SUMMER INTERNSHIP REPORT

at



(May 5th to July 5th, 2025)

A Report

By

Dr. Harshita Kapil

Mentor. Dr. Shikha Bassi

PGDM (Hospital and Health Management)

2024-2026



International Institute of Health Management Research,

New Delhi

10th July 2025

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Harshita Kapil** was associated with **IQVIA Consulting and Information Services India Private Limited ("IQVIA")** on the **"Evaluation of CSS schemes Package 07: Health Sector and Mizoram Health System Strengthening Project"** as a part of the curriculum during the period from **5th May 2025 till 5th July 2025.**

This certificate is being issued to recognize successful completion of her internship.

For IQVIA Consulting and Information Services India Pvt. Ltd



Dr. Santosh Moses
Principal – Public Health, South Asia

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Certificate of Approval

The Summer Internship Project titled **"To what extent is India progressing towards achieving its goal of tuberculosis elimination?"** at **"IQVIA Consulting and Information Services India Pvt. Ltd. (IQVIA)"** is hereby approved as a certified study in management carried out and presented in a manner satisfactorily to warrant its acceptance as perquisite for the award of Post Graduate Diploma in Health and Hospital Management for which it has been submitted. It is understood that by this approval the undersigned do not necessarily endorse or approve any statement made, opinion expressed, or conclusion drawn therein but approve the report only for the purpose it is submitted.



Dr. Shikha Bassi
Assistant Professor
IIHMR, DELHI

FEEDBACK FORM

(Organization Supervisor)

Name of the Student: Dr. Harshita Kapil

Summer Internship Institution: IQVIA Consulting and Information Services India Pvt. Ltd.

Area of Summer Internship: NITI Aayog-Evaluation of CSS schemes Package 07: Health Sector and Mizoram Health System Strengthening Project

Attendance: 100%

Objectives met:

1.Developed understanding of evaluation studies and how they are carried out

2.Developed understanding of OECD DAC evaluation framework (REESCI)

3.Understood different methodologies for conducting research studies including primary, secondary and literature review.

4.Understood qualitative and quantitative data collection and analysis

5.Developed an understanding of utilising Microsoft office tools in day to day tasks, like Word, Excel and Power Point.

6.Understood basics of proposal writing, contents and structure

Deliverables:

1.Completed assigned transcription and analysis work

2.Supported in developing write up for different chapters in evaluation of CSS schemes report

3.Supported in conducting literature review and secondary data analysis for evaluation of CSS scheme report

4.Drafted comprehensive internship report to assess India progress towards achieving its goal of tuberculosis elimination

Strengths:

1.Disciplined

2.Positive attitude

3.Excellent in communication

4.Fast learner

5.Efficient

6.Analytical

7.Accountability and reliability

Suggestions for Improvement: Need to further explore and develop understanding of different ways to approach public health and research related problems/challenges holistically, considering multiple dimensions and perspectives.



Signature of the Officer-in-Charge

(Internship)

Date: 27/06/2025

Place: Noida, U.P.

FEEDBACK FORM

(IIHMR Mentor)

Name of the Student: Dr. Harshita Kapil

Summer Internship Institution: IQVIA Consulting and Information Services India Pvt. Ltd.

Area of Summer Internship: NITI Aayog-Evaluation of CSS schemes Package 07: Health Sector and Mizoram Health System Strengthening Project

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Date: 05/07/2025

Place: Delhi

Dr.Harshita Kapil ST report

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ACKNOWLEDGEMENT

A Summer Internship is a valuable opportunity for personal growth and acquiring knowledge. I consider myself fortunate to have been provided with this opportunity to expand my understanding and skills in the Public Health Sector. I am truly appreciative of the chance to engage in a valuable learning and self-development experience at IQVIA.

First and foremost, I am immensely grateful to **Dr. Santosh Moses** and **Mr. Kanishak Gautam** for offering me a chance to intern and receive hands-on experience in the field of public health. This internship has been of great help in broadening my knowledge of community health practices, implementation of programs, and their monitoring and evaluation. I would also like to express my heartfelt gratitude towards **Manjari Sharma** (Engagement Manager) as her invaluable advice, feedback and encouragement have played an instrumental role in shaping my overall internship experience.

I would particularly like to express my gratitude towards my internship mentor**, Dr. Chander Pal Thakur, Senior Consultant**, for his constant support and valuable feedback during the internship. His dedication and professional experience in public health guided me and helped me gain relevant knowledge and experience during this time.

I would like to extend a special vote of thanks to **Dr. Nadeem Shaikh,** (Consultant) for his constant encouragement, unwavering support, and helpful discussions throughout my internship and the entire research process.

I would also like to thank **Mr. Amit Saini and Mr. Chandan Nagasuri** for providing me with an enriching experience of KIIs.

I would also like to appreciate the whole team at IQVIA for making my experience a valuable one and providing an environment that valued learning and teamwork.

I extend my sincere gratitude to my college mentor **Dr. Shikha Bassi**, **Anju Sehrawat** (Placement officer IIHMR, Delhi) and **IIHMR, Delhi** for providing me with this internship opportunity and for their academic guidance and inspiration throughout the process that has significantly contributed to my growth. Lastly, I am highly thankful for the moral support and encouragement that I have received throughout the internship from my family and friends.

I consider this opportunity to be a significant milestone in my career journey. This internship deepened my understanding of the consulting field and strengthened my research and analytical abilities and has immensely contributed to my academic and professional development, and I am committed to utilizing the skills and knowledge that I have acquired to the best of my abilities and continuously improving upon them in order to achieve my career goals in the area of public health.

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LIST OF ABBREVIATIONS

AAM	Ayushmaan Arogya Mandir
ACF	Active Case Finding
ACSM	Advocacy, Communication, and Social Mobilization
CSS	Centrally Sponsored Scheme
DBT	Direct Benefit Transfer
DOTS	Directly Observed Treatment
DR-TB	Drug Resistant Tuberculosis
DS-TB	Drug Sensitive Tuberculosis
DST	Drug Susceptibility Testing
FQ	Fluoroquinolones
INH	Isoniazid
LTFU	Loss to follow up
MDR-TB	Multi-drug-resistant Tuberculosis
NPY	Nikshay Poshan Yojna
NTEP	National Tuberculosis Elimination Programme
NTP	National Tuberculosis Programme
NTSU	National Technical Support Unit
OOPE	Out of Pocket Expenditure
PPD	Purified Protein Derivative
PLTFU	Pre-treatment loss to follow-up
PTB	Pulmonary Tuberculosis
RNTCP	Revised National Tuberculosis Control Programme
TBI	Tuberculosis Infection
TPT	Tuberculosis Preventive Treatment
TST	Tuberculin Skin Test
XDR-TB	Extensively Drug-Resistant Tuberculosis

PART A: OBSERVATIONAL LEARNING

Section 1: Introduction

IQVIA is a prominent global organization specializing in data analytics, technology-driven solutions, and clinical research support for the life sciences sector. It plays a critical role in connecting different facets of healthcare by combining analytical expertise, advanced technologies, and vast data resources. With a workforce of nearly 86,000 professionals operating in over 100 countries, IQVIA's Connected Intelligence™ platform provides timely and actionable insights. This enables healthcare innovators to bring new medical treatments to market more efficiently and improve patient care outcomes.

