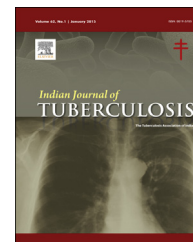


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Editorial

TB control requires new tools, policies, and delivery models

Despite the global scale-up of the DOTS strategy, reduction in TB incidence has been disappointingly modest.¹ India is a good illustration. Although the Revised National TB Control Programme (RNTCP) covers the entire population and has met the 2015 targets, India continues to report over 2 million cases every year, and accounts for a third of the 3 million ‘missing cases’.¹

Mathematical models suggest that a major reason behind the observed lack of rapid reduction in TB incidence is the inability of programmes to rapidly diagnose and treat TB, before transmission occurs.² In India, an average TB patient is diagnosed after a delay of about 2 months, and after having seen three different providers.³ This underscores the importance of early diagnosis, of engaging private and informal sectors where patients seek care, and suggests that systematic screening (or active case finding) may be necessary to identify missing cases.

To control TB in India and elsewhere, we need:

- New tools (e.g. new diagnostics and drugs)
- New policies (e.g. Standards for TB Care in India)
- New delivery models (e.g. public-private mix [PPM] to engage private sector)
- Substantially higher allocation of resources for TB control

1. New tools

With the incidence of TB declining very slowly, it is difficult to imagine elimination of TB by 2050 with the kind of TB tests, drugs and vaccine used in most high TB burden countries. For example, most high burden countries still rely on the insensitive sputum smear microscopy.

TB elimination will require substantially better tools. Thankfully, new, accurate diagnostics for TB are finally here and steadily being scaled up. The Xpert MTB/RIF test (Cepheid Inc., Sunnyvale, CA), is now being scaled up for TB diagnosis (pulmonary as well as extrapulmonary) and drug-resistance detection and over 10 million tests have been used in the public sector in high burden countries.⁴ In India, this technology is being used in the RNTCP as a rapid drug-susceptibility test, along with other WHO-endorsed tools like line probe assays and liquid cultures. In the private sector,

these WHO-approved tests are now more affordable and accessible via the Initiative for Promoting Affordable and Quality TB Tests (IPAQT www.ipaqt.org).⁵

Progress has also been made with TB drugs. Bedaquiline, a new drug to treat adults with MDR-TB, is the first new TB drug approved in over 40 years. Other new TB drugs (e.g. delamanid) or combinations (e.g. moxifloxacin-containing regimens; combinations containing PA-824, moxifloxacin and pyrazinamide) are expected in the near future. Shortening TB treatment will increase cure rates, improve adherence, and reduce the risk of drug resistance.

2. New policies

In March 2014, two major standards were published – the 3rd edition of the International Standards for TB Care (ISTC),⁶ and the first edition of the Standards for TB Care in India (STCI).⁷ These policy documents are based on the most current evidence, and already incorporate new tools like Xpert MTB/RIF and newer WHO recommendations on treatment (e.g. acceptance of both daily and thrice-weekly intermittent regimens). These standards aim to inform physicians about the best approaches to TB detection, treatment and follow-up, and their acceptance and widespread use should reduce mismanagement of TB.⁸

The impact of these new policies, of course, will depend on how widely they are disseminated and used.⁹ In India, available evidence suggests that most private practitioners do not follow international standards.¹⁰ Thus, it is important to educate the large number of private practitioners about STCI, and to monitor whether they are following the standards.

3. New delivery models

New tools and new policies will obviously need to reach patients who need them the most. This brings up the relevance of new business models and delivery innovations that can make quality care more affordable and accessible to patients at the base of the pyramid (BOP).¹¹

TB patients need a complete and patient-centric solution, regardless of where they seek care (public or private).¹² Engagement of the private sector for TB control is a key area

where newer PPM models are urgently needed. As articulated by Ratnavelu and Pai, there are many good reasons to work with the private sector for TB control in India.¹³

First, half of all patients with TB seek care in the private and informal sectors, and private practitioners are often the first contact care providers. Many patients begin seeking care in the informal private sector, including chemists and unqualified practitioners. So, if we want to diagnose TB early and prevent further transmission, then engagement of such first-contact private providers is the important. For example, India has over 7 lakh chemists, and many of them directly dispense medications, without prescriptions, for persons with chest symptoms. If chemists can be engaged, they could become a great source of active case finding.

Second, there is plenty of evidence that quality of TB care in the private sector is suboptimal.¹⁴ Private doctors prefer blood tests for TB that have not been recommended by ISTC or STCI.¹⁵ Even if diagnosis is made correctly, TB treatment in the private sector is highly variable with a variety of irrational drug regimens, formulations and dosages.^{10,16,17} So, it is important for private practitioners to follow international and national guidelines and use the correct drugs and regimens.

Third, even if the correct TB treatment is started, adherence is not guaranteed. In fact, private practitioners find it difficult to ensure treatment completion among their patients.¹⁰ Thus, in the private sector, there is a need create systems to support patients during therapy.

