

Tuberculosis

Assessing the gaps across tuberculosis care cascade

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TB is an infectious disease mainly affecting the lungs, anyone can get tuberculosis, but certain factors increase the risk of getting an infection.

TB is caused by a specific type of bacteria



Mycobacterium Tuberculosis

People with active TB disease in the lungs or voice box can spread the disease



Through air

speaking

singing

laughing

coughing

sneezing

Person can get an infection after inhaling the droplets



Under 5 years of age. Until children reach age 5, they have high risk of a TB infection becoming active TB disease. The risk is greater for children under age 2.

Age 65 and older. The immune system weakens during older age. Older adults have a greater risk of active TB disease.

Risk Factors for TB infection



Working in health care and treating people with a high risk of TB.



Living with someone with active TB disease.



Living or working in places where people live close together, such as prisons, nursing homes and shelters for homeless people.



Living in a community identified as being at high risk of tuberculosis.

Living or traveling in a country where TB is common, including several countries in Latin America, Africa, Asia and the Pacific Islands.

Risk of active TB disease

- HIV/AIDS

- Malnutrition or low body weight

- Drugs to prevent rejection of transplanted organs

- Use of unlawful injected drugs

- Severe kidney disease

- Long-term use of prescription steroids

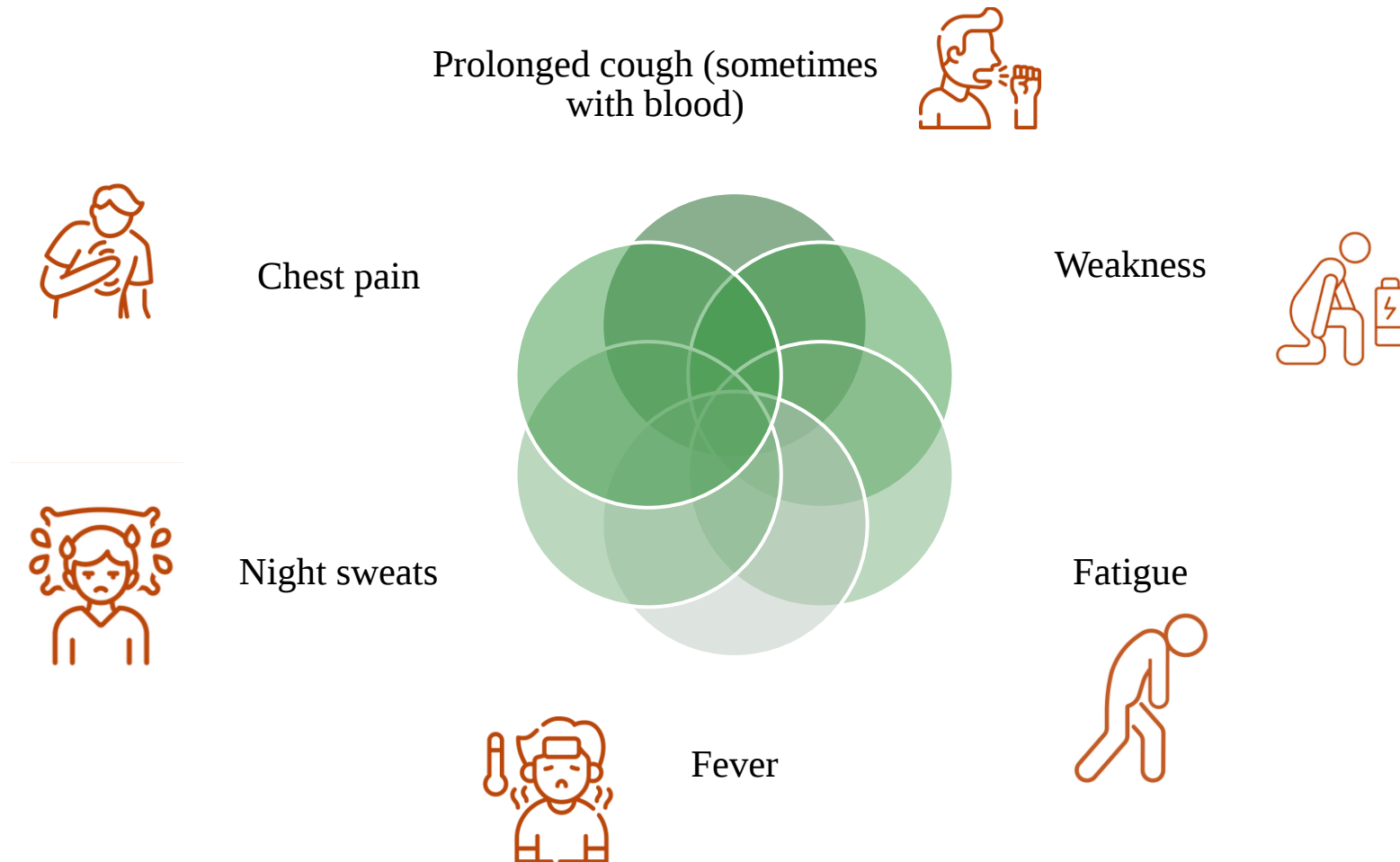
- Diabetes

- Cancer treatment, such as chemotherapy

- Smoking and alcohol

Latent TB infections (TBI) do not show symptoms and are not contagious. Just a small percentage of people gets TB infection will develop the active TB disease and show symptoms

Common symptoms of active TB include



Tuberculosis (TB) remains one of the most significant public health challenges in India, a country that bears the highest burden of the disease globally

Global Burden of disease

In 2022, TB caused the deaths of 1.3 million people, with 167,000 individuals who were HIV-positive. TB is the second leading infectious killer worldwide after COVID-19, surpassing HIV/AIDS.