IQVIA is also at the forefront of safeguarding patient privacy, employing comprehensive privacy-preserving technologies and practices. These measures ensure the ethical and secure handling of health data, empowering stakeholders such as pharmaceutical companies, medical device firms, researchers, government bodies, and insurers to better understand disease trends, treatment effectiveness and human health behaviours.

Mission and Vision

IQVIA strives to create a world where advancements in data science merge with human ingenuity to deliver solutions that improve global health. The company views each challenge as a chance to make a difference for patients, partners, and communities. It encourages individuals to pursue purposeful careers that contribute to creating a healthier and more innovative world

Company Values:

• Creativity and Teamwork

• Honesty and Integrity

• Innovation and Ethical conduct

IQVIA possesses extensive proficiency in delivering advisory services to governments, international non-governmental organizations (NGOs), and multidimensional funding agencies in emerging markets. Their comprehensive capabilities encompass strategic guidance, program management, national health surveys, commodity assessment and mapping, procurement and supply chain evaluation, in-country development, monitoring and evaluation, assessment of pharmaceutical markets, engagement with the private sector, ensuring access to medicines, policy and regulatory analysis, and health data analytics across different geographies.

Project I worked on:

I was working as a research intern for an evaluation study, titled: **The Evaluation of Centrally Sponsored Schemes in Package 07 – Health Sector.**

IQVIA is conducting this study in collaboration with Development Monitoring and Evaluation Office of NITI Ayog.

NITI Aayog, established by the Government of India in 2015, serves as the country's premier public policy think tank. It plays a key role in promoting economic development and fostering cooperative federalism by actively involving state governments in shaping economic policies through a bottom-up approach.

They have engaged IQVIA to conduct a comprehensive 'Evaluation of Centrally Sponsored Schemes in Package 07 – Health Sector' to assess the alignment and complementarity of policies guiding these schemes, ensuring that efforts are not duplicated and promoting a cohesive strategy to achieve national health goals, including those in line with the UN-SDGs.

Section 2: Learnings At IQVIA

Projects

I worked on two projects during my internship tenure at IQVIA, as follows:

- Evaluation of Centrally Sponsored Schemes in Package 07 – Health Sector
- Supply Chain strengthening component under Mizoram Health Systems Strengthening Project.

Role in IQVIA

My roles and responsibilities at IQVIA during my internship tenure included:

- Developed understanding of evaluation studies and their implementation.
- Learnt how the OECD-DAC REESC+I evaluation framework is adapted for evaluating schemes/programs.
- Assisted in the process of evaluation of supply chain management and functioning in the state of Mizoram.
- Engaged in secondary research and literature reviews, desk review and assessment of documents available on government websites and other public domains.
- Developed understanding on how the study tools are drafted including household survey, facility assessment and Key Informant Interview tools.
- Conducted data-cleaning and quality check for the data collected during the study to make it suitable for analysis.
- Created multiple excel workbooks organizing important data for analysis.
- Involved in the process of data analysis during the evaluation study for CSS.

- Transcribed 30+ KIIs and FGDs that were held at district, state and National level.
- Participated in 2 KIIs (Key Informant Interviews) for qualitative analysis as an interviewer and developed understanding about communicating and coordinating with key stakeholders or bureaucrats at national level. These KIIs were for:
  1) Joint Secretary NCDs, MoHFW.
  2) Additional Secretary, Education Ministry
- Understood key parameters of proposal and report writing.

Section 3: Conclusive learnings

- Exposure to real-world consulting work and projects, thereby closely observing the consulting workflow.
- Learned to be more detail-oriented and analytical while reviewing documents and reports.
- Gained hands-on experience in professional presentations, data collection, analysis, and visualization using different tools.
- Enhanced my proficiency in tools like Microsoft Word, Excel and PowerPoint.
- Communication and coordinating with government officials during KIIs.
- Coordination among team members for the timely achievement of goals.
- Engaging with people from varied areas of experience and expertise.
- Developed time management skills by performing multiple tasks and meeting deadlines.

Limitations

- **Internship-** Time period was limited to develop a comprehensive and in-depth understanding of different aspects of project management and implementation and proposal writing.
- **Project-** The study only covered a comprehensive evaluation of Centrally Sponsored Health Schemes, and no Central sector scheme was taken into account.

PART B: PROJECT REPORT

Section 1: Introduction

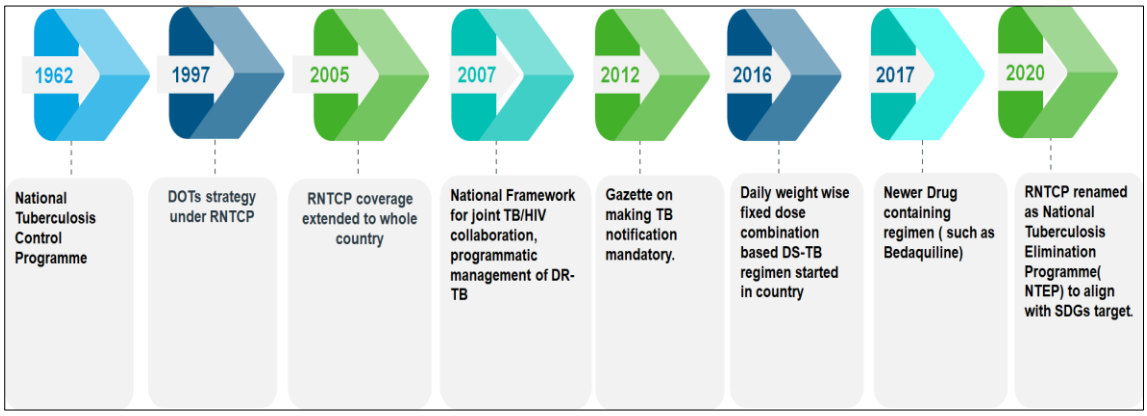
Background and Rationale:

Tuberculosis is a common communicable disease that is caused by Mycobacterium tuberculosis; it primarily affects the lungs (termed as 'Pulmonary TB'), although extra-pulmonary cases of the disease are also observed[i]. In 2023, 10.8 million incident cases of tuberculosis were reported globally. The global TB incidence rate was found to be 134 newly diagnosed cases per 1 lac population. South Asia alone was responsible for 44% of the total global burden of TB disease, with India alone contributing roughly over a quarter (26%) of the total global incidence. Between 2015 and 2023, there was a 23% global reduction in TB related deaths. However, the decline in TB mortality in the Southeast Asia region during the same period was more modest, at just 11%[ii] .TB mostly affects people in their most productive years, thereby having an indirect effect on a country's overall financial development by negatively impacting it's working capital.

