during 4 days and facilitated by an **international consultant**. It will cover the following aspects:

- the use of: i) the mapping of individual TB cases in their residential areas (ex.: in the urban neighborhoods) and ii) the NTP information system data inherent to the socio-economic, demographic, professional, behavioral, sanitary profile (and others) of each notified TB patient,
- the procedures needed to define and develop appropriate approaches, including algorithms' development, to fight TB in different urban and highly populated environments,
- the identification of key players who will help in the implementation of these approaches; these players might be for example, private care providers,

[73] Mercy Corp data collected through active screening in chest camps in 2021.

members of NGOs operating in poor or socially disadvantaged neighborhoods, local political or administrative authorities and others,

- the identification of notified TB incidence rate threshold from which a systematic and active TB screening needs to be carried out, while taking into account the possible issues that might be encountered such as : i) the poor yield of TB screening, ii) the possible false TB diagnosis or iii) being the cause of the stigmatization of neighborhood residents or for a specific group of persons,
- the procedures and indicators to monitor and evaluate the implementation of the approaches to fight TB adapted to urban and highly populated settings.

1.9.2 To develop a framework document to implement approaches to fight TB adapted to urban and highly populated settings. This document will be prepared by the **international consultant**.

1.9.3 To print 1,000 copies of the framework document to implement approaches to fight TB, adapted to urban and highly populated settings.

1.9.4 To organize one national training workshop on the implementation of approaches to fight TB in urban/sub-urban and highly populated areas. The workshop will last 3 days and involve 25 participants from PTPs and RTPs and 2 facilitators; the copies of the framework document will be distributed to the participants and used for the training. The training program of workshop will focus on:

- the mapping of notified TB cases through simulation exercises,
- the use of individual data on notified TB cases collected through NTP information system using simulation exercises,
- the development of approaches to fight TB adapted to fictitious urban settings.

1.9.5 To facilitate the organization of similar training workshops in the provinces and regions. These workshops will be facilitated by the participants who attended the national workshop (see the activities identified in the PSPs).

1.9.6 To ensure, by the staff of CMU/TB Program Central Unit, the technical assistance and monitoring of the development and implementation of the different approaches to fight TB in urban and highly populated areas in the provinces and regions.

1.9.7 To provide support, to PTPs provincial units and RTPs regional units, in systematically evaluating the outcomes of each approach which was implemented in urban and highly populated setting in the provinces or regions.

1.9.8 To contribute to duplicating and evaluating the approaches which reached tangible outcomes in the settings where they were implemented.

1.9.9 To devote, every year in at least one interprovincial quarterly meeting organized by CMU/TB Program Central Unit, a session on the outcomes of the approaches implemented to fight TB in urban/sub-urban and highly populated areas in Pakistan.

1.9.10 To prepare, every year, a document describing the different approaches which were implemented in urban and highly populated areas as well as reporting the outcomes of these approaches. This document will be prepared by the staff of CMU/TB Program Central Unit and put on the website of MoNHSRC.

1.10 Improving and strengthening the provision of care services for patients with respiratory symptoms including those with post-TB lung disease

Respiratory symptoms is one of the leading causes of care seeking in ambulatory health settings. It is among patients with such symptoms that cases with presumptive TB must be identified and managed to diagnose TB. Many surveys[74] reported that among all patients who seek care for respiratory symptoms in PHC facilities, less than 2% and even less than 1% are TB cases. The absence of systematic and standardized approach to manage these patients does not facilitate to easily identify the right TB patients.

In Pakistan, TB prevention, care and control services are provided by BMUs across the national territory. But, BMUs are dealing not only with TB but also with all the patients with respiratory symptoms including those with chronic respiratory diseases (CRDs) such as post-TB lung disease which can lead to restrictive respiratory insufficiency. However, the TB Program has not issued any guidance on how to link issues inherent to TB with those inherent to the other respiratory diseases, including CRDs, especially post-TB lung disease.

The Practical Approach to Lung health (PAL) has been established by WHO few years ago; it is patient-centered approach which promotes a standardized and integrated respiratory care management in ambulatory health settings.

To this end, the process of PAL development and implementation will be initiated in few districts in the framework of this NSP, as follows:

1.10.1 To assign, within the NTP Central Unit team, a focal person for PAL development, implementation and monitoring.

1.10.2 To establish, in late 2025, a national task force for PAL development in Pakistan; this task force should include all the key stakeholders, including senior members of PCS, who will contribute to PAL development.

1.10.3 To organize 3 meetings of the members of the national task force for PAL development in 2026. During these meetings, the task force members will plan and discuss the

[74] Practical Approach to Lung Health (PAL) surveys and PAL feasibility tests carried in country settings.

activities that need to be undertaken to initiate PAL in Pakistan. Each meeting will last 2 days and be coordinated by the focal person for PAL within the CMU/TB Program Central Unit.

1.10.4 To organize, in 2026, a 5-day workshop on the development of national PAL guidelines for Pakistan. This workshop will be facilitated by an international consultant and attended by 25 participants, including the members of the national task force for PAL development and implementation in Pakistan as well as the members of PSC.

1.10.5 To develop and finalize, by the international consultant, the national PAL guidelines' document and a model of adapted training material.

1.10.6 To carry out a feasibility study on PAL implementation under the leadership of the international consultant. This implies:

- writing protocol to undertake the feasibility study,
- carrying out a baseline study,
- training of 15 trainers,
- training, on PAL guidelines, of GPs practicing in 100 BMUs by the 15 trainers in 5 simultaneous different workshops; each training workshop will last 5 days,
- carrying out the "impact" study,
- data cleaning and analysis, then discussion of the results,
- writing a full report on the feasibility study and its outcomes on the identification and management of presumptive TB patients, the quality of TB diagnosis, drug prescription including antibiotics, bronchodilators, steroids for inhalation use, cost of drugs' prescription per respiratory patient managed and others.

1.10.7 To organize a national meeting to: i) present the results of PAL feasibility study and ii) outline an operational plan to develop and implement PAL in Pakistan; the meeting will last 1 day and involve 35 participants and 4 facilitators from CMU/TB Program Central Unit and from the national task force for PAL.

1.10.8 To develop and finalize the operational plan to implement PAL in line with the guidelines.

1.10.9 To finalize the training material needed to implement the PAL guidelines from the model developed by the international consultant; this will be undertaken by the members of the national task force for PAL development under the leadership of the focal person for PAL.

1.10.10 To print 800 copies of PAL guidelines.

1.10.11 To print 800 copies of training material to implement PAL guidelines.

1.10.12 To organize a workshop for a refresher training of the 15 trainers who were involved in the feasibility test. This workshop will last 6 days and facilitated by 2 national consultants from the national task force for PAL development and implementation. The training program that will be followed to train the medical officers practicing in BMUs will be discussed with the 15 trainers in this workshop.

1.10.13 To organize 5 workshops to train on PAL the medical officers of the BMUs of 5 selected districts in one province. Each workshop will last 5 days and involve 25 participants and 2 facilitators. These 5 workshops will be organized during the 3rd and 4th quarter of 2026.

1.10.14 To acquire 5 spirometers with their printers for the district headquarter hospitals of the 5 districts.

1.10.15 To acquire 40 aerosol therapy nebulizers for the BMUs and district headquarter hospitals to use in children and adults.

1.10.16 To acquire 200 peak-flow meters for the medical staff of the BMUs and district headquarter hospitals of the 5 districts.

1.10.17 To ensure through DRAP the supply, in β_2-agonists and steroids medication for inhalation use, for the BMUs and the district headquarter hospitals of the 5 districts.

1.10.18 To integrate the supervision of PAL activities in that of TB Program services in order to ensure the monitoring of the implementation of these activities.

1.10.19 To evaluate the outcomes of PAL activities through the existing information system and relevant surveys.

1.10.20 To evaluate in 2027 the outcomes of the implementation of PAL activities in the 5 selected districts before its extension to other districts of Pakistan.

1.10.21 To explore the possibilities of integration of PAL services, in the near future, into the Essential Universal Health Coverage Package which is presently being piloted in 12 districts located in different provinces.

1.11 Ensuring TB treatment to all TB patients and maintaining a high treatment success rate

Organizing et ensuring TB treatment services' provision are fundamental elements of any national TB program. Making TB treatment accessible to all affected patients and curing them contribute to declining TB transmission in communities, reducing the physical and functional incapacities associated with TB and decreasing deaths from this disease.

The treatment success rate of TB patients, in Pakistan, was more than 90% every year since 2012; it was 94% in the 2020 last cohort analysis. Through the implementation of this NSP the treatment success rate is expected to remain at more than 90% every year.

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs**, the actions that need to be taken to ensure appropriate TB treatment services and follow-up to all patients diagnosed with TB, in line with the TB Program policy, irrespective of their age, gender or their administrative status.

Objective 2: To increase the number of detected and treated of MDR/RR-TB cases from 3,373 in 2021 to at least 9,560 by 2026 and their treatment success rate to at least 80% from 2024 onwards.

The burden of MDR/RR-TB has been recently estimated by WHO at approximately 16,000 patients in the general population of Pakistan in 2021, with an incidence of 6.8 MDR/RR-TB cases per 100,000 population. Also according to WHO, the prevalence of MDR/RR-TB is estimated at 2.5% in new TB cases and 4.9% in previously treated TB patients for the same year[75]; therefore, the number of MDR/RR-TB cases among all notified TB patients was estimated at 8,915 for that year. However, the prevalence of fluoroquinolones is very high in Pakistan, it is 12% among all TB patients and 40% in MDR/RR-TB cases; this issue is believed to be related to inappropriate prescription of these drugs in clinical practices.

PMDT is fully integrated in the national strategy to end TB in Pakistan. There are two full-time medical officers who are assigned for PMDT development and implementation activities within the CMU/TB Program Central Unit. Important efforts have been made during the last decade to identify and manage drug-resistant TB patients. The CMU/TB Program Central Unit is assisted in its efforts by PMDT Coordination Committee.

The NRL has developed significant laboratory capacities to diagnose drug-resistant TB through the use of molecular testing. The TB laboratory network of TB Program has presently 475 Xpert machines operational in 424 sites for the whole country; most of them are installed in hospitals; most of them are GeneXpert-Alert connected. Xpert MTB/XDR testing is installed in all PMDT sites. However, DSTs are performed only in the NRL and the PRL of KP, Sindh and Punjab; they are not carried out in the PRL of Balochistan because of the instability of electrical power and the incompatibility of voltage for some key laboratory equipment.

The number of PMDT sites has remained the same at 32 since 2018; but in 2022, 10 new decentralized treatment sites have been opened in several districts to make the treatment provision more accessible to patients.

The Xpert testing coverage was 55 to 60% of TB cases in 2021/2022. But, 92 and 84% of respectively bacteriologically confirmed new PTB and previously treated PTB cases were tested for rifampicin resistance.

The number of drug-resistant TB patients who were diagnosed, in Pakistan, significantly increased from 888 in 2012 to 3,373 in 2021; but, this increase was not fully steady over years. Among the 3,373 drug-resistant TB patients diagnosed in 2021, 85% were treated and followed in the PMDT sites. However, these 3,373 cases account for: i) 38% of the expected number of drug-resistant TB cases among all notified TB patients and ii) 18% of those who appear in general population in 2021.

