LUNG HEALTH MATTERS: TB, CHEST DISEASES AND BEYOND

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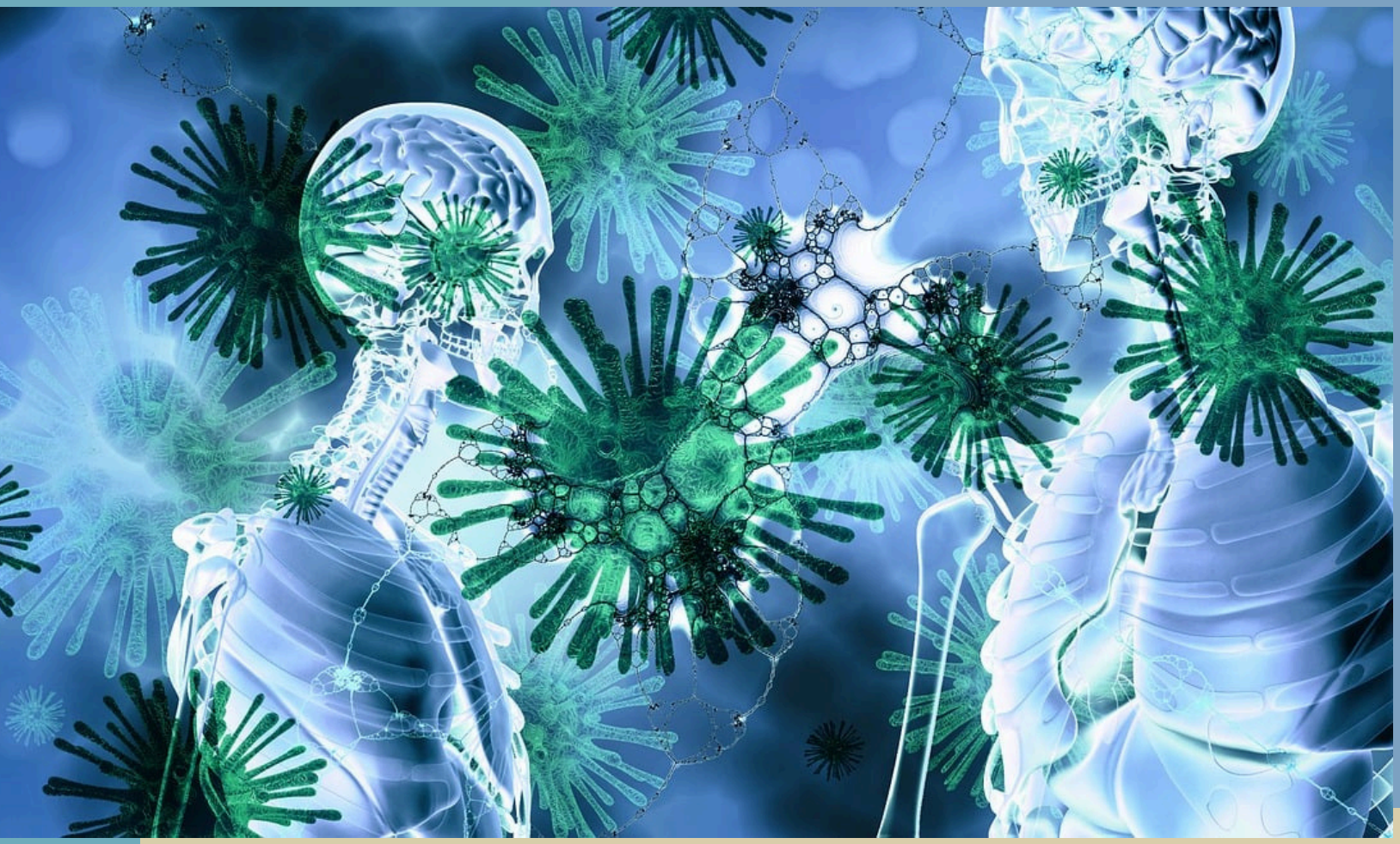
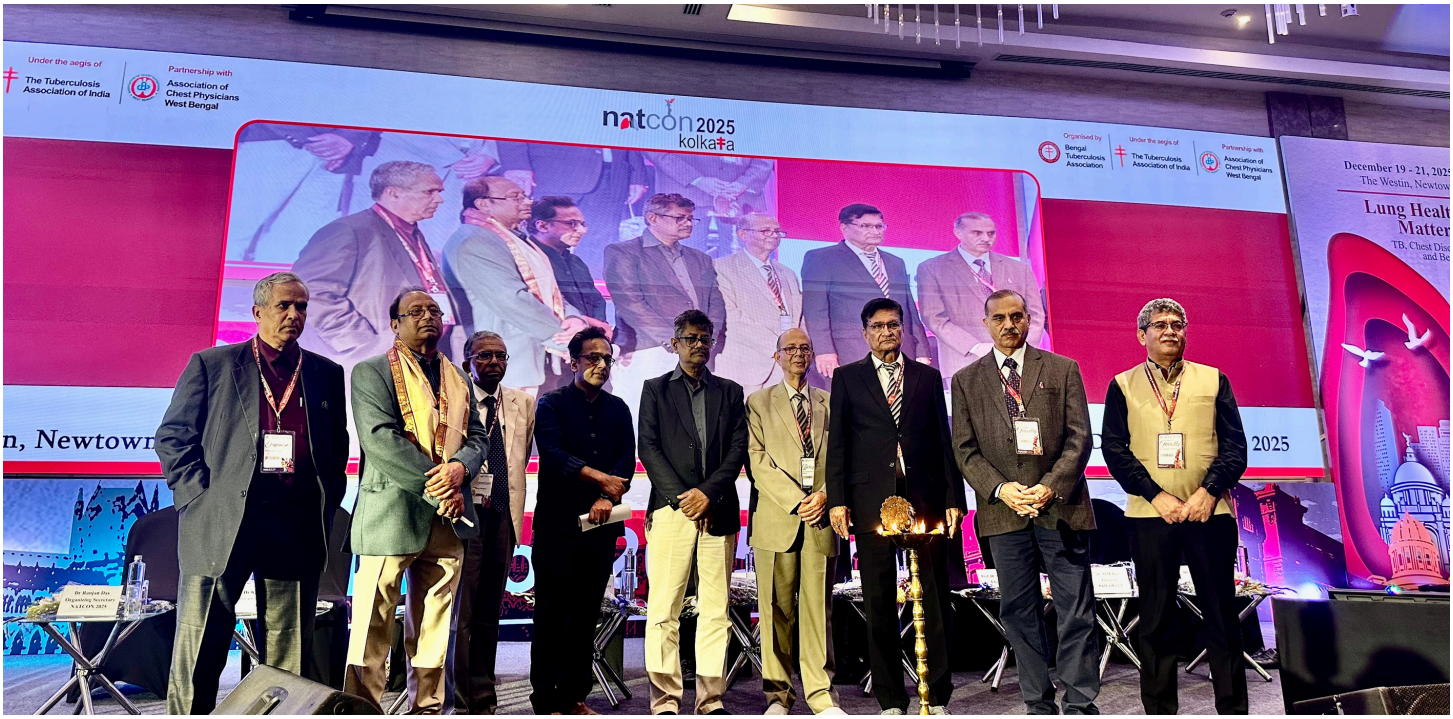
80th National Conference on Tuberculosis & Chest Diseases
December 19 - 21