In 2014 and 2015, the WHO and all UN Member States committed to ending the Global TB epidemic, by supporting the WHO's End TB Strategy and the UN Sustainable Development Goals (SDGs). These commitments placed special focus on integrating TB prevention, diagnosis and treatment services into the overall strategy of achieving Universal Health Coverage and increasing social protection. They also requested multisectoral action against wider social and economic determinants of TB; and along with the pursuit of scientific innovations, such as a development of new TB vaccine. [ii] The UN has held two high-level meetings on TB: the first in 2018 and the second in 2023 to accelerate these efforts [ii] .

Global TB Report in 2023 (WHO), highlighted that despite TB being a preventable and curable disease, India reports a high TB burden. If we look at the historical picture, India has launched multiple programs in the past to contain the spread of TB. Initially, the National Tuberculosis Programme (NTP) that was initiated in 1962. Then in 1997, India adopted the Revised National Tuberculosis Control Programme, that was based on DOTS (Directly Observed Treatment), and in the year 2020, the program was renamed as the National Tuberculosis Elimination Programme (NTEP), which aligns with India's ambitious target of eliminating TB by 2025, that is five years ahead of the UN-SDG target. TB elimination has been defined as reducing TB incidence to less than 1 case per 1,00,000 population per year. However, to achieve its goal the country requires not only a strong TB care infrastructure but integrated programmatic interventions.

Figure 1: Evolution of TB control programs at National Level



Earlier TB elimination efforts were primarily aimed at controlling the spread of new TB cases and the approach was quite narrow and clinical, while the current approach emphasizes more on complete TB elimination through a proactive, comprehensive, patient-centric approach that involves community engagement and integrated healthcare efforts involving the private sector. India has undergone extensive health system strengthening as, earlier the diagnosis was mostly dependent on sputum smear microscopy but now the diagnostic services have been expanded to include rapid molecular diagnostic tests like CBNAAT, True Nat, DST (Drug Susceptibility Testing) and the duration of TPT (TB Preventive Treatment) has also been reduced to 3 months. Initiatives like digital surveillance through NIKSHAY portal, TB Mukt Bharat Abhiyaan, and DBT under NPY (Nikshay Poshan Yojna) have made monitoring and evaluation easy, reduced OOPE and has revolutionized overall TB care in India. Although India has undergone significant progress in TB elimination but there is still a long way to go.[i] Initiatives of taking assistance of TB Vijeta's and Ni-kshay Saathi's have strengthened the patient support mechanism and systems thereby increasing community participation. The TB patients with other chronic conditions like malnutrition, diabetes and HIV-AIDS are now getting the extra medical care and tailored treatment plans that will enhance their treatment outcomes and increase their life expectancy.

In context of national and global commitments to eliminate TB, it is essential to understand India's performance and key challenges in achieving this target. This study aims to assess India's progress and current TB elimination strategies including gaps in program implementation and service delivery and will accordingly provide insights and recommendations that will strengthen the elimination program. This will be done by reviewing key indicators such as TB incidence rates, mortality rates and treatment success rate relating to both DS-TB and DR-TB , case notification rates, diagnostic testing under the National TB Elimination Programme and the implementation practices of National

Strategic Plan (2017-25) by extracting relevant data from the available literature, policy guidelines , national and international TB reports and conducting a thorough secondary literature review.

Research Question:

"To what extent is India progressing towards achieving its goal of tuberculosis elimination?"

Primary Objective:

To assess India's progress towards achieving its goal of tuberculosis elimination.

Secondary Objective

- To understand National Tuberculosis Elimination Program and its components and activities
- To assess the performance of TB elimination activities
- To highlight key challenges in achieving TB elimination
- To provide recommendation to fast-track TB elimination progress in the country.

Section 2: Mode Of Data Collection

Methodology:

The study was conducted based on secondary research design by reviewing the pre-existing literature that included national policy documents (NHP-2017, NTEP), international documents (SDG), WHO Tuberculosis report 2023 and 2024, India Annual TB report 2024 and other relevant progress reports and articles that were available. Results were obtained by comparing and analysing the trends demonstrated by the Key Performance Indicators (KPIs) in the available literature.

Various research papers that have been published in reputed journals and evaluating tuberculosis elimination efforts in India were reviewed. The databases searched included PubMed and Google Scholar using keywords such as "tuberculosis elimination India," "RNTCP,", "DR-TB", "NTEP," and "MDR-TB". The search strategy included usage of certain filters while surfing the database which included – Publication date (last 10 years) and Text availability (Free Full Text).

The search was confined to English-language only, research articles published between 2015 and 2025. After removing the duplicates, articles were initially screened only by their title and abstract and later full texts of potentially eligible studies were screened for the final inclusion. Studies were included if they focused on TB elimination strategies and

programs implementation, Studies that were published in reputed journals which had an impact factor of more than 3 were only selected. Of the 50 studies initially identified, 15 were reported to meet the inclusion criteria and were included in this review.

Inclusion criteria

1) Publications and reports pertaining to TB elimination efforts in India.
2) Literature that has been published between 2015-2025 (last 10 years, as the SDGs were set up in 2015.)
3) Government reports and guidelines (NTEP, Annual TB reports, NHP)
4) Grey literature focused on status of TB elimination progress in India.
5) International guidelines like SDG.
6) Research Papers published in Journals with impact factors greater than 3.

Exclusion criteria

1) Literature and reports published before the year 2015.
2) Literature focusing on TB elimination status in other countries outside India.
3) Reports published in languages other than English.
4) Studies in which the key indicators were not measured, or results for the key indicators were not prepared.
5) Newspaper and online news articles.

