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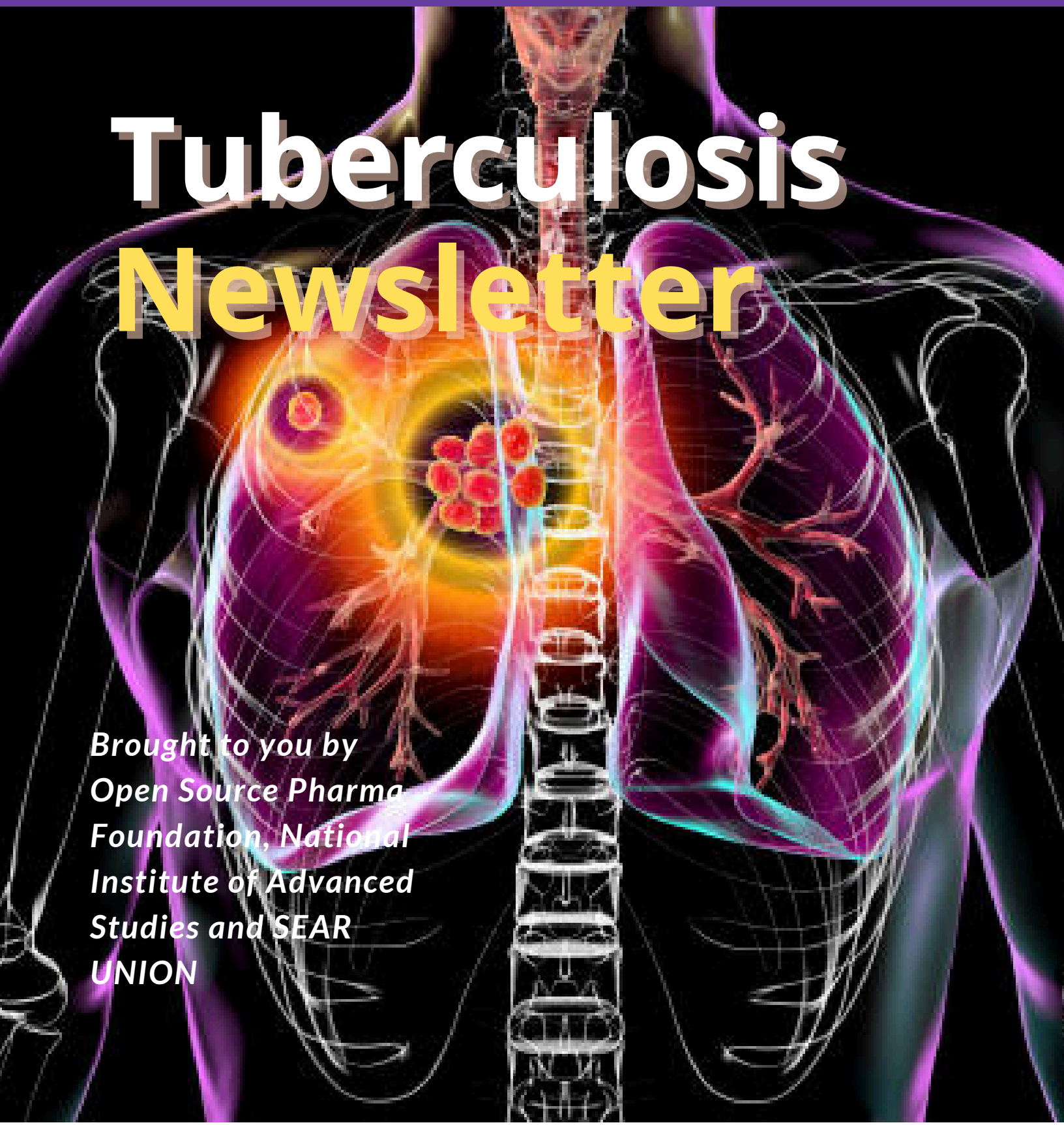
# Tuberculosis Newsletter



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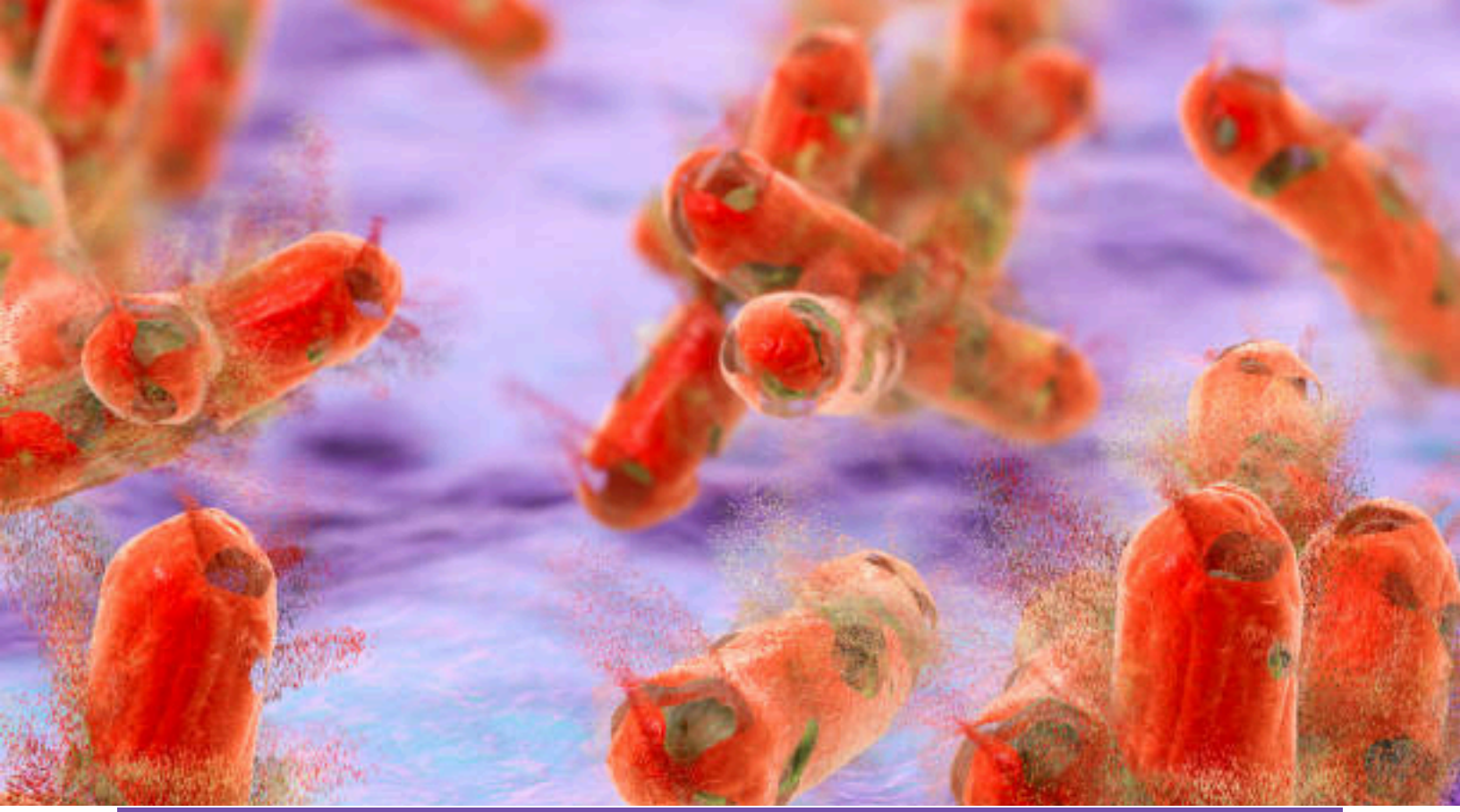

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# The Last Mile Is Not a Distance: One thing we keep coming back to: our biggest problem isn't discovery. It's delivery.

Dr. Nibedita Rath, Scientific Director, Open Source Pharma Foundation, Manyata Tech Park, Bengaluru, India, President, Union Lung Health, South East Asia Region, India

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**Abstract:**

**Ten years ago, fighting TB in India meant tests that took weeks to give an answer, and treatments that took years to work. A lot has changed since then. Drug-resistant TB used to mean almost two years of painful daily injections. Now it can be treated with six months of tablets. Nearly every district has a machine that can confirm TB in under two hours. Some tests don't even need refrigeration and can pick up TB from a simple swab of the tongue, which finally means we can diagnose small children who can't cough up a sample. A computer can now read a chest X-ray in seconds. Most of this equipment is made right here in India.**

But we still haven't figured out something simpler, and somehow harder: getting any of this to the person who is actually coughing. The numbers that should worry us aren't about how many people are falling ill but how few of them we're reaching in time.

Only 21% of the 24.3 million people with suspected TB who were tested under the programme received an upfront molecular test. In Rajasthan, only 29% of extra-pulmonary TB cases ever saw a NAAT machine. When 1,146 people were surveyed across five states, only 38.1% had even heard of BPaLM, the new six-month regimen. And out of India's roughly 6,500 molecular testing machines, the average one runs about 1,000 tests a year a lot of capacity we've bought, installed, and left sitting idle.

"This isn't a failure of science. It's a failure of turning that science into practice. That's the thread that runs through this issue, and it's why these six pieces belong together."

Dr Kuldeep Singh Sachdeva makes the structural case. Diagnostics, he argues, aren't just one tool among many; they're the gateway that everything else depends on. TB keeps spreading until an infected person is correctly diagnosed and properly treated. His numbers are uncomfortable: of about 64,000 rifampicin-resistant cases detected, only 41% were tested for fluoroquinolone resistance. Of 200 million people mapped for screening, only 1% were actually tested. His main point that expanded diagnostics should be treated as a strategic investment, not just another recurring cost, is really the backbone of this issue.

Image Credit: Getty Images

Dr Himanshu Vashistha shows what that kind of investment could buy. Near-point-of-care platforms can test sputum with sensitivity in the low nineties, cost a fraction of centralised testing, run on battery or solar power, need no cold chain, and can be used competently by a nurse or an ASHA worker after about two hours of training. The tongue-swab data is worth paying attention to as it opens up a real way to screen children and elderly patients, who have long been diagnosed mostly on clinical judgement because they can't produce a sputum sample. He's careful to end on the point every honest technologist eventually makes: tools alone don't get rid of a disease.

Priyanka Sharma's two pieces show exactly what he means. Her piece on extra-pulmonary TB looks at the part of the epidemic the diagnostic revolution hasn't reached yet a fifth of all notifications in Rajasthan, 91% of them diagnosed on clinical judgement alone, with children and elderly patients facing the sharpest uncertainty. Her second piece is the flip side of that story. Between 2021 and 2024, a State Technical Support Unit nearly doubled private-sector notifications, raised presumptive enrolment by 54.9%, cut NAAT turnaround from ten days to seven, and cut bank-seeding delays from twenty one days to seventeen. The work behind those numbers mapping, onboarding, supervision, training, moving samples around isn't glamorous, and it rarely gets written about. But it's exactly what turns capacity into coverage.

Dr Rakesh PS takes the private-sector conversation a step further, from engagement to leadership. STEPS started in Kerala on an idea that sounds almost too simple: build TB care into the quality checks, follow-ups and accreditation that good hospitals are already running, instead of bolting it on from outside. The model now operates in more than 1,000 hospitals across seven states and was recognised in the Kochi Declaration 2024. The lesson is that good TB care in the private sector doesn't need an expensive parallel programme. It needs ownership.

And Akshaya Patil, Dr Ramya Ananthakrishnan and Anupama Srinivasan bring it back to where it has to end with people. 102 TB Champions, nearly 59,000 people reached, 433 people supported through drug-resistant TB treatment, 303 of them on BPaLM. Their survey holds the clearest statement of our problem anywhere in this issue: 87.4% of respondents knew TB spreads through the air and 86% knew it's curable, but fewer than four in ten had heard of the shorter regimens. People know about the disease. They just don't know what's changed about treating it.