The Tuberculosis Association of India



Articles

The inauguration ceremony of NATCON 2025 in Kolkata marked a remarkable beginning to this year's comprehensive scientific program focused on the theme "LUNG HEALTH MATTERS: TB, CHEST DISEASES AND BEYOND." This pivotal event brought together leading experts, policymakers, and healthcare professionals to address the multifaceted challenges facing lung health and tuberculosis care. The NATCON 2025 inauguration thus set an energetic and visionary tone, fuelling a conference dedicated not only to celebrating past achievements but also to inspiring bold steps forward in respiratory health. With an emphasis on integration, innovation, and impact, the event heralded a new chapter for TB and lung disease management, uniting minds and igniting ideas that will shape the future of respiratory health in India and beyond.



The Inauguration ceremony of the 80th NATCON-2025

Image Credit : Apollo 247

Shortening TB Treatment — A Myth or a Reality?

Dr. Gopalan Narendran, M.B., B.S., DTRD, DNB (Chest), FRCP(London) Madras Medical Colleg, NIRT, ICMR

The bacteriological marvel of Kochs bacilli, demanding multidrug therapy even for fully drug-sensitive tuberculosis, has always remained a resilient task in TB treatment shortening, beyond 6 months. ICMR-NIRT in its traditional way has been in the forefront along with the National TB program in designing trials that paved way of shortening TB treatment from 12 to 6 months, making India a global hub of regimen innovation, fulfilling the necessity of a simpler, shorter and safer regimen that forms the corner stone of therapy

Treatment strategy must consider the extent of lesions on chest radiography and the bacteriological burden in sputum, with a deeper insight into emerging drug-resistance patterns and constantly evolving treatment phases.

The fundamental principle in shortening regimen design, as per Aitchison, is to incorporate as many sterilizing drugs as possible, capable of eliminating “persistors” while preserving future therapeutic options. Multiple scientific approaches include concepts of stratified medicine to Bayesian adaptive designs.