Data Compilation:

To create a comprehensive evidence table, relevant characteristics were drawn from each selected study. These included the study title, publishing journal, year of publication, study link, aims and objectives, research design and setting, target population, sampling technique, major findings, strengths and limitations, and any recommendations provided. The extracted data were compiled using Microsoft Excel and tabulated for comparison and analysis.

Section 3: Interpretation from literature review and secondary data analysis

Programmatic Push:

National Tuberculosis Elimination Program (NTEP): The RNTCP was, in 2020, rechristened as the National TB Elimination Program (NTEP) with the purpose of highlighting the Government of India's objective for eliminating TB from India by the year

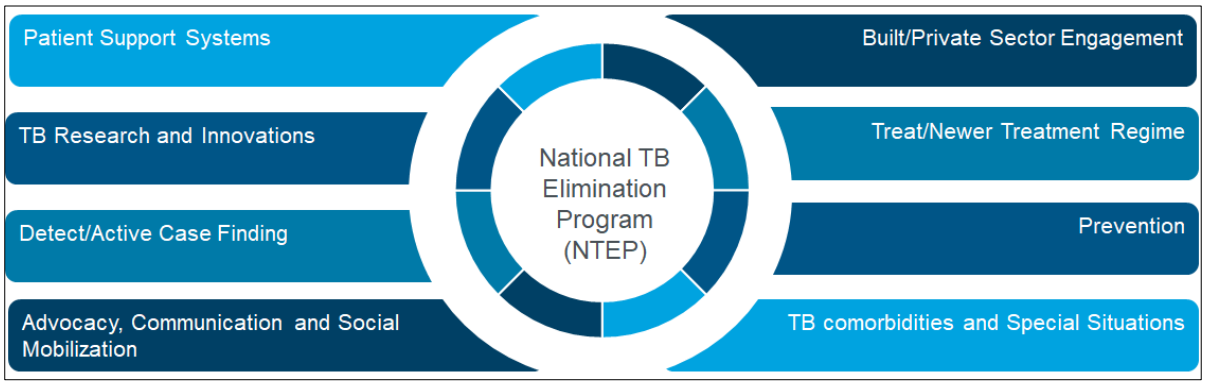
2025. It is a public health program that supports India's anti-TB work. It is a flagship program under the NHM and gives technical and managerial guidance to anti-tuberculosis work across the country.

The general NTEP specific goals are as follows.

- 80% reduction in TB incidence.
- 90% reduction in TB mortality.
- Zero catastrophic cost on TB treatment
- The program establishes a 90% treatment success rate.
- Increased private sector involvement, notification to 1.5 million annually and ensure consistent quality of care, by 2023.

The programme is dominated primarily by the NSP 2017-2025, and activities of the programme are executed on 4 strategic pillars – "Detect – Treat – Prevent – Build" (DTPB). These pillars collectively address the full continuum of TB care, ensuring that every aspect from case detection and treatment to long-term prevention and systemic strengthening is managed through a coordinated and integrated approach[ii].

Figure 2: Components of NTEP



The NTEP adopts a comprehensive multi-pronged strategy encompassing critical components:

Detect/active case findings; Expand diagnostic reach through early identification and active surveillance using molecular testing and portable x-rays.	Treat/ Newer Treatment Regime; ensure effective and patient friendly TB treatment through standardized and shorter oral regimes.

Prevention; Interrupt TB transmission via systematic contact screening and preventive therapy.	Built/Private sector engagement; Leverage digital platforms to integrate private sector in TB cases management and data analytics
.TB comorbidities and special Situations; Address comorbidities like HIV, Diabetes and malnutrition to improve TB outcomes.	Patient Support System: Provide financial aid to enhance TB treatment adherence and reduce patient burden.
Advocacy, communication and social mobilization; Foster community engagement to strengthen TB elimination efforts.	TB Research and Innovations; Drive innovation and collaboration to advance TB diagnostics, treatment, and prevention

Additional activities include, India has launched a range of innovative initiatives under NTEP to support its ambitious 2025 target.

1) **The 100-day campaign** marked a significant milestone in India's fight against tuberculosis, focusing on high burden and vulnerable population across the country named the Pradhan Mantri TB Mukt Bharat Abhiyaan (PMTBMBA), which was launched in 2022. During the campaign, 12.97 crores individuals were screened leading to the detection of 7.1 lakh, 2.85 lakhs asymptomatic cases. It encourages community support through the Ni-kshay Mitra initiative, under which individuals and organizations adopt TB patients to provide nutritional and emotional support. Over 1.5 lakh Ni-kshay Mitras have registered, illustrating strong civic engagement [XIX].
2) Another critical scheme is the **Ni-kshay Poshan Yojana** which provides DBT of INR 500 per month to each TB patient to ensure nutritional support. Since its inception, it has disbursed INR 2781 crores to over 1 crore beneficiaries [i].
3) India has also **expanded TB preventive treatment (TPT)** using a shorter 3 HP regimen for management of latent TB. It involves once a week dose of isoniazid and rifampicin for a period of 12 weeks, which is a significant reduction in pill burden[XX].
4) The government has additionally launched Adult BCG vaccine trials, integrated TB care under the Ayushman Bharat Mission, and leveraging of digital platforms like the **Nikshay portal and Tele-TB consultations** to streamline diagnosis, treatment, and follow up [i].

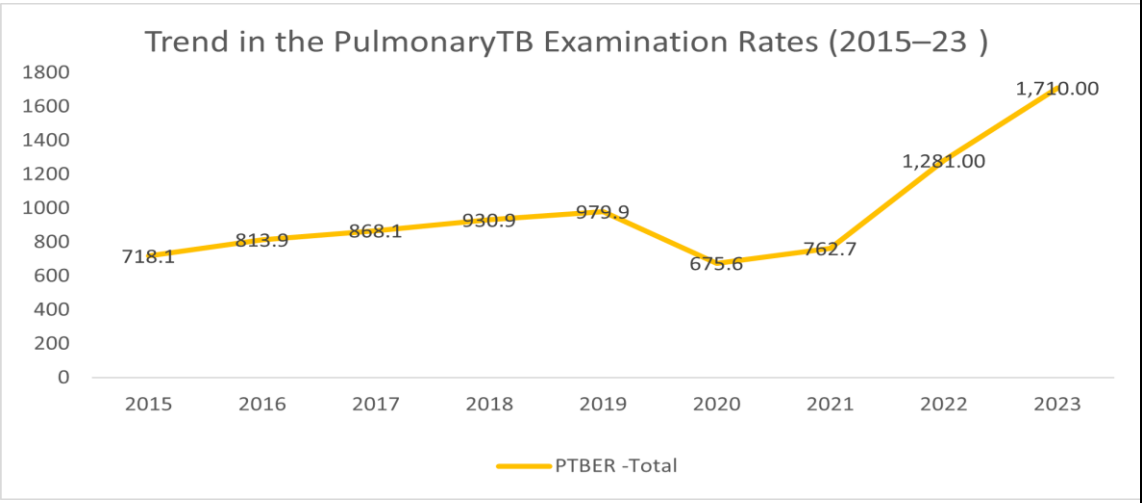
Progress for TB elimination in the country

