

# Toward a Comprehensive CURE

**Digital information and communication technology is helping to meet health care challenges in India.**

By Debdoot Sheet

How would you provide effective and affordable health care in a country of more than 1.25 billion where there are only 0.7 physicians for every 1,000 people [1]? The Revised National Tuberculosis Control Program (RNTCP) and the Karnataka Internet-Assisted Diagnosis of Retinopathy of Prematurity (KIDROP) service are two notable efforts designed to deliver care across India, in both urban and rural areas and from the country's flat plains to its rugged mountainous and desert regions.

RNTCP uses mobile communication and short message service (SMS) technology to alert tuberculosis (TB) patients of the need to take medicine or visit the nearest care center for follow-up. If patients do not acknowledge these reminders, health care workers visit them to encourage that they continue treatment. This comprehensive protocol has resulted in a near 90% cure rate for TB. KIDROP, on the other hand, uses advanced image compression and communication technology to provide digital screening of retinopathy for infants living in remote areas who would otherwise not have access to the specialized facilities currently available only in select Tier-1 Indian cities. The service

connects specialists in cities to patients who can access the facility via a mobile screening unit that can travel to remote locations carrying the retinal imaging and high-speed communication infrastructure.

## A New and Better TB Treatment

TB is a highly infectious disease that generally remains latent, without many visible symptoms. Although only a tenth of affected patients die if left untreated, TB-related mortality is very high in developing countries, which account for almost 95% of the world's affected population. The Tuberculosis Research Center, established in 1956 in Chennai, Tamil Nadu, proved that the age-old practice of treating TB in an isolated sanatorium with access to nutritious food and ample rest was, in fact, unimportant if adequate drug therapy is available and taken by patients. This supports research that TB patients treated at home do not risk contaminating family members; that revelation, in turn, revolutionized TB treatment globally. The National Tuberculosis Institute (NTI) was established in 1959 in Bengaluru, Karnataka, with the aim of training medical and paramedical professionals to deliver long-term comprehensive drug-therapy-based treatment across the length and breadth of urban and rural India.

To facilitate effective implementation, district TB centers (DTCs) were established. TB patients could travel shorter distances for diagnosis and periodic follow-up and also to pick up medication every week. They could speak with clinical counselors in their native language and discuss any reservations they might have related to their medications' side effect. While these efforts were successful early on, the gradual withdrawal of NTI-trained medical and paramedical staff meant that the centers faced difficulties over time, with only 66% of enrolled patients taking medication regularly and an average default rate of 34%. This posed a challenge to

the effective survival of the DTC model for TB treatment in India. After years of review, the Indian government decided in 1992 to revamp the DTC program model with the aid of the World Health Organization (WHO) and the Swedish International Development Agency. It was determined that the program suffered from managerial weakness, inadequate funding, overreliance on X-rays for imaging-based diagnosis, non-standard treatment regimens, low rates of treatment completion, and lack of systematic information on treatment outcomes. This led to the birth of the RNTCP [2], which was launched nationwide in 1997.

The RNTCP initially adopted the WHO-formulated directly observed treatment short-course (DOTS) strategy, which consists of five components:

- 1) strong political will and administrative commitment
- 2) diagnosis by quality-assured sputum smear microscopy
- 3) uninterrupted supply of quality-assured short-course chemotherapy drugs

- 4) directly observed treatment
- 5) systematic monitoring and accountability.

This helped achieve the target detection rate of 70% and a cure rate of 85%, which led to an overall decrease of TB incidence in the country. With this success, the twelfth revised national plan was enacted to achieve a new target detection rate of 90% and a cure rate of 90% for new cases and 85% for retreatment cases between 2012 and 2017.

## Digital Monitoring of TB

To further this goal, Project Nikshay was launched in 2012, with the government of India declaring TB a "notifiable disease," thereby mandating that all stakeholders in the health care system notify the Central TB Division of Ministry of Health and Family Welfare about all diagnosed and treated cases. Project Nikshay is a web-based portal for monitoring TB patients and enabling effective implementation of the RNTCP. Developed by the National Informatics Center, Project Nikshay covers various aspects of controlling TB using web-based technology and SMS services. These technologies have been employed effectively for communication with patients as well as for monitoring the RNTCP program on a day-to-day basis, while also enabling national surveillance of the disease.

The process begins with the central offices receiving a hard copy form from public or private health care providers indicating a diagnosed case and providing details about the patient's biometrics, disease history, whether it is a new or retreatment case, and pathological diagnostic test results, along with the name of the diagnosing and treating physician and any para-