10.6 M people got infected by TB in 2022



5.8 million men



3.5 million women



1.3 million children

Burden of disease in India

India is responsible for 25% of the world's tuberculosis cases, with an estimated 2.6 million new cases and almost 450,000 tuberculosis-related deaths annually



2.4 M people got infected by TB in 2022



1.4 million men



0.9 million women



0.1 million 0-14 years age

Research Question and Objective

Research Question

How can the challenges in the TB care cascade in India be effectively mitigated to enhance TB control and improve patient outcomes, particularly in high-prevalence states, while considering the financial burdens and gaps in care pathways?

Objectives

- To analyze TB prevalence across Indian states using the latest India TB Report and identify regions with the highest burden.
- To analyze gaps in the Tuberculosis care cascade, including screening, diagnosis, treatment initiation, adherence, and follow-up.
- To identify evidence-based strategies to address the gaps exist in TB care cascade.

Methodology

Study Design

This study employed a **descriptive analysis of TB** indicators using data from the India TB Report 2023 and a review of literature to analyze gaps across the TB care cascade in India. The approach involved a comprehensive review of existing literature and data sources, focusing on various stages of TB care, from diagnosis to treatment completion.

Data Sources

- PubMed
- NCBI peer-reviewed journal articles
- News articles
- TB India Reports
- National Strategic Plan (2017-2021)

Data Collection Method

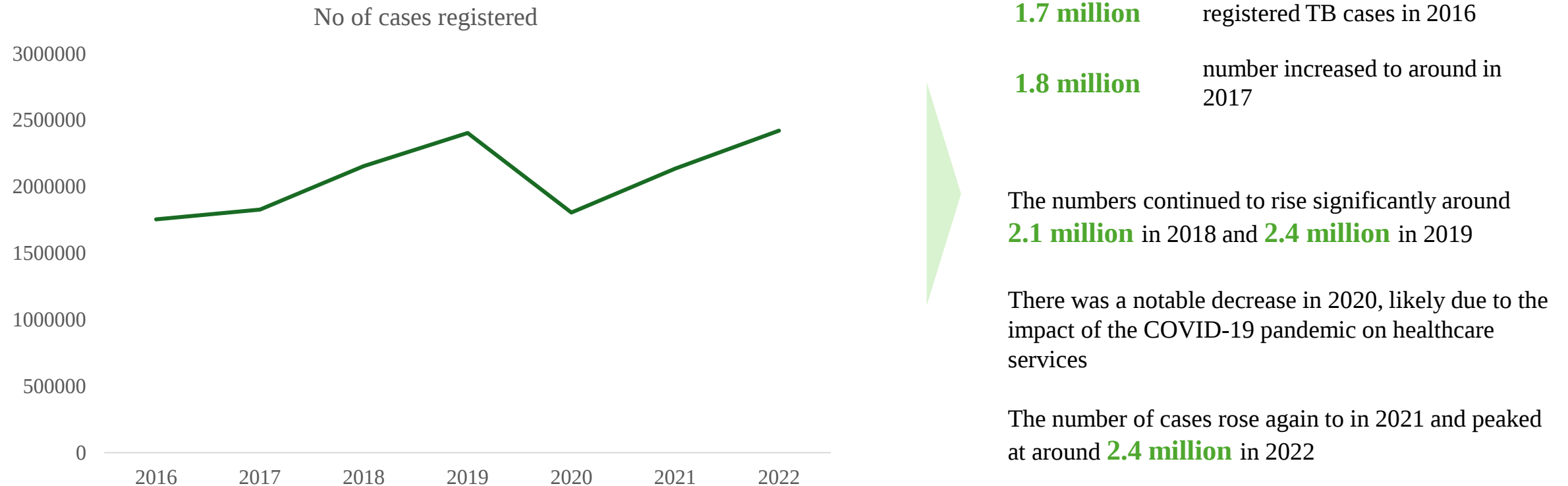
Secondary data collection was employed, gathering existing data from the mentioned sources to ensure a broad and detailed analysis of the TB care cascade in India.