Over the decades, we have progressed from year-long regimens to just two months regimen, but with a price to pay in the form of recurrences. The Velayudhan et al. at trial in ICMR-NIRT was the first to demonstrate the feasibility of treatment shortening to 4 months , using moxifloxacin while the Narendran et.al trial clearly showed the prowess of daily over intermittent regimen, with the latter eliminating emergence of acquired rifampicin resistance in the immune-compromised hosts. The only other major trial to convincingly establish non-inferiority of a four months compared to a 6 months daily regimen , at twelve months post-randomization, was the TBTC Study 31, which employed a four-month moxifloxacin–rifapentine regimen.

The pioneering work of Martin J. Boeree’s group has further opened newer frontiers exploring high-dose rifampicin, as an alternative to rifapentine . But then, durable success was achieved only when ably supported by additional potent drugs.

Interestingly, all major global trials have demonstrated non-inferiority of the four-month regimen in non-severe TB, yet the definitions of disease severity have lacked uniformity. Nor has any trial clearly identified a definitive determinant of relapse, though baseline cavitation with delayed sputum conversion remains the closest predictor.

Remarkably, the success of these regimens lies not merely in statistical estimands or sample size, but in their ease of administration and improved adherence, which influenced global guideline groups.

The quest for further shortening continues through novel molecules such as ganfeberole, which have unique mechanisms of action, has emerged. Innovative biomarkers like the RS-ratio and FDA stains coupled with adaptive trial designs that minimize delays in establishing efficacy would certainly take the centre stage in future, conserving resources and time, but making shorter regimens a global reality

Expanding Horizons of Pulmonary Medicine: Interventional Pulmonology – a Kaleidoscopic View

Dr Ranjan Das

The last four and a half decades have witnessed remarkable achievements in interventional pulmonology. I plan to present the various facets of the technological advancements that enabled these minimally invasive diagnostic and therapeutic procedures. This will be interwoven with my personal experiences from this journey.

When I graduated in 1976, the only interventions in pulmonary medicine performed by chest physicians were pleural aspiration, closed pleural biopsies and intercostal chest drain placement. For lung and mediastinal masses, the recommended procedures were Rigid Bronchoscopy and Mediastinoscopy, respectively, and these were within the domain of thoracic surgeons.

A paradigm shift took place with the invention of the Flexible Fibreoptic Bronchoscope by Dr Shigeto Ikeda, which he presented for the first time at the World Congress on Diseases of the Chest, Copenhagen, in August 1966. Very soon, flexible fibreoptic bronchoscopy became a chest physician's procedure that could be easily performed in a minor OT setup using local anaesthesia, with or without light sedation.

Initially the main indications were of diagnostic in nature: namely for 1) Symptom evaluation eg. persistent cough, Hemoptysis, hoarseness & stridor, and 2) Clinical and Radiological findings evaluation eg. suspected malignancy, suspected bronchial obstruction, pneumonia of unknown etiology or not responding to treatment, suspected tuberculosis where sputum is negative, interstitial lung disease, mediastinal lymphadenopathy, suspected bronchopleural/tracheoesophageal fistula, dynamic airway obstruction

The various diagnostic procedures are:

·Bronchial lavage
·Bronchial biopsies
·Bronchial brushings
·Trans-bronchial needle aspiration
·Trans-bronchial lung biopsies

The only therapeutic procedure performed initially with the flexible scope was the removal of tracheobronchial foreign bodies.

A brief personal interlude will not be out of place: In 1993 I was called to perform a flexible bronchoscopy on a middle-aged lady admitted in intensive care unit of a private hospital in Kolkata for evaluation of collapse of one lung where two earlier attempts by rigid bronchoscope failed to give any diagnostic clue or any therapeutic benefit. That time my personal flexible bronchoscope was the only instrument in Kolkata. An intrabronchial vegetable foreign body (piece of green cilly) was removed by flexible bronchoscopy and patient recovered in no time. Then a young bronchoscopist, I was enthused by the feat, and presented the case in 8th National Update on Flexible Fibreoptic Bronchoscopy held at Bangalore. I was fortunate to meet a group of energetic bronchoscopists led by the late Dr A. C. Shah. Eleven bronchoscopists from different regions of India, including me, decided to form an Indian Association of Bronchology and

Image Credit: History of Bronchoscopy: The Evolution of Interventional Pulmonology Chapter, Jan 2018, Interventions in Pulmonary Medicine

at Kolkata in 1995. The conference with eminent speakers like Dr Atul C Mehta and live workshops was extremely successful, and was instrumental in popularizing flexible bonchoscopy, particularly in Eastern India.

