BioSpectrum
the business of Bi
24 years of leveraging the business of Bio
www.biospectrumindia.co

How AI could change way India manages drug-resistant TB

20 November 2026 | Views | By Dr Gunisha Pasricha, Associate Director, Research â?? Infectious Disease Genomics, MedGenome Labs

If advanced sequencing and AI tools are to affect outcomes across India, they must be available beyond large urban facilities



India has made significant progress against tuberculosis (TB), with the incidence of the disease declining 21% since 2015, to 187 per 100,000 people, according to the WHO Global Tuberculosis Report 2025. Yet India still accounted for 32% of the world's estimated multidrug- and rifampicin-resistant TB cases in 2024. Hence, the challenge today is no longer just finding infections, but knowing precisely, and early which drugs are likely to work.

The Cost of Uncertainty

When a person with persistent cough reaches a clinic, a chest X-ray may indicate the possibility of pulmonary TB. But further testing is needed to confirm it. For this, sputum samples are sent to the lab, and if it shows resistance to rifampicin (a key first-line TB medicine), the next obvious question becomes: which other drugs will still work?

New treatment regimens for drug-resistant tuberculosis (DR-TB) rely on combinations of medicines. If treatment starts without enough information on the resistance, patients may be given drugs that are ineffective, delaying cure and increasing the risk of treatment failure and disease transmission. This can also lead to further drug resistance and make it harder to choose the right treatment later.

Conventional culture-based drug susceptibility testing can take weeks because the bacterium grows slowly. In the meantime, the patient is usually treated based on the limited information available. Some do well, others get sicker, sometimes even pass the infection on to people at home or sometimes develop further resistance. This becomes not just health but also a financial burden on the family, with each delay in the chain having a cost.

Bridging the gap: Smarter Screening with AI

AI-assisted detection software can analyse chest X-rays in seconds and flag images that may indicate TB. The WHO recommends its use for TB screening in people aged 15 and above, and some tools can even operate offline, making them useful in remote areas with limited connectivity. In December 2024, India started using these AI-enabled X-ray devices for door-to-door and community screening under the 100-day TB Mukt Bharat Abhiyaan.

The national programme has adopted DeepCXR, an AI chest X-ray reader developed by ICMR with the Institute for Plasma Research, which is free to the government. For screening teams, this means they can reach far more people, including those who show no obvious symptoms. By late 2025 the campaign had screened over 19 crore vulnerable people and detected more than 24.5 lakh TB patients, of whom 8.61 lakh had no symptoms at all. Phase two launched in 2026 has continued this approach.

Enabling Targeted Treatments

Once TB is confirmed, the priority shifts to resistance. While rapid molecular can identify resistance to selected drugs within hours, to check for resistance across a wider range of medicines, WHO recommended targeted next-generation sequencing

(NGS), a genomic test, in 2024. Newer NGS tests developed in India, such as MedGenome's SpitSeq, can identify mutations linked to resistance with 100% sensitivity and 98.04% specificity to more than 20 first- and second-line medicines, and delivering reports within ~14 days.

AI-based analytical tools help process the enormous amount of complex genetic data generated through NGS, identifying mutations linked to drug resistance, and comparing them with existing databases to give clinicians a clear, drug-by-drug report rather than raw data, that can be used along with the patient's history, symptoms and other test results to guide treatment decisions. It is important to note that while AI can assist, laboratory expertise and clinical judgement still matter for accurate treatment decisions.

Beyond Diagnosis

Some of the most promising Indian applications are increasingly using AI to strengthen different stages of TB care. For instance, PATO (Prediction of Adverse TB Outcomes) scores each patient's risk of dropping out or dying, so health workers can follow up the highest-risk patients first. Haryana uses vulnerability mapping for TB using geospatial AI to combine programme data with health and environmental indicators and pinpoint high-risk locations. A Hyderabad-based company is using Google's HeAR model, trained on about 100 million cough sounds, to improve TB screening in resource-constrained places. These applications show AI's potential to strengthen TB care from early detection to treatment and follow-up.

Making AI-enabled healthcare accessible

If advanced sequencing and AI tools are to affect outcomes across India, they must be available beyond large urban facilities. They must reach district- and block-level centers, perform reliably across diverse populations, and support clinical judgement to enable timely treatment decisions.

While India has made considerable progress in deploying AI for TB screening and risk prediction, sustained investment will be essential to scale these innovations equitably. Affordable technologies, healthcare worker training, reliable data systems and evidence of cost-effectiveness, supported by public–private partnerships, will be critical to translating technological advances into better patient outcomes.

The challenge is no longer simply developing AI solutions but ensuring they reach the people who need them most. For India, the opportunity is to integrate these capabilities into a seamless diagnostic pathway to enable earlier TB detection, faster resistance profiling, and more timely, targeted treatment.

Dr Gunisha Pasricha, Associate Director, Research – Infectious Disease Genomics, MedGenome Labs