Author	Methodology	Key Features
Subbaraman R, Nathavitharana RR, Satyanarayana S, Pai M, et al. (2016)	Systematic review and meta-analysis of public sector health data to construct care cascade of tb.	-Estimated how many patients suffering from TB ‘lost’ and did not receive effective treatment at each stage of care cascade. - For certain forms of TB, such as smear-negative TB and multidrug-resistant TB, increasing the detection and diagnosis of new patients utilizing cutting-edge TB diagnostic tests may be the most important strategy for improving patient outcomes.
Harsh D. Shah, Shalu Chaudhary, Bharat Desai, Jay Patel, et. al (2024)	Cross-sectional qualitative research using a grounded theory approach and thematic analysis.	-Poor health-seeking behavior influenced by socio-economic status and misinformation about TB. -Significant delays were noted in initial consultation due to patient behaviors and socio-economic factors. -Unavailability of diagnostic tests and high costs in the private sector contributed to delays. -Delays in starting treatment after diagnosis, particularly influenced by the cost and availability of tests.
Ramnath Subbaraman, Tulip Jhaveri, Ruvandhi R. Nathavitharana (2016)	Systematic review and observational cohort study	-The study focuses on identifying and addressing the gaps in the TB care cascade to improve patient outcomes and control the spread of the disease. -The impact of socio-economic factors, healthcare infrastructure, and policy gaps on the effectiveness of TB care.

Author	Methodology	Key features
Sandul Yasobant, Harsh Shah, Priya bhavsar, et al. (2023)	A cross-sectional assessment in two Indian states, Jharkhand, Gujarat	- According to the study, there are notable delays in the TB care cascade that affect more than half of patients with pulmonary TB and a far higher percentage of patients with extra-pulmonary TB. -Over half of patients with pulmonary tuberculosis and a greater proportion of patients with extra-pulmonary tuberculosis reported delays in the tuberculosis care cascade, namely during the initial phases of consultation, diagnosis, and treatment initiation..
Susmita Chatterjee, Palash Das, Guy Stallworthy, Gayatri Bhambure et.al (2024)	The study employs a combination of qualitative and quantitative research methods, including patient surveys and data analysis.	-Examines the financial burden of TB on patients living in India. -Analyzes the impact of different methodological choices on estimating catastrophic costs. -Focuses on direct and indirect costs incurred by patients.
Tadayuki Tanimura, Ernesto Jaramillo, Diana Weil, Mario Raviglione, and Knut Lönnroth (2014)	Comprehensive review of existing literature and studies on TB-related costs.	-Identification of high out-of-pocket expenses faced by TB patients. -Estimation of catastrophic costs (costs exceeding a significant percentage of household income). -Impact of these financial burdens on treatment adherence and health outcomes.

Author	Methodology	Key Features
Gargi Thakur, Shalvi Thakur, Harshad Thakur (2020)	Qualitative research involving interviews and surveys with stakeholders such as healthcare providers, policymakers, patients, and public health officials	-Identification of critical challenges in TB control, including gaps in healthcare infrastructure, diagnostic delays, and treatment adherence issues. -The impact of socio-economic factors, stigma, and lack of awareness on TB management. -Stakeholder insights on the effectiveness of current TB control strategies and areas needing improvement.
Andrew Courtwright and Abigail Norris Turner (2016)	Analysis focusing on TB-related stigma.	-Examines the pathways through which TB-related stigma impacts patients. - Identifies social, cultural, and economic factors contributing to stigma. - Discusses the consequences of stigma, such as delayed diagnosis and treatment non-adherence.
Harsh D. Shah, Mahalaqua Nazli Khatib, Zahiruddin Quazi Syed, Abhay M. Gaidhane et. al, (2022)	Qualitative review of existing literature on TB diagnosis and care.	-Identification of critical gaps in TB diagnosis at various stages, including patient delays in seeking care, community-level stigma, and systemic issues like inadequate diagnostic infrastructure. -The importance of patient education, community engagement, and strengthening healthcare systems to improve TB diagnosis and treatment outcomes.

The trend of TB prevalence in India from 2016 to 2022 based on the number of registered cases



This trend highlights both the fluctuations in TB case registrations and the significant impact of the pandemic on TB diagnosis and reporting