India isn't really held back by a lack of scientific discovery any more. We have shorter all-oral regimens, decentralised molecular tests, non-invasive sampling, AI-assisted X-ray reading, manufacturing at home, and a national digital system to track it all. What we don't reliably have yet is the connective tissue in between the trained provider at the local Ayushman Arogya Mandir, the private hospital that notifies without being chased, the survivor who can explain a new regimen in plain local language, the support unit that keeps turnaround times honest, the diagnostic process that doesn't quietly give up when the disease isn't in the lungs.

The 2025 elimination deadline has come and gone. It's worth saying that plainly instead of dancing around it, because the useful response to a missed deadline isn't to reset the clock it's to be specific about what got in the way. This issue is our attempt at that kind of specificity, and a reminder that the last mile isn't a distance to be covered. It's a system to be built.

**Image Credit: Getty Images**

# Accelerating Tuberculosis Elimination in India Through High-Impact Diagnostic Strategies

Dr.Kuldeep Singh Sachdeva, President and Chief Medical Officer, Molbio Diagnostics, New Delhi, India

**Abstract:**

**India accounts for the largest share of the global tuberculosis (TB) burden, and diagnostic gaps remain a major barrier to elimination. Despite significant expansion of molecular testing and laboratory infrastructure under NTEP, delayed diagnosis, incomplete drug-resistance testing, underutilized platforms, inequitable access, and weak private-sector integration continue to undermine outcomes. This article highlights the central role of diagnostics in reducing transmission and improving survival, and proposes high-impact strategies including targeted screening, universal upfront molecular testing, baseline drug-resistance testing, decentralized point-of-care diagnostics, private-sector engagement, and adoption of future ready tools. Strengthening diagnostics is essential to accelerate TB elimination in India.**


Image Credit: Molbio

***Achieving TB elimination will require a paradigm shift from selective testing to universal, high-quality diagnostic coverage, particularly at the first point of patient contact with the health system.***

1. **Context and Rationale**

According to the WHO Global TB report (2025), India bears the largest tuberculosis (TB) burden globally, accounting for over one-quarter of the world's TB cases. Despite sustained progress over the past decade, TB continues to impose a substantial public health, economic, and social burden, disproportionately affecting the poor, working-age adults, and vulnerable populations [1].

The National Strategic Plan (NSP) for TB Elimination (2023–2027) under the National Tuberculosis Elimination Programme (NTEP) places strong emphasis on early and accurate diagnosis, universal drug-resistance testing, rapid initiation of appropriate treatment, patient-centric and equity-focused care. Diagnostics are explicitly identified in the NSP as a foundational pillar for TB elimination, alongside treatment, prevention, and social support. This reflects a growing recognition that treatment success and transmission control are contingent on timely and accurate diagnosis. While India has expanded access to molecular diagnostics and strengthened laboratory networks, diagnostic gaps continue to limit the impact of programmatic interventions [2,3]

Achieving TB elimination will require a paradigm shift from selective testing to universal, high-quality diagnostic coverage, particularly at the first point of patient contact with the health system [4].

**Why Diagnostics Are Central to TB Elimination**

TB elimination is fundamentally **diagnosis-dependent**. Unlike many communicable diseases where presumptive or syndromic management may interrupt transmission, **TB transmission persists until infectious individuals are accurately diagnosed and effectively treated**. Every missed or delayed diagnosis represents a continued source of community transmission[5].

Current programmatic experience highlights several diagnostic challenges that directly undermine elimination efforts:

·Diagnostic delays remain substantial, with patients often experiencing weeks to months between symptom onset and confirmed diagnosis, particularly when initial testing relies on low-sensitivity tools.

·Currently only 53% of bacteriologically positive TB cases are detected underlying the fact that 47% TB cases are bacteriologically-negative and the efforts to identify organisms remain sub-optimal.

·Only about 44% of estimated Drug-resistant TB (DR-TB) were detected; the cases are frequently identified late, after treatment failure or clinical deterioration, increasing both mortality and programmatic costs.

·In some settings, smear microscopy continues as the initial diagnostic test, despite limited sensitivity (~50–60%), resulting in false negatives, delayed diagnosis, and missed TB cases, particularly among vulnerable populations [6].

These diagnostic gaps contribute to ongoing community transmission, higher TB-related mortality, amplification of drug resistance and increased financial burden on households and the health system.

Conversely, strengthening TB diagnostics produces **multiplicative public health benefits**. Evidence from India and comparable high-burden settings demonstrates that **early molecular diagnosis and upfront drug-resistance testing** reduce the infectious period and secondary transmission, enable treatment initiation within days rather than weeks improving outcomes and survival, prevent the emergence and spread of drug-resistance and reduce long-term programmatic costs.

In economic terms, investments in diagnostics yield high returns, as the cost of early detection is substantially lower than the cost of treating advanced or drug-resistant disease. From a health systems perspective, diagnostics serve as the gateway intervention upon which all downstream TB control measures depend.

**2. Current Diagnostic Landscape in India**

**Public Sector Diagnostic Network**

Over the past decade, India has significantly expanded its tuberculosis diagnostic capacity, establishing one of the largest laboratory networks globally. This expansion has been driven by sustained investments in decentralized laboratory infrastructure and the adoption of WHO-recommended diagnostic technologies (WRD) [7]. The public sector diagnostic ecosystem currently comprises:

Rapid molecular diagnostic platforms, including Truenat and CBNAAT, deployed across districts and high-burden blocks with 6,500 NAAT laboratories (approximately 4,800 Truenat and 1,700 CBNAAT),

A wide network of 24,500 smear microscopy centres providing peripheral access

About 84 Culture and drug-susceptibility testing (DST) laboratories, including reference laboratories for first- and second-line drug resistance

As a result of these efforts, the proportion of bacteriologically confirmed TB cases tested using molecular diagnostics has increased substantially in recent years, and India now performs tens of millions of TB diagnostic tests annually through the public health system. Molecular testing capacity has expanded to all districts, supporting early detection of TB and rifampicin resistance.

However, coverage has not uniformly translated into optimal utilization or impact. Persistent challenges include:

Under-utilization of molecular platforms in some facilities due to workflow, staffing, or operational constraints. A total of 6.8 million tests were performed on ~ 6500 devices translating into an average utilisation of ~ 1000 tests per device per year indicating gross underutilisation of available capacity. These platforms also support multi-disease testing, including HIV, HCV, HPV, and dengue, offering opportunities for improved efficiency and return on investment through integrated use.

Geographic inequities remain evident, especially in **remote and tribal areas and the North-Eastern states and larger states** reflecting challenges in specimen transportation. Available point of care platforms offers an ideal platform for scaling up decentralised testing in these areas.

In addition, while culture and DST capacity has expanded, turnaround times remain long (4 to 8 weeks), limiting their effectiveness for timely clinical decision-making. These gaps reduce the potential gains from existing investments and constrain progress toward elimination.

**Private Sector Diagnostics**

The private health sector plays a dominant role in TB care-seeking behaviour, with more than half of TB patients initially seeking diagnosis and treatment outside the public system. Private laboratories and hospitals therefore represent a critical but under-leveraged component of the national diagnostic landscape [8,9].

Despite this central role, significant gaps persist:

- Access to WRDs in the private sector remains inconsistent and often cost-dependent
- Diagnostic algorithms vary widely, with continued use of non-standard or low-sensitivity tests in some settings
- TB notification and data integration with national surveillance platforms remain incomplete, despite regulatory mandates
- The potential of Rural Health Care Providers (RHCPs) in adoption of near point-of-care (nPOC) diagnostic and screening technologies endorsed by NTEP, particularly in inaccessible, high-burden, and large rural populations is not realised.
- Community ownership of Active Case Finding (ACF) strategies remains poor.

These challenges contribute to delayed diagnosis, inappropriate treatment, and under-reporting of TB cases, undermining national surveillance and planning. While recent public–private mix (PPM) initiatives have improved engagement, diagnostic integration of the private sector remains partial and uneven across states.

**Equity and Access Challenges**

Despite overall expansion of diagnostic capacity, equitable access to quality TB diagnostics remains a major concern. Several population groups continue to face disproportionate barriers, including:

- Rural and tribal populations, where distance, transport costs, and limited facility readiness delay testing
- Urban poor and migrant populations, who frequently rely on informal or fragmented care pathways
- People living with HIV and other vulnerable groups, for whom TB diagnosis is often more complex and delayed

These inequities result in missed or late diagnoses, prolonged infectious periods, and poorer outcomes. From an elimination perspective, such diagnostic blind spots sustain transmission in precisely those populations where TB burden is highest.

**3. Key Gaps and Challenges**
**Financing and Market Constraints**

Sustainable financing remains a key challenge for TB diagnostics. Molecular testing depends on cartridge and consumable based platforms, creating recurrent, volume-driven expenditure. Given programme targets that require multiple screening tests for each confirmed TB case, at least one molecular diagnostic test for every presumptive patient, and additional testing among nearly 15% high-risk populations, the resulting national testing volume is estimated at 20–30 crore screening and diagnostic tests annually. This scale of testing creates substantial and sustained recurrent expenditure pressures for both state governments and NTEP [10,11].

At the same time, India's domestic diagnostic manufacturing capacity remains under-leveraged. Despite the availability of indigenous platforms, procurement and market-shaping strategies have not fully exploited economies of scale to reduce per-test costs, secure supply chains, and stimulate innovation. Addressing these constraints is essential to ensure affordable, resilient, and domestically financed diagnostic services at scale.

Technical Gaps in TB Diagnostics

Despite significant expansion of diagnostic infrastructure under the NTEP, important technical gaps continue to constrain impact. Smear microscopy remains the first diagnostic test in certain settings despite its well-documented low sensitivity. Reliance on smear-based algorithms contributes to missed diagnoses and prolonged infectious periods.

While rapid molecular diagnostics have been scaled nationally, upfront detection of drug resistance remains largely limited to rifampicin. Resistance to fluoroquinolones and other key drugs is often identified only after treatment failure or clinical deterioration. Given India's large burden of drug-resistant TB, delayed or incomplete resistance profiling increases the risk of amplification of resistance and poor treatment outcomes.

Additionally, non-sputum-based diagnostics remain limited (blood or saliva or stool), constraining effective diagnosis in children and extrapulmonary TB, which together account for a substantial proportion of notified cases. These technical gaps directly undermine early detection and effective case management [12,13].

**Programmatic and Health System Gaps**

Beyond technology availability, programmatic inefficiencies reduce the effectiveness of existing diagnostic capacity. Delays between diagnosis and treatment initiation remain common, particularly where diagnostic and treatment services are not co-located increasing the risk of loss to follow-up.

Diagnostic and treatment pathways are often fragmented across facilities, sectors, and levels of care, particularly at the public–private interface. This fragmentation leads to duplication of testing, inconsistent clinical decision-making, and avoidable patient costs. Furthermore, quality assurance systems across laboratories remain variable, with differences in adherence to standard operating procedures, external quality assessment, and data reporting.

Collectively, these system-level gaps dilute the potential benefits of advanced diagnostics and limit their contribution to elimination goals.

## 4. Strategic Policy Recommendations

### Strategy 1: Screening and Active Case Finding

Screening population and Implementing targeted Active Case Finding (ACF) among high-risk and vulnerable populations using low-cost chest radiography (with digital or AI-assisted interpretation where feasible) followed by confirmatory molecular testing.

Currently, out of the 200 million population mapped for screening only 2.1 million (1%) are tested of which 35,000 (1.6%) are diagnosed with TB. To improve screenings, community-led ACF models should be explored and operationalized through convergence with the G RAM G scheme, leveraging the availability of nearly 12 crore active workers at the village level to support symptom screening, community mobilization, referral, and linkage to diagnostic services [14].

Usage of newer triage and diagnostic tool for community, increase the community screening from 1% of mapped population to 20% of mapped population will enable early identification of presumptive TB cases, reduce diagnostic delays, and optimize use of molecular diagnostics while maintaining affordability at scale.