The nation has achieved great strides in declining incidence and mortality rates of TB. A study which compared TB incidence at subnational level with 3 different approaches to track progress toward TB Elimination in India portrayed that TB incidence in 1 state (Kerala), 2 UTs (Lakshadweep and Dadra and Nagar Haveli, Daman & Diu) and 35 districts has reduced by a minimum of 20% compared with 2015. Two districts in India were free of TB in 2020, namely Budgam (J&K) and Lakshadweep [xii].

Despite global increases in TB cases post-pandemic, India has contributed to stabilizing the situation through improvements in notification, service delivery and coverage. India made substantial progress in expanding the use of WHO-recommended rapid molecular tests (e.g., GeneXpert, TrueNat). India is one out of the only 3 countries (with Cambodia and Timor-Leste) who have conducted a national level survey to detect TB prevalence that was completed by 2021, whose results were a key input into WHO's TB incidence estimates for India [ii].

Trends in new case Detection and Notifications

Figure 3: Trends in PTBER 2015-23



In case of TB notification rate, India has made significant progress. TB case notifications surged from about 1.63 million in 2015 to over 2.55 million in 2023, a ~58% overall increase. It is also observed that the private sector notification rate is also increasing over the years with it's contribution rising more than sevenfold to ~33% of total cases [ii]. India diagnosed 63,939 cases of MDR-TB, highlighting it's commitment to address drug resistance [i].

Figure 4: Trends in ACNR 2012-2023

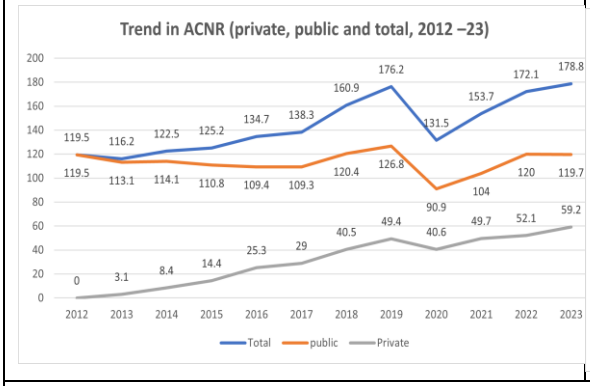
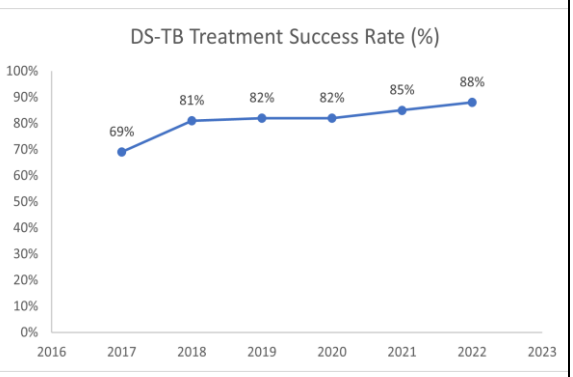


Figure 5: Trends in Drug-susceptible TB (DS-TB) treatment success rate



The Pulmonary TB Examination Rate of India was stable during 2015-2019, witnessed a decline in 2020, due to Covid-19 and the examination rate has increased steadily from

2021 onwards, indicating a significant growth in diagnostic efforts. Similarly, trends in annual case notification rate have increased sustainably from 2012 to 2023 with private notification increasing, reflecting improved engagement with private sector. Drug susceptible TB treatment success rate has increased from 69% in 2016 to 88 % in 2022 with a consistent year on year improvement. India is among the best-performing of the 30 high TB-burden nations globally with >80% treatment coverage i. DBT under NPY remained committed to providing financial support to TB patients, where around INR 2,781 crores was released to almost 1 crore beneficiaries i. Starting of Pradhan Mantri TB Mukt Bharat Abhiyaan (PMTBMBA) in September 2022 was a landmark in the activity of engaging communities, under it over 1.5 lakh Ni-kshay Mitras have become committed towards assisting individuals suffering from TB. Other programs like incentives to the treatment supporters and ASHA workers, TB Vijeta's and Ni-kshay SAATHI further aimed at enhancing patient support systems [i].

Achievements when compared with National Strategic Plan (NSP)

Table 1: Impact of Indicators and achievements of NSP

Target and achievements Of National strategic plan			
Impact Indicators	**Baseline**	**Target**	**Achievement**
	2015	**2023**	**2023**
Reduction in estimated TB incidence rate (per lakh population)	217	77	199
Reduction in estimated mortality due to TB (per lakh population)	32	6	23

Source: Central TB Division, Ministry of Health and Family Welfare

Target and achievements Of National strategic plan			
Outcome Indicator	**Baseline 2015**	**Target 2023**	**Achievement 2023**

Total TB notification rate (in millions)	1.74	2.7	2.55
Total private providers TB notification (in millions)	0.19	1.5	0.84
Proportion of notified patients initiated on treatment	90%	95%	95%
Treatment success rate in notified DS-TB patients	75%	92%	87%
Treatment success rate in notified DR-TB patients	46%	73%	65%

Table 2: Outcome indicators and achievements of NSP

NTEP continued to ensure that the supply of quality-assured anti-TB drugs and diagnostics isn't interrupted by maintaining a robust procurement and supply chain management systems. Real-time inventory management and logistics tracking is facilitated through the Ni-kshay Aushadhi module, enabling efficient distribution and timely availability at all levels. 84% of drugs and 76% of diagnostics were supplied against the indents raised during the year 2023, depicting efficiency in central procurement and delivery systems [i]. The NSP has shown notable improvements in notification rates and treatment initiation, and success rates, however we are nearing the targets. For instance, the TB incidence rate had a target of 77 per lakh population for the year 2023, and the TB incidence showcased a 16% decline, that is higher than the global decline of 9%. And the TB mortality, depicted a 18% decline, although we are yet to achieve the targets [ii].