The treatment success rate among MDR/RR-TB patients enrolled on treatment reached 72% in the 2019 last cohort analysis while among pre-XDR/XDR-TB cases the treatment success rate was 67% during the same year.

[75] WHO TB Profile – Pakistan; 2021

The MDR/RR-TB treatment regimens have been updated in line with the new WHO recommendations, to use an all oral long regimen in 2019, all oral short regimen in 2020 and modified short regimen (with linezolid in the first 2 months) in 2021. The new 6-month BPaL(M) regimen started in September 2022 in 4 PMDT sites in Punjab. Supply in drugs for PMDT has been regular without any stock outs.

The 2nd line TB medicines are supplied by *Green Light Committee* with the financial support of GF. Significant proportion of diagnosed drug-resistant TB cases are treated and followed free of charge in the PMDT sites.

In spite of decentralizing Xpert machines to *tehsil* level and the development of specimens' transport systems, many TB patients have not yet access to Xpert testing. The persistence of low detection and late diagnosis of drug-resistant TB is contributing to early death of patients.

However, the TB Program of Pakistan has developed significant technical skills and capacities to diagnose and manage patients with MDR/RR-TB. These capacities should be maintained strengthened and sustained. In line with the End TB strategy and in the framework of this NSP, the TB Program of Pakistan will continue to increase the detection of MDR/RR-TB cases and improve their treatment success; this will contribute to the decline in TB mortality.

The interventions and activities highlighted below aims at improving and strengthening PMDT capacities of TB Program in order to reach the objective specified above.

2.1 Ensuring the availability of national PMDT guidelines in line with the WHO recommendations

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the activities inherent to this strategic intervention.

However, some actions need to be taken at national level to strengthen this intervention, as follows:

2.1.1 To review and update the national PMDT guidelines in line with the coming new WHO recommendations (probably in 2024 or 2025). This review and update will be undertaken by an international consultant. The printing will be carried out by PTPs and RTPs.

2.1.2 To develop SOPs and algorithm inherent to PMDT:

2.1.2.1 To hire a national consultant who will lead the development of SOPs and algorithm inherent to PMDT.

2.1.2.2 To organize a 1-day restrictive meeting on the design and outlines of the SOPs and algorithms inherent to PMDT services based on the last version of PMDT guidelines document. The meeting will be attended by the PMDT staff operating at national, provincial and regional levels as well as by the key partners involved in PMDT activities. The meeting will be facilitated by the national consultant.

2.1.2.3 To develop and finalize, by the national consultant, the SOPs and algorithms designed and outlined in the restrictive meeting (activity 2.1.2.2). The copies of the SOPs and algorithms will be printed in the provinces and regions by the PTPs and RTPs.

2.1.3 To develop IEC material to be used in PMDT sites and MDR/RR-TB treatment facilities. This material will be developed by the staff in charge PMDT activities in CMU/TB Program Central Unit. The IEC material will be printed in the provinces and regions by the PTPs and RTPs.

2.2 Improving and strengthening the TB Program capacities to detect and diagnose drug-resistant TB cases

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the activities needed to improve and strengthen TB Program capacities to identify patients with drug-resistant TB.

Many activities inherent to the development and implementation of this intervention are already identified and described in the sections on upgrading and enhancing the TB laboratory activities in the PSPs and RSPs.

2.3 Rehabilitating inpatient wards devoted to PMDT care in provinces and districts hospitals

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the activities inherent to this strategic intervention.

2.4 Improving and strengthening the technical capacities of health staff involved in PMDT activities

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the activities inherent to this strategic intervention.

A simple session on MDR/RR-TB case management will be included in the upcoming initial and refresher training workshops for the BMUs' staff.

In addition, the following actions will be taken at national level by CMU/TB Program Central level:

2.4.1 To ensure a 1-week study tour for 6 drug-resistant TB management staff in charge, within CMU/TB Program Central Unit and PTPs (2 in 2024, 2025 and 2 in 2026). This study tour will focus on the organizational and programmatic aspects associated with PMDT activities and will take place in a selected country with a sound experience in programmatic management regarding PMDT (ex.: Peru).

2.4.2 To ensure 2-week traineeships in improving and strengthening skills in clinical management of patients with MDR/RR-TB or XDR-TB. These traineeships will be organized for 14 PMDT physicians/clinical staff who are dealing on regular basis with drug-resistant TB patients in PMDT sites (5 in 2024, 5 in 2025 and 4 in 2026). These

traineeships will take place in a country with sound experience in clinical management of patients diagnosed with MDR/RR-TB or XDR-TB (ex.: Latvia).

2.5 Ensuring the treatment management of drug-resistant TB patients

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the various activities inherent to the treatment management of drug-resistant TB patients during the three years covered by the strategic plans.

2.6 Strengthening the infection control measures in hospital wards and PMDT sites

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the various activities to enhance infection control in PMDT health facility settings.

2.7 Strengthening the PMDT services at province and district levels through the decentralization of PMDT services' provision

The provincial and regional TB Programs describe, in their respective **attached PSPs and RSPs (under Objective 2)**, the activities to reinforce PMDT services in provinces and districts, including the decentralization of PMDT services.

2.8 Implementing a pharmacovigilance system (in this NSP, it is developed in the intervention 5.19 under Objective 5)

The provincial and regional TB Programs identify, in their respective **attached PSPs and RSPs**, the activities planned to be undertaken to improve the pharmacovigilance inherent to TB medicines.

2.9 Implementing and sustaining a routine surveillance system for drug-resistant TB

The provincial and regional TB Programs identify, in their respective **attached PSPs and RSPs**, the activities planned to be undertaken to improve the surveillance of drug-resistant TB.

However, some actions need to be undertaken at national level, by CMU/TB Program Central Unit, as follows:

2.9.1 To explore the possibilities to adopt and expand the *e-DRTB Application* developed by the PTP of Punjab, in collaboration with DOPASI Foundation and Stop TB partnership.

2.9.2 To strengthen and sustain a routine surveillance system for drug-resistant TB (**see activity 1.5.12**):

2.9.2.1 To develop a protocol for the implementation of a routine surveillance system regarding TB drug resistance in Pakistan. This protocol will be developed by a national consultant.

2.9.2.2 To organize 5 workshops, of 1 day each, to standardize the process of data collection. Each workshop will be attended by 30 participants from districts, Xpert sites and TB laboratories and facilitated by 2 senior staff, one from CMU/TB Program Central Unit and the other from the NRL.

2.9.2.3 To implement the TB drug resistance surveillance protocol as soon as it is finalized and validated by the *Strategic and Technical Advisory Group* and the workshops on data collection held.

Objective 3: To increase the proportion of notified TB cases with known HIV status from 52% in 2021 to at least 95% by 2026 and to treat every year 100% of identified TB/HIV with ART.

HIV burden is low in Pakistan where HIV epidemic is concentrated in high-risk groups. The overall burden is estimated at 210,000 PLHIV in 2021, with nearly 0.2% prevalence in general population. It is estimated that at most 5% of TB burden is associated with HIV in overall population. The HIV prevention, care and control services are organized in the framework of the NACP. The NACP has implemented 52 HIV care sites where the provision of ART is ensured for PLHIV; it is planned that the number of these sites will increase to 72 within the coming months. These HIV care sites are, in fact, the reference health facilities for HIV case management and where registered HIV patients receive care services. Until November 2022, 53,718 PLHIV have been registered by the NACP services, up from 4,500 in 2013. Among these registered PLHIV, 32,912 (61.4%) are receiving ART. The PLHIV are systematically screened for TB at the moment they are registered in HIV care sites. Those who are diagnosed with TB are registered and treated by the closest BMU. However, the preventive TB therapy of PLHIV with no active TB is not fully implemented.

TB Program has made a significant progress in HIV screening in notified TB patients; the number of TB patients who were tested for HIV infection increased from 10,423 in 2012 (4% of notified TB cases) to 175,872 in 2021 (52% of notified cases). In most of the years, the proportion of TB patients who were HIV-positive was less than 1%. The TB patients who are identified HIV-infected are referred to the closest HIV care sites where they are registered and receive ART. Only 63% of co-infected TB/HIV patients registered in 2021 have received ART.

The existing coordination mechanism between the TB Program and NACP established at national level is not fully functioning and there are no coordination mechanisms at province and district levels. There is still no national guidelines on collaborative TB/HIV activities jointly developed by NTP and NACP.

TB is the first cause of death in PLHIV. Improving and expanding joint TB/HIV approach will contribute to declining deaths from TB in Pakistan.;

This objective 3 is considered in all the attached PSPs and RSPs. Therefore, to improve and strengthen the collaborative TB/HIV activities in the provinces and regions, the following intervention will be strengthened and supported from the national level:

3.1 Strengthening at national level the existing coordination mechanism for collaborative TB/HIV activities

The existing National Committee for Collaborative TB/HIV activities will be revitalized, under the leadership of TB Program and NACP, as follows:

3.1.1 To organize a 2-day meeting with the members of the National Committee for Collaborative TB/HIV activities to discuss and evaluate the mission of this committee. If needed, the mission of the committee will be revised and redefined.

3.1.2 To ensure that all the key stakeholders are included or represented in the National Committee for Collaborative TB/HIV activities.

3.1.3 To develop and issue a framework document on the mission of the National Committee for Collaborative TB/HIV activities. The development of this document will be based on the discussions and conclusion of the meeting specified above (see activity 3.1.1). This document will be distributed to the relevant persons who need to be informed and put on the website of MoNHSRC.

3.1.4 To ensure that the members of the National Committee for Collaborative TB/HIV activities meet every six months to discuss the progress made in the implementation of planned TB/HIV activities, the strategic orientations adopted and/or needed to be adopted, the resources' mobilization, the issues in the coordination of joint TB/HIV activities, especially the exchange of information between the TB Program and NACP, and the issues of communication between on one hand the TB Program and NACP and, on the other hand, the national committee and provincial committees. The National Committee for Collaborative TB/HIV activities will also meet on *ad hoc* basis whenever necessary.

3.2 Establishing coordination mechanisms for collaborative TB/HIV activities at province and district levels

The provincial and regional TB Programs identify, in their respective **attached PSPs and RSPs**, the activities planned to establish coordination mechanisms for collaborative TB/HIV activities at provincial and regional levels.

However, the following action will be taken at national level:

3.2.1 To provide support to the provinces and regions in the process of establishing the provincial and regional coordination mechanisms for collaborative TB/HIV activities, especially to: i) develop a protocol defining the constituencies and the missions of the provincial and regional committees, ii) ensure the representation of affected communities as well as that of all the relevant stakeholders involved in TB and HIV issues at province and/or district levels, iii) set up a model of work agenda for the provincial or regional committee and iv) subsequently inform formally the Health Secretaries of their respective provinces or regions. This assistance will be provided by the Central Units of TB Program and NACP.