### Strategy 2: Universal Upfront Molecular Testing

Transitioning to molecular tests as the initial diagnostic test for all presumptive TB cases represents a critical policy shift. Replacing smear-first algorithms with rapid molecular testing would substantially reduce missed cases and diagnostic delays. The upfront molecular testing gap is 79%; under the programme of the 24.3 million presumptive TB cases tested only 5.1 million (21%) had molecular tests. A benchmark of 100% is proposed to achieve in next five years enabling earlier case detection, shorter infectious periods, reduced transmission, and improved treatment outcomes.

### Strategy 3: Universal Baseline Drug-Resistance Testing

Mandatory reflex testing for first- and second-line drug resistance at the time of TB diagnosis would ensure that resistance profiles are known before treatment initiation. Out of the 64000 Rifampicin cases detected only 26000 (41%) were tested for second line TB resistance (Fluroquinolone). Decentralized rapid DST using molecular platforms can make this feasible at scale. This would result in reduced amplification of drug resistance, higher treatment success rates, and lower long-term programme costs.

### Strategy 4: Decentralization and Point-of-Care Diagnostics

Expanding **point-of-care molecular diagnostic platforms at Sub-centres (SCs), Primary Health Centres (PHCs), and Community Health Centres (CHCs) supported by mobile diagnostic units and strengthened specimen transport networks** will help address geographic inequities and reduce patient-level diagnostic delays. India currently has approximately **182000 lakh Ayushman Arogya Mandirs, 32,000 PHCs, and 6,500 CHCs, while about 24,500 Designated Microscopy Centres (DMCs)** are largely concentrated at PHCs, CHCs, and tertiary facilities. A phased saturation approach is proposed, aiming to extend **molecular diagnostic coverage to 50% of AAM and 100% of PHCs and CHCs,** thereby decentralizing access, improving equity

Decentralization of TB diagnostics by expanding point-of-care molecular testing to achieve 50% coverage of Ayushman Arogya Mandir and 100% coverage of PHCs and CHCs, would lead to faster diagnosis, improved access in hard-to-reach areas, and greater equity in TB care.

**Strategy 5: Private Sector Diagnostic Integration**

Enable private sector use of WRDs through a co-financing model, whereby the programme covers up to 50% of test-kit costs, conditional on mandatory Nikshay notification and performance-linked reimbursement. Introduce a digital diagnostic voucher for presumptive TB patients diagnosed in the private sector, redeemable only for WRDs at empanelled laboratories. This will standardize diagnostic practices, strengthen surveillance, and reduce patient out-of-pocket expenditure while maintaining fiscal discipline. Engaging RHCPs extends diagnostic reach beyond formal health facilities, enabling early identification of presumptive TB cases, reducing first-contact delays, and improving access in settings with limited facility density

**Strategy 6: Innovation and Future-Ready Diagnostics**

**Non-sputum-based diagnostics (blood, saliva, or stool), cough-based application, and genomic surveillance using next-generation sequencing (NGS)** are critical to prepare India for **elimination-phase TB challenges** and emerging drug-resistance patterns. AI-assisted CXR triage has demonstrated the ability to screen **3–5 times more individuals per day** than symptom-based approaches, with **sensitivity exceeding 85–90%** in community and high-risk settings, enabling efficient identification of presumptive TB at low per-person cost.

Non-sputum-based diagnostics are particularly important for **children, extrapulmonary TB, and smear-negative disease,** which together account for an estimated **30–40% of TB** cases and are systematically under-diagnosed using sputum-dependent methods. In parallel, targeted use of **NGS for surveillance** can detect emerging resistance to key drugs and transmission clusters earlier than conventional methods; even **sentinel genomic surveillance covering 5–10% of DR-TB** cases can provide actionable insights for programme planning and drug policy.

***Decentralization of TB diagnostics by expanding point-of-care molecular testing to achieve 50% coverage of Ayushman Arogya Mandir and 100% coverage of PHCs and CHCs, would lead to faster diagnosis, improved access in hard-to-reach areas, and greater equity in TB care.***

**5. Economic and Public Health Impact**

Strengthening tuberculosis (TB) diagnostics yields high returns on investment because TB transmission and outcomes are diagnosis-dependent. With India reporting ~2.7 million TB cases annually, reducing diagnostic delays delivers substantial public health and fiscal benefits.
An untreated pulmonary TB patient may infect 10–15 individuals per year, whereas rapid molecular diagnostics enable confirmation within days and early treatment initiation. Evidence indicates that universal upfront molecular testing can reduce diagnostic delays by 30–50%, resulting in fewer secondary infections and lower future TB incidence.

The economic case is strongest for drug-resistant TB (DR-TB). MDR-TB treatment costs are approximately 10–15 times higher than drug-sensitive TB, require 18–24 months of therapy, and have poorer outcomes. In contrast, the incremental cost of universal baseline drug-resistance testing is relatively small. Preventing even 10–15% of MDR-TB cases through early resistance detection is sufficient to offset additional diagnostic expenditure, making diagnostic scale-up cost-saving over time.
Early diagnosis also reduces catastrophic health expenditure, which frequently exceeds 20–30% of annual household income due to repeated pre-diagnostic visits and income loss. As TB primarily affects the 15–59 year age group, early diagnosis preserves productivity and reduces long-term disability. Overall, economic analyses show that investments in TB diagnostics become cost-saving within a 3–5 year horizon, outperforming downstream spending on prolonged treatment and hospitalization.

**Conclusion:**
TB elimination cannot be achieved without a decisive strengthening of diagnostic strategies. Universal access to rapid, accurate, and affordable diagnostics across public and private sectors and at all levels of care must be positioned as a core national priority to translate political commitment into measurable elimination gains.

Diagnostics are the gateway intervention for TB elimination. India possesses the technological capacity, programmatic experience, and manufacturing strength to lead globally. Strategic policy action on diagnostics will determine whether TB elimination becomes a reality or remains an aspiration. Expanded TB diagnostics should be treated as a strategic investment, not a recurrent cost, delivering measurable health gains and long-term fiscal savings while accelerating progress toward TB elimination.

**References:**


1. https://www.who.int/teams/global-programme-on-tuberculosis-and-lung-health/tb-reports/global-tuberculosis-report-2025.
2. https://tbcindia.mohfw.gov.in/national-strategic-plan-to-end-tb-in-india-2020-25/#:~:text=The%20National%20Strategic%20Plan%20for%20TB%20Elimination,OC%20of%20ICCM%20for%20the%20period%202026%2D2027.
3. Pai M. (2015). The End TB Strategy : India can blaze the trail. The Indian journal of medical research, 141(3), 259–262. https://doi.org/10.4103/0971-5916.156536.
4. Sachdeva, K. S., Parmar, M., Rao, R., Chauhan, S., Shah, V., Pirabu, R., Balasubramaniam, D., Vadera, B., Anand, S., Mathew, M., Solanki, H., & Sundar, V. V. (2020). Paradigm shift in efforts to end TB by 2025. The Indian journal of tuberculosis, 67(4S), S48–S60. https://doi.org/10.1016/j.ijtb.2020.11.001.
5. Chandra, A., Kumar, R., Kant, S., & Krishnan, A. (2021). Diagnostic Pathways and Delays in Initiation of Treatment among Newly Diagnosed Tuberculosis Patients in Ballabgarh, India. The American journal of tropical medicine and hygiene, 104(4), 1321–1325. https://doi.org/10.4269/ajtmh.20-1297.
6. Biswas, S., Uddin, M. K. M., Paul, K. K., Ather, M. F., Ahmed, S., Nasrin, R., Kabir, S., Heysell, S. K., & Banu, S. (2022). Xpert MTB/RIF Ultra assay for the detection of Mycobacterium tuberculosis in people with negative conventional Xpert MTB/RIF but chest imaging suggestive of tuberculosis in Dhaka, Bangladesh. International journal of infectious diseases : IJID : official publication of the International Society for Infectious Diseases, 114, 244–251. https://doi.org/10.1016/j.ijid.2021.11.010.
7. Pai, M., & Swaminathan, S. (2023). India is well placed to scale innovations in tuberculosis diagnostics. The Indian journal of medical research, 157(2&3), 114–117. https://doi.org/10.4103/ijmr.ijmr_243_23.
8. Arinaminpathy, N., Deo, S., Singh, S., Khaparde, S., Rao, R., Vadera, B., Kulshrestha, N., Gupta, D., Rade, K., Nair, S. A., & Dewan, P. (2019). Modelling the impact of effective private provider engagement on tuberculosis control in urban India. Scientific reports, 9(1), 3810. https://doi.org/10.1038/s41598-019-39799-7.
9. Shah, H. D., Chaudhary, S., Desai, B., Patel, J., Yasobant, S., Bhavsar, P., Saha, S., Sinha, A. K., Saxena, D., Patel, Y., & Modi, B. (2024). Exploring private sector perspectives on barriers and facilitators in availing tuberculosis care cascade services: a qualitative study from the Indian state. BMC primary care, 25(1), 5. https://doi.org/10.1186/s12875-023-02244-w.
10. Gopalan N., Newtonraj A., Elizabeth L.K., Shanmugam S.K., Ranganathan U.D., Muniyandi M., Ramraj B., Devaleenal B., Venkataraman A., Nagarajan K., Bethunaickan R., Sathya Narayanan M.K., Deka M., Selvaraju S., Santhanakrishnan R., Krishnan R., Chinnaiyan P., Palaniyandi K., Vetrivel U., Jeyakumar S.M., Natarajan S., Mathur A. Current challenges and future development of India's healthcare system' towards tuberculosis free India – research evidence and programmatic initiatives. The BRICS Health Journal. 2024;1(1):35-58. https://doi.org/10.47093/3034-4700.2024.1.1.35-58.
11. Nathavitharana, R. R., Garcia-Basteiro, A. L., Ruhwald, M., Cobelens, F., & Theron, G. (2022). Reimagining the status quo: How close are we to rapid sputum-free tuberculosis diagnostics for all?. EBioMedicine, 78, 103939. https://doi.org/10.1016/j.ebiom.2022.103939.
12. Gupta-Wright, A., & Denkinger, C. M. (2024). Advances in TB diagnostics: A critical element for the elimination toolkit. The Indian journal of medical research, 159(5), 391–394. https://doi.org/10.25259/IJMR_261_2024.
13. Shah, H. D., Nazli Khatib, M., Syed, Z. Q., Gaidhane, A. M., Yasobant, S., Narkhede, K., Bhavsar, P., Patel, J., Sinha, A., Puwar, T., Saha, S., & Saxena, D. (2022). Gaps and Interventions across the Diagnostic Care Cascade of TB Patients at the Level of Patient, Community and Health System: A Qualitative Review of the Literature. Tropical medicine and infectious disease, 7(7), 136. https://doi.org/10.3390/tropicalmed7070136.
14. efaidnbmnnnibpcajpcglclefindmkaj/https://tbcindia.mohfw.gov.in/wp-content/uploads/2025/09/Guidance-Document-on-TB-Mukt-Bharat-Abhiyan_0.pdf?utm_source=chatgpt.com.

# Bridging the Last Mile: How Near-Point-of-Care Diagnostics Are Rewriting the Rules for TB Elimination

Dr. Himanshu Vashistha, Regional Technical Specialist, FIND (The Foundation for Innovative New Diagnostics), Pune, India

**Abstract:**

**Despite advances in centralized molecular diagnostics, such as GeneXpert, nearly 30-40% of global TB cases remain undiagnosed because of logistical barriers at the periphery, such as lack of power, cold chains, and skilled staff at primary health centres (PHCs). This study evaluated two near-point-of-care (nPOC) platforms, Uniamp (Huwel Diagnostics)/ Pluslife MiniDock and TruePOC MTB Ultima (Molbio), for integration into the National TB Programmes (NTPs). Utilizing insights from field trials conducted in Southeast Asia, and Sub-Saharan Africa,along with WHO benchmarks for 2024–2025, we summarised evidenceon technical performance, operational resilience, and economic factors. TruePOC offers micro-PCR on disposable chips with the ability to detect Rif/Isoniazid resistance, whereas Pluslifeemploys isothermal RHAM amplification for quicker, energy-efficient results. Both systemsachieve 91–93% sensitivity in sputum samplescompared to GeneXpertUltra, with Pluslifeallowing (85.7% sensitivity) and TruePOC (77.9% sensitivity) for tongue swabs in patientswho are difficult to sample,such as children. The averagecost per sample is $3.6, which is way more economical than centralized testingcosts of $18–25 (including transportation). Challenges include digital integration and scaling up training; however, with adaptations by NTP, such as linking to the Nikshay portal and implementing quality assurance (QA), these tools support the goal of decentralized TB elimination by 2030.**

**Introduction:**

In the global fight against tuberculosis (TB), late detection has always been a silent killer. For many years, the story of TB diagnostics has been characterized by centralization, where samples are sent over long distances from the patient to the testing equipment, often compromising their viability, tracking, or timeliness. Although WHO recommended molecular nucleic acid amplification tests (mNAATs) like GeneXpert MTB/RIF (Cephied) and Truenat MTB-RIF (Molbio) assays have transformed our capacity to identify Rifampicin (RIF) drug resistance, still nearly 30-40% of TB cases worldwide remain undetected and transmit TB in the community [1].