A significant advancement was the development of video-bronchoscope in 1987 which provides magnified high-definition visualization of airways which improves diagnostic accuracy and precision during biopsies or other therapeutic interventions.

Narrow-band imaging and autofluorescence bronchoscopy are technological advancements that help in detecting malignant changes in the mucosa early.

The field of interventional pulmonology has witnessed tremendous growth, evolving into an increasingly dynamic and challenging specialty. Success in this area hinges on careful patient selection and the continuous development of advanced procedural skills.

Advancements in technology expanded the armamentarium, which paved the way for different minimally invasive procedures, providing scope for cure or palliation that was not possible hitherto.

Technologies in the Bronchoscopist's Armamentarium

- Laser- Useful for removal / debulking of endotracheal or endobronchial tumor. Techniques include vaporization or resection of tumor. Advantages include a bloodless field. Disadvantage – high initial cost
- Electrocautery – Cost-effective technology. Use of a probe or snare for the removal of an endotracheal or endobronchial tumor
- Cryo –for cryo tumor debulking and cryobiopsy
- Argon Plasma is a non-contact mode of electrocautery.
- Photodynamic Therapy (PDT) –Technique is based on the interaction of tumor-selective photosensitizers and laser that causes selective death of tumor cells. For palliative intention PDT is comparable to Nd: YAG laser for relieving endobronchial tumor obstruction.
- Brachytherapy: Endoluminal brachytherapy, performed as an out-patient procedure, using a flexible bronchoscope employing the afterloading technique with Iridium-192 for central lung cancer with curative or palliation intent
- CRE (Controlled Radial Expansion) Balloon for Dilatation of stenotic trachea/bronchi
- Stents – Silicon, SEMS (Self-Expandable Metallic Stents)
- Endobronchial Ultrasound – Convex probe for transbronchial needle aspiration and biopsies in real time from enlarged mediastinal nodes adjacent to trachea and main bronchi

- Radial probe for targeting and sampling the peripheral lung parenchymal lesion

· Electromagnetic Navigational bronchoscopy for sampling a peripheral pulmonary nodule

· Bronchoscopic Lung Volume Reduction – valves, coils, thermal vapor ablation, lung sealant

· Bronchial thermoplasty for severe asthma

Flexi-rigid Pleuroscope is another innovation that brought medical thoracoscopy into the world of Interventional Pulmonology. In fact, Pleuroscopy , also called Medical Thoracoscopy, has changed our approach to the difficult to diagnose pleural effusion.

To summarise: The field of interventional pulmonology has expanded enormously and has become more exciting and challenging. Proper selection of cases and mastering of skills are keys to success.

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SMOKING AND TUBERCULOSIS

Dr. Raj Kumar, Director, Vallabhbhai Patel Chest Institute (VPCI), University of Delhi

In 2024, an estimated 10.7 million people developed TB, corresponding to 131 incident cases. Most TB cases occurred in the WHO South-East Asia Region. Globally, TB was responsible for an estimated 1.23 million deaths in 2024. For smoking as of 2024, there are about 1.2 billion tobacco users worldwide. Smoking is a known and proven risk factor for both tuberculosis (TB) infection and the progression to active disease, nearly doubling the risk compared with non-smokers. TB disease incidence attributable to tobacco smoking is nearly 20% resulting in an estimated 1.3 million excess cases each year, and approximately 15% of TB deaths are attributable to tobacco use, with the greatest impact seen in low- and middle-income countries where both TB and smoking are highly prevalent. Smoking has been found to significantly increase the risk of active TB disease, and also the risk has been found to rise with the amount and duration of smoking, showing a dose–response relationship [4] Cigarette smoking has also been linked to poorer treatment outcomes and delayed smear or culture conversion, indicating that smoking is an important factor to consider in TB elimination strategies. These effects of smoking are primarily attributed to its ability to impair mucociliary clearance, damage the epithelial barrier, and deplete surfactant proteins, thereby facilitating bacillary entry into the alveoli.[6] Smoking cessation has been shown to markedly enhance TB treatment outcomes. Patients who successfully abstain from smoking demonstrate lower rates of treatment default and failure, superior sputum conversion rates, and more favourable radiological findings.

Smoking cessation is now considered an integral component of TB care, with specific guidance from WHO and TB–tobacco collaborative frameworks. Behavioral counselling plus pharmacotherapy are effective in TB patients, similar to the general population.[8] Integrating smoking-cessation support into TB services can significantly help in lowering TB incidence, recurrence, and mortality. TB clinics provide a high yield setting for such interventions, as most smoking TB patients are willing to quit, and providing advice coupled with continued follow-up here helps in maintaining long-term abstinence.[6,9] Overall, a strong association exists between smoking and TB, with smoking both increasing the risk of developing the disease and adversely affecting treatment outcomes. Smoking cessation among TB patients not only reduces TB incidence and improves clinical results but also represents an opportunity to target a receptive subgroup, as these patients are generally more willing to accept cessation advice and attempt quitting.