The Joint Effort for Elimination of Tuberculosis (JEET) Project was implemented across 95 districts in six states of India as a major initiative to engage the private sector in TB care and reporting. Running from January 2018 to December 2019, the project led to a 138.1% increase in TB notifications, rising from 44,695 to 106,404 cases. Additionally, the case notification rate increased from 20 to 44 per 100,000 population, and the number of private sector notifications more than tripled during this time. The increase in the number of notified cases of microbiologically confirmed pulmonary and extra-pulmonary tuberculosis cases was more than double (from 10780 to 25 384) and almost threefold (from 1477 to 4096), respectively. Districts where the project was carried out experienced a 150.3% rise in case notification rates per 100,000 population, increasing from 16.8 in 2017 to 41.9 in 2019. In contrast, districts without project implementation saw a comparatively lower increase of 89.8% during the same period [v].

India faces a number of challenges at various levels of health system that hinder it's TB elimination efforts, that are as follows:

Impact of COVID-19 pandemic on National TB Elimination Efforts

The COVID-19 pandemic severely disrupted the essential Tuberculosis (TB) service in India. Controlling TB in a densely populated country with a great number of individuals with latent TB infection proved especially challenging, as the pandemic made it more difficult to detect and treat active cases. The government healthcare system was significantly overwhelmed by the rise in COVID-19 cases, while private healthcare services became less accessible and more costly. A lack of preparedness, particularly in ensuring the uninterrupted supply of anti-TB drugs, led to temporary hinderance in TB service delivery [xv]. According to Health Management Information System (HMIS) data, the pandemic severely detoriated the TB prevention, diagnosis, and treatment services, with notable decline in the availability of DOTS providers and anti-TB drugs. Human resources responsible for TB programs were diverted to manage COVID-19, resulting in decline in the quality of reach of TB care. According to modelling studies, the 59% drop in tuberculosis case detection from the end of March to May 2020 may have resulted in an estimated 87,711 excess deaths during that year [xvi]. On a positive note, measures taken for COVID-19 control such as social distancing and bidirectional screening, contributed to limiting the TB infection pool and aided in simultaneous diagnosis of pulmonary TB and COVID-19, with efficient use of resources [xv]. In response, NTEP launched a Rapid Response Plan in September 2020 to improve the standards of services that were disrupted by the pandemic's impact on TB services and recovery efforts [xvi].

Health seeking behaviour

A study conducted in 2021 by Beena E. Thomas and colleagues focusing on India's tribal population reported that, out of 74,532 individuals screened for TB-related symptoms, 2,675 were identified as presumptive TB cases. Only one-fourth of them presented for care for their symptoms. Although half of them presented for care after one week, one-fifth presented for care after more than one month with no difference found regarding the first point of care ; stats show that half of them approached a private and half of them approached a public facility. The significant factors that influenced care-seeking behaviour of different individuals were knowledge on symptoms of TB, such as blood in sputum, shortness of breath and unexplained weight loss. Gender differences have been observed in symptoms that effected care-seeking behaviours [vii].

It is also clear that the recipients were poorly informed regarding the handling of side effects or issues- as seen as being a lack of care and insensitivity by treatment staff. The

perceived indifference in government treatment centers urged beneficiaries to use private providers as an alternative. Alcohol abuse was also a significant challenge to treatment compliance observed by providers. Social exclusion and stigmatization for being infected with MDR-TB is also brought out. Weak family and social networks had been observed to lead to LTFU.

Service delivery

Previous studies indicate that there are prevalent issues in the effective application of TB Preventive Treatment (TPT).

Priority number one for NTEP was to identify, treat and follow-up individuals with active TB disease and since India carries a heavy burden for the active disease, this monumental task takes away from the significance of TPT. India has been late in embracing recent technologies for diagnosing Tuberculosis Infection (TBI). As per national policy, RNTCP depends on Tuberculin Skin Test (TST) for detecting infection, but TST has a number of drawbacks such as poor reproducibility and high false positives. Further, there is an ongoing lack of quality-assured Purified Protein Derivative (PPD). Cost of the product, technical difficulty and restricted commercial availability of IGRA raises a question mark on the feasibility of its use generating an emergent need to determine what test, is the most suitable test to administer in India to quickly detect TBI and select those, most likely to be benefited from TPT. But in our nation, the administration of TPT is mainly for the kids. This has also been displayed by previous studies that have recruited adult participants, that the TPT acceptance rates have been significantly low iii. The monitoring and expiry management of NTEP drug stocks in the private sector is handled by the Patient Provider Support Agency (PPSA) under contract to the NTEP. Although the Joint Monitoring Mission (JMM) depicts that the drug management system under the RNTCP works well, with no noticeable drug shortages having occurred in the past two years but an absence of a sufficient amount of buffer stock in the country poses a risk of drug shortages in the future, if there are unforeseen delays in procurement, or if more than the expected number of TB cases emerge. Even under NTEP all Anti-TB drugs are available with sufficient stocks ranging for six months and above. Frequent transfers of trained staff and inadequate number of trained personnel at PHCs and TB units disrupts continuity of treatment [i]. Many patients face delayed diagnosis due to low awareness, poor access to diagnostic tools in rural areas, and multiple provider consultations. Delayed case detections are also observed, due to missing asymptomatic or subclinical TB cases [i]. Overburdened health workers in public facilities, lack of trained staff, and shortages of diagnostics and drugs in some states also hinders service delivery [xviii]. Extensive gaps exist in the service delivery;

differences in HR staff between different States/UTs are one of NTEP's biggest challenges. The ratio of notified TB patients who received financial aid under DBT showed a wide gap. Suggesting partial financial coverage to patients. An economic-epidemiological model provided deeper insights, suggesting that decentralized Xpert testing was most advantageous when testing volumes were high at local facilities, pre-treatment loss to follow-up (LTFU) rates were elevated, and when the specimen transport system was dedicated solely to TB. Assuming the quality of testing remained consistent across both centralized and decentralized settings, the decentralized approach proved more cost-effective, with median savings of $338,000 per 20 million population over a decade in the most economically favourable scenario [xiv].

Most of the previous studies have used that homes of PTB patients are transmission hot spots and should be treated with TPT to reduce the pool of infection [iv].