As we are near the pivotal goals of the WHO End TB Strategy, which aims for an 80% decrease in incidence by 2030, we must address the logistical challenges that contribute to the "missing millions [1]." Recent assessments of field trials in India, Southeast Asia, and sub-Saharan Africa have highlighted the emergence of a new wave of "near-point-of-care" (near-POC) platforms. These innovations, such as TruePOC (Truenat MTB Ultima from Molbio Diagnostics) and Pluslife MiniDock (Huwel Uniamp in India), offer the potential to identify the disease and make diagnosis more accessible [2,3].

Shortcomings of the Hub-and-Spoke Model: To understand why these new nPOC platforms are essential, it is important to examine the limitations of the current system. In many areas with limited resources, the diagnostic shortfall is not due to a lack of scientific understanding but rather to a deficiency in infrastructure. Centralized testing depends on a "hub-and-spoke" model. Patients present at a peripheral clinic (the spoke), but their sputum must be transported to a hub (reference laboratory) equipped with stable AC power, air conditioning, and skilled staff. This model is fragile in states where power outages can last for hours, and environment temperatures soars about 45 Degree Celsius. Results that should take hours take days. Patients with low economic status, often daily wage earners who cannot afford to wait for the late results, lost in transit, and chose to drop out of the care cascade before it begins. The 2024–2025 targets suggest that for universal access, tools that can survive the peripheral health care network settings, not just the reference laboratory, are needed. This is where near-POC platforms come into play [2].

***A near point-of-care (POC) device capable of delivering a non-invasive, highly sensitive test through a simple tongue swab could revolutionize pediatric screening practices.***

TruePOC and Pluslife/Huwel [3-12]: Recent comparative analyses have focused on two frontrunners gaining attention in the National TB Programs (NTPs): TruePOC (Truenat MTB Ultima from Molbio) and Pluslife MiniDock (Huwel Uniamp). Although they share the goal of decentralization, their underlying technologies offer distinct advantages. TruePOC utilizes a chip-based micro-polymerase chain reaction (PCR) and is an evolution of the widely used Truenat system but is optimized for rugged utility. It targets the IS6110 gene complex along with rpoB and inhA genes to detect Rifampicin and Isoniazid resistance. The operational utility of this device lies in its autonomy. It runs on battery power capable of sustaining 8–10 tests and features built-in GSM/Wi-Fi connectivity. This allows for the automatic upload of results to national dashboards, such as India's Ni-kshay portal, a critical feature for real-time surveillance.

Pluslife MiniDock (Huwel Uniamp), conversely, employs an isothermal amplification technique known as Recombination-Aided Hyper-Branching Amplification (RHAM)/ loop mediated isothermal amplification (LAMP). By avoiding the thermal cycling required for PCR, the device consumes significantly less electricity, making it potentially solar/battery operation viable option. It targets IS6110 and mpb64 genes. However, the most groundbreaking aspect of this innovation may not lie in its chemical composition but in its ability to work with various samples (tongue swab, sputum). Studies conducted in India, Uganda, Vietnam, Cameroon and Bangladesh have demonstrated that Pluslife excels in tongue swabs, showing a sensitivity of 76% compared to 91% when using sputum samples. Breakthrough technology for patients unable to produce sputum like children: The proficiency of the Pluslife (Huwel) platform with tongue swabs is extraordinary. Diagnosing TB in children has been difficult for many years. Children often struggle to produce sputum, necessitating invasive methods such as gastric lavage for sample collection. Alternatively, treatment decisions sometimes depend on the clinical judgment of healthcare providers.

A near point-of-care (POC) device capable of delivering a non-invasive, highly sensitive test through a simple tongue swab could revolutionize pediatric screening practices. This breakthrough would allow healthcare providers to conduct screenings for both children and the elderly in community environments where collecting induced sputum samples is impractical. While the sensitivity of this method is not as high as that of molecular tests based on sputum, it greatly outperforms the smear microscopy currently used in these settings. This development offers a "triage" function that has the potential to save thousands of lives.

**Reducing Cost in TB elimination:** The Economic argument for decision-makers in public health, weighing clinical benefits against financial constraints is crucial. The question lies in, is it feasible for NTPs to decentralize these tests? The current centralized testing using GeneXpert is projected to cost between $11.47* and $14.84* per test [GeneXpert Device cost-$15000, and Test cost-$7.97 while for Truenat assay Device cost- $10000 and test cost- $7.9] (6,7), considering the "hidden" expenses of sample transportation, cold chain upkeep, power backups, and the administrative load of retesting due to sample loss. Conversely, the overall cost per sample for near-POC platforms ranged from $10.45* to $10.70* when scaled (6,7). The TruePOC cost was approximately $5-8 per test*, while the average cost for Pluslife from Pluslife Biotech (Guangzhou, China) is $3.60 per test [Minidock ultra device cost $155 + Thermolyse cost- $180]. Cost reference from GDF catalogue Jan 2026 [7,15]. The bulk of this cost (approximately 61%) lies in the disposable cartridges. However, as procurement scales up through global mechanisms, such as the Global Drug Facility (GDF), these prices are projected to drop. Furthermore, these devices eliminate the need for cold chains. Reagents for TruePOC are stable at 30°C for six months, a massive logistical relief for supply chains struggling with the "last mile."

In a country with a high TB burden like India, with per-test costs up to 80–90% lower than existing solutions, this platform and assay has the potential to dramatically improve affordability for low-income states, expand TB screening reach, save enough to fund nutritional support schemes, or expand active case-finding by integrating decentralized tools into the National TB Elimination Programme.

Operational Resilience and Workforce Transformation: Deploying these devices requires a shift in workforce strategy. The beauty of near-POC tools is that they are designed for mid-level providers, such as nurses and Community Health Workers (CHWs) or ASHAs, rather than trained specialists, such as microbiologists. Field pilots have indicated that user error rates decrease to below 2% following only two hours of training. Nonetheless, this transition shifts the training responsibility from a limited number of laboratory technicians to a significantly larger group of community workers. Although the initial cost of training 1,000 community health workers like Accredited Social Health Activists (ASHAs) appears higher than that of training personnel for a single reference laboratory, the long-term scalability facilitates a more profound integration of the health system within the community.

| Table 1. Comparative performance, operational characteristics, and cost of near-point-of-care TB diagnostic platforms versus centralized NAAT systems | | | |
|---|---|---|---|
| **Parameter** | **TruePOC MTB Ultima (Molbio Diagnostics)** | **Pluslife MiniDock (Huwel/Uniamp)** | **Centralized NAAT (GeneXpert MTB/RIF /** |
| **Technology platform** | Chip-based micro-PCR | Isothermal amplification (RHAM/LAMP) | Real-time PCR-based NAAT |
| **Target genes** | IS6110, rpoB, inhA | IS6110, mpb64 | rpoB (primary target) |
| **Drug resistance detection** | Rifampicin + Isoniazid | Not available | Rifampicin (± INH depending on assay) |
| **Sensitivity (sputum samples)** | 91–93% vs. reference standard (8,13,15) | 91–93% vs. reference standard (8,13,15) | Reference standard |
| **Sensitivity (tongue swab samples)** | 77.9% (8,13) | 85.7% (range ~76%) (9,12,15) | Not routinely applicable |
| **Sample types supported** | Sputum | Sputum, tongue swab | Sputum |
| **Time to result** | <2 hours (near-POC setting) (8) | ~1 hour (isothermal amplification) (3,4) | ~2 hours (excluding transport delays) (6,7) |
| **Power requirements** | Battery-operated (8–10 tests per cycle) (3) | Low power; battery/solar compatible (3,4) | Continuous stable electricity required |
| **Connectivity** | Built-in GSM/Wi-Fi; integration with Nikshay | Bluetooth-based data transfer (13) | Laboratory information systems |
| **Cold chain requirement** | Not required; reagents stable up to 30°C for ~6 | Not required (3,4) | Required for reagents and transport |
| **Cost per test (assay only)** | USD 5–8 (7) | USD 3.60 (7,15) | USD ~7.9–8 (6,7) |
| **Total cost per test (programmatic)** | USD 10.45–10.70 (including overheads) (6,7) | USD 10.45–10.70 (6,7) | USD 18–25 (including transport, logistics) (6,7) |
| **Device cost (approximate)** | ~USD 10,000 (Truenat platform reference) (6,7) | ~USD 155 (MiniDock) + consumables (7) | ~USD 15,000 (6,7) |
| **Training requirements** | Minimal; usable by mid-level providers (13) | Minimal; suitable for CHWs/ASHAs (13) | Skilled laboratory technicians required |
| **User error rate after training** | <2% after short training (~2 hours) (13) | <2% after short training (~2 hours) (13) | Low (controlled lab environment) |
| **Primary use case** | Decentralized PHC-level diagnosis with drug | Active case finding, pediatric TB, remote | Centralized confirmatory diagnosis |
| **Key advantage** | Integrated drug resistance detection + real-time | Non-invasive sampling + ultra-low power | Established high-accuracy reference standard |
| **Key limitation** | Higher cost than isothermal alternatives | Limited drug resistance detection; connectivity | High logistical burden; delayed turnaround time |

However, challenges persist, particularly because healthcare sectors operate in isolation, posing a continuous threat. While TruePOC's integrated SIM card enables seamless data synchronization, Bluetooth-reliant devices, such as Pluslife, may encounter "handshake" failures in areas with weak signals. Ensuring data visibility is imperative for national programs to be successful. Quality Assurance (QA) systems, which enable artificial intelligence to identify anomalies in raw data curves, are crucial for upholding standards when testing is conducted outside a controlled laboratory environment [13,14,15].

**The Verdict:**

Rather than viewing the comparison between TruePOC and Pluslife as a competition with a single victor, it should be seen as emphasizing the importance of a detailed and layered approach to diagnosis. TruePOC stands out as a reliable option for peripheral primary healthcare, especially in situations where testing for drug resistance (Rifampicin/Isoniazid) is essential, and direct access to national databases is necessary for tracking patients.In contrast, Pluslife, with its minimal power needs and compatibility with tongue swabs, is perfectly suited for active case-finding campaigns, pediatric clinics, and extremely isolated areas where battery power is the only viable energy source and collecting sputum is challenging.

**Conclusion:**

The future of TB elimination lies in the decentralization of diagnostic tools near patients.Priced at approximately $3.60* per test, near-POC platforms are a robust, cost-effective, and accessible alternative to centralized bottlenecks. However, tools alone cannot eradicate diseases. To fully harness the potential of these tools, National TB Programs must invest in the surrounding ecosystem by negotiating assertively for reduced cartridge/chip prices, ensuring a dependable supply chain for consumables, conducting thorough maintenance checks, and crucially, investing in the training of community health workers. By moving diagnostics from reference laboratories to village-level Ayushman Arogya Mandirs (AAMs), we achieved more than just statistical improvements. We restored dignity to the patient, ensuring that detection is available not just to those who can reach the city but to anyone, anywhere, who needs it.