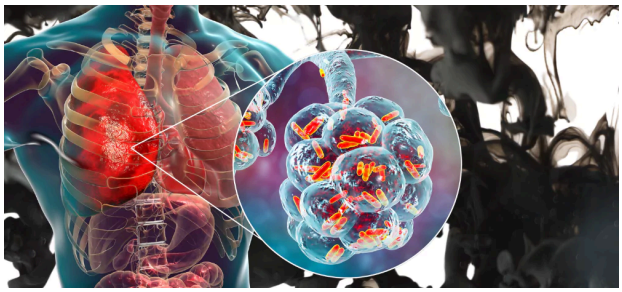

Image Credit : QTOX

My 16-Year Journey with MDR-TB Care and Research at Guntur

Dr.Srikanti Raghu, Professor & HOD, Department of Pulmonary Medicine Guntur Medical College, Guntur

My genetic resistance study on 369 INH-resistant TB patients revealed a predominance of inhA mutations, influencing drug selection strategies particularly the universal use of levofloxacin to compensate for compromised INH activity.

Multidrug-resistant tuberculosis (MDR-TB), defined as resistance to both isoniazid and rifampicin, continues to pose a major challenge to global TB elimination efforts. India remains one of the highest-burden countries. Against this backdrop, the Government Hospital for Chest and Communicable Disease (GHCCD), Guntur, has played a pivotal role in advancing diagnosis, treatment, and research on drug-resistant TB.

Our approach was focused on early detection, accurate diagnosis, and standardized drug regimens, by preventing default, reducing disability and deaths, we strengthened every pillar of MDR-TB care.

MDR-TB was once rare, but inadequate regimens, poor adherence, improper drug supply, and limited programmatic support contributed to a steady rise in resistant cases. As the first physician from Andhra Pradesh to receive formal MDR-TB training in Hyderabad, I had the opportunity to establish and lead MDR-TB services at GHCCD, transforming it into the first designated DR-TB Center in the newly formed Andhra Pradesh.

My early experience came from managing patients under DOTS-Plus (Category IV). Between 2009 and 2012, 106 confirmed MDR-TB patients were evaluated. Due to high default rates, severe drug toxicity, and long treatment durations limited success, these challenges highlighted the urgent need for shorter and safer regimens.

A major breakthrough came with the shorter MDR-TB regimen, studied between 2018 and 2020 in 360 patients at our centre. The regimen achieved an impressive treatment success, with extremely low treatment failure. This represented a significant improvement over earlier Category IV outcomes and reaffirmed the value of standardized shorter therapies.

Parallelly, My genetic resistance study on 369 INH-resistant TB patients revealed a predominance of inhA mutations, influencing drug selection strategies—particularly the universal use of levofloxacin to compensate for compromised INH activity.

We also documented outcomes of XDR-TB, an area with limited treatment options and high mortality.

My unpublished work includes study on young female MDR-TB patients and the landmark evaluation of the BPaLM regimen, a revolutionary 6-month, all-oral treatment endorsed by WHO in 2022. Early results from my 2025 cohort show excellent tolerance with no significant adverse effects to date.

From painful injections and 24-month regimens to today's six-month oral therapy, MDR-TB management has undergone a remarkable transformation. GHCCD, Guntur, has been at the forefront of this journey—strengthening patient care, research, and hope. As we continue advancing with Bedaquiline-based regimens and molecular diagnostics, the vision of eliminating TB is no longer distant—it is within reach.

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Dr. V. K Arora, Chairman, Tuberculosis Association of India
Dr. Sanjay Rajpal, Corresponding Author, Director, New Delhi Tuberculosis Centre
Dr. Ankita Anand, Bacteriologist; New Delhi Tuberculosis Centre

Introduction: Tuberculosis remains one of the most formidable global health threats, disproportionately afflicting underserved and socioeconomically marginalized populations. While advances in microscopy, culture, and molecular diagnostics have strengthened disease detection, each modality carries intrinsic limitations—from low sensitivity in paucibacillary and extrapulmonary disease to protracted turnaround times and infrastructural barriers that constrain widespread deployment. These diagnostic shortcomings underscore the pressing need for innovative solutions capable of transcending conventional bottlenecks and reimagining the landscape of TB detection, surveillance, and therapeutic monitoring.Against this backdrop, artificial intelligence (AI) and digital health technologies have emerged as potent accelerators of TB innovation. AI-driven radiographic interpretation, cough-sound analytics, and algorithmic analysis of molecular assays exemplify a shift toward data-intelligent, patient-centric care. Systematic evaluations reveal that machine learning models can predict treatment duration, anticipate adverse drug reactions, and infer drug-resistance patterns with notable precision, thus enabling more personalized and adaptive therapeutic strategies.