State wise TB case notification rates for 2022

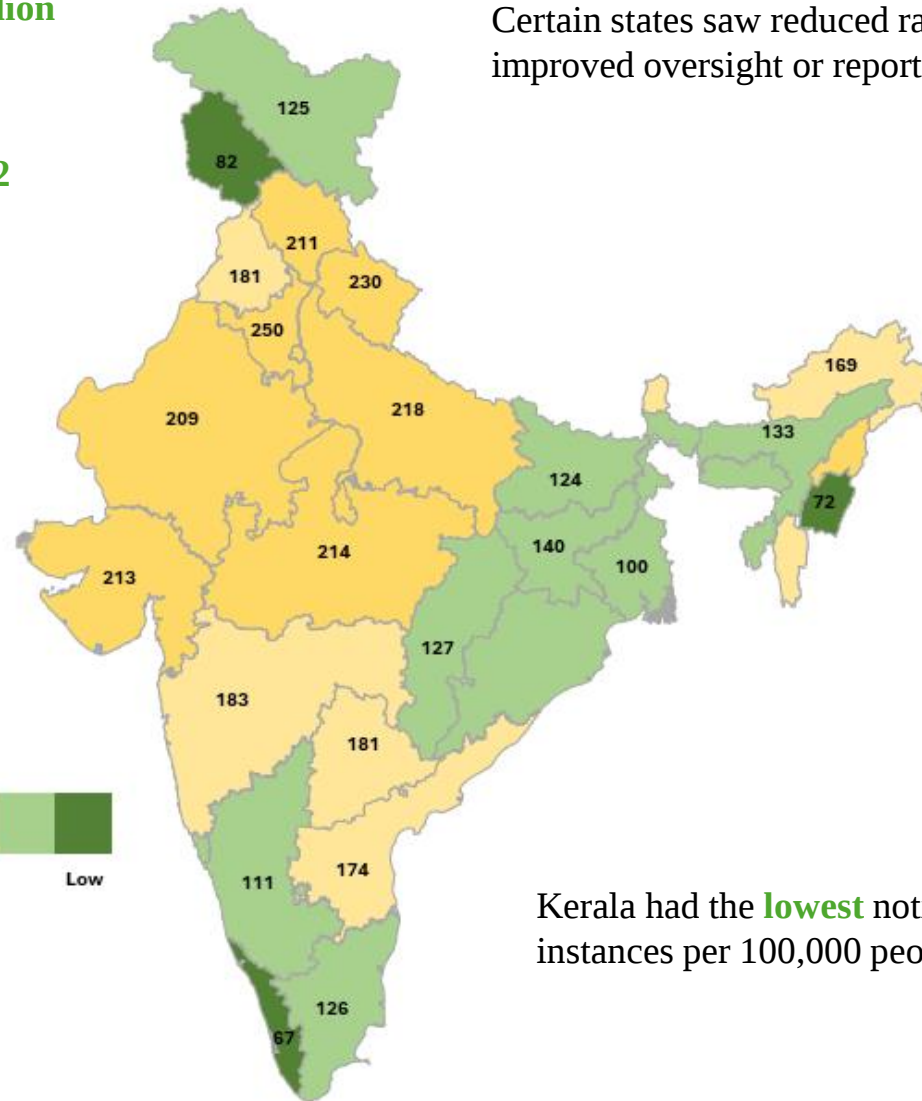
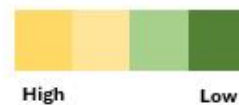
TB notifications in India reached a record high of **2.42 million** cases, marking a **13%** increase from 2021

This corresponds to an approximate notification rate of **172 cases** per **100,000** people a 13% increase from 2021

Delhi had the **highest** at **546 cases** per 100,000 people

High notification rates of **250 and 213 cases** per 100,000 persons, respectively, were also recorded by **Maharashtra and Uttar Pradesh**, indicating a notable TB prevalence in these densely populated states.

Gujarat came next, registering **214** instances reported for per 100,000 residents, demonstrating the pervasiveness of tuberculosis in the area



Certain states saw reduced rates of tuberculosis notice, indicating improved oversight or reporting

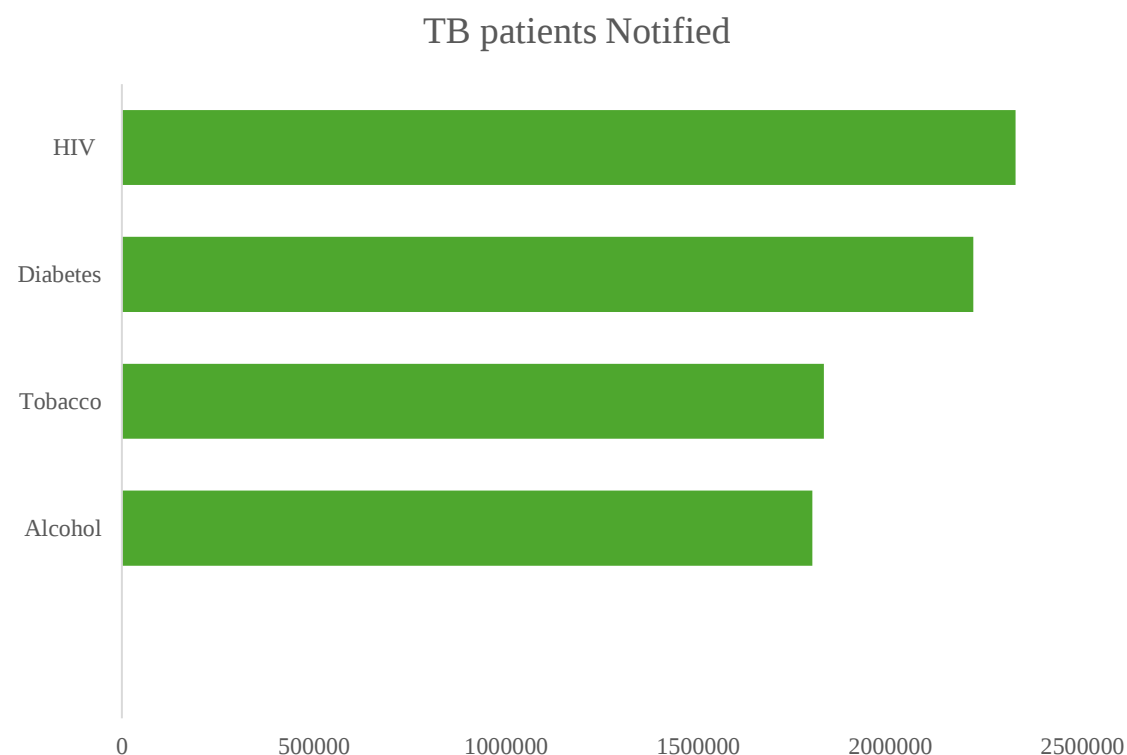
Lower rates were recorded from **Mizoram and Jammu & Kashmir**, at **72 and 82** instances per 100,000 persons, respectively.