**References:**


1. The missing TB Millions, STOP TB partnership, available at: https://www.stoptb.org/missing-tb-millions.
2. Global Laboratory Initiative (GLI) Model of TB Diagnostic Testing. https://www.stoptb.org/who-we-are/stop-tb-working-groups/global-laboratory-initiative-gli.
3. MiniDock MTB Test – Pluslife, https://sandbox.stoptb.org/articles/minidock-mtb-test-pluslife.
4. MiniDock MTB Test – Product Details (Pluslife), https://www.pluslife.com/productinfo/1268173.html.
5. Pluslife Official Site (Pluslife Home Page), https://www.pluslife.com.
6. Bhatia, R., Chauhan, A., Kaur, K., Rana, M., & Singh, M. (2023). Cost-Effectiveness of Currently Available Diagnostic Tools for Diagnosis of Pediatric Tuberculosis Under National Tuberculosis Elimination Program. Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine, 48(1), 24–30. https://doi.org/10.4103/ijcm.ijcm_471_22.
7. Global drug facility catalogue, https://www.stoptb.org/news/early-present-2026-innovative-near-poc-pulslife-tb-test-available-gdf-catalogue-360.
8. Diagnostic performance of the Pluslife MiniDock MTB and Molbio MTB Ultima assays (Clinical Infectious Diseases), https://academic.oup.com/cid/advance-article/doi/10.1093/cid/ciaf709.
9. Wu, Z., Yan, L., Lai, X., Yang, J., Liang, J., Ma, X., Xie, J., Ji, L., Wang, Y., Hu, J., Chen, R., Lv, C., Fu, X., Chen,Y., Guo, H., Xu, L., Liang, H., Liu, S., Chen, Z., Huang, M., … Chen, X. (2026). Diagnostic accuracy of a novel point-of-care tongue swab assay for pulmonary tuberculosis: a multicentre prospective study. Clinical microbiology and infection : the official publication of the European Society of Clinical Microbiology and Infectious Diseases, 32(2), 331–336. https://doi.org/10.1016/j.cmi.2025.11.010.
10. Pluslife MiniDock MTB Test Clinical Evaluation Summary (Pluslife News), https://www.pluslife.com/newsinfo/3101370.html.
11. Pluslife MiniDock TB Test Featured in Novel TB Diagnostics Coverage (Pluslife News), https://www.pluslife.com/newsinfo/3108232.html.
12. Multicountry evaluation of swab-based molecular tests (medRxiv preprint), https://www.medrxiv.org/content/10.1101/2025.04.12.25325603v1.
13. Diagnostic accuracy of the Pluslife MiniDock MTB and Molbio MTB Ultima (QxMD synopsis), https://read.qxmd.com/read/41432010/diagnostic-performance-of-the-pluslife-minidock-mtb-and-molbio-mt ultima assays-to-detect-tuberculosis-from-tongue-and-sputum-swabs-among-outpatients-and-in-active-case-finding-in-cameroon.
14. Pluslife MiniDock MTB Test – eBioMedicine coverage summary, https://www.pluslife.com/newsinfo/3101370.html.
15.Steadman, A., Kumar, K. M., Asege, L., Kato-Maeda, M., Mukwatamundu, J., Shah, K., Trang, T., Ball, A., Khimani, K., Kim Dung, D. T., Michael, J. S., Christopher, D. J., Phan, H., Yerlikaya, S., Nahid, P., Denkinger, C. M., Cattamanchi, A., & Andama, A. (2025).

# Extra-Pulmonary Tuberculosis in Rajasthan, India: Epidemiological Trends, Diagnostic Challenges, and Strategic Interventions under the National TB Elimination Program

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**Abstract:**

**Extra-Pulmonary Tuberculosis (EPTB) constitutes a substantial proportion of tuberculosis (TB) cases in India, particularly in high-burden states such as Rajasthan. Diagnostic complexity, diverse clinical presentations, limited bacteriological confirmation, and under-reporting especially from the private sector continue to pose significant challenges.**

**Objectives: This study assesses the epidemiological profile of EPTB in Rajasthan, examines diagnostic and reporting gaps, and highlights strategic interventions for improved programmatic management.**

Image Credit: metropolis Healthcare

**Introduction:**

Tuberculosis (TB) remains one of the leading infectious causes of morbidity and mortality globally, with India contributing nearly one-fourth of the global burden [1]. While pulmonary TB has historically received greater programmatic attention due to its transmissibility, Extra-Pulmonary Tuberculosis (EPTB) represents an increasingly significant yet under-recognised public health challenge. EPTB refers to TB involving organs other than the lungs, including lymph nodes, pleura, bones and joints, abdomen, genitourinary system, and central nervous system.

In India, EPTB accounts for approximately 15–25% of notified TB cases [1,4], with variations across states depending on diagnostic capacity, reporting mechanisms, and population characteristics. Rajasthan, a large and socio-demographically diverse state, faces unique challenges, including vast geographic coverage, disparities in healthcare access, and a high reliance on clinical diagnosis for EPTB. The absence of bacteriological confirmation in most cases complicates surveillance, delays diagnosis, and affects treatment outcomes.

Under the National TB Elimination Program (NTEP) [2], India aims to eliminate TB by 2025. Achieving this ambitious target requires focused attention on EPTB, particularly in high-burden states. This study presents a comprehensive overview of the EPTB scenario in Rajasthan in 2024, highlighting epidemiological trends, diagnostic gaps, and strategic interventions needed to improve disease management.

**Methods**

**Study Design and Data Sources**

A retrospective observational study was conducted using secondary data from the Ni-kshay portal, the Government of India's web-based TB notification system. Data from January to December 2024 were analysed. Additional inputs were obtained from state TB program reports and routine surveillance records under the NTEP Rajasthan program.

**Study Variables**

The following variables were included:

· Proportion of EPTB among total TB notifications
· Site-specific distribution of EPTB
· Diagnostic modality (bacteriological vs. clinical)
· NAAT (CBNAAT/Truenat) testing coverage
· Sector-wise notification (public vs. private)
· Age-wise distribution (paediatric, adult, geriatric)

**Data Analysis**

Data were summarised using descriptive statistics. Proportions and percentages were calculated to describe trends. Graphical representations were developed to visualise the distribution of sites, diagnostic status, sector-wise contribution, and age-wise burden. As this study involved analysis of anonymised secondary program data, ethical clearance was not required.

**Results**

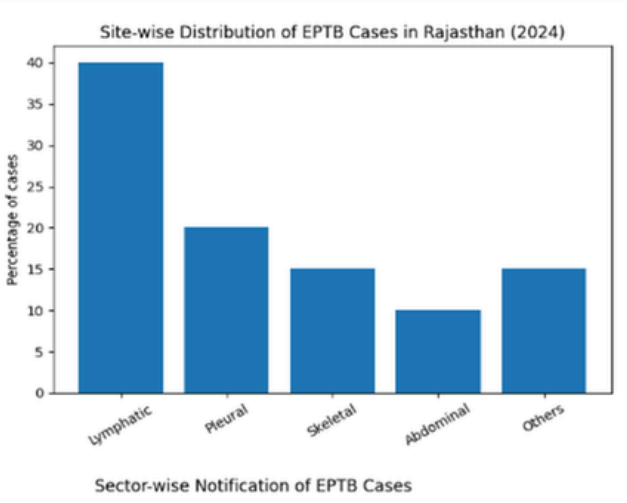
**1. Overall Burden of EPTB**

In 2024, EPTB constituted approximately 20% of the total TB cases notified in Rajasthan, indicating a substantial disease burden. This proportion aligns with national trends [1] but highlights the need for a strengthened programmatic focus at the state level.

**2. Site-wise Distribution of EPTB**

Lymphatic TB emerged as the most common form of EPTB, accounting for 40% of cases, followed by pleural TB (20%), skeletal TB (15%), and abdominal TB (10%). Other forms, including genitourinary and meningeal TB, together constituted 15%.

**Figure 1** illustrates the site-wise distribution of EPTB cases in Rajasthan.




**1. Diagnostic Status and Testing Coverage**

A key finding of the study was the low level of bacteriological confirmation, with only 9% of EPTB cases confirmed microbiologically. The remaining 91% were clinically diagnosed, reflecting the inherent diagnostic challenges associated with EPTB.

NAAT testing coverage was limited to 29% of EPTB cases, despite programmatic guidelines recommending universal molecular testing wherever feasible [2,3,5].

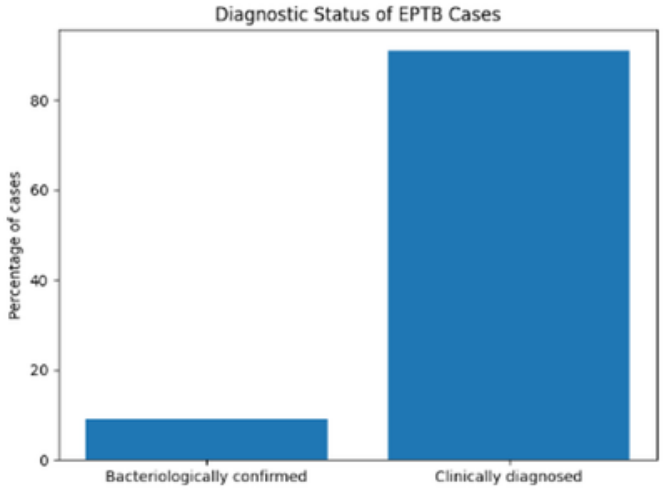
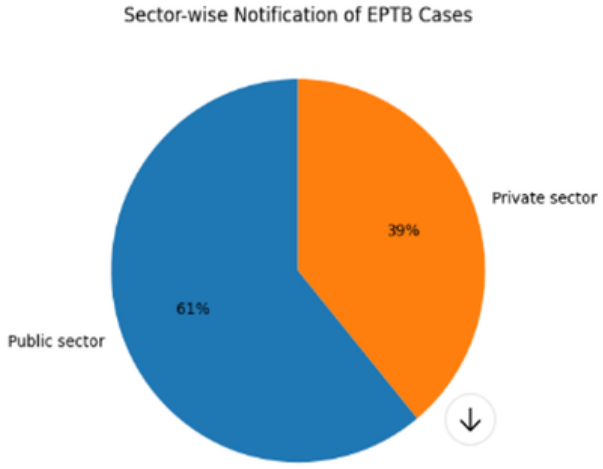



**Figure 2 shows the diagnostic status of EPTB cases**

4. **Sector-wise Notification**

Public sector health facilities accounted for 61% of EPTB notifications, while the private sector contributed 39%. Although private-sector engagement has improved in recent years, under-notification remains a concern, particularly for EPTB cases managed empirically in private settings.

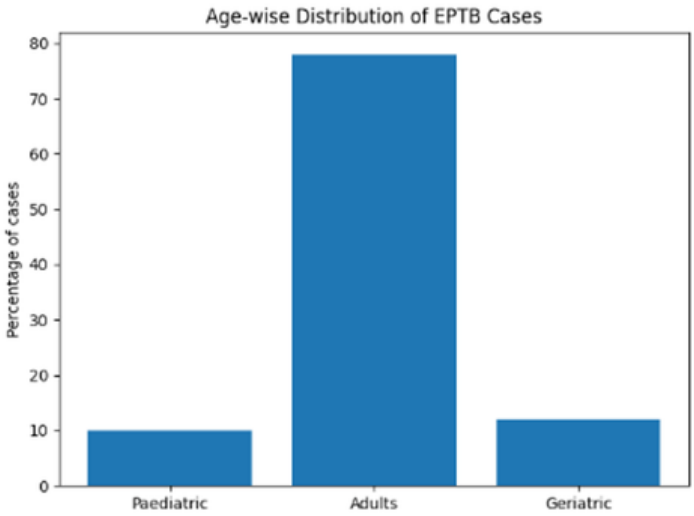
**Figure 3 depicts sector-wise notification patterns**



5. **Age-wise Distribution**

Adults constituted the majority of EPTB cases (78%). However, paediatric cases accounted for 10%, and geriatric cases for 12%, indicating vulnerability at both extremes of age. Diagnostic delays and atypical presentations were more common in these groups.