Yet, the full realization of AI's promise hinges on robust governance mechanisms that ensure ethical data stewardship, algorithmic transparency, and equitable access, particularly for populations most burdened by TB. The fusion of human clinical judgment with machine intelligence therefore signals not merely technological progress, but an imperative ethical evolution in the global campaign to eradicate tuberculosis.

Artificial Intelligence in Tuberculosis Diagnosis:

Artificial intelligence has become a transformative catalyst in TB diagnostics, particularly through automated chest radiograph interpretation powered by convolutional neural networks. In settings with limited radiological expertise and substantial interpretive subjectivity, these AI systems provide consistent, high-accuracy detection of TB-specific radiographic patterns, effectively supporting clinical decision-making. A 2025 systematic review in the Journal of Thoracic Disease affirmed their diagnostic strength, reporting sensitivity values of 88–96% and specificity of 85–93%, closely paralleling expert radiologist performance.[1]

Such findings underscore AI's potential to standardize radiographic assessment and to operationalize large-scale, rapid triage systems that expedite confirmatory testing and therapeutic initiation. When embedded within national TB control frameworks, AI-enabled diagnostic algorithms can substantially curtail diagnostic delays, enhance case detection rates, and optimize resource allocation—critical determinants of successful disease containment.

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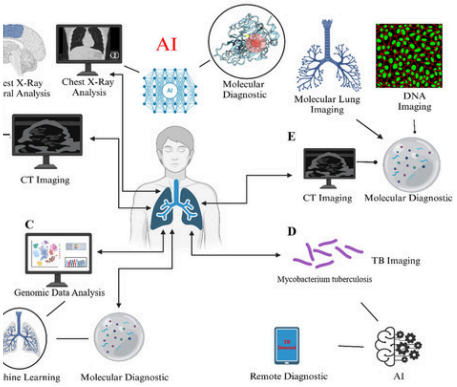


Image Credit: MDPI, Diseases 2025, 13(6), 184; https://doi.org/10.3390/diseases13060184

Beyond conventional radiography, the integration of AI into portable and handheld X-ray platforms represents a seminal advancement in community-based TB screening. These compact, battery-operated systems—now increasingly deployed in field settings across India—combine real-time imaging with on-device AI analytics, thereby enabling immediate interpretation at the point of care. As highlighted in The Indian Express (2025), the introduction of AI-assisted handheld X-ray units has revolutionized active case finding, particularly within geographically isolated, socioeconomically marginalized, and high-transmission clusters such as rural districts and urban slums. This innovation not only democratizes access to diagnostic services but also aligns with the overarching vision of decentralized, technology-enabled TB surveillance.

Moreover, AI-guided point-of-care ultrasound (POCUS) technologies have expanded the diagnostic frontier beyond pulmonary manifestations to encompass extrapulmonary tuberculosis—a domain traditionally challenged by diagnostic complexity and imaging limitations. These systems leverage AI-driven image recognition algorithms to detect subtle sonographic abnormalities indicative of TB involvement, often achieving interpretative accuracy on par with or superior to human experts. As a non-ionizing, portable, and cost-efficient modality, AI-assisted POCUS offers an invaluable adjunct to radiographic screening, particularly in pediatric, pregnant, or immunocompromised populations where radiation exposure is contraindicated.

Collectively, these AI-integrated imaging modalities signify a paradigmatic evolution in TB diagnostics—from dependence on human interpretation to the adoption of intelligent, automated, and contextually adaptive systems. By bridging infrastructural deficits, expediting case identification, and ensuring uniform diagnostic quality across heterogeneous healthcare environments, artificial intelligence is poised to redefine the diagnostic landscape and accelerate progress toward the global goal of TB elimination.

AI-Powered Cough Analysis: The Swaasa Paradigm:

One of the most cutting-edge domains in AI-enabled TB diagnostics is the computational analysis of cough acoustics—a technique that leverages ubiquitous mobile devices to deliver scalable, non-invasive, and low-cost detection. The Swaasa platform, developed by Salcit Technologies, epitomizes this innovation by using advanced machine-learning models to decode cough soundwaves recorded through standard smartphone microphones. Because pulmonary TB induces distinctive alterations in cough rhythm, temporal structure, and spectral profiles, these AI systems can identify such biophysical signatures with remarkable precision and analytical depth.