Kerala had the **lowest** notification rate of **67** instances per 100,000 people

Overall growing trend in catastrophic expenditure for TB in India from 2015 to 2022 along with several key comorbidities that significantly impact TB notifications.



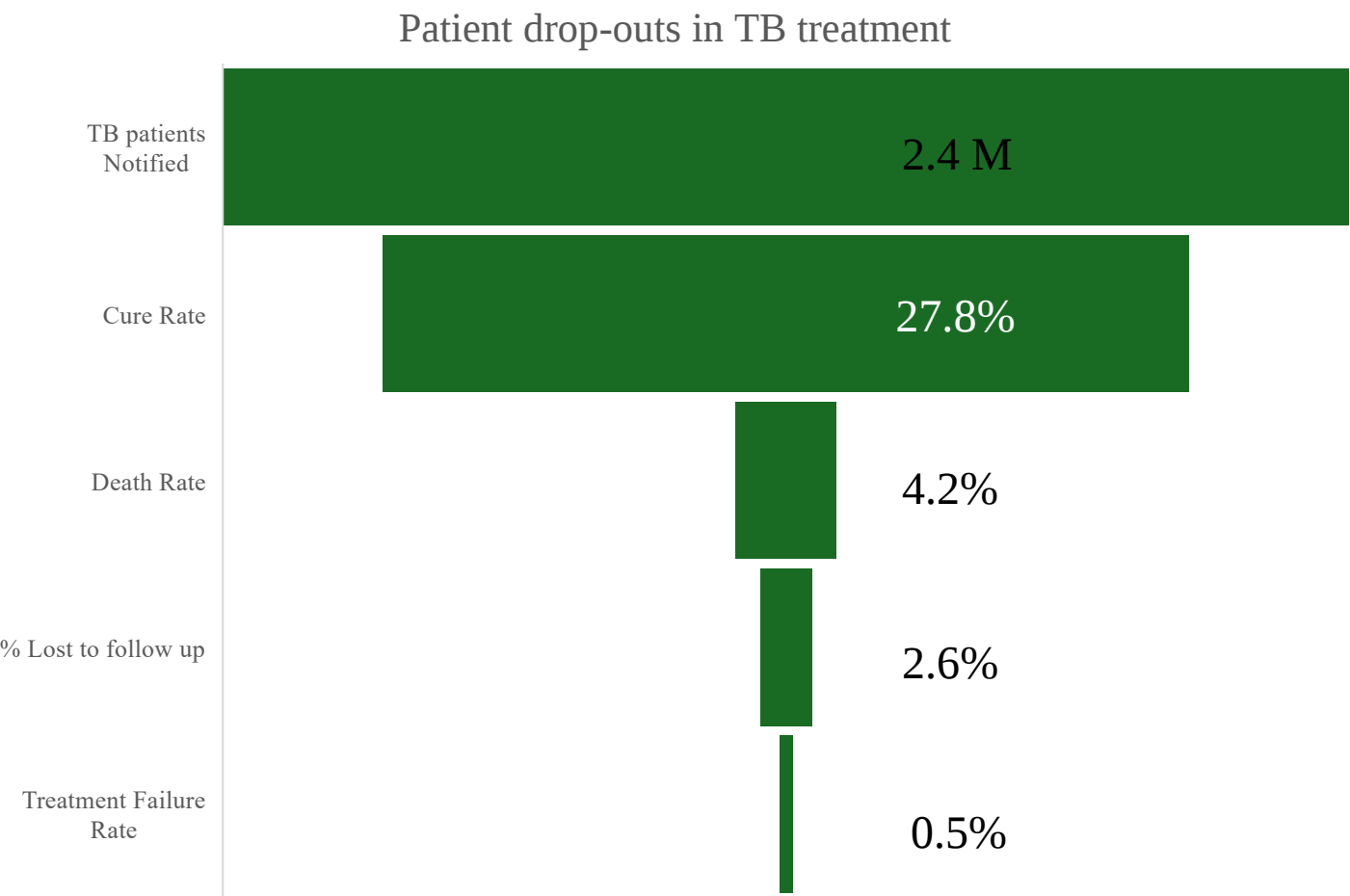
The percentage of families facing catastrophic expenditures increased from **30% in 2015** to a peak of **36% in 2021**, followed by a minor dip to **32% in 2022**



In 2022, approximately **210,543** TB patients were identified as tobacco users, with **67,157** linked to tobacco cessation services

Substantial number of TB notifications among PLHIV, exceeding **2 million** cases