**Figure 4 presents the age-wise distribution of EPTB cases.**




**6. District-wise Distribution of EPTB Cases**

**Discussion**

The findings of this study highlight that EPTB represents a significant and growing component of the TB burden in Rajasthan. The predominance of lymphatic and pleural TB is consistent with national and global literature [1,4]. However, the low rate of bacteriological confirmation remains a critical concern. The increasing share of EPTB among total TB cases over time necessitates recalibration of TB control strategies, with greater emphasis on molecular diagnostics, specimen transport systems, and clinician training. Without addressing these diagnostic limitations, EPTB will remain under-confirmed and under-characterised, impeding progress toward TB elimination.

**Diagnostic Challenges**

EPTB diagnosis is inherently complex due to:

- Pauci-bacillary nature of disease
- Difficulty in obtaining appropriate samples
- Limited access to invasive diagnostic procedures
- Inadequate utilisation of molecular diagnostics
- The low NAAT coverage observed in this study underscores the need for expanded diagnostic infrastructure, specimen transportation mechanisms, and clinician sensitisation.

**Table 1. District-wise distribution of Extra-Pulmonary Tuberculosis cases in selected districts of Rajasthan, 2024**

| District | Total TB cases | EPTB cases | EPTB (%) | Bacteriologically confirmed (%) |
|---|---|---|---|---|
| Jaipur | 12,500 | 2,800 | 22.4 | 10 |
| Jodhpur | 9,800 | 1,900 | 19.4 | 9 |
| Udaipur | 7,600 | 1,650 | 21.7 | 8 |
| Kota | 8,200 | 1,500 | 18.3 | 9 |
| Bikaner | 6,900 | 1,300 | 18.8 | 8 |
| Ajmer | 7,400 | 1,450 | 19.6 | 9 |
| Alwar | 7,100 | 1,400 | 19.7 | 9 |
| Bharatpur | 6,800 | 1,350 | 19.9 | 8 |

**Programmatic and Reporting Gaps:**

Despite improvements in Ni-kshay reporting, private sector under-notification persists. Many EPTB cases in private practice are treated empirically without laboratory confirmation, leading to delayed notification and loss to follow-up. Strengthening public-private partnerships is therefore essential [2].

**Vulnerable Populations**

The notable burden among paediatric and geriatric populations calls for tailored diagnostic algorithms, child-friendly sample collection methods, and geriatric-sensitive care models.

Strategic Interventions and Way Forward

Based on the findings, the following strategic interventions are recommended:

- Strengthening Diagnostic Capacity: Expansion of NAAT access [3,5], biopsy and cytology services, and sample referral systems.
- Standardised Diagnostic Algorithms: Dissemination and adherence to STCI-aligned EPTB diagnostic pathways.
- Capacity Building: Regular training of clinicians, laboratory staff, and field workers on EPTB recognition and management.
- Private Sector Engagement: Enhanced notification incentives, digital integration, and continuous engagement with private providers.
- Community Awareness: Targeted IEC campaigns focusing on early symptoms of EPTB.
- Focused Attention on High-risk Groups: Paediatric, geriatric, and co-morbid populations require prioritised screening and follow-up.
- Operational Research: Continuous evaluation of diagnostic strategies and treatment outcomes to inform policy.

**Conclusion:**

Extra-Pulmonary Tuberculosis constitutes a substantial proportion of TB cases in Rajasthan and poses unique diagnostic and programmatic challenges. Low bacteriological confirmation, limited molecular testing, and private sector under-reporting continue to hinder effective control. Addressing these gaps through strengthened diagnostics, capacity building, and multisectoral collaboration is essential for achieving TB elimination targets. A patient-centric, evidence-based approach will be key to improving EPTB outcomes in Rajasthan.

**References:**


1. World Health Organization. (2024). Global tuberculosis report 2024. World Health Organization. https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2024
2. Central TB Division, Ministry of Health & Family Welfare, Government of India. (2016). National TB elimination programme: Technical and operational guidelines for tuberculosis control in India. Government of India. https://tbcindia.gov.in/
3. Central TB Division, Ministry of Health & Family Welfare, Government of India. (2023). Standards for TB care in India (STCI). Government of India. https://tbcindia.gov.in/
4. Sharma, S. K., & Mohan, A. (2004). Extrapulmonary tuberculosis. Indian Journal of Medical Research, 120(4), 316–353. https://www.icmr.gov.in/ijmr/2004/120/4/1204.pdf
5. Pai, M., Kalantri, S., & Dheda, K. (2006). New tools and emerging technologies for the diagnosis of tuberculosis: Part I. Latent tuberculosis infection. Expert Review of Molecular Diagnostics, 6(3), 413–422. https://doi.org/10.1586/14737159.6.3.413



**Image Credit: Getty Images-India Health Tuberculosis**

# Bridging the Gap: Strengthening Private Sector Integration into the National Tuberculosis Elimination Programme (NTEP) through Technical Support Insights from Rajasthan, India

Priyanka Sharma, Former State Technical Support Unit (STSU), National Tuberculosis Elimination Programme, Rajasthan, India

**Abstract:**

**Private healthcare providers constitute a major healthcare delivery channel in Rajasthan, yet their contribution to tuberculosis (TB) notification and integrated care under the National Tuberculosis Elimination Programme (NTEP) has historically remained suboptimal. This study evaluates the impact of the State Technical Support Unit (STSU) in strengthening private-sector engagement, improving surveillance, and enhancing the quality of TB care across the state. A retrospective quantitative analysis of Ni-kshay data (2021–2024) was undertaken to assess changes in private-sector notification, presumptive enrolment, diagnostic coverage, and turnaround time (TAT) improvements following technical support interventions. Private-sector TB notifications nearly doubled over the period, presumptive enrolment increased by 54.91%, and NAAT diagnostic TAT improved from 10 to 7 days. The findings demonstrate that STSU-led interventions, including provider mapping, capacity-building, onboarding, and systems strengthening, substantially improved private-sector integration with NTEP. These results highlight the critical role of structured technical support systems in accelerating progress toward TB elimination.**

**Introduction:**

Tuberculosis (TB) continues to pose a significant public health challenge in India, accounting for the highest global TB burden [1]. In states like Rajasthan, the private health sector accounts for a large share of initial care-seeking for TB-like symptoms. However, underreporting by private providers has historically weakened the surveillance system [3,4], undermining comprehensive case detection and timely initiation of treatment.

To address this persistent gap, the Government of India established State Technical Support Units (STSUs) [2] to strengthen programme implementation, improve data quality, and enhance public–private collaboration under NTEP. Rajasthan's STSU has been instrumental in accelerating private-sector engagement, ensuring the availability of free diagnostics, adherence mechanisms, and streamlined reporting through the Ni-kshay platform.

This study evaluates the measurable impact of STSU interventions on private-sector performance across Rajasthan between 2021 and 2024.

**Methods**

A retrospective quantitative analysis was conducted using Ni-kshay data for the period 2021–2024. Key performance indicators assessed included:

- Private-sector TB notifications
- Presumptive TB enrolment
- Coverage of molecular diagnostics (NAAT)
- Turnaround time (TAT) for NAAT testing
- Bank seeding TAT for patient benefit disbursement
- Number of active notifying health facilities

STSU intervention records, including capacity-building initiatives, provider onboarding data, and district-level support activities, were reviewed to contextualise performance trends.

Results

1. Private Sector Notification and Presumptive Enrolment

Private-sector TB notifications nearly doubled between 2021 and 2024 [2].

Presumptive enrolment increased by 54.91%, with the largest annual rise occurring in 2024 (+12,942 cases), demonstrating improved provider engagement and referral pathways.

2. Expansion of Notifying Health Facilities

The number of active notifying private health facilities increased from 1,385 to 1,676, reflecting successful mapping, onboarding, and routine support by STSU teams.

3. Diagnostic and System-Strengthening Improvements

NAAT TAT improved from 10 days to 7 days [2], enhancing early diagnosis and prompt treatment initiation.

Bank seeding TAT—critical for direct benefit transfers—reduced from 21 to 17 days, improving patient support service efficiency.

Image Credit: Getty Images-Noah Saleem

4. Programme Support Interventions

Key STSU activities contributing to these improvements included:

- Mapping and onboarding of private providers
- Regular sensitisation workshops and hands-on Ni-kshay training
- District-level supportive supervision
- Strengthening diagnostic linkages and sample transport mechanisms
- Facilitating patient access to free drugs, diagnostics, and adherence support tools

**Discussion:**

The findings demonstrate that targeted technical support significantly enhances private-sector participation in TB care [3-5]. Increased notifications and improved diagnostic timelines reflect both heightened provider engagement and strengthened programme systems.

Rajasthan's experience aligns with national evidence highlighting the importance of structured partnerships between public health departments and private providers [5]. By reducing systemic bottlenecks such as delayed diagnostics, inadequate reporting mechanisms, and fragmented care pathways, the STSU model promotes a more integrated, accountable, and patient-centred TB care ecosystem. Sustaining and scaling these interventions will be essential as India advances toward the 2025 TB elimination goals.

**Conclusion:**

The State Technical Support Unit has played a pivotal role in strengthening Rajasthan's private-sector–public health interface under NTEP. Through comprehensive capacity-building, system optimisation, and field-level support, the STSU has improved TB case detection, notification, and management. Continued investment in such technical assistance structures will be vital to sustaining gains and accelerating progress toward TB elimination.

**References:**

1.World Health Organisation. (2023). Global tuberculosis report 2023. World Health Organisation. https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2023

2.Central TB Division, Ministry of Health & Family Welfare, Government of India. (2024). National TB elimination programme annual report 2024. Government of India. https://tbcindia.gov.in/

3.Arinaminpathy, N., Batra, D., Khaparde, S., Vualnam, T., & others. (2019). The number of privately treated tuberculosis cases in India: An estimation from drug sales data. The Lancet Infectious Diseases, 19(12), 1285–1294. https://doi.org/10.1016/S1473-3099(19)30547-1

4.Satyanarayana, S., Subbaraman, R., Shete, P., Gore, G., Das, J., Cattamanchi, A., & others. (2015). Quality of tuberculosis care in the private health sector: A cross-sectional study. The Lancet Infectious Diseases, 15(12), 1381–1388. https://doi.org/10.1016/S1473-3099(15)00122-6

5.Pai, M., & Kasaeva, T. (2018). Removing barriers to TB care: The role of public–private partnerships. Journal of Clinical Tuberculosis and Other Mycobacterial Diseases, 12, 1–3. https://doi.org/10.1016/j.jctube.2018.05.001


Image Credit: Getty Images-Money Sharma

# STEPS and the Kochi Declaration: From Private Sector Engagement to Private Sector Leadership in TB Elimination

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**Abstract:**
**Private hospitals treat most of India's TB patients, yet ensuring quality care outside government clinics remained challenging. STEPS, a low-cost, patient centred model piloted in Kerala, links private providers to national TB standards. It has since expanded beyond its origins, now covering over 1,000 private hospitals across seven states, offering a scalable path toward TB elimination.**

**Introduction:**
In India, where more than half of people with tuberculosis (TB) symptoms first seek care from the private sector, engaging private healthcare providers is essential to achieving TB elimination. Yet for decades, ensuring that patients treated in private facilities received the same quality of care and public health support available through government programmes remained a major challenge [1].

The System for TB Elimination in Private Sector (STEPS) has emerged as a transformative solution. Piloted in Kerala, STEPS is a private sector-led, patient-centred, low-cost, and sustainable model that ensures every patient diagnosed with TB in participating private hospitals receives comprehensive care aligned with national standards [2,3] What began as a state-level innovation has now evolved into a national movement involving more than 1,000 private hospitals across seven states in India.

**Reimagining Private Sector Engagement**

STEPS was founded on a simple but powerful idea: quality TB care is not only a public health responsibility but also part of the social responsibility of private healthcare institutions.
Rather than viewing TB care as an externally funded public health activity, STEPS positions it as an extension of the patient-care commitment that hospitals already make to the communities they serve. The model draws inspiration from customer-care and after-sales service systems that are routinely used by successful private hospitals to ensure patient satisfaction, continuity of care, and quality outcomes [2,3].

