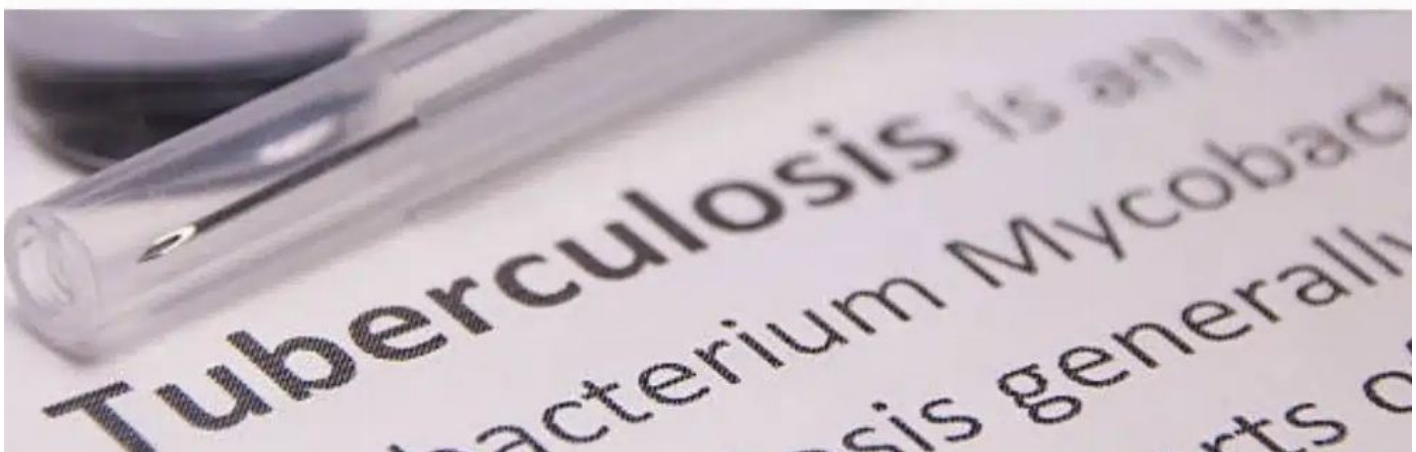


Tamil Nadu Leads with AI-Based TB Death Prediction Model

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TB Death Prediction Model



TB Death Prediction Model Latest News

Tamil Nadu has become the first Indian state to integrate a TB death prediction model into its State TB Elimination Programme, enabling early identification and hospitalisation of high-risk patients to reduce tuberculosis-related mortality.

Introduction

- In a landmark step towards eliminating **tuberculosis** (TB), Tamil Nadu has become the first state in India to deploy a predictive model that estimates the likelihood of death in TB patients.
- Integrated with the state's existing digital triage platform TB SeWA, this model is designed to enable faster hospital admissions for severely ill patients, ultimately reducing TB-related mortality.
- This innovation is a collaborative outcome of the Indian Council of Medical Research's National Institute of Epidemiology (ICMR-NIE) and the Tamil Nadu State Health Department under the larger framework of Tamil

The Predictive Model and How It Works

- The newly launched predictive model uses five clinical indicators at the time of TB diagnosis:
 - **Body Mass Index (BMI)**
 - **Presence of pedal oedema (swelling of feet)**
 - **Respiratory rate**
 - **Oxygen saturation levels**
 - **Ability to stand without support**
- Healthcare workers input these variables into the TB SeWA application. Based on this input, the model calculates the probability of death ranging from **10% to 50%** for severely ill patients.
- For those not flagged as severely ill, the predicted mortality risk remains between **1% and 4%**.
- This sharp differentiation in risk estimation helps frontline healthcare staff prioritise admissions and initiate early treatment, which is especially crucial given that over **70% of TB deaths occur within the first two months** of treatment.

Significance of the Integration

- Prior to this model, Tamil Nadu's TB SeWA system helped identify severely ill patients using the five indicators, enabling timely inpatient care.
- The integration of a quantified probability of death now offers an *objective assessment* of risk, improving decision-making at the primary health level.
- The team at ICMR-NIE noted that while the average time from diagnosis to hospital admission is one day in Tamil Nadu, **about 25% of severely ill patients face delays of 3-6 days**. The new model is expected to reduce such delays.

Development and Validation of the Model

- The model was developed using **data from nearly 56,000 TB patients** diagnosed across Tamil Nadu between July 2022 and June 2023.
- It was observed that **10-15%** of adults diagnosed with TB were classified as severely ill at the time of diagnosis.
- The model's validation has demonstrated that the five triage variables used in TN-KET are just as predictive of mortality risk as the comprehensive baseline variables in the national Ni-kshay TB portal.
- However, Ni-kshay variables typically take **up to three weeks** to populate, too late to act upon for high-risk patients. In contrast, the TN-KET system captures triage data within a day, ensuring faster action.

Broader Public Health Impact

- All **2,800 public health facilities** in Tamil Nadu, from Primary Health Centres to Medical Colleges, currently use the TB SeWA application. The model supports:
 - **Real-time triaging**

- **Objective risk stratification**
- **Timely hospital referrals**
- The success of TN-KET and its associated tools has already contributed to **reduced loss in the TB care cascade** across two-thirds of Tamil Nadu's districts.
- This innovation serves as a replicable model for other Indian states, where early TB deaths remain a significant challenge despite free diagnosis and treatment.

Global and National Context

- According to the World Health Organisation, TB remains one of the top causes of death globally.
- India bears the **highest burden of TB in the world**, with **two deaths every three minutes**.
- A recent study titled *"Time to Death and Associated Factors among Tuberculosis Patients in Dangila Woreda, Ethiopia"* identifies old age, low body weight, and TB/HIV co-infection as significant predictors of early mortality.
- Tamil Nadu's model, by addressing similar risk factors early, aligns with global recommendations for reducing TB deaths.

Source: TH | Week

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