3.3 Developing sound national guidelines on collaborative TB/HIV activities.

3.3.1 To develop a national guidelines document on collaborative TB/HIV activities. This document will be developed by the Central Units of TB Program and NACP

with the technical assistance of a national consultant and in coordination with the National Committee for Collaborative TB/HIV Activities; these guidelines will clearly specify the role of each stakeholder, especially those of the TB Program and NACP.

3.3.2 After finalization, to organize a 1-day meeting to validate the national guidelines' document on collaborative TB/HIV activities. All the relevant stakeholders will attend this meeting, including the members of the *Strategic and Technical Advisory Group* for TB prevention, care and control.
Copies of this guidelines' document will be printed by PTPs and RTPs.

3.3.3 To prepare, by the Central Units of TB Program and NCAP, simple SOPs with algorithms on intensified TB screening in PLHIV, intensified HIV screening in TB cases, TPT provision in PLHIV with no active TB and ART and CPT in co-infected TB/HIV patients.
Copies of these SOPs and algorithms will be printed by PTPs and RTPs.

3.3.4 To develop a training material on collaborative TB/HIV activities; it will be developed by the Central Units of TB Program and NACP in collaboration with the relevant stakeholders. This training material needs to be incorporated in the training material to implement the revised and updated TB Program guidelines' document (see activity 1.1.3).

3.4 Enhancing the intensified case finding of HIV in TB patients in all the districts of Pakistan

The provincial and regional TB Programs identify and describe in details, in their respective **attached PSPs and RSPs**, the activities planned to strengthen the intensified case finding of HIV in TB patients.

3.5 Reinforcing intensified TB case finding in PLHIV and people at a high risk of HIV infection

The provincial and regional TB Programs identify and describe in details, in their respective **attached PSPs and RSPs**, the activities planned to strengthen the intensified case finding of TB in PLHIV, including the actions that need to be taken to provide TPT to PLHIV in whom TB screening and evaluation did not identify any active TB.

3.6 Enhancing infection control measures in TB/HIV health facilities and ART sites

The provincial and regional TB Programs identify and describe in details, in their respective **attached PSPs and RSPs**, the activities planned to enhance infection control measures in TB/HIV facilities and HIV care sites.

3.7 Ensuring the monitoring and evaluation of TB/HIV collaborative activities.

The provincial and regional TB Programs identify and describe, in their respective attached **PSPs and RSPs**, the activities planned to monitor and evaluate collaborative TB/HIV activities.

Objective 4: To improve and enhance TB prevention through i) tuberculosis preventive therapy of, at least, 80% of household contacts and PLHIV with no active in 2024 to 2026 and ii) strengthening infection control.

In 2021, the coverage of TPT was 3% among children who are household contacts of contagious TB cases. Coverage of TPT among people PLHIV remains unknown and according to NACP Central Unit this preventive treatment has not been yet fully implemented. Pakistan pledged its political commitment to implement and expand prevention activities, including TPT provision to eligible individuals.

CMU/TB Program has developed sound and appropriate guidelines document on PMTPT. This document focuses mainly on household contacts of contagious TB cases and PLHIV. Other target populations are mentioned in the document, in line with the WHO guidelines but not prioritized. LTBI test is not required to provide TPT to PLHIV and household contacts irrespective of their age. The guidelines' document includes a clear algorithm and describes well the process to be used for TB screening and evaluation. The guidelines document is proposing not one type of TPT regimen but three TPT options: 6H, 3HR, and 3HP.

The network of TB Program in Pakistan is based on mainly BMUs which are in general not the first level of contact of the population with health system; this may constitute a barrier to access PMTPT services. The information system needed for the implementation of PMTPT is designed and included in the guidelines document, but nothing has been put in place in the BMUs to monitor and evaluate PMTPT activities. The guidelines document has not been yet printed and implemented and no health staff has been yet trained to use these guidelines.

Presently, PMTPT is poorly implemented in Pakistan. The implementation and expansion of PMTPT will need significant efforts at all levels of healthcare as well as the involvement of relevant partners.

Infection control is a key component of the national policy to prevent TB in Pakistan. It is implemented in PMDT sites and TB laboratories (mainly categories BSL II and III laboratories); but, its implementation is sub-optimal in BMUs. Guidelines on infection control have been developed seven years ago by TB Program. These guidelines need to be revised and updated.

The improvement of TB prevention, through PMTPT and infection control, will contribute to reducing the occurrence of TB in population and also mortality from TB.

To this end, the following actions will be taken:

4.1 Expanding PMTPT activities

4.1.1 To assign a focal staff, within the CMU/TB Program Unit, who will be, on part time basis, in charge of the implementation and monitoring of PMTPT activities.

4.1.2 To develop, by CMU/TB Program Central Unit, simple SOPs and algorithm to implement PMTPT activities. These SOPs and algorithm should be coherent with the new PMTPT guidelines.

4.1.3 To ensure that the new guidelines' document on PMTPT are printed by the PTPs and RTPs.

4.1.4 To ensure that the SOPs and algorithm are printed by the PTPs and RTPs.

4.1.5 To print, by PTPs and RTPs, the tools of the information system designed in the PMTPT (see activity 5.20.2).

4.1.6 To provide support to PTPs and RTPs to develop and implement PMPTP activities identified and described in their respective **attached PSPs and RSPs.**

4.1.7 To monitor, at national level, the implementation PMTPT activities and evaluate their outcomes.

4.2 Revising and updating the existing national guidelines document on infection control in health facilities and congregate settings.

4.2.1 To assign, a focal staff, within the CMU/TB Program Unit, who will be, on part time basis, in charge of the development, implementation and monitoring of infection control activities.

4.2.2 To hire a national consultant for the review and update of the national guidelines on infection control in health facilities and congregate settings.

4.2.3 To review and update, by the consultant, the national guidelines document on infection control in health facilities and congregate settings in line with the WHO recommendations.

4.2.4 To organize, by CMU/TB Program Central Unit, a workshop to discuss and validate the new version of the national guidelines document on infection control prepared by the national consultant who will facilitate this workshop.

4.2.5 To put the new national guidelines document on infection control on the web site of MoNHSRC. Copies will be printed by PTPs and RTPs and made available for health workers.

4.2.6 To organize a training workshop, on infection control, for the senior staff of PTPs and RTPs. The workshop will be organized by CMU/TB Program Central Unit and facilitated by the national consultant. The new guidelines document on infection control will be used and discussed in this workshop. After the training workshop, the PTPs and RTPs senior staff will include a session on infection control in all the

upcoming refresher and initial training workshops that will take place in their provinces and regions.

4.2.7 To ensure, by CMU/TB Program Central Unit, a monitoring of TB occurrence in all categories of health workers, including those who provide healthcare services in TB settings.

Objective 5: To improve and strengthen the governance and the programmatic management capacities for the provision of TB services at national, provincial and district levels.

The management is a fundamental element for the development and implementation of the strategic interventions and activities inherent to any health program. Even though Pakistan has successfully established a TB control program since July 2000, its managerial capacities are still not fully operational. In terms of programmatic management, the functions of TB Program Central Unit are still not fully defined, such as the coordination at national level of specific interventions to prevent and control TB (ex.: PPM, childhood TB, high-risk groups….), coordination with partners or the mobilization of additional resources. In fact, at national level, the TB Program is a component of the CMU whose mission is to manage the interventions and activities funded by GF. The managerial capacities of the PTPs and RTPs' Units at provincial and regional levels are not well developed. To successfully implement the interventions and activities specified above, under the Objectives 1, 2, 3 and 4 of this NSP, the CMU/TB Program Central Unit and the PTPs/RTPs should fully play their role in the management process of TB Program. The actions that will be taken to reach this 5th objective aim at improving and strengthening the governance and programmatic management capacities of Pakistan TB Program, especially at central and provincial/regional levels.

5.1 Restructuring the TB Program Central Unit and developing and enhancing its technical and managerial capacities

5.1.1 To clearly redefine the mission of TB Program Central Unit in accordance with the roles it should play in: i) the development of national strategies and policies for TB prevention, care and control in line with the international recommendations, ii) the specification of the strategic interventions that need to be undertaken in line with the established national policies, iii) the development of the national guidelines and SOPs needed to implement the national strategies to ensure appropriate TB prevention, care and control activities, iv) the establishment of NSPs with their inherent annual operational plans, v) the coordination and monitoring of the implementation of the strategic interventions specified in the national strategy and in the NSPs, vi) the mobilization of resources to implement these interventions and their inherent activities, vii) the organization of training process regarding health staff and community actors who should be involved in TB prevention, care and control efforts, viii) the organization of the supervision activities across the national territory, ix) the availability and accessibility of appropriate and free of charge quality TB treatment for all patients, x) the coordination with the national and international partners involved in TB activities in Pakistan, xi) the establishment of functional and efficient monitoring and evaluation system and xii) the development of operational research agenda based on the results of the analysis of the data generated by the monitoring and evaluation system.

It is important to clearly identify the key strategic interventions whose development and implementation should be coordinated and monitored at national level, such as TB case management, strengthening TB laboratory activities, PPM, community rights and gender (CRG), childhood TB, joint TB/HIV activities, TB and comorbidities, TB in identified in high-risk, PMTPT, monitoring and evaluation and so on.

5.1.2 To clearly define the terms of reference of each position within the Central Unit in line with the areas of work that need to be developed and sustained for TB prevention, care and control.

5.1.3 To assign, according to her/his qualifications, each staff of TB Program Central Unit to the position which fits her/his professional profile.

5.1.4 To organize a 6-day training workshop on the programmatic management of a national TB control program. This workshop will be facilitated by one international consultant and involve, as trainees, 20 senior staff from TB Program Central Unit, PTPs' provincial units and RTPs' regional units. The workshop program will cover the following managerial aspects: i) strategic planning to develop and implement TB prevention, care and control interventions, ii) key principles to develop quality guidelines, iii) the use of data generated by TB Program information system for management purposes, iv) calculations of projections for activities' implementation, v) the management of TB medicines and other supplies vi) the development of approaches to fight TB in specific environment such as complex emergency settings or socially disadvantaged neighborhoods in urban or sub-urban areas, vii) the rules and procedures to develop and implement active TB screening, viii) the organization of training activities within the NTP network, ix) the organization of supervision activities within the NTP network, x) the establishment of a coordination mechanism with and among the partners involved in TB prevention, care and control efforts xi) the mobilization of funding resources to financially support TB prevention, care and control in Pakistan, xii) the advocacy to raise the visibility of TB among political decision makers, xiii) the communication procedures to reach those who need to be informed, xiv) the sustainability of efficient and sound NTP information system and xv) the establishment of a continuous momentum for operational research on TB epidemiology, prevention, care and control.

5.1.5 To organize a 2-week course on data management and analysis, with the technical assistance of 2 national consultants, for relevant health professional staff from TB Program Central Unit, PTPs provincial units and RTPs' regional units (a priority will be given to the monitoring and evaluation focal persons and data analysts). The program of this course will cover: i) the development and implementation of an information system for TB prevention, care and control, ii) the establishment of data sets, iii)

epidemiological surveillance principles, iv) data analysis methods, v) utilization of the data analysis results for epidemiological surveillance purposes, vi) evaluation of TB prevention, care and control strategies and activities which have been implemented, vii) use of analyzed data to manage TB program resources and viii) identification of hypotheses for operational research. Twenty TB Program staff will participate to this course (see activity 5.21.3).