In most hospitals, patients receive excellent diagnostic and clinical services while they remain within the facility. However, TB requires long-term follow-up extending over months, involving treatment adherence support, monitoring of adverse events, contact investigation, preventive therapy for family members, linkage to social welfare benefits, and documentation of outcomes. Traditionally, these activities often fell outside routine hospital systems.

STEPS bridges this gap by creating an internal hospital mechanism that coordinates both clinical and public health actions. Each participating hospital establishes a STEPS Centre that functions as a single-window coordination unit. A designated STEPS Lead usually a trained nurse works with departmental STEPS Links from pulmonology, general medicine, paediatrics, microbiology, pharmacy, nursing services, infection prevention and control, and hospital administration. Together, they ensure that every patient diagnosed with TB receives the complete package of services recommended under the Standards for TB Care in India [2,3].

***STEPS bridges this gap by creating an internal hospital mechanism that coordinates both clinical and public health actions.***

The model fits naturally within existing hospital systems. Hospitals accredited by the National Accreditation Board for Hospitals and Healthcare Providers (NABH) already maintain robust quality assurance mechanisms, patient safety protocols, documentation systems, infection prevention and control programmes, and patient follow-up processes. STEPS builds upon these existing structures rather than creating parallel systems, making implementation feasible, affordable, and sustainable.

By standardizing processes and documentation, STEPS helps hospitals consistently deliver evidence-based TB care while ensuring that all essential actions are recorded. This improves patient outcomes, strengthens clinical governance, and mitigates potential medico-legal risks associated with incomplete documentation or deviations from accepted standards of care.

**A Movement Led by Hospitals and Healthcare Professionals**

The model is built on three interconnected pillars:

- **Private Hospital TB Consortiums** at city level, comprising private hospital owners and administrators, that provide leadership and governance among participating hospitals.
- **Coalitions of Professional Medical Associations**, which advocate with clinicians and promote standards of TB care across specialties.
- **STEPS Centres** established within private hospitals to coordinate patient care, notification, treatment support, contact investigation, preventive therapy, social welfare linkages, and treatment adherence support.

A distinctive feature of STEPS has been the leadership of the Association of Healthcare Providers (India) (AHPI) and the Indian Medical Association (IMA).

AHPI championed the concept among private hospital managements and facilitated the formation of hospital consortiums that assumed ownership of the TB elimination agenda [4]. Through its patronage of the Coalitions of Professional Medical Associations, IMA brought together multiple professional bodies onto a common platform for TB elimination. This professional ownership helped bridge the gap between clinicians and public health programmes, creating a shared responsibility for improving TB care.

**Delivering Better Outcomes at Low Cost**

Formal evaluations demonstrated that STEPS successfully addressed long-standing gaps in the quality of TB care in the private sector. The model improved microbiological confirmation of diagnosis, expanded access to drug susceptibility testing, strengthened HIV status ascertainment, increased treatment outcome reporting, and improved treatment success rates [2,3,5,6].

Importantly, these achievements were realized through a model that is both affordable and sustainable. Rather than creating parallel systems or relying heavily on external intermediaries, STEPS strengthens existing hospital systems and integrates public health functions into routine patient care. Evaluations confirmed that the model is acceptable to patients, healthcare providers, hospital administrators, and programme managers alike.

The success of STEPS demonstrates that quality TB care in the private sector does not require expensive vertical programmes. Instead, it requires leadership, accountability, and systems that place patients at the centre of care.

From Kerala Innovation to National Scale

The success of STEPS in Kerala attracted attention from healthcare leaders across the country. Over time, the model expanded beyond its state of origin and is now being implemented in more than 1,000 hospitals across seven Indian states.

A major driver of this expansion has been the commitment of AHPI. Recognizing the critical role of private healthcare institutions in ending TB, AHPI adopted TB elimination as an institutional commitment and promoted the establishment of state-level and city-level consortiums of private hospitals in Haryana, Uttar Pradesh, and Delhi [4,7].

Building on these efforts, AHPI and partner institutions facilitated the formation of the National Consortium of Private Hospitals to End TB in India, creating a platform through which private hospitals across the country can collaborate, share best practices, strengthen partnerships with the National TB Elimination Programme (NTEP), and contribute collectively to India's TB elimination goals.

This growing network demonstrates that private-sector leadership can be scaled successfully while maintaining quality, accountability, and patient-centred care.

**Global Recognition Through the Kochi Declaration**

The impact of STEPS has now extended beyond India.
In June 2024, leaders of the Stop TB Partnership Private Sector Provider Constituency, the Commonwealth Medical Association, and national medical associations from multiple countries gathered in Kochi, Kerala, for the Leadership Summit for Achieving the UN High-Level Meeting Targets on TB.

The resulting Kochi Declaration 2024 recognized the urgent need to strengthen private sector engagement in TB care and explicitly acknowledged STEPS as an innovative model of private-provider engagement. The declaration highlighted STEPS as a successful private-private partnership owned and operated by private hospitals and endorsed its role in improving access to quality TB care [8].

The declaration further called upon professional medical associations, private healthcare providers, governments, and TB programmes to work together to accelerate progress towards ending TB. This global endorsement reflects the growing recognition that achieving TB elimination will require strong partnerships with the private health sector, where a large proportion of patients first seek care.
Looking Ahead

As countries strive to achieve the targets of the UN High-Level Meeting on TB and the Sustainable Development Goals, the experience of STEPS offers valuable lessons.
The model demonstrates that private hospitals are not merely service providers but can become active leaders in public health. By bringing together hospital networks, professional medical associations, clinicians, and government programmes around a shared vision, STEPS has transformed private sector engagement from a transactional partnership into a collaborative movement for TB elimination.

Importantly, the principles underlying STEPS extend well beyond tuberculosis. The same platform can potentially support other national health priorities that require long-term follow-up, surveillance, continuity of care, and public health action. In the future, STEPS could evolve into a broader framework a System for Total Engagement of Private Sector enabling structured collaboration between private healthcare institutions and multiple public health programmes while preserving the strengths of both sectors.

The journey from a state-level innovation in Kerala to a nationally scaled and internationally recognized model illustrates what is possible when healthcare institutions take collective ownership of a public health challenge. With continued leadership from private hospitals, professional associations, AHPI, IMA, and national TB programmes, STEPS provides a practical pathway towards universal access to quality care and a healthier future for all.

**STEPS at a Glance**

- 1,000+ hospitals
- 7 states
- Private sector-led
- Low-cost and sustainable
- Endorsed by the Kochi Declaration 2024
- Supported by AHPI and IMA
- Potential model for broader public health engagement

**Image Credit: KIMS HEALTH**


**Image Credit: IMA Kerala**

***The principles underlying STEPS extend well beyond tuberculosis. The same platform can potentially support other national health priorities that require long-term follow-up, surveillance, continuity of care, and public health action.***

**References:**


1. World Health Organization. Engaging private health care providers in TB care and prevention: a landscape analysis, second edition. Geneva: World Health Organization; 2021. Available from: https://iris.who.int/server/api/core/bitstreams/373545c5-0c63-4131-9aef-c99e3155975d/content

2. Balakrishnan S, Rakesh PS, Sunilkumar M, Sankar B, Ramachandran R, Ameer KA, et al. STEPS: A solution for ensuring standards of TB care for patients reaching private hospitals in India. Glob Health Sci Pract. 2021 Jun 30;9(2):286-292

3. Rakesh PS, Balakrishnan S, Sunilkumar M, Alexander KG, Vijayan S, Roddawar V, et al. STEPS - a patient centric and low-cost solution to ensure standards of TB care in private sector hospitals, Kerala, India. BMC Health Serv Res. 2022 Jan 2;22(1):4.

4. Khetarpal SK, Gupta SS. EP17-757-15 AHPI-led corporate hospitals' engagement in the Nation's TB elimination efforts [abstract]. In: Abstract Book of the 55th Union World Conference on Lung Health; 2024 Nov 12–16; Bali, Indonesia. Int J Tuberc Lung Dis. 2024;28(11 Suppl 1):S1-S814. Abstract no. EP17-757-15. Available from: https://documents.theunion.org/web-uploads/UNION2024_Abstracts.pd

5. Rakesh PS, Shannawaz M. Ensuring universal access to quality care for persons with presumed tuberculosis reaching the private sector: lessons from Kerala. Int J Equity Health. 2024 May 17;23:101. Available from: https://link.springer.com/article/10.1186/s12939-024-02151-1

6. Anupkumar TN, Gayathri AV, Aparna M, Achanta S, Rajaram K, Krishna D. OA26-312-14 Impact of private sector engagement (STEPS) strategy on TB notification and outcome in Kerala, India, 2018-2023 [abstract]. In: Abstract Book of the 56th Union World Conference on Lung Health; 2025 Nov 12–15; Bali, Indonesia. Int J Tuberc Lung Dis. 2025;29(11 Suppl 1):S1-S963. Abstract no. OA26-312-14. Available from: https://documents.theunion.org/web-uploads/UNION2024_Abstracts.pd

7. Sehgal N, Sehgal MJ, Khullar J, Kumari P, Rakesh PS. Outpatient department based digitally enabled systematic screening for TB: Experiences from a private hospital in Delhi. Indian J Tuberc. 2026 Apr 25; In Press, Corrected Proof. Available from: https://www.sciencedirect.com/science/article/pii/S0019570726001174

8. Jayalal JA, Asokan RV, Sahu S, Burhan E, Rajathurai M, Abel C, et al. Free Content The Kochi Declaration 2024 – A catalyst for global TB elimination through private sector engagement. Int J Tuberc Lung Dis. 2025 Nov 28;29(12):523-525


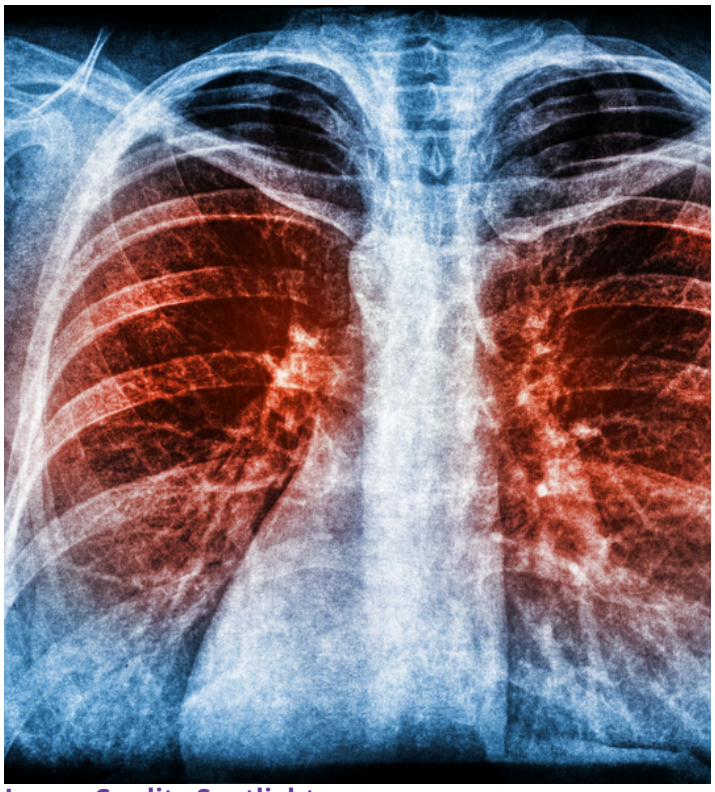

**Image Credit: Spotlight**

# Bridging Scientific Innovation and Community Action to Create Impact: How TB Champions Are Strengthening DR-TB Care in the Era of New-Age Treatments

Akshaya Patil, Community Lead, Market Access, TB Alliance; Anupama Srinivasan, Deputy Director, REACH, India, Dr Ramya Ananthakrishnan, Director, REACH, India

**Abstract:**
**Drug-resistant tuberculosis (DR-TB) remains a major challenge in India, which accounts for nearly a third of the global MDR/RR-TB caseload, with roughly 1 in 10 patients lost to follow-up. While newer, shorter all oral regimens such as BPaLM have improved treatment outcomes and reduced pill burden, technological innovation alone is insufficient without community awareness, trust, and support. Fast Track Cure offers a model for partnering with local communities to build awareness, encourage care-seeking, and support patients through diagnosis and treatment, accelerating the uptake and impact of new TB regimens.**

**Introduction:**
Drug-resistant tuberculosis (DR-TB) remains one of the most difficult challenges in TB care. With approximately 55,000 of notified cases of multidrug-resistant/rifampicin-resistant TB(MDR/RR-TB) in 2024, India carries nearly a third of the global caseload. Further, approximately 1 in 10 people who begin DR-TB treatment in India are lost to follow-up [1]. Poor awareness of new treatment regimens, inadequate treatment literacy, side effects of treatment and stigma associated with TB contribute to treatment interruption. [2]. These dynamics underscore the urgency to close gaps in diagnosis, treatment initiation, and continued support.