Empirical assessments of Swaasa demonstrate robust diagnostic performance, with an overall accuracy of 86.8% and a sensitivity of 90.4% for detecting pulmonary TB. As a non-invasive, low-infrastructure, and field-ready tool, it enables frontline health workers to rapidly identify presumptive cases without reliance on centralized laboratories. Its scalability makes it particularly valuable in rural and high-burden urban settings, supporting earlier case detection, disruption of transmission, and swift referral for confirmatory testing. When integrated into broader digital health systems—such as EMRs and adherence-monitoring platforms—Swaasa contributes to a seamless, algorithm-supported continuum of care from initial screening to treatment initiation.

Automated Line Probe Assay (LPA) Interpretation:

The Line Probe Assay (LPA) endures as a diagnostic linchpin in the molecular delineation of drug-resistant tuberculosis (DR-TB), most notably for rifampicin and isoniazid resistance. Nevertheless, the traditional manual decipherment of LPA hybridization bands necessitates highly skilled personnel and is intrinsically susceptible to human fallibility and interpretive subjectivity. The advent of AI-mediated computer-vision analytics has fundamentally recalibrated this paradigm by facilitating automated, high-fidelity interpretation of LPA strip patterns. Harnessing deep-learning frameworks, these algorithms algorithmically parse banding intensities, spatial configurations, and hybridization patterns to infer resistance genotypes and produce standardized analytical outputs within a fraction of the conventional time frame.

A landmark 2024 study in the Proceedings of the AAAI Conference on Artificial Intelligence demonstrated that AI-enhanced LPA interpretation dramatically reduced analysis time while maintaining accuracy comparable to expert microbiologists for both rifampicin- and isoniazid-resistant strains. This automation minimizes operator variability, reduces dependence on highly trained personnel, and expands reliable molecular testing to peripheral, resource-limited laboratories. Additionally, integrating AI-generated LPA results into centralized digital platforms enables real-time resistance surveillance, strengthening public health systems' capacity to anticipate and respond to emerging MDR-TB patterns.

Digital Health Interventions for Therapeutic Adherence:

Therapeutic adherence remains the quintessential determinant of TB control efficacy, directly modulating treatment outcomes, transmission dynamics, and the evolution of antimicrobial resistance. Digital Health Interventions (DHIs)—spanning mobile applications, short message service (SMS)-based prompts, and video-observed therapy (VOT) interfaces—have materialized as potent vehicles of patient-centric engagement [5]. Within this domain, the Gamified Real-Time Video-Observed Therapy System (GRVOTS) epitomizes the confluence of behavioral science and digital innovation.

The GRVOTS platform employs gamification strategies—such as rewards, milestones, and interactive feedback—to strengthen patient motivation and bolster adherence to therapy. By combining real-time audiovisual confirmation of medication intake with adaptive reinforcement, it significantly improves compliance and lowers default rates, thereby reducing relapse and limiting the emergence of drug-resistant strains. When integrated with AI-driven diagnostic tools like Swaasa cough analytics and AI-enabled portable radiography, such digital adherence systems create a cohesive, technology-aligned continuum of TB care, ensuring seamless progression from early detection to sustained treatment adherence and enhanced programmatic outcomes.

AI in Surveillance and Public Health Intelligence:

Transcending the microcosm of individual patient care, artificial intelligence now constitutes an indispensable instrument in macroscale epidemiological surveillance and health-system intelligence. By mining expansive datasets culled from electronic health records (EHRs), laboratory information systems, and mobile-health infrastructures, AI algorithms elucidate latent correlations, forecast epidemiological trajectories, and refine strategic allocation of scarce health resources.

Aggregated Swaasa-derived cough analytics, for instance, can function as a sentinel informatics network, demarcating spatiotemporal clusters of heightened TB probability and catalyzing targeted screening interventions. Concurrently, AI-automated LPA resistance analytics facilitate dynamic cartography of genotypic resistance dissemination, thus informing data-driven policymaking and anticipatory containment strategies. These interlinked data conduits collectively enhance the adaptive intelligence and operational elasticity of national TB elimination programs, epitomizing the evolution toward **precision public health**—where interventions are algorithmically tailored for maximal epidemiological yield with minimal logistical expenditure.

Conclusion:

In summation, artificial inte lligence is undergoing a conceptual metamorphosis—from an ancillary diagnostic adjunct to a **constitutive pillar of computational public health** architecture. Its multidimensional integration across diagnostic, therapeutic, and surveillance strata presages a transformative epoch wherein TB control transcends reactive remediation to embrace **predictive analytics, personalized interventionism, and real-time epidemiological foresight**. Through this symbiosis of algorithmic cognition and human oversight, AI heralds an era of data-empowered, **anticipatory, and ethically governed tuberculosis eradication strategies.**

Bridging Silos: Integrating Private Sector Efficiency, Public Health Goals, and Academic Innovation

Dr. Chaitali Nikam, Microbiologist, National Centre for Disease Control

IIn modern healthcare, the boundaries between private enterprise, public health systems, and academic research are dissolving, revealing new opportunities for innovation. Groundbreaking progress in molecular diagnostics and public health implementation exemplifies the promise of such integration.