Drug Resistant TB

India bears a quarter of the world's MDR-TB burden, the highest globally. 3% of new cases and 25% of relapse cases develop MDR-TB or resistance to one of the Anti-TB drugs. Monoresistance to rifampicin drug was not observed and resistance to isoniazid was a common occurrence, followed by resistance to pyrazinamide and to streptomycin respectively. Among the relapse cases, greater resistance to first-line drugs was noted. Fluoroquinolones (FQ) Resistance may contribute to the emergence of XDR-TB. India have noted increased FQ resistance rates among MDR-TB patients compared to Non MDR-TB patients. India is plagued by uncontrolled empiric FQ use because it can be bought over the counter. Findings from the initial National Anti-Tuberculosis Drug Resistance Survey revealed that new TB cases showed higher resistance to aminoglycoside antibiotics such as amikacin, capreomycin, and kanamycin, compared to those with a history of treatment. Additionally, 1.3% of all tested samples were identified as XDR-TB. Contrary to the traditional belief that previous TB treatment is a major risk factor for MDR-TB, emerging data suggests that the majority of MDR-TB cases are due to transmission rather than acquisition, accounting for 96% of new cases and 61% of relapsed cases in India. To effectively detect the estimated 2.8 million TB cases and 150,000 MDR-TB cases each year, there is an urgent need to expand both the laboratory network and testing capacity across the country.

Indian healthcare facilities lack effective airborne infection control systems, where only 10% of healthcare professionals use N95 masks. This is manifested clearly in the high rate of latent and active TB infection among Indian healthcare workers [xiii]. A qualitative study conducted at an MDR-TB treatment center in India identified several barriers to treatment

adherence, including adverse drug reactions, limited provider support, financial constraints, mismatch between patient schedules and treatment timings, heavy alcohol use, and social stigma. Treatment challenges were intensified by the large number of daily pills, injections, and the prolonged duration of MDR-TB therapy. Many participants reported difficulty sticking to the regimen, which could involve 10 to 13 pills daily along with injections over a period of two years or more.

The study also noted that adult women tend to mount stronger immune responses, often leading to a tuberculoid form of the disease, which may play a role in the development of MDR-TB. According to the findings, 19.3% of females had MDR-TB while 14.7% had non-MDR-TB, based on 95% confidence intervals. Additionally, older adults and individuals living with HIV appeared to show greater resistance to MDR-TB, as supported by multivariate logistic regression analysis [xvii].

Direct benefit transfer

A Mixed-Methods Study on the Requirement of Re-examination of the Cash Transfer Policy of India in 2022 has shown that 9% of the patients were not given DBT, for 46% beneficiaries their first instalment was delayed and 49% of them were given their last instalment after their treatment was over.

On a multivariable logistic model, non-recipients of the DBT scheme, unemployment status, and a HIV positive status were a strong predictor of poor treatment outcomes. An ICMR study conducted between 2018 and 2022 across nine states revealed that around 75% of TB patients received at least one instalment of the Nikshay Poshan Yojana (NPY). However, more than half of these recipients experienced delays of over three months before receiving their first payment. The primary causes of these delays included procedural bottlenecks, detection of errors, and challenges in collecting accurate bank information from beneficiaries. Additional obstacles included absence of a bank account, inactive accounts, missing documentation, and the use of a single bank account for multiple family members. Individuals also feared being defrauded because of the exchange of personal bank information, certain patients declined the financial support of 500 rupees since they have some scepticism or question where and in what manner their bank information will be utilized. A few NTEP officials were of the opinion that it is almost impossible to achieve 100% coverage of the DBT scheme as there persisted a severe lack of proper documentation among the migrants. Some of the staff were also of the opinion that DBT was being misused on addiction or buying commodities other than food, particularly by males. Almost all the patients felt that the monetary benefit under the current program falls short of adequately addressing the nutritional needs of TB patients

undergoing intensive anti-TB treatment. A 2022 mixed-methods study involving 426 participants found that 9% did not receive direct benefit transfers (DBT), while 91% had successfully completed their treatment. According to multivariable analysis, patients who did not receive DBT had a fivefold higher likelihood (95% CI: 2–12) of experiencing unfavourable treatment outcomes [xi].

Community Awareness and Engagement

A 2016 systematic review and meta-analysis by Subbaraman et al. provided a detailed overview of the multiple stages in the TB care cascade where patients are often lost to follow-up, severely undermining the effectiveness of healthcare delivery under the Revised National Tuberculosis Control Program (RNTCP). One of the most critical contributors to these losses is the pervasive stigma surrounding tuberculosis. In a community-based survey across 30 Indian districts, Karuna D. Sagili found that approximately 75% of respondents held stigmatizing views toward individuals with TB.

This stigma leads to delayed care-seeking and late diagnosis, which increases the size of the infectious TB pool, thereby raising the risk of both community-level and household transmission. Furthermore, more than half of TB patients reportedly continue to face social discrimination even after diagnosis. Another notable study in India estimated that over 200,000 patients experience pretreatment loss to follow-up (PTLFU) each year under the National TB Elimination Program (NTEP), with stigma being a major driving factor.

Previous studies have shown that TB-related stigma stems from various fears and social beliefs, including fear of airborne transmission, loss of status, social exclusion, rumours, verbal abuse, emotional mistreatment, difficulty in marriage, and even family abandonment. A widespread misconception is that TB is hereditary. Interestingly, individuals who are aware that TB is curable and transmitted through the air still exhibit high levels of stigmatizing behaviour, challenging the notion that knowledge alone can dispel stigma.

Women documented more TB stigma concerning marriage potential and men documented stigma concerning work. One of the radical measures that India undertook in 2017 was to look actively for TB in vulnerable and marginalized populations, this has been said to be distressing because it is embarrassing, uncomfortable and not private [vi].

Several studies suggest that although free of cost TB care services are readily available in the public sector, almost half of the TB patients are managed outside of RNTCP. TB drug sales in the private market suggest that over 2.2 million patients with TB are being managed by the private health sector every year, which is twice the number managed by

the public sector. India's private healthcare sector is fragmented, unregulated and comprises of different types of providers making the quality of TB care suboptimal in this sector.

Private sector

A 2015 systematic review by Satyanarayana et al. analysed 11 studies and found that public sector healthcare providers generally demonstrated better knowledge and practices related to TB compared to those in the private sector. The review highlighted that fewer than one-third of TB patients in the private sector receive appropriate care. Multiple well-structured systematic reviews have explored the causes and extent of poor diagnosis and treatment outcomes in India. On average, TB patients experience a diagnostic delay of about 55 days, often after consulting nearly three healthcare providers for their symptoms.

Out of 22 studies evaluating provider knowledge, less than half of the surveyed providers were aware of the proper use of sputum smears for TB diagnosis. In 75% of studies evaluating self-reported practices, fewer than 25% of providers reported ordering sputum smears for patients with chest symptoms. Additionally, in 11 out of 14 studies assessing treatment knowledge, less than one-third of providers were familiar with the standard regimen for treating drug-sensitive TB (DS-TB).

