'NIKSHAY' – harnessing Information technology for delivery of enhanced TB care

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Introduction

Early diagnosis and complete treatment of TB is the cornerstone of TB prevention and control strategy. India's National TB Control programme provides quality assured diagnostic and treatment services to all TB patients including necessary supportive mechanisms for ensuring treatment adherence and completion. The Revised National TB Control Programme (RNTCP) provides mechanisms to ensure treatment adherence support through Directly Observed Therapy (DOT). The current emphasis of the RNTCP is to achieve the goal of Universal Access to quality TB diagnosis and treatment for all TB patients in the community. The Private sector plays an important role in the management of TB cases. Non- standardized prescribing practices among some of the private providers with inappropriate, inadequate and unsupervised treatment regimens could lead to the development of drug resistant TB. However, if TB patients diagnosed and treated under all sectors are reported to public health authorities, the mechanisms available under the RNTCP can be extended to these patients to ensure treatment adherence and completion. The impending epidemic of drug resistant TB can be prevented to a large extent by this intervention.

In order to ensure proper TB diagnosis and case management, reduce TB transmission and address the problems of emergence of spread of Drug Resistant-TB, it is essential to have complete information of all TB cases. Therefore, Govt of India declared Tuberculosis a notifiable disease on 7th May 2012. All public and private health providers are to notify TB cases diagnosed and/or treated by them to the nodal officers for notification.

Notification offers an opportunity to support private sector for following standardized practices for the care of TB patients. Complete and accurate data obtained from notification would permit availability of data on the epidemiology of the disease.

Overview of NIKSHAY

To keep a track of the TB patients across the country, the Government of India has introduced a system called NIKSHAY. The word is combination of two Hindi words NI and KSHAY meaning eradication of tuberculosis. NIKSHAY (www.nikshay.gov.in) is a web enabled application, which facilitates monitoring of universal access to TB patients data by all concerned. The system has been developed jointly by the Central TB Division of the Ministry of Health and Family Welfare and National Informatics Centre (NIC) and it was launched by the Government of India in June 2012. A gazette notification was published by the Government of India mandating all private health establishments to inform the details of TB patients treated by them to NIKSHAY repository.

The innovative IT application of NIKSHAY makes it possible for the grass-root level healthcare providers to track every TB patient. The most significant feature of NIKSHAY is that it promotes the use of Information Technology at sub-district levels. Video based training module

has been developed in Hindi and English with message from ex-Deputy Director General(TB) emphasising the importance of NIKSHAY in eradication of TB from India. NIKSHAY has been implemented at national, state, district and Tuberculosis Unit (TU) levels. Data entry in terms of registering the TB patient, pre-treatment and follow-up tests, treatment, HIV and contact tracing details is done at TU level. Such TB patient database is being used at district, state and national level for monitoring purposes.

Objectives of Nikshay are to :

- Establish real-time TB surveillance through Case-Based-Web-Based electronic recording and reporting
- Monitoring of TB Patients Treatment
- Develop and make available TB notification and registration system for both public and private sector
- Improve quality care by health service providers
- Support treatment of patients & Reporting of cases
- Increase transparency & accountability
- Provide follow up Alerts for adherence
- Providing required data for planning at National & State levels.
- Provide TB related information on epidemiological / social impacts

Since TB has been made a notified disease by the Ministry of Health & Family Welfare, Government of India, it is mandatory for the private health establishments or Government health establishment not covered under Revised National TB Control Programme (RNTCP) to inform about TB patients. NIKSHAY registers all such health establishments and entry of TB patients as per the recommended formats.

Ministry of Health & Family Welfare funds the hiring of contractual manpower at various levels for effective implementation of RNTCP scheme and programmatic management of drug resistant TB (PMDT). NIKSHAY facilitates the maintenance of details of all such contractual manpower helping the Central TB Division (CTD) to monitor the resource utilization in an effective manner.