The evolution of diagnostic validation in infectious diseases began in clinical microbiology, where early efforts shortened the time between disease onset and diagnosis. These initiatives highlighted the value of mentorship and cross-sector collaboration, nurturing professionals skilled in both laboratory science and real-world health system needs.

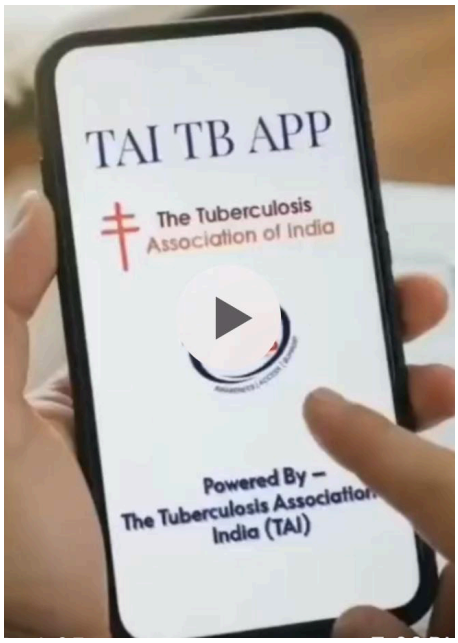
A transformative leap occurred with molecular platforms like the TrueNAT MTB assay for tuberculosis, enabling near-point-of-care testing in low-resource settings. This advancement showcased the synergy of academic discovery, policy responsiveness, and scalable private-sector solutions, speeding the path from sample collection to actionable results especially in underserved areas.

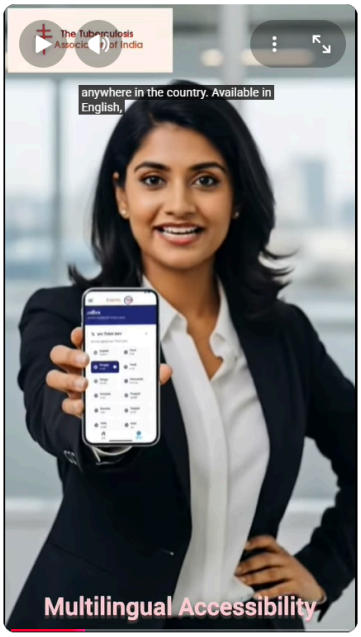
India's One-Stop TB Diagnostic Solution Model further exemplified this integration. Utilizing public-private partnerships, the model streamlined diagnostics and improved TB notifications, achieving over 99% completion in key settings. This success blended private sector agility with public health objectives and rigorous academic validation.

The COVID-19 pandemic put laboratory systems under immense strain, demonstrating that adaptability rooted in skilled teams and flexible protocols is critical for scaling operations and supporting epidemic responses. Laboratories able to harness cross-sector collaboration proved vital to national efforts.

Ongoing initiatives continue to show the value of integrated approaches, whether improving laboratory efficiency or expanding genomic surveillance for outbreaks. This blend of academic rigor, public health priorities, and private sector implementation is now essential to progress.
Involvement in policy, such as developing national health strategies, demonstrates how systemic integration creates a feedback loop: research informs guidelines, which shape practice, and outcomes spark new research. Programs like India's National TB Elimination Program and National AIDS Control Program benefit from this cycle.

As healthcare challenges grow more complex, continued cross-pollination among private, public, and academic sectors will be crucial. Integrating diagnostics, rapid response mechanisms, and scalable innovations highlights the transformative power of collaboration in advancing public health goals.





TAI has launched the Tuberculosis Mobile App promoting awareness, access to vital TB resources and treatment information in multiple languages for all users

Workshop on “Community Empowerment” in 80th NATCON under the Aegis of TAI, 18th December 2025, Kolkata

LUNG UNION-SEAR SESSION
Cure to care: integrating PTLD into the TB care continuum

Moderator: Dr. Nibedita Rath, President , Union SEAR

Panelists: Dr. V.K Arora, Dr. Radha Munje, Dr. Vishal Chopra, Dr. Chaitali Nikam
Chairperson: Dr. H. J Singh

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For more information regarding this newsletter please contact

Dr. Nibedita Rath
nibedita.rath@ospfound.org

Dr. Radha Munje
radhamunje@yahoo.com

Ms. Priyanka Sharma
priyankasharma@spym.org