5.1.6 To organize a 6-day workshop on the management of a national TB laboratory network for the staff of NRL, PRLs and key other TB laboratories. The workshop will be facilitated by a national consultant. The workshop agenda will cover: i) the management of the resources of a laboratory network, ii) the process of planning of TB laboratory activities, iii) the budgeting process associated with a TB laboratory network, iv) the organization of supervision of the activities carried out within a TB laboratory network, v) the implementation of quality control system for TB laboratories' activities, vi) the implementation of an information system for a TB laboratory network, vii) the management of data generated by TB laboratory information system and viii) others. Fifteen staff belonging to the TB Program laboratory network will participate to this workshop.

5.1.7 To ensure the planned and *ad hoc* i) meetings of *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan, Inter-Principal Recipient Coordination Committee, PMDT Coordination Committee, National PPM Steering Committee, National Committee for Collaborative TB/HIV, National Task Force for PAL Development in Pakistan and National Task Force for Operational Research as well as ii) the meetings with partners such as National Disaster Management Authorities, PCS, PPA, Pakistan Medical association, Pakistan Medical and Dental Council, DRAP, Army Health Department, partners such as Mercy Corp, DOPASI Foundation, PATA and other NGOs and international partners like USAID, GF and WHO.

5.1.8 To develop funding proposals to mobilize financial resources from potential national and international donors or through the framework of bilateral and multilateral cooperation (see interventions 5.9 and 5.10).

5.1.9 To hold a 2-day meeting on TB epidemiology, prevention, care and control in Pakistan and on programmatic management issues inherent to TB Program. These meetings will be organized, on quarterly basis, by NTP Central Unit held, with the PTPs and RTPs' teams and partners.

5.1.10 To ensure, every year, the participation of 2 relevant NTP staff, according to their work areas, in regional and international courses or workshops on for examples:

- TB laboratory technics and management,

- Development of strategies to implement active screening of TB in high-risk groups,
- PMTPT,
- PMDT (cost covered in activities 2.4.1 and 2.4.2),
- Procurement and stock management,
- Research methodology.

5.1.11 To ensure, every year, the participation of 3 relevant staff from TB Program Central Unit in the annual conference of International Union Against Tuberculosis and Lung Disease.

5.1.12 To renew office furniture and information technology equipment (desks, chairs, cupboards, computers, printers, internet, photocopy machines, data-show) for the NTP Central Unit.

5.1.13 To cover the running cost for internet and telephone every year.

5.1.14 To acquire three cars for the staff of TB Program Central Unit to ensure their mobility to and from the provinces and regions.

5.2 Providing assistance to the PTPs' provincial units and RTPs regional units in strengthening their technical and managerial capacities

The PTPs and RTPs identify and describe in their respective **attached PSPs and RSPs** the actions they will take to improve and enhance their technical and managerial capacities. To this end, the CMU/TB Program Central Unit will be involved in the following interventions:

5.2.1 To help PTPs and RTPs clearly define their mission in the framework of Pakistan TB Program and identify the TB work areas that should be covered by PTPs and RTPs.

5.2.2 To assist provincial and regional units of PTPs and RTPs to specify the terms of reference of the positions associated with the TB work areas.

5.2.3 To provide technical support to provincial and regional units of PTPs and RTPs to organize the training workshops, at provincial and regional level, on programmatic management, for the District TB Officers and District TB Coordinators.

5.3 Establishing human resource development plan

Given that the missions of TB Program Central Unit and PTPs and RTPs provincial and regional units are defined and the terms of reference of each position are established, a human resource development plan will be developed to sustain the commitment of health professionals in place to their work along with the expected progress they can make in their carrier. To this end, the following actions will be taken:

5.3.1 To hire a national consultant who will prepare a development plan for health workers involved in the fight against TB in Pakistan.

5.3.2 To ensure, by CMU/TB Program Central Unit, a tour for the national consultant who will meet health and community workers involved in TB Program activities in all the provinces and regions of Pakistan. The meetings will be organized on individual basis or in focus groups.

5.3.3 To prepare, by the national consultant, a plan for the development of TB Program human resources at national, province, district, BMU and community levels.

5.3.4 To organize, by CMU/TB Program Central Unit, an *ad hoc* meeting of the *Strategic and Technical Advisory Group* for TB on the human resource development plan. The national consultant will present and lead the discussion on the plan with the members of the *Strategic and Technical Advisory Group* for TB.

5.3.5 After the validation of the human resource development plan by the *Strategic and Technical Advisory Group* for TB, to print 1,000 copies of this plan and to distribute them to the provinces and regions and to those who need to be informed. A copy of the plan will be put on the web site of the MoNHSRC.

5.4 Preserving and strengthening the functionality of the *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan

5.4.1 To reiterate the mission of the *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan. Its role is to:

- assist the CMU/TB Program Central Unit in defining the national policy for TB prevention, care and control in Pakistan;
- identify the strategic orientations,
- discuss and validate the guidelines developed under the leadership of the TB Program Central Unit,
- help in establishing strategic planning,
- discuss and validate the annual operational plans,
- develop actions to promote the TB Program policy in the national health agenda,
- coordinate with the:
    - PMDT Coordination Committee
    - National Steering PPM Committee,
    - National Committee for Collaborative TB/HIV Activities,
    - National Task Force for PAL Development,
    - National Task Force for Operational Research,
    - others,
- participate in the inter-provincial quarterly meetings and *ad hoc* evaluations undertaken by the CMU/TB Program Central Unit.

The *Strategic and Technical Advisory Group* will develop, on annual basis, a work agenda and its secretariat will be under the responsibility of TB Program Central Unit.

5.4.2 To ensure that other relevant stakeholders are included in the *Strategic and Technical Advisory Group* for TB prevention, care and control such as: private medical sector, NACP, PCS, PPA, Reproductive Health organizations operating at national level and other potential stakeholders as required.

5.5 Ensuring coordination with partners

5.5.1 To assign a staff within the CMU/TB Program Central Unit who will ensure, on part time basis, the coordination with and among partners.

5.5.2 To establish, at the CMU/TB Program Central Unit level, the list of partners that are presently involved in TB activities in Pakistan, such as: NACP, Mercy Corps, DOPASI Foundation, PATA, WHO, UNDP, IOM, GF, USAID, AKU, GSSM, INH and others.

5.5.3 To share, with all the partners, the relevant documents on the national strategy established for TB prevention, care and control in Pakistan, the PSPs, RSPs and NSP, including their budgets, and their annual operational plans. The budget plans should identify the interventions and activities for which there are financial gaps.

5.5.4 To specify, in a formal document, the role of each partner. Its TB work area(s) must be clearly identified in the PSPs, RSPs and NSP.

5.5.5 To organize, by CMU/TB Program Central Unit, a meeting with all the partners every six months and on *ad hoc* basis whenever needed.

5.6 Creating a momentum for a multisectoral approach in favour of TB prevention, care and control in Pakistan

5.6.1 To develop a strategic document on how to build a multisectoral approach for TB prevention, care and control. This document will be prepared by a national consultant and validated by the *Strategic and Technical Advisory Group* for TB prevention, care and control in Pakistan.

5.6.2 To establish a restricted committee involving CMU/TB Program Central Unit, Pakistan Stop TB Partnership, DOPASI Foundation, PATA and representatives of key partners. This committee will identify the relevant ministries of the Government, ministerial departments, national Unions and syndicates, political and parliamentary groups who can play a major role in the multisectoral approach such as the Ministries of Finance, Agriculture, Education, Justice, Labor or the Parliamentary Health Commission.

5.6.3 Once the list of the ministries and political groups established, to contact and approach them one by one. The restricted committee will meet the relevant representative of each ministry and political or parliamentary group to explain the problem of TB in Pakistan and the need for support to fight this disease.

5.6.4 To organize a 2-day national conference on TB situation in Pakistan. Will participate key representatives of the ministries highlighted above and already approached, parliamentary groups, labor unions, parliamentary health commission, Human Rights NGOs, NGOs promoting political and social status of Women in Pakistan, and others. It is expected that 100 persons will attend this conference. The presentations and discussions' sessions will be facilitated by prominent persons from academies, political environment and civil society.

Work groups will:

- define and discuss the role that should be played by each represented ministry and each political entity in TB prevention and control in Pakistan and
- specify the actions that each ministry and political entity will commit to undertake for TB in the coming years.

5.6.5 To establish a commitment convention between each ministry or political entity and the MoNHSRC. The convention will clearly specify the commitment actions that will be taken by the ministry or political entity in favor of TB prevention, care and control in Pakistan.

5.6.6 To ensure that each commitment convention is signed by the relevant Minister or the official leader of the political entity and the Minister of MoNHSRC.

Similar actions will be conducted by PTPs and RTPs in their provinces and regions respectively; they are described **in their attached PSPs and RSPs**.

5.7 Promoting and advocating, at national level, for a higher visibility of TB in Pakistan among political decision makers and funding organizations

5.7.1 To organize a 2-day workshop on the strategy of advocating for the fight against TB with Pakistani policy decision makers and potential donors. Will participate in this workshop relevant representatives of Pakistan Stop TB Partnership, DOPASI Foundation and other key national NGOs as well as staff from CMU/TB Program Central Unit. This workshop will be facilitated by a national consultant.

5.7.2 To develop a document on the strategy of advocating for the fight to end TB with Pakistani policy decision makers and potential national and international donors. The document will be developed by the national consultant in line with the discussions held in the workshop.

5.7.3 To print 300 copies of the document on the strategy of advocating for the fight against TB and to distribute them to the relevant NGOs and partners.

5.7.4 To ensure that annual action plans are developed regarding advocacy for the fight against TB with Pakistani policy decision makers and potential national and international donors. These plans will be prepared by Stop TB Partnership, DOPASI Foundation and other NGOs. Each NGO will establish its own annual action plan; the activities planned to be undertaken by the NGOs should not overlap across their annual action plans in order to ensure appropriate coordination of their activities.

5.7.5 To provide support to these NGOs to hold meetings with policy decision makers and donors. Each of these NGOs, including Stop TB Partnership and DOPASI Foundation, should organize at least 1 meeting per year with policy decision makers and potential national and international donors.

5.7.6 To evaluate, every year, the outcomes of advocacy activities undertaken for the fight against TB, through the following indicators:

- amount of funding mobilized through advocacy,
- the number of times the issue of TB was discussed in the sessions of parliamentary health commission per year,
- the number of times the issue of TB in Pakistan was raised in open parliament sessions per year,
- the increase in the budget allocated by Government to TB prevention, care and control in Pakistan.

Similar actions will be conducted by PTPs and RTPs; they are described **in their attached PSPs and RSPs**.

5.8 Including the issue of TB prevention, care and control in all the national and provincial initiatives to alleviate poverty in Pakistan

5.8.1 To identify all the national initiatives to alleviate poverty; this identification will be undertaken by Stop TB Partnership, DOPASI Foundation and other NGOs.

5.8.2 To establish contact with the most relevant entities in charge of the initiatives to alleviate poverty in Pakistan.