NIKSHAY utilises SMS technology in an effective manner. Through SMS, it communicates with TB patients and grassroots level healthcare services providers as well as health and family welfare policy makers, health managers and health administrators at different tiers of the healthcare delivery system. Whenever a new patient is registered on NIKSHAY, an SMS is sent to the patient with registration ID and details of DOTS Operator along with advisory note to take the regular medicine. Daily SMS is sent to all monitoring authorities in CTD, to State TB Officers (STO), District TB Officers (DTO) giving the number of patients, Designated Microscopic Centre (DMC)/Peripheral Health Interface (PHI) registered, profiles of STOs, DTOs and TUs updated, entry of contractual manpower, Health Establishments registered and patients have been notified.

The multidrug-resistant TB (MDR-TB) has become a significant public health problem in a number of countries and an obstacle to effective TB control. A module has been developed in

NIKSHAY to maintain the records of MDR-TB patients at Intermediate Reference Laboratory (IRL), who are referred for Culture and DST . These patients could be from RNTCP or come as follow-up patients from DRTB Centres or directly sent for pre-treatment test.

CTD has been facilitated with reports having details of all the patients at national level and concerned patients at state, district and TU level through query and reports system. Dashboard has been provided so that any TB patient of the country can be contacted from CTD. Information about TB patients, which was earlier in Treatment Cards at Tuberculosis unit level, has been digitised for faster access and monitoring.

Phases of service delivery and feature enhancements under NIKSHAY:

- **Phases 1, 2, 3, 4:** Basic Information about facilities and officials in the RNTCP, Information of TB cases initiated on DOTS, Notification of TB and registration system: This will involve registration of health establishments and data entry of notified TB cases at TU and district level.

- **Phase 5:** Programmatic Management of DR TB: Details of MDR-TB requests and results will be uploaded by DST labs and treatment details will be uploaded by the treatment centres.

- **Phase 6:** SMS based treatment monitoring and follow up: Push query and pull information on treatment adherence from DOT provider on weekly basis with periodic SMS alerts to patients.

- **Phase 7, 8:** Linkages between facilities for transfer & referral: Linkage of various public health establishments and track the transfer of patient from one centre to another. The data entry for referral will be done at the TU level and the receiving TU will be alerted through various channels.

- **Phase 9:** Hand held device use: NIKSHAY application will be made available on android handheld device

- **Phase 10:** Multiple entry mode: will include mapping and defining output of automatic machines for rapid diagnostics for TB

- **Phase 11, 12:** Web based TB Notification and mobile, IVRS based notification for private health facilities

- **Phase13:** Automated output with inbuilt statistical software

- **Phase 14:** Programme management: This phase will enable electronic transfer of incentives to relevant stakeholders including drugs and logistics management

- **Phase 15:** Proposal tracking system

- **Phase 16:** GIS mapping of DR-TB cases & TB cases notified

Training programmes on   NIKSHAY :

As an initial roll out, seven 'Training of Master Trainers' programmes were held at NTI, Bangalore in the month of July 2013 wherein over 180 participants from all over India, including State Tuberculosis Officers, Programme Medical Officers, RNTCP Consultants and Data Entry Operators with representatives from other partner NGOs attended. These trainings imparted the skills on the Nikshay Software for the end users and also facilitated subsequent district level trainings and creation of State/District level 'help desks'.

Conclusion:
The fully feature enabled Nikshay would allow any stakeholder – suspect, physician, chemist and community member etc - to notify a suspect with TB symptoms. A strong clinical decision support system (CDSS) supplemented by dynamic mapping of healthcare infrastructure will enable uniform and real time distribution of information. Anonymity of the suspects and patients will be maintained to alleviate the fear of social stigma. The software will also assist in addressing pressing issues such as dynamic work load management for laboratories, and direct transfer of incentives. A biometric authentication based treatment adherence and a platform for integration of other healthcare programs (NACP, NBCP, MCH) could be an additional benefit offered by the enhanced process. A key benefit of this system will be the integration of stakeholders across boundaries thus offering a favourable scenario to combat the menace of Tuberculosis.