TB Care cascade and treatment outcome of notified patients in 2022



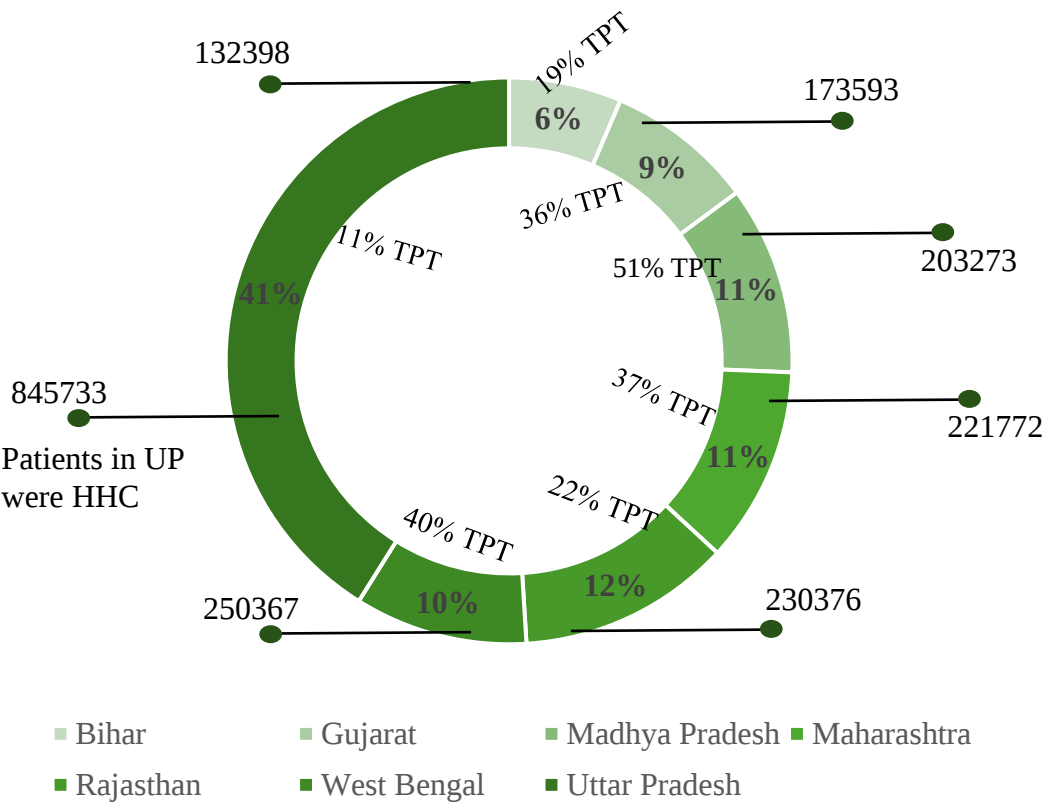
Out of 2,082,444 TB patients notified, 1,527,464 were from public and 554,980 from private healthcare facilities.

The overall cure rate is 27.8%, with the public sector achieving a much higher rate (35.8%) compared to the private sector (5.7%).

The treatment success rate is relatively consistent across sectors, with the public sector at 85% and the private sector at 86.7%, resulting in an overall success rate of 85.5%.

However, the dropout rates are concerning: the overall death rate is 4.2%, with the public sector slightly higher (4.5%) than the private sector (3.6%).

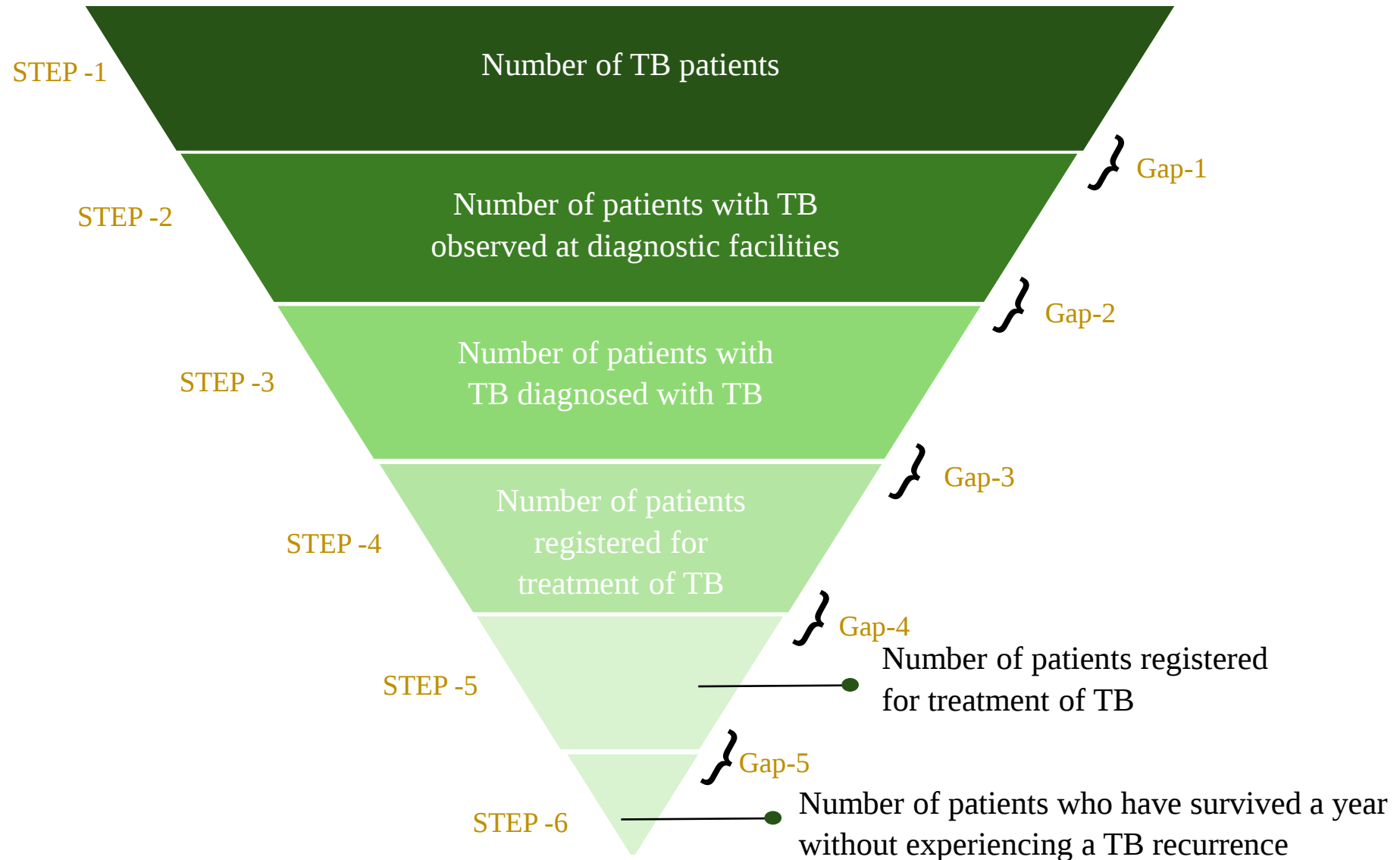
Distribution of Household Contacts (HHC) of Pulmonary Bacteriologically (PBCT) by State and percentage of patients receiving TPT