5.8.3 To approach and organize a meeting with the most relevant entities involved in poverty alleviation at national level in Pakistan, such as *Alkhidmat* Foundation, or Pakistan Poverty Alleviation Fund. The meeting should identify and discuss the areas of collaboration between TB Program and each entity. When possible, a memorandum of understanding will be established between the CMU/TB Program Central Unit and the relevant entity.

5.8.4 To organize a meeting with the relevant representative of Benazir Income Support Program and explore the possibilities of inclusion of women with active TB in its Cash Transfer Program as well as in its food supplementation program. To enhance and sustain their collaboration, a memorandum of understanding will be established between the CMU/TB Program Central Unit and the Benazir Income Support Program.

5.8.5 To develop and submit funding proposals to the entities in charge of the initiatives to alleviate poverty. The proposals will be developed by Stop TB Partnership, DOPASI Foundation and other NGOs in coordination with the CMU/TB Program Central Unit. The proposals may, for example, ask for funding to cover the cost of: i) the psycho-social support for patients with drug-resistant TB, ii) the allowances for NGOs' community workers, such as LHWs, involved in TB services provision or iii) the rehabilitation of dilapidated BMUs facilities in flood- or conflict-affected areas.

Similar actions will be conducted by PTPs and RTPs; they are described **in their attached PSPs and RSPs**.

5.9 Exploring the possibilities of financial support from philanthropic groups

5.9.1 To establish a comprehensive list of philanthropic groups operating in Pakistan at national level.

5.9.2 To identify and approach the philanthropic groups which will most likely be willing to support TB services in Pakistan. These groups will be contacted by Stop TB Partnership, or DOPASI Foundation or other NGOs in coordination with CMU/TB Program Central Uni.

5.9.3 To establish with the philanthropic groups willing to support TB activities the list of actions that they will support. These actions should correspond to the interventions or activities specified in the NSP for which funding is not available.

Similar actions will be conducted by PTPs and RTPs; they are described **in their attached PSPs and RSPs**.

5.10 Mobilizing funding support through bilateral and multilateral cooperation

5.10.1 To organize a meeting between CMU/TB Program Central Unit and the Department of International Relations of MoNHSRC (or the relevant department); this meeting will be organized once a year and on *ad hoc* basis. The meeting will focus on the funding situation of TB in the context of bilateral and multilateral cooperation with regards to Pakistan and on the possibilities to have, presently or in the near future, funding for TB activities through international cooperation.

5.10.2 Whenever possible and needed, to develop and submit funding proposals to the Department of International Relations of MoNHSRC to get financial support through bilateral and multilateral cooperation.

5.11 Including the issue of TB prevention, care and control in all the ongoing actions undertaken by the government for the rehabilitation of public services, including health services, in areas in post complex emergency associated with flooding.

5.12 Promoting and protecting human rights in the context of TB prevention, care and control in Pakistan in close collaboration with the relevant national organizations

The culture of human right is progressing rapidly in Pakistan as reported in the CRG assessment carried out in 2022. There are many NGOs which advocate for the development of human rights culture all over the national territory. Many of these NGOs are affiliated to *Human Right Commission of Pakistan*. Moreover, there is a Ministry of Human Rights in Pakistan.

In the framework of this NSP, the discrimination and stigmatization associated with TB and the issue of inequity regarding access to TB services will be considered through the ongoing momentum for the development human rights' culture in Pakistan.

5.12.1 To organize a 3-day workshop on the issue of human right and TB with the relevant departments of the Ministry of Human Rights, and key NGOs such as Pakistan International Human Rights Organization, Human Rights Commission of Pakistan, Society for Human Rights and Prisoners' Aid or National Commission for Justice and Peace. The gender issue will be also considered in this workshop, and therefore NGOs involved in political and social promotion for women will be represented. The workshop will aim at:

- establishing the strategic orientations to fight the discrimination and stigmatization associated with TB and ensure equity to access TB care,
- promoting the Pakistan accountability mechanism (OneImpact) to orient people on their rights and how to claim them,
- identifying the legal measures that can result in the development and implementation of these strategic orientations through sound and appropriate actions,
- defining the expected outcomes and the indicators to assess them.

The workshop will be facilitated by a national consultant.

5.12.2 After the workshop, to develop a national document on the human rights' issues inherent to TB, how to report them and the measures/aid/services that need to be promoted and developed, including legal actions to address them. The document will be developed by the national consultant in collaboration with TB Program, NGOs and affected communities.

5.12.3 To print 2,000 copies of the national document on the human rights' issues associated with TB and to distribute them to the relevant ministerial departments and state organs as well as to NGOs which can promote the fight against TB in the framework of the ongoing human rights' momentum.

5.12.4 To implement activities of information and sensitization in line with the strategic orientations specified in the national document and targeting relevant settings:

5.12.4.1 To inform and sensitize health workers:

5.12.4.1.1 To develop, specifically for health workers, a simple information and sensitization brochure on the discrimination and stigmatization associated with TB and on the right of all people to have access to TB services.

5.12.4.1.2 To print and distribute, to PTPs and RTPs, 20,000 copies of information and sensitization brochure targeting health workers.

5.12.4.2 To inform and sensitize senior management staff and managerial staff of industrial, commercial and business companies:

5.12.4.2.1 To develop, specifically for senior management staff and managerial staff of business companies, a simple information and sensitization brochure on the discrimination and stigmatization associated with TB and on the right of all people to have access to TB services.

5.12.4.2.2 To print and distribute, to PTPs and RTPs, 20,000 copies of information and sensitization brochure targeting senior management staff and managerial staff of business companies.

5.12.4.3 To inform and sensitize the teaching staff of primary, intermediate and high schools:

5.12.4.3.1 To develop, specifically for the teaching staff of primary, intermediate and high schools, a simple information and sensitization brochure on the discrimination and stigmatization associated with TB and on the right of all people to have access to TB services.

5.12.4.3.2 To print and distribute, to the PTPs and RTPs, 20,000 copies of information and sensitization brochure targeting the teaching staff of primary, intermediate and high schools.

The utilization of these brochures, by PTPs and RTPs, is described **in their attached PSPs and RSPs**.

5.12.5 To establish an *ad hoc* committee involving Ministry of Justice, MoNHSRC, Ministry of Labour, NGOs involved in the promotion and development human rights culture in Pakistan and other relevant stakeholders in order to improve the legal environment regarding human rights issues associated with TB.

5.12.6 To promote the review and the discussion of propositions on the legal environment developed by the *ad hoc* committee in the Parliament through Parliamentary Health Commission.

5.12.7 To develop and roll out an innovative communication strategy that ensures that every person affected by TB, including those who are illiterate or who have disabilities have access to timely information on TB.

5.13 Institutionalizing Community, Rights and Gender (CRG) in the context of ending TB

Pakistan is committed to advancing a community rights and gender approach to TB as demonstrated by the CRG assessment and action plan (2022). TB is rooted in poverty and disproportionately affects the economically disadvantaged and marginalized. This, coupled with the gender, legal and social barriers, identified in the Pakistani CRG assessment inhibits access and thus people ability to realize their right to health. To respond to the findings of the CRG assessment, the National TB Program and Provincial TB Programs, in collaboration with DOPASI Foundation and other NGOs will implement the following actions in accordance with the Pakistan CRG Action Plan.

5.13.1 To appoint a CRG focal point at the TP Program Central Unit to oversee the implementation of the Pakistan CRG Action Plan

5.13.2 To create, coordinate, and support a network of TB champions that includes Patient Clubs and representatives of TB key and vulnerable populations, National TB community-based organizations and TB survivors network with a quarterly-based meetings for meaningful engagement in TB response.

5.13.3 To advance gender equity in the TB workforce at all levels

5.13.4 To develop and roll out a training for TB Program, PTPs and RTPs staff including trainings on gender-sensitive care in TB.

5.13.5 To organize a 2-day consultation to orient TB stakeholders on the Pakistan CRG Action Plan. This workshop will be organized by CMU/TB Program Central Unit. It will be attended by 30 participants from NTP, PTPs, RTPs, NACP, DOPASI Foundation, Stop Partnership, Ministry of Human Rights, key human right organizations, relevant NGOs and partners.

5.13.6 Conduct a TB stigma assessment to identify the levels and dimensions of TB stigma by gender and key and vulnerable populations.

5.13.7 To conduct size estimations of all key and vulnerable populations identified in the CRG Assessment Report.

5.13.8 Ensure that TB data are segregated by key and vulnerable population to enable strategic targeting of TB interventions.

5.13.9 To roll out the CRG interventions and activities in line with the Pakistan CRG Action Plan (2023 – 2026).

5.14 Reviving the exiting helpline to be used by individuals who request information on tuberculosis

A helpline was established, in 2019, to specifically support the pilot project of mandatory TB case notification. A phone number was assigned by Pakistan Telecommunication Authorities to CMU/TB Program Central Unit for the use of this helpline by private GPs and private pharmacists; the number is: 080088000 with a 4-digit code (# 9112) for TB registration and notification by GPs and pharmacists. The mandatory case notification along with the support of the helpline contributed, in the framework of this pilot project, to successfully increasing TB case notification by 11%. In addition, the helpline gave more visibility to TB Program among the medical communities of Pakistan and, through it, technical guidance on TB cases' management was provided to healthcare providers who were not yet engaged with TB Program. Unfortunately, the use of this helpline has nearly stopped when the mandatory TB case notification pilot project was over. However, in the framework of the present NSP, the "e-pharmacies" application will be used for the mandatory notification (see activity 1.7.6) to replace the helpline in this regard.

The CMU/TB Program Central Unit is planning to revive this existing helpline which will not focus in priority, anymore, on TB notification.

In the framework of this NSP, the objective of the helpline is to answer to technical questions and to provide general information on TB, TB services available or on TB epidemiology in the world or in Pakistan. These questions and information are likely to be requested by a person from general population and individuals with scientific background or technical skills. The helpline will also play a role of complain call centre for the individuals who seek care from TB services. The technical information will be provided to helpline users by TB Program staff who have the required technical expertise. To this end,

5.14.1 To outsource the helpline to a call centre; therefore, the required budget should be secured every year.

5.14.2 To develop a short practical guidance document, with the appropriate answers to the frequent questions/information requested by the helpline users. This guidance document will guide the helpline receptionists in her/his daily tasks.

5.14.3 To organize a 2-day training workshop for the helpline receptionists on how to provide the appropriate answers or information to the helpline users and how to use the guidance document to convey these answers or information. Six helpline receptionists will be trained in this workshop which will be facilitated by CMU/TB Program staff.

5.14.4 To monitor the number of calls recorded in order to evaluate its usefulness.

5.15 Improving and strengthening the initial training on Pakistan TB Program strategy in schools of medicine

There are 176 medical schools in Pakistan, among which 45 belong to the public sector. All of them are regulated by the Pakistan Medical and Dental Council. It is not clear to which extent TB case management, as specified in TB Program policy, is taught in these teaching

institutions. But, they do not have yet formalized any linkages with TB Program. To this end, the following actions will be taken:

5.15.1 To organize a 3-day national meeting involving the Pakistan Medical and Dental Council and the 20 key medical schools from the public and private sectors. The meeting will focus on the enhancement of the teaching of NTP policies in Pakistan. Will participate the representatives of the key departments of the 20 medical schools, including those of respiratory diseases and pediatrics as well as the members of *Strategic and Technical Advisory Group* for TB and the senior staff of CMU/TB Program Central Unit.