The changing DR-TB treatment landscape presents opportunities to address these gaps by simplifying and decentralizing care while improving treatment experiences and outcomes. Newer, shorter, all-oral regimens, specifically, the six-month BPaLM (bedaquiline + pretomanid + linezolid + moxifloxacin) regimen significantly reduce DR-TB treatment duration and pill burden and have resulted in improved treatment success rates, as well as cost savings for health systems [3-5].

However, the development of improved medical technologies alone does not automatically translate into impact. For a new regimen to improve lives, people must know it exists, be able to access care without stigma or isolation, and feel supported throughout their treatment journeys to complete treatment.

To this end, strengthening community engagement, improving access to high-quality DR-TB care, and increasing demand for shorter regimens through awareness, peer support, and knowledge-sharing in high-burden settings were core elements of a recently concluded Fast Track the Cure (FTTC)-supported project implemented by REACH between May 2025 and March 2026. Led by TB Alliance, FTTC brings communities around the world together to raise awareness and facilitate access to new DR-TB treatments. This particular project was conducted across five Indian states: Bihar, Uttar Pradesh, New Delhi, Uttarakhand, and Tamil Nadu.

Across these states, the project showed how trained community leaders can help translate treatment innovation into practical action at a meaningful scale. It trained 102 TB Champions, reached nearly 59,000 people through community meetings and campaign activities, sensitized 870 TB survivors on DR-TB, and provided direct peer support to 433 people with DR-TB, including 303 people on BPaLM regimens. Qualitative feedback suggested that TB Champion support helped make care feel more manageable, reinforced adherence, addressed fears and practical barriers, and helped people remain connected to services. Together, these results demonstrate the value of pairing shorter, simpler treatment options with community-led education, survivor leadership, and facility-linked peer support.

Image Credit: REACH India

The need for this approach was reinforced by a rapid community-based awareness survey conducted before community meetings. Among 1,146 participants surveyed across five states, basic TB awareness was relatively high: 87.4% correctly identified airborne transmission, 86% knew TB is curable, 75% understood that stopping treatment midway worsens disease, and 84.7% knew that TB services are free in government facilities. However, this general awareness did not consistently translate into an accurate understanding of symptoms, drug resistance, or newer treatment options. Only 51% correctly identified key TB symptoms, 47.6% understood drug resistance, and only 38.1% had heard of BPaLM or shorter regimens.

The project findings underscored the importance of trusted community messengers who can explain DR-TB and treatment innovation in accessible terms, while also helping people stay connected to care. The project confirmed that the impact of scientific advances is amplified when product introduction is complemented by community systems that can explain, humanize, and support those advances, and that initiatives like FTTC can play a distinctive role at the intersection of innovation, access, and community action.

**1. Building Community Capacity on DR-TB**

The project's first step was to strengthen the knowledge and confidence of TB Champions and survivor-led networks so they could serve as trusted messengers on DR-TB and newer treatment options. This capacity-building component was designed to help translate technical information into practical, credible messages that communities could understand and act on.

Under the project, five state-level capacity-building workshops were conducted, training 102 TB Champions on DR-TB. The workshops were organized in consultation with TB survivor networks and the National TB Elimination Programme (NTEP), with participation from State TB Cell representatives across all five states. The training focused on DR-TB, services available under the National TB Elimination Programme (NTEP), challenges faced by people with DR-TB, and the urgent need to raise community awareness on newer treatment options.

Importantly, these were not conventional top-down trainings, nor were they limited to technical information and guidance. Workshops were designed to create space for lived experience. Sessions began with 'My Stories,' allowing participants to share their personal journeys with TB or DR-TB. These sessions were complemented by technical sessions, interactive activities such as 'Pathways to Cure,' and a 'Knowledge to Action' segment that encouraged participants to translate learning into community-level interventions.

This approach represents a more holistic view of education and awareness building, as people affected by TB often carry knowledge that cannot be captured in clinical guidance alone: the fear of a diagnosis, the burden of treatment, the anxiety of disclosure, the difficulty of sustaining work and family life, and the loneliness that stigma can create. By combining technical knowledge with lived experience, the project helped equip TB Champions to convey credible messages of information and hope, as well as why new and shorter treatments can be beneficial.

**2. Taking Knowledge to Communities**

After training, TB Champions were tasked with spreading their knowledge and experiences to improve community awareness on DR-TB. Their work was practical, local, and grounded in trust. They identified vulnerable locations such as slums, villages with high TB notification, areas with key vulnerable populations, schools, colleges, Panchayat buildings, National Rural Employment Guarantee Act (NREGA) worksites, and other public places. They worked with local stakeholders, including Pradhans, councillors, ASHA stands for Accredited Social Health Activist (ASHAs), Anganwadi workers, and health staff, to mobilize communities.

**Image Credit: REACH India**

The messages delivered at these meetings were designed to be straightforward and non-technical. TB Champions spoke about symptoms of TB, types of TB, diagnosis of TB and DR-TB, treatment options including shorter regimens, follow-up tests, available services, and social support schemes such as Nikshay Poshan Yojana (Nikshay Nutrition Scheme). These messages directly responded to the survey findings, which showed that communities often knew TB was curable and transmissible but had less consistent understanding of symptoms, drug resistance, and shorter DR-TB treatment options.

TB Champions also shared their contact numbers, allowing people to reach out after meetings. This proved important because many community members were hesitant to ask questions publicly but later called TB Champions for help in accessing diagnostic services.

Across the five states, TB Champions conducted over 2,000 community awareness meetings and sensitized about 49,656 people. Delhi recorded the highest number of meetings, followed by Tamil Nadu, Uttar Pradesh, Bihar, and Uttarakhand. The community campaign also engaged over 9,000 additional people through a mix of online and offline activities, giving TB Champions repeated opportunities to reinforce messages in familiar settings.

**3. Peer Support in the Era of BPaLM**

In addition to building community understanding of the need for and benefits of shorter DR-TB treatment, the project also demonstrated the value and feasibility of facility-based peer support for people with DR-TB. TB Champions were key actors in this intervention as well. As part of this project, TB Champions were positioned across six DR-TB nodal centres or centres of excellence across Delhi, Uttarakhand, and Tamil Nadu. The project supported 433 people with DR-TB through peer support, including 303 people receiving BPaLM.

One of the roles TB Champions played in this context was to support the decentralization of TB care. The shorter, simpler, and all-oral nature of regimens like BPaLM is conducive to decentralizing DR-TB care, bringing it closer to those seeking treatment. However, some barriers to treatment are not logistical. Engaging TB Champions helped address human barriers like fear, stigma, household pressures, misperception, and skepticism of treatment, many of which were shaped by community experiences with older DR-TB treatments. Champions served as emotional anchors and trusted contacts. They listened, counselled, shared their lived experience, reinforced the importance of adherence, explained sputum disposal and cough etiquette, discussed nutrition and hygiene, and followed up by phone after initial in-person interactions.

The qualitative evidence helped show how this peer support contributed to better treatment experiences. In 22 feedback interviews with people with DR-TB, TB Champions, and NTEP/healthcare providers, stakeholders described the shorter all-oral regimen as more manageable in terms of duration, pill burden, and treatment experience. Providers from project sites observed improvements in treatment continuity and adherence, and one DR-TB coordinator reported that there had been no loss to follow-up among cases handled so far. TB Champions also helped address practical issues that could interrupt care, including travel difficulty, family concerns, and coordination with health staff.

The project also captured reflections on the improved treatment experiences with BPaLM compared to older treatments. A TB Champion in Delhi, who had undergone a long and painful treatment journey from 2015 to 2017, observed that people now receiving treatment are benefitting from simplified, shorter, and better-tolerated regimens. Her reflection captures both the progress made and the responsibility ahead: the benefits of innovation must be made visible, understandable, and accessible to those who need it most.

**4. From Awareness to Action**

The project's community campaign, built around the message "End Stigma, End TB," extended TB Champion engagement beyond formal meetings and facility-based support and demonstrated how online and offline engagement can be mutually reinforcing. In an effort to amplify the benefits of the project's work beyond those who were trained directly or attended community events in person, TB Champions took to social media to share ready-to-use visuals, post campaign messages, establish hashtags, and communicate in their own words. They also conducted awareness sessions in schools, colleges, institutions, local events, melas, and public gatherings. Each Champion was encouraged to reach at least 100 individuals through combined online and offline efforts. Overall, 9,144 people were sensitized on DR-TB through the community campaign, in addition to the 49,656 reached through meetings.

**Image Credit: REACH India**

**5. Future Implications**

The project showed that TB Champions can play a critical role as translators of science, navigators of care, and builders of trust. They can explain new regimens in language that communities understand, reduce fear by sharing recovery stories, identify people who may need testing, and support those struggling with side effects or adherence. They can also help health systems better understand the experiences of people affected by TB and the types of support that can make care easier to complete.

This is especially important as TB innovation accelerates. Shorter regimens, better diagnostics, digital adherence tools, and future vaccines will only achieve their promise if communities are engaged early, meaningfully, and consistently. FTTC's mission is therefore not simply to promote access to new tools but to ensure that communities understand, trust, demand, and benefit from them. The REACH project shows what this bridge can look like in practice: survivor-led capacity building, clear community messaging, facility-linked peer support, data-informed awareness activities, and partnership with NTEP at state and national levels.

The project also reinforces that people with lived experience are not only beneficiaries of TB programmes but essential partners in making those programmes work. As new tools like BPaLM become part of routine care, community leadership should be treated as a core component of product introduction, helping ensure that innovation reaches the last mile with dignity, clarity, trust, and impact.

**References:**


1. Central TB Division, Ministry of Health and Family Welfare, Government of India. India TB Report 2024. New Delhi: Government of India; 2024.
2. Teo AKJ, Singh SR, Prem K, Hsu LY, Yi S. Duration and determinants of delayed tuberculosis diagnosis and treatment in high-burden countries: a mixed-methods systematic review and meta-analysis. Respir Res. 2021;22:251. doi:10.1186/s12931-021-01841-6.
3. World Health Organization. WHO consolidated guidelines on tuberculosis. Module 4: treatment — drug-resistant tuberculosis treatment, 2022 update. Geneva: World Health Organization; 2022. ISBN: 978-92-4-006312-9.
4. Nyang'wa BT, Berry C, Kazounis E, Motta I, Parpieva N, Tigay Z, et al. Short oral regimens for pulmonary rifampicin-resistant tuberculosis (TB-PRACTECAL): an open-label, randomised, controlled, phase 2B-3, multi-arm, multicentre, non-inferiority trial. Lancet Respir Med. 2024;12(2):117-128. doi:10.1016/S2213-2600(23)00389-2.
5. Sweeney S, Laurence YV, Berry C, Singh MP, Dodd M, Fielding K, Kazounis E, Moodliar R, Solodovnikova V, Tigay Z, Liverko I, et al. 24-week, all-oral regimens for pulmonary rifampicin-resistant tuberculosis in TB-PRACTECAL trial sites: an economic evaluation. Lancet Glob Health. 2025;13(2):e355-e363. doi:10.1016/S2214-109X(24)00467-4.


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