A consistent finding across all simulated patient studies conducted in India was the low rate of TB testing, even when patients presented with classic symptoms of the disease. Instead of proper testing, broad-spectrum antibiotics and non-specific treatments were commonly prescribed. As a result, although patients actively seek medical help, they are either misdiagnosed or experience significant delays in diagnosis.

Recognizing these challenges, numerous initiatives are underway to strengthen the involvement of the private sector in the delivery of TB care in India.

NTSU has been created with the help of IQVIA and offers technical support to the states to strengthen private sector involvement. It is presently operating in 9 focus states. Private providers are also offered financial incentives for reporting a TB patient as well as for reporting the treatment outcome of a TB patient.

Section 4: Recommendations and Conclusion

Enhancing active case finding (ACF): Earlier evidence suggests that accelerating the reduction in TB cases is possible through strengthening health systems and enhancing the quality of care, particularly by expanding active case finding (ACF) efforts among high-risk and vulnerable groups such as people living in urban slums, tribal communities, and individuals with HIV.

Strengthening and scaling up of screening and diagnostic services: Scale up utilization of rapid molecular tests such as CBNAAT/True Nat at the level of primary care. Government should increase testing infrastructure in Community Health Centres (CHCs) and primary care facilities below it, provide portable Xray at all levels of care, and increase awareness for its usage. Further we should make efficient use of digital mechanisms and

use AI-enabled chest X-ray interpretation tools (like Qure.ai) to improve screening and integrate digital platforms (Nikshay, Nikshay Aushadhi) for referral-tracking and follow-up. Also, we should ensure universal Drug Susceptibility Testing (DST) at the time of diagnosis. Medication availability should be prioritized across all sectors and be made available through easier drug procurement mechanisms.

Integration with Ayushman Arogya Mandir (AAM): Integrate TB screening with other health programs such as Ayushman Bharat HWCs. Mobile X-ray units should be deployed and scheduled on a fixed weekly rotation across all Ayushman Arogya Mandirs (AAMs), thereby enhancing diagnostic outreach for high-risk populations.

Improving health seeking behaviour: Delayed care-seeking among tribal individuals showing signs of TB remains a significant barrier to effective treatment. To ensure timely diagnosis and initiation of care within these communities, there is a critical need for gender-responsive strategies alongside robust health system improvements. Adherence to treatment is influenced by various factors, including the management of drug-related side effects, the introduction of shorter and fully oral treatment regimens, provision of motivational support, flexible timing for DOT services, and the presence of social and familial encouragement. Additionally, increasing awareness through intensified Information, Education, and Communication (IEC) efforts plays a crucial role.

TB-related stigma is complex and multilayered, necessitating tailored, context-specific interventions that span across the entire TB care continuum. Addressing this requires empathetic, patient-centred psychosocial and clinical support, designed to be non-discriminatory, sensitive, and need-based. Furthermore, efforts to reduce stigma should be intensified through Advocacy, Communication, and Social Mobilization (ACSM) initiatives.

Enhancing Efficiency of Nikshay Poshan Yojna:

To improve the impact of the Nikshay Poshan Yojana, the scheme could be strengthened by providing monthly food kits rich in essential nutrients and increasing the current financial support under the Direct Benefit Transfer (DBT) mechanism. These enhancements may contribute to better treatment adherence and improved health outcomes for TB patients. Strengthening role of TB health visitors in generating awareness, opening of zero balance account and verification of account details of beneficiaries.

Strengthening inter and intra departmental collaboration: Initiatives should be taken to foster coordination with ministries of labour, housing, tribal affairs, railways, etc. and

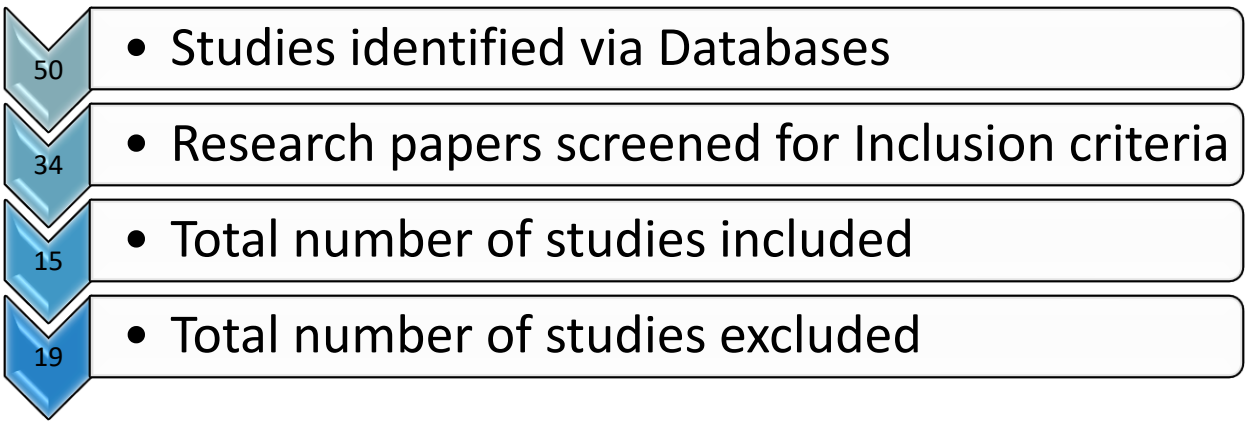
integrate TB Screening with Other Programs like screening for TB during HIV testing and treatment visits, NCD clinics (e.g., diabetes, smoking cessation programs) and antenatal care for maternal TB detection. However, additional context-specific interventions are needed to reach the TB elimination targets, which might include tackling undernutrition [viii].

Augmenting role of private providers: There is persistently low notification rates from the private sector, a dual-incentive framework must be instituted, a strengthened regulatory architecture should be enforced to ensure comprehensive and accountable private sector engagement.

Although India has made impressive progress towards its TB elimination goal, the evidence indicates that it isn't on track to achieve its target by 2025, at the current pace and scale of interventions. A modified strategy emphasizing early diagnosis, health system strengthening, multi-sectoral partnerships, private sector involvement and technological innovations will be critical to eliminate TB.

ANNEXURES

Annexure 1:



Annexure 2:

Evidence table of the included studies is attached below.
https://docs.google.com/spreadsheets/d/1we03ezCp278UpYarrsvdyjiCHiYo1igGZ32CiPS9-Xs/edit?usp=sharing

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