During the meeting, will be:

- discussed and established a standardized program to teach the TB Program policies and strategies that should be used in Pakistan,
- defined the arrangements needed to carried out this program
- established a writing committee of the teaching program.

5.15.2 To prepare a document specifying: i) the standardized program to teach the TB Program policies and strategies in place in Pakistan and ii) the arrangements needed to implement it in the medical schools of Pakistan.

The document will be developed by the writing committee highlighted above; this committee will meet 2 times.

5.15.3 To organize a meeting with the key representatives of Pakistan Medical and Dental Council and *Strategic and Technical Advisory Group* for TB to discuss the preliminary version of the document.

5.15.4 After validation, by Pakistan Medical and Dental Council and *Strategic and Technical Advisory Group*, of the preliminary version of the document on the teaching TB Program policy and strategies in medical schools, to forward the document to all the 176 medical schools available in Pakistan for amendments, rearrangements and validation.

5.15.5 To print 1,000 copies of the document on the standardized program to teach the TB Program policy and strategies in medical schools of Pakistan. Copies will be forwarded to the deans of the 176 medical schools, the National Ministry of Education and the MoNHSRC.

5.15.6 To establish an agreement protocol between the Pakistan Medical and Dental Council and MoNHSRC regarding the teaching of TB Program policy and strategies in the medical schools of Pakistan.

5.15.7 To encourage the PTPs and RTPs provincial and regional units to establish a memorandum of understanding between the regional or provincial highest public health authorities and each medical school present in the province or region. These actions are specified in **their respective PSPs and RSPs**.

5.15.8 To encourage PTPs and RTPs to establish linkages between BMUs and the medical schools for traineeships of medical students, interns and residents.

5.16 Organizing the training process

Organizing the training of health professionals involved in TB activities is a key component of the management of TB Program. The CMU/TB Program will establish the overall framework to organize the training of health workers providing TB services. To this end, the following actions will be taken:

5.16.1 To develop, by the CMU/TB Program Central Unit, a framework document which specifies the procedures and steps that should be followed to organize the training of health staff, as follows:

- Establishment of a training plan, every six months (or on yearly basis) by all the PTPs and RTPs as well as by the relevant staff of Central Unit who are in charge of the development, implementation and monitoring of specific strategic interventions, such as PMDT, PPM, PMTPT, PAL, etc…;
- Requirements needed to organize a training of health staff:
    - objectives of the training,
    - the organization of the training, including the number of training sessions or workshops, guidelines, SOPs and training material that are available,
    - content of the training program,
    - agenda over time of the training sessions or workshops planned,
    - cost of the training,
    - report on each training session or workshop organized,
    - others.

5.16.2 To print 500 copies of this framework document and to distribute them to all the staff who undertake training, especially the staff of the PSPs, RSPs and districts. Copies will be also forwarded to partners, such as Mercy Corp, GSSM, AKU and others organizations who might be involved in training activities. The framework document will be put on the website of MoNHSRC.

5.16.3 To ensure, by the relevant staff of the TB Program Central Unit, the monitoring of training activities undertaken by the PTPs and RTPs according to their established

agendas of the training sessions planned and to their reports on the training sessions or workshops organized.

5.16.4 To prepare every year a report on the training activities undertaken across the country. This report will be prepared by CMU/TB Program Central Unit.

The PTPS and RTPs describe in **their respective PSPs and RSPs** how they will organize the training of health workers involved in TB services provision in their provinces and regions.

5.17 Strengthening and monitoring supervision activities.

5.17.1 To assign a focal staff within CMU/TB Program Central Unit team for the monitoring of supervision activities that need to be carried out in TB Program network.

5.17.2 To revise and update, by the focal staff, the existing supervision checklist to include information on the implementation of new interventions such as PMTPTP.

5.17.3 To develop, by CMU/TB Program Central Unit, a national guidelines' document on how to conduct the supervision of TB Program activities in Pakistan. The document will include a copy of the sheet of the report that must be established for each supervision visit as well as a copy of the revised and updated checklist that will be used to collect information during each supervision visit.

5.17.4 To print, by CMU/TB Program Central Unit, 1,000 copies of the national guidelines' document on supervision and to distribute them to PSPs and RSPs and to put a copy on the web site of the MoNHSRC.

5.17.5 To ensure that copies of the revised and updated checklist are printed by PSPs and RSPs in their respective provinces and regions.

5.17.6 To include a session on how to conduct a supervision in the training on programmatic management organized at national level for TB Program and NRL staff (see activities 5.1.4 and 5.1.6).

5.17.7 To monitor the supervision activities planned by the PSPs and RSPs provincial and regional units.

5.17.8 To ensure supervision by CMU/TB Program Central Unit focal staff for the implementation and monitoring of specific interventions such as PMDT, collaborative TB/HIV activities, PPM, PAL and others. The supervision visits will take place at province/region, district and BMU levels. Each visit will be carried out by the relevant TB Program Central Unit staff for at least 3 days.

5.17.9 To develop a report on each supervision visit carried out by CMU/TB Program Central Unit staff.

5.17.10 To collect, at national level, the annual reports prepared by PSPs and RSPs on supervision activities carried out in the provinces and regions. These reports will be collected every year by the focal staff, in charge of monitoring supervision activities, within the CMU/TB Program Central Unit.

5.17.11 To prepare an overall report on the supervision TB Program activities across the national territory of Pakistan. This report will be prepared from the provincial reports (see activity 5.17.10) by the focal staff, in charge of monitoring supervision activities, within the CMU/TB Program Central Unit.

5.18 Procuring and managing TB medicines and other supplies

The procurement of TB medicines and other supplies and their management constitute a major component of TB prevention, care and control and represent a fundamental pillar of TB Program management. In general, the procurement and supply in TB drugs are correctly undertaken and monitored.

To strengthen and sustain them, the following actions will be conducted by CMU/TB Program Central Unit:

5.18.1 To recruit an additional staff who will coordinate the management of TB medicines and other supplies within CMU/TB Program Central Unit.

5.18.2 To support, the PSPs and RSPs, to ensure their supply in first and second line TB medicines, including TB drugs for pediatric use and PMTPT as well as a small quantity of first line TB medicines in loose presentations for patients who present side effects when treated with first line drugs in fixed-dose combination (see the **respective PSPs and RSPs of PTPs and RTPs**). The procurement of TB medicines will consider the required buffer stocks.

5.18.3 To evaluate by an international expert the management of TB medicines in 2024 and 2026 (from the process to estimate needs for TB drugs up to their distribution to patients). The availability and sale of TB medicines in private pharmacies will be also assessed.

5.18.4 To revise the drug management information system, whenever needed, in function of the results of the evaluation conducted by the international expert.

5.18.5 To ensure the training of 2 senior staff from CMU/TB Program Central Unit on TB drug management in an international course (2024 and 2026).

5.18.6 To organize 2 workshops on the management of TB medicines for pharmacists in charge of TB drugs and TB supplies' management at provincial and regional levels (1 in 2024 and the other 2026). This workshop will last 2 days and will be facilitated by 2 TB Program Central Unit staff.

5.18.7 To include a session on TB drug management in the training workshops on programmatic management that will be organized for CMU/TB Program Central Unit and PTPs staff (see activity 5.1.4).

5.18.8 To develop and make available online training modules, adapted to each level, on TB medicines and supplies management.

5.18.9 To monitor, on routine basis and at all levels, the procedures of estimating, ordering, acquiring, stocking and distributing TB medicines.

5.18.10 To ensure that standardized procedures are used at all levels to calculate the WHO-recommended priority indicators for stocks' management.

5.18.11 To develop and implement, by CMU/TB Program Central Unit, a web-based for logistics and inventory management system.

5.18.12 To ensure that the monitoring of TB drug and supplies management is included in the supervision activities which are carried out on routine basis.

5.18.13 To promote and implement a functional monitoring system to identify potential stock out of TB medicines (for example: an alert is triggered as soon as the buffer stock of any TB drug starts to be used in any province or region).

5.18.14 To discuss the issues inherent to TB medicines and supplies management in the inter-provincial meeting organized on quarterly basis at national level by CMU/TB Program Unit.

5.18.15 To organize, by CMU/TB Program Central Unit, a half day meeting with DRAP every six months and on ad hoc basis whenever needed.

5.18.16 To organize, by CMU/TB Program Central Unit, a meeting with the relevant staff of Pakistan Pharmaceutical Manufacture Association whenever needed.

5.19 Improving and strengthening the pharmacovigilance system

There is a pharmacovigilance system established in Pakistan by DRAP. This system collects data and information on adverse side effects associated with pharmaceutical products. It is also responsible for the detection, monitoring, assessment and prevention of these adverse effects. The information is collected all over the national territory through the involvement of treating physicians practicing in each province. However, the surveillance of adverse side effects inherent to TB medicines, especially the 2nd line TB drugs, has not been yet fully integrated in this pharmacovigilance system.

The TB Program Central Unit aims at successfully treating 80% of diagnosed MDR/RR-TB cases at national level from 2024 onwards. New TB drugs, such as bedaquiline, delamanid or BPal, and new treatment regimen will be used and it is expected more pre-XDR- and XDR-TB patients will be treated. However, the occurrence of adverse side effects is not negligible under such treatment circumstances.

A pharmacovigilance for second line TB medicines using the WHO aDSM model has been established but not yet formalized between NTP and DRAP. NTP and PTPs are not retro-informed by DRAP on the level of adverse effects associated TB drugs among TB patients followed in PTP and RTP settings.

To improve and strengthen the pharmacovigilance regarding TB medicines, the following actions will be taken:

5.19.1 To hire a national consultant who will prepare a working document on the pharmacovigilance process associated with TB medicines in Pakistan.

5.19.2 To organize a 2-day consultation meeting between CMU/TB Program Central Unit staff and the relevant staff of DRAP. The definitions of TB drugs' side effects that should be reported will be discussed and clarified and the procedures to report adverse effects associated with TB medicines will be discussed and adopted. The process of retro-information on TB drugs side effects from DRAP to TB Program will be described and clarified. The meeting will be attended by 15 participants and facilitated by the national consultant.

5.19.3 To develop a working document on the pharmacovigilance procedures that should be used, in Pakistan, for the adverse effects related to TB medicines. This document will be prepared by the national consultant.

5.19.4 After validation by the meeting participants, PTPs, RTPs and PMDT staff and partners, 500 copies of the working document will be printed. A copy will be put on the web site of MoNHSRC.

5.19.5 To distribute the copies of the working document on TB drugs' pharmacovigilance in Pakistan to PTPs, RTPs and partners.

5.19.6 To ensure that the pharmacovigilance procedures are rolled out in line with the requirements specified in the working document.

5.19.7 To prepare, every year by CMU/TB Program Central Unit staff, a report on the occurrence of adverse side effects associated with the use TB drugs in Pakistan.