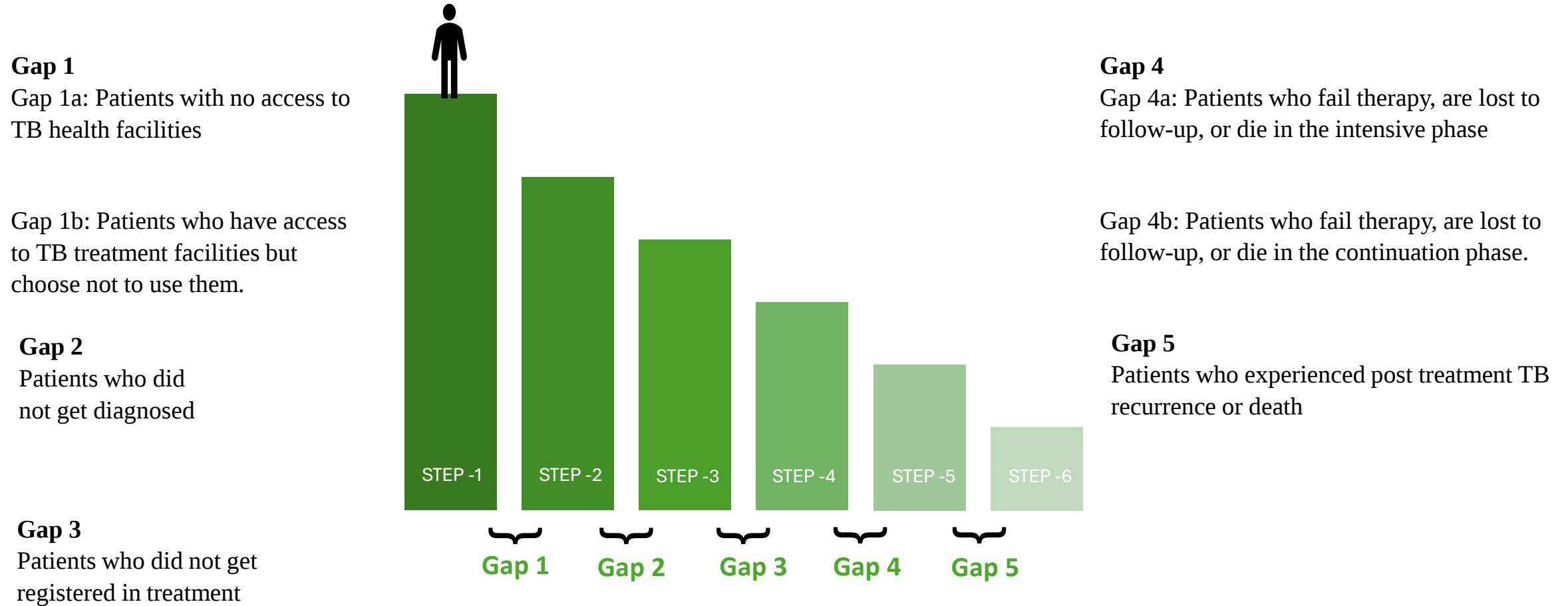
- 3356272 Patients in India were HHC of PBCT
- 92% No of HHC of PBCT screened for TB in India
- 71% No of HHC of PBCT were evaluated for TB in India
- 41% No of HHC of PBCT were diagnosed for TB in India
- 72 % No of HHC of PBCT were put on TB treatment
- 24% No of HHC of PBCT provided TPT after ruling out active TB patients

Screening efforts in Uttar Pradesh are robust, with **94%** of HHC screened for TB. However, only **39%** of those screened are evaluated for TB, and **74%** of those diagnosed are put on treatment, indicating gaps in the follow-up process. The data underscores the critical need for Treatment for Preventive TB (TPT) to reduce the risk of TB transmission and progression among HHC.