5.19.8 To devote one session on TB adverse effects' occurrence in at least one inter-provincial quarterly meeting per year.

5.20 Enhancing the monitoring and evaluation system, including the improvement of data analysis

The monitoring and evaluation are fundamental elements in programmatic management of any health program. The data collected through the information system are crucial for managing the TB Program resources, following the trend over time of TB epidemiology situation and evaluating the outcomes of TB prevention, care and control efforts.

TB Program has adopted and implemented the most recent WHO recommendations on monitoring and evaluation regarding TB services and has successfully implemented a well-functioning information system.

The definitions of TB cases and treatment outcomes are clearly described and identified in a recent working document developed by CMU/TB Program Central Unit. Data are still collected and reported on paper material. However, the move from the paper-based model to the digitalized information system is proceeding. Indeed, i) the Electronic Medical Reporting (EMR) has been introduced in many districts (at *tehsil* level) in the provinces of KP and Punjab, ii) the GeneXpert Alert connectivity has been implemented in more than 90% of Xpert sites, iii) the digital aggregated TB data are available nationwide, through DHIS2, covering 153 districts and the case-based DHIS-2 is being presently piloted in ICT. The integration of EMR into DHIS2 is planned for the near future. The information system of TB Program captures comprehensive data on PMDT and TB laboratory activities. It has also succeeded to collect a significant amount of data for TB notification, epidemiologic surveillance, evaluation and programmatic management purposes.

The CMU/TB Program Central Unit is financially supported by COVID 19 Response Mechanism and Bill and Melinda Gates Foundation to implement and expand case-based DHIS-2. More than 1,500 computers are in the process of acquisition and DHIS-2 coordinators of all the 38 Administrative Divisions have been trained (an Administrative Division is a cluster of 4 to 6 districts) and using case-based DHIS-2 in the districts where there are appointed. A guideline document on how to use the case-based DHIS-2 has been developed and is available. It is planned that this program will be implemented and used in all the BMUs and facilities of private GPs engaged in PPM1.

To strengthen and sustain the monitoring and evaluation system, the following actions will be taken:

5.20.1 To redesign, by CMU/TB Program Central Unit, TB treatment register in order to capture information on ART and cotrimoxazole provisions (as recommended in the last JPRM).

5.20.2 To ensure that, every year, all the required recording and reporting tools are printed by PTPs and RTPs (see their **respective PSPs and RSPs**), such as presumptive TB patients' registers, TB treatment registers, contact investigation registers, registers for PMTPT, microscopy and Xpert laboratory registers, culture, Xpert and DST registers, PMDT patients' registers, TB patient cards (TB 02 card), TB patient facility cards (TB 01 card) and transfer forms, request forms for examination of biological specimens, TB presumptive referral forms and others. These forms and registers should be consistent with those identified in the Monitoring and Evaluation Module recently developed by CMU/TB Program Central Unit. These acquisitions are specified in the **attached PSPs and RSPs**.

5.20.3 To ensure that information on all patients diagnosed with drug-resistant TB are included in the existing Electronic Nominal Recording and Reporting System[76] (and not only including information on MDR/RR-TB cases enrolled on treatment).

5.20.4 To ensure that the training of BMUs' staff on case-based DHIS-2 are organized by PTPs and RTPs. This training will be conducted by the DHIS-2 coordinators already trained at Administrative Division level (cost already covered by COVID 19 Response Mechanism).

5.20.5 To ensure through PTPs and RTPs that the BMUs with case-based DHIS2 implemented have access to internet (cost covered by COVID 19 Response Mechanism).

5.20.6 To link EMR to the process of expansion of case-based DHIS-2.

5.20.7 To explore the possibilities of integration of the existing information systems on TB (EMR, DHIS2, GeneXpert Alert, CAD4TB).

5.20.8 To support the PTPs and RTPs in expanding case-based DHIS-2 in the BMUs newly created in 2024 to 2026 through the acquisition of additional laptops, ensuring internet access and training efforts.

5.20.9 To monitor, by CMU/TB Program Central Unit, the required quarterly electronic reports generated through case-based DHIS-2 in TB facilities (BMUs and engaged private GPs). Also, to monitor the electronic data by districts, province and region.

[76] This system was developed by WHO/EMRO some years ago.

5.20.10 To present and discuss the TB data compiled at national level in the inter-provincial quarterly meeting organized by CMU/TB Program Central Unit.

5.20.11 To ensure linkages between TB Program information system and the National Health Information System established by the MoNHSRC.

5.20.12 To undertake, at CMU/TB Program Central Unit level, in-depth analysis of the data collected at national level through the TB Program information system. The results of the analysis will allow to follow the trend over time of TB epidemiology situation in Pakistan, manage TB Program resources, evaluate the outcomes of TB Program interventions and activities and raise hypotheses for operational research.

5.20.13 To technically assist the PTPs and RTPs to define and develop specific approaches for clustered notified TB cases identified through the mapping of TB cases (see PSPs and RSPs of provinces and regions). This technical assistance should be provided by TB Program Central Unit which can, if needed, ask for help from academies or members of the *Strategic and Technical Advisory Group* for TB in Pakistan.

5.20.14 To prepare every year an annual report on the situation of TB epidemiology, prevention, care and control in Pakistan. This report will be based on the results of the data analysis. It will be developed by the TB Program Central Unit.

5.20.15 To present and discuss the results of the annual report in the most suitable inter-provincial quarterly meeting organized by TB Program Central Unit.

5.20.16 To print, every year, 300 copies of the annual report on the situation of TB epidemiology, prevention, care and control in Pakistan. The copies of this report will be distributed to the key departments of MoNHSRC, PTPs, RTPs, Provincial and regional Health Secretariats, donors, partners and all those who need to be informed.

5.20.17 To evaluate, in early 2026, the TB Program information system with the technical assistance of an international consultant. The results of this evaluation will be followed by an in-depth epidemiologic evaluation and an international TB Program review.

5.20.18 To organize an international in-depth review of Pakistan TB Program in mid-2026.

5.21 Strengthening and sustaining the existing momentum for research on TB prevention, care and control in Pakistan

There is, within the CMU, a specific unit devoted to the development of research in TB prevention, care and control in Pakistan. As of 2016, this unit initiated the Structured Operation Research Training Initiative (SORT IT) course in collaboration with TDR, the Union, GF, and other partners. As a result, a good momentum for research has been taking place with a focus on the various aspects of TB prevention, care and control in Pakistan. TB Program Central Unit has built non negligible capacities to conduct research, through SORT IT, with the training of 46 health professionals from different provinces and regions. Many research studies, in fact 65, have been, so far, conducted and published on TB in Pakistan.

The following actions will be taken to enhance research on TB:

5.21.1 To ensure that hypotheses for research are based on the analysis of TB Program data.

5.21.2 To establish operational linkages between research and the existing TB Program information system.

5.21.3 To reinforce, by TB Program Central Unit, the training of the relevant PTPs' staff on data analysis methodology, formulating hypothesis for research and writing research studies' protocols (see activity 5.1.5) .

5.21.4 To establish on an annual basis in 1-day seminar, a list of hypotheses that need to be tested in research studies. This list will be made available to all the research institutions as well as for the relevant academies.

5.21.5 To involve academic and research institutions in the formulation of research priorities.

5.21.6 To mobilize funding for research activities through the process of fund raising conducted by CMU/TB Program central, DOPASI Foundation and Stop TB Partnership through national organizations and institutions as well as through international partners.

5.21.7 To organize, every six months, a seminar on the research studies which are progressing or finalized, including their outcomes. Will attend these seminars the relevant key partners and representatives of research institutions and academies.

5.21.8 To conduct operation research on following areas as per recommendation of recent JPRM:

5.21.8.1 A population-based TB prevalence survey (PAAR).

5.21.8.2 Comparison of fluoroquinolones with delamanid for preventive treatment of household contacts of MDR-TB patients (PAAR).

5.21.8.3 TPT coverage, barriers and challenges in the context of contact investigation (disaggregated by PLHIV, contacts < 5 years of age and 5 years and older). TPT

completion (disaggregated by regimens lasting 6 months or more and others lasting less than 6 months).

5.21.8.4 Management of MDR-TB contacts in the context of high rate of fluoroquinolones resistance (PAAR).

5.21.8.5 Comparison of MDR/RR-TB services provided in PMDT centralized and decentralized facilities, including the management of adverse side effects association with TB drugs.

5.21.8.6 Predictor factors of death in MDR/RR-TB patients.

5.21.8.7 Evaluation of the management of patients with post-TB lung disease (PAAR).

5.21.8.8 PAL feasibility study (PAAR).

5.21.8.9 Evaluation of the management of childhood TB in areas with a high notification of children with TB.

5.21.8.10 Data quality audit in provinces and regions (PAAR).

5.21.8.11 Evaluation of TPT provision in registered PLHIV.

5.21.8.12 Treatment outcomes of TB in patients with mental disorders (PAAR).

5.21.8.13 A descriptive study on EPTB cases notification and evaluation of their management in Pakistan (PAAR).

5.22 To commemorate World TB Day every year.

5.22.1 To provide, by CMU/TB Program Central Unit, a support to PTPs and RTPs to organize World TB Day events in their respective provinces and regions.

5.22.2 To organize, by CMU/TB Program Central Unit, a round table seminar on TB situation in Pakistan every year. This seminar will be chaired the Health Secretary of MoNHSRC and involve 100 to 150 participants from communities, professional medical bodies, NGOs, philanthropic organizations, donors, social welfare entities, partners, high-risk groups and vulnerable populations, and others.

5.22.3 To organize a mass media campaign on World TB Day through newspapers, journals, radio, podcasts and television channels.

Objective 6: To preserve the key TB prevention, care and control services in the areas in acute phase of complex emergency

The occurrence of an acute phase of complex emergency has a major effect on the existing TB services. It is usually characterized by an important movement of populations, a disruption of the existing public services, including health services and possible major security issues. Pakistan has been confronted to situations of complex emergencies during the last four decades, such as waves of refugees from Afghanistan and earthquakes or flooding episodes. In these contexts, many NGOs and faith-based organizations (FBOs) commit to support the relief efforts and may provide health care to populations in the complex emergency-affected areas. In Pakistan, the organization and implementation of the process of relief interventions are under the responsibilities of the National Disaster Management Authorities (NDMA) at national level and the Provincial Disaster Management Authorities (PDMA) at provincial level.

Under such circumstances, WHO usually establishes a Health Cluster Unit for Complex Emergency to coordinate the relief actions in close collaboration and coordination with the national authorities, namely, in Pakistan, NDMA at national level and PDMA at province level.

In the occurrence context of acute phase of any complex emergency, urgent measures must be taken to preserve in priority the continuation of the treatment of TB patients who were already on treatment and to ensure efficient coordination among all the stakeholders which may be involved in the provision of TB services in the affected areas.

To this end, the following actions will be taken:

6.1 To create, under the leadership of CMU/TB Program Central Unit, a National Coordination Mechanism for TB Services in Complex Emergency-affected Areas. This coordination mechanism will include all the relevant stakeholders who are involved in the provision of health care services in the affected areas. A focal staff from CMU/TB Program Central Unit will be assigned to ensure the administrative and coordination activities.