Significant gaps exist across the TB care cascade

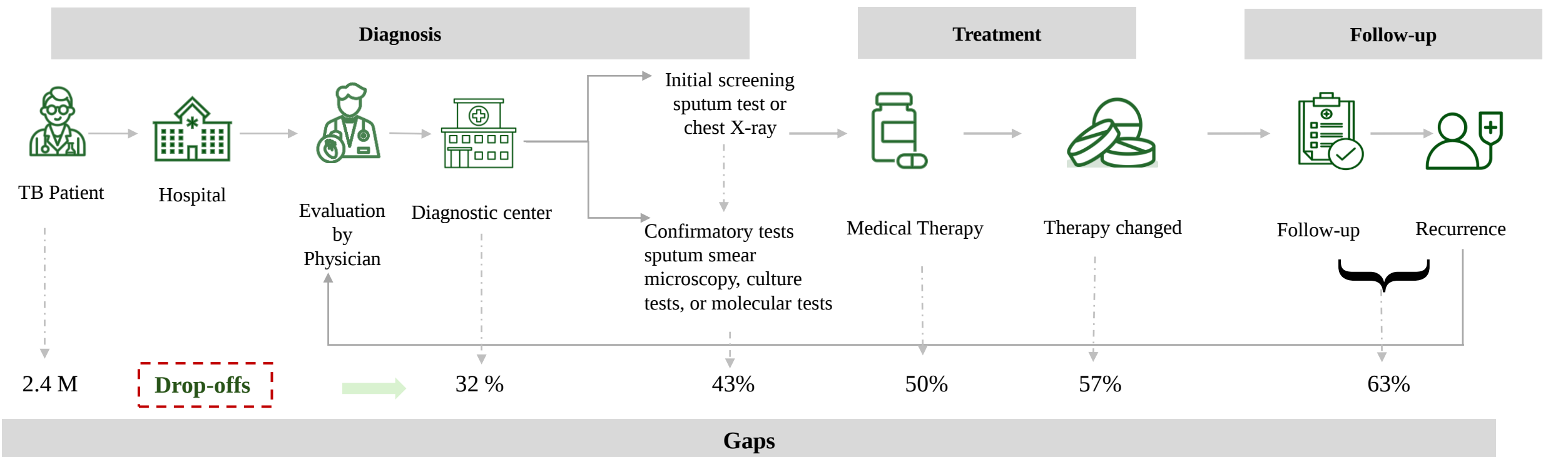


Gaps in the TB care cascade in India at each step



This approach has been vital in monitoring progress in global health initiatives, including the UNAIDS 90-90-90 strategy for HIV

Limitations of present estimations and suggestions for enhancing the situation of India's tuberculosis cascade of care



Gaps in Registration

Inadequate access to TB facilities and lack of awareness about the disease

Barrier in case detection

Inadequate access and awareness to quality diagnostic services

Gaps in successful diagnosis

poor sample collection and transportation.
Delays in test results

Barriers to get treatment

Lack of awareness about free TB treatment services.
poor coordination between the public and private healthcare sectors

Barriers to successful treatment

MDR-TB due to side effects of medications
Challenges in accessing treatment services, especially for marginalized populations

Loss to follow-up

High rates of post-treatment TB recurrence
Inadequate follow-up
Limited access to comprehensive care for patients with comorbidities or drug-resistant TB

Suggestions for enhancing the situation of India's tuberculosis cascade of care

Gaps in Registration

1

Public Awareness Campaigns

Engage with local community leaders and religious organizations to raise awareness about TB



Access to Quality Diagnostic Services especially in remote and underserved areas

Barrier in case detection

2

Improved Diagnostic Infrastructure including newer technologies like Xpert MTB/RIF



Improve sample collection and transportation systems to reduce delays in test results

Training for Healthcare Providers

Gaps in successful diagnosis

3

Awareness about Free TB Treatment Services



Provide financial support to patients who cannot afford treatment

Improve coordination between the public and private healthcare sectors to ensure seamless linkage to treatment.

Barriers to get treatment

4

Provide social support to patients, including counseling and peer support



Implement regular treatment adherence monitoring to identify and address adherence issues early

Access to Comprehensive Care for comorbidities and drug-resistant TB.

Loss to follow-up

5

Ensure that patients receive regular follow-up care to monitor treatment outcomes and detect recurrence early



Provide comprehensive care for patients with comorbidities, including treatment for associated conditions

Implement drug resistance surveillance to monitor and address the emergence of drug-resistant TB

Thankyou