6.2 To ensure that the focal staff in-charge of National Coordination Mechanism will:

6.2.1 closely collaborate with the NDMA, PDMA and WHO Health Cluster Coordination Unit for Complex Emergency

6.2.2 maintain steady communication with the respective PTP or RTP Unit of the province or region in acute phase of complex emergency

6.2.3 attend the regular meetings planned and organized by the WHO Health Cluster Coordination Unit, and

6.2.4 provide, in these meetings, updated information on TB services in the areas affected by the acute phase.

6.3 To include TB issues in all rapid health assessments undertaken for the areas in acute phase; this assessment may be carried out by the NDMA or PDMA, WHO Health Cluster Coordination Unit for Complex Emergency or others.

6.4 To assess the number of patients already on TB treatment in the areas in acute phase of complex emergency from the existing recording and reporting system in order to ensure the continuation of their treatment.

6.5 To convey health education messages, to TB patients who are already on treatment, through information channels accessible to patients in communities.

6.6 To establish, by CMU/TB Program Central Unit or PTP Provincial Unit/RTP Regional Unit, the lists of health facilities which can appropriately ensure the provision of TB treatment services to patients in the communities in acute phase of complex emergency and in areas neighboring these affected communities.

6.7 To widely distribute these lists in the refugee and IDP communities and among health care providers operating in the areas in acute phase of complex emergency, including the staff of NGOs and international agencies, such as UNHCR.

6.8 To develop, by the CMU/TB Program Central Unit, specific SOPs to manage TB patients who were living in acute phase areas and present for TB treatment provision in health facilities. This must include regular TB drug provision to patients, treatment administration monitoring, referral mechanism for complications or adverse TB drug side effects, recording and reporting, and process of transfer to other areas which have not been affected by the acute phase of complex emergency.

6.9 To ensure appropriate storage of TB drugs in the health facilities where TB treatment services are provided. These facilities will be supplied by TB Program and the level of their TB drugs' stock will be closely monitored.

6.10 To widely distribute TB Program treatment guidelines and SOPs, developed to manage TB patients during the acute phase (see 6.8), to the staff working in the public health facilities and to NGOs and agencies supporting the health facilities involved in the provision of TB services in affected and non-affected areas.

6.11 To ensure the TB Program leadership and coordination of TB prevention, care and control activities in the areas in acute phase of complex emergency while ensuring that appropriate TB services are maintained in the areas which are not affected by the disaster/ emergency.

6.12 To ensure, by the TB Program in close collaboration with the NGOs/FBOs and international agencies, the monitoring and supervision of TB activities in the affected areas.

6.13 To establish, by CMU/TB Program Central Unit and WHO Health Cluster Coordination Unit for Complex Emergency, a list of TB drugs which are exclusively used for TB treatment in Pakistan, given that TB medicines might be supplied through other drug distribution systems which can appear during the acute phase.

6.14 To widely distribute this list to NGOs, FBOs and international agencies ensuring health care services in the areas in acute phase of complex emergency; in addition, the content of this list will be reminded and highlighted by TB Program staff in all the meetings held with NGOs, FBOs and international agencies.

6.15 To ensure the provision of TB diagnosis and treatment services in the areas which are not in acute phase of complex emergency.

6.16 To maintain PMDT activities in areas which are not affected with the acute phase of complex emergency.

6.17 To maintain in priority TB contact investigation and childhood TB activities in non-affected areas.

6.18 TB activities carried out in affected areas will be closely monitored and evaluated and compared to the non-affected areas.

6.19 To maintain, readjust and, if possible and necessary, expand, after the acute phase, TB activities.

6.20 To develop, by the CMU/TB Program Central Unit, a document specifying the arrangements to be followed in order to ensure an appropriate transfer of TB patient within the national territory or for foreign refugees from Pakistan to their home country.

6.21 To readjust the NSP and PSP and the operational plans in function of the changes observed after the acute phase.

6.22 To develop, by NTP and partners, proposals for the financial support to TB services development and strengthening in the affected areas and other relevant regions; these proposals will be submitted to international multilateral agencies and development agencies of foreign countries which will support the rehabilitation of the infrastructure in the areas affected by the complex emergency in Pakistan.

ANNEXURES

Annex 1: Projections used for the NSP of Pakistan

Projections used for the NSP of Pakistan						
	2021	**2022**	**2023**	**2024**	**2025**	**2026**
Population size	**229422203**	**234010647**	**238690860**	**243464678**	**248333970**	**253300650**
Estimated incidence	0.00264	0.00262944	0.00261892	0.00260845	0.00259801	0.00258762
Estimate number	**605675**	**615317**	**625113**	**635065**	**645175**	**655446**
New episode TB	**339256**	**424559**	**443830**	**470460**	**498687**	**528609**
Case detection	**56%**	**69%**	**71%**	**74%**	**77%**	**81%**
Progression rate/year in New episode		**25.1%**	**4.5%**	**6.0%**	**6.0%**	**6.0%**
New TB cases with Unknown status and relapses excluded	328876	412108	426077	446937	468766	491606
Relapses	10380	12451	17753	23523	29921	37003
Failure cases	1006	1027	1420	1568	1969	2960
Interruption cases	1104	1191	2130	3764	5512	6907
Other previously treated TB cases	1658	1779	2367	2509	1969	2467
All reTTT	14148	16448	23671	31364	39370	49337
All TB cases	343024	428556	449748	478301	508136	540943
Prop of Relapse/New episode TB	3%	3%	4%	5%	6%	7%
Prop of reTTT/all TB cases	4%	4%	5%	6%	7%	8%
Prop of relapse/ReTTT	73%	76%	75%	75%	76%	75%
Prop of Failures/ReTTT	7%	6%	6%	5%	5%	6%
Prop of InterrupTTT	8%	7%	9%	12%	14%	14%
Prop of other reTTT cases/all ReTTT	12%	11%	10%	8%	5%	5%
New bacterio confirmed PTB with SSE	54,820	67,584	77,546	75,085	56,252	31,463
New bacterio confirmed PTB with Xpert	82,229	101,377	144,014	175,199	225,008	283,165
New bacterio confirmed PTB	137049	168961	221560	250285	281260	314628
New non Bacterio confirmed PTB	132120	168421	119302	107265	93753	78657

PTB	269169	337382	340862	357550	375013	393285
Bacterio.confirma PTB	51%	50%	65%	70%	75%	80%
Prop. SSE-confirmed PTB	20.4%	20.0%	22.8%	21.0%	15.0%	8.0%
Prop. Xpert-confirmed PTB	30.5%	30.0%	42.3%	49.0%	60.0%	72.0%
%PTB/New cases	82%	81%	80%	80%	80%	80%
New EPTB	59707	74726	85215	89387	93753	98321
%EPTB/New cases	18%	18%	20%	20%	20%	20%
Estimated Incidence rate MDR/RR-TB per 100,000 population	0.000068	0.000068	0.000068	0.000068	0.000068	0.000068
Estimated number of incident MDR/RR-TB cases in population	15601	15913	16231	16556	16887	17224
Prev MDR in New cases	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Prev MDR in reTTT	4.9%	4.9%	4.9%	4.9%	4.9%	4.9%
Nbr MDR among notified all new TB cases	8222	10303	10652	11173	11719	12290
Nbr MDR among notified ReTTT TB cases	693	806	1160	1537	1929	2418
Estimated nbr of MDR-TB cases among all notified TB cases	8915	11109	11812	12710	13648	14708
%MDR-TB cases detected among all notified TB cases	38%	35%	45%	55%	60%	65%
Nbr MDR-TB detected	3373	3878	5315	6991	8189	9560
% of MDR TB treated	85.3%	89.9%	95%	100%	100%	100%
Nbr of MDR TB cases treated	2878	3487	5050	6991	8189	9560
Nbre of pre-XDR and XDR cases treated	884	1046	1515	2097	2457	2868
MDR-TB cases treated with **mSTR**				92	0	0
MDR-TB cases treated with **sSTR**				835	983	956
MDR-TB cases treated with **LTR-3**				451	819	956
MDR-TB treated with **BPalM**				1862	3685	4589
MDR-TB treated with **BPal**				1802	2702	3059
% of MDR-TB cases treated among estimated incident MDR-TB cases in general population	18.4%	21.9%	31.1%	42.2%	48.5%	55.5%
Nbr of presumed TB cases	1647587	1536187	2726892	3575495	4500156	5899274
Nbr suspects/PTB	6	5	8	10	12	15
Number slides/ year	5551496	5361105	9076067	11734622	14621622	18944852

Number of working days	260	260	260	260	260	260
Number of slides/ working day	21352	20620	34908	45133	56237	72865
Number of slide/laboratory/day	15	15	15	20	20	20
Number of TB microscopy laboratories	1423	1375	2327	2257	2812	3643
Nbr Xpert tests needed	1421086	1800889	2356366	2791890	3403933	4109071
Nbr modules working 3 cycles per day needed	1822	2309	3021	3579	4364	5268
Nbr of specimens that need transport from BMUs to Xpert testing sites	852651	1080534	1413819	1675134	2042360	2465442
Nbr of specimens that need transport from Xpert sites to NRL or PRL for further DSTs	85265	108053	141382	167513	204236	246544
Number of patient-cultures needed	80542	96013	136292	180620	215887	257684
Number of specimens needed for culture	161084	192026	272584	361239	431773	515367
Number of cartridges for DSTs (for FLQ, INH, amikacin and ethionamide using Xpert MTB/XDR machines)				8039	9417	10994
Number of Index cases (excluding MDR)	155564	190814	244952	275698	307950	342650
Number of contacts (5/index case)	777821	954068	1224759	1378489	1539750	1713251
Prevalence of active TB among contacts	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Number of active TB cases among contacts	3889	7156	12248	22400	28870	34265
Number of contacts with no active TB	151675	279065	477656	873618	1125942	1336336
Number of contacts eligible for TPT	151675	279065	477656	873618	1125942	1336336
Number of children-contacts < 5 years with no active TB						
Number of contacts > 5 years with no active TB						
Number of PLHIV registered	**8416**	**9943**	**11900**	**12825**	**13650**	**14300**
Prevalence of active TB among followed PLHIV	3%	3%	3%	3%	3%	3%
Number of PLHIV with active TB	1013	298	357	385	410	429
Number of PLHIV with no active TB	7403	9645	11543	12440	13241	13871
Number of notified TB cases with known HIV status	176413	260671	288490	446937	473753	502178
% of notified TB cases with known HIV status	52%	61%	65%	95%	95%	95%

Number TB cases with HIV infection	1058	949	1731	2682	2843	3013
% of HIV infection among tested TB cases	0.6%	0.4%	0.6%	0.6%	0.6%	0.6%
Number of TB cases with HIV infection eligible for ART	2071	1247	2088	3066	3252	3442
Number of TB cases with HIV infection who receive ARVs	1305	873	1775	3066	3252	3442
Number of household contacts and PLHIV that need TPT	159078	288710	489199	886058	1139183	1350207
Number of TB/HIV patients who need ARV and CPT	2071	1247	2088	3066	3252	3442