Fourth, engagement of the private sector is necessary to increase rates of TB case notification. Since 2012, it is mandatory for all TB cases in the country to be notified to the public health authorities. Unfortunately, most private practitioners and private hospitals still do not notify TB cases. Fifth and last, engagement of the private sector is critical to detect drug-resistance and ensure that all patients with drug-resistant disease have access to free second-line treatment that is available in the public sector.

In India, there are several examples of innovative models in healthcare aimed at the BOP segment – from artificial limbs, to affordable cataract and heart surgeries.¹¹ There are novel models in the area of TB care as well, including World Health Partners, Operation ASHA, and Initiative for Promoting Affordable and Quality TB Tests (IPAQT).¹² These models have used product and process innovations to serve the BOP market.

Currently, a Private Provider Interface Agency (PPIA) model is being tried out in two urban cities in India, to assess whether interface agencies can aggregate and incentivize private providers, educate them on STCI, improve quality of care and increase case notifications.¹² Lessons from this pilot should inform larger-scale PPM initiatives in India.

4. Increased resources for TB control

Lastly, for implementing new tools, policies and delivery approaches, we need much more resources for TB control.¹⁸ In particular, the RNTCP requires a substantially higher budget, if it has to deliver on the objectives laid out

in the National Strategic Plan.¹⁹ Expenditure on health itself needs to be increased, given how little India spends on health. After all, without adequate resources, no country can tackle TB. Policy makers and politicians need to realize that TB control will result in substantial cost savings down the line, and bring significant economic benefits to the country.²⁰

Conflicts of interest

The author has none to declare.

REFERENCES

1. World Health Organization. *Global Tuberculosis Control: WHO Report 2013*. Geneva: WHO; 2013.
2. Dye C, Williams BG. The population dynamics and control of tuberculosis. *Science*. 2010;328:856–861.
3. Sreeramareddy CT, Qin ZZ, Satyanarayana S, Subbaraman R, Pai M. Delays in diagnosis and treatment of pulmonary tuberculosis in India: a systematic review. *Int J Tuberc Lung Dis*. 2014;18:255–266.
4. Weyer K, Mirzayev F, Migliori GB, et al. Rapid molecular TB diagnosis: evidence, policy-making and global implementation of Xpert[®] MTB/RIF. *Eur Resp J*. 2013;42:252–271.
5. Pai M. Promoting affordable and quality tuberculosis testing in India. *J laboratory physicians*. 2013;5:1–4.
6. TB CARE I. *International Standards for Tuberculosis Care*. 3rd ed.; 2014 [Accessed March 2014]. www.istcweb.org.
7. Central TB. *Division—Ministry of Health and Family Welfare & WHO Country Office for India. Standards of TB Care in India*. New Delhi, India: Ministry of Health and Family Welfare; 2014.
8. Pai M, Satyanarayana S, Hopewell PC. Improving quality of tuberculosis care in India. *Ind J Tuberc*. 2014;61:1–7.
9. Pai M. Improving the quality of tuberculosis care: we need standards and strategies to translate them into practice. *J Epi Glob Health*. 2014;4:77–80.
10. Achanta S, Jaju J, Kumar A, et al. Tuberculosis management practices by private practitioners in Andhra Pradesh, India. *PLoS One*. 2013; 13;8:e71119.
11. Prahalad CK. *The Fortune at the Bottom of the Pyramid* [5th Anniversary Edition]. New Jersey, USA: Wharton School of Publishing; 2010.
12. Pai M, Yadav P, Anupindi R. Tuberculosis control needs a complete and patient-centric solution. *Lancet Glob Health*. 2014;2:e189–e190.
13. Ratnavelu VK, Pai M. TB Control: Five Key Reasons to Engage the Private Sector. *The Hindu*; 2014. <http://www.thehindu.com/sci-tech/health/medicine-and-research/tb-control-five-key-reasons-to-engage-the-private-sector/article5805559.ece> [19 March 2014].
14. Bhargava A, Pinto LM, Pai M. Mismanagement of tuberculosis in India: causes, consequences, and the way forward. *Hypothesis*. 2011;9:1–13.
15. Jarosawlski S, Pai M. Why are inaccurate tuberculosis serological tests widely used in the Indian private healthcare sector? A root-cause analysis. *J Epidemiol Glob Health*. 2012;2:39–50.
16. Udwardia ZF, Pinto LM, Uplekar MW. Tuberculosis management by private practitioners in Mumbai, India: has anything changed in two decades? *PLoS ONE*. 2010;5:e12023.

17. Mishra G, Mulani J. Tuberculosis prescription practices in private and public sector in India. *Natl J Integr Res Med*. 2013;4:71–78.
18. Laxminarayan R, Nandi A. Tuberculosis control in India: more bang for bucks than simply saving lives. *Ideas for India*. New Delhi: International Growth Centre; 2013. http://ideasforindia.in/article.aspx?article_id=147.
19. Sachdeva KS, Kumar A, Dewan P, Kumar A, Satyanarayana S. New vision for revised National Tuberculosis Control Programme (RNTCP): universal access - "Reaching the un-reached". *Indian J Med Res*. 2012;135:690–694.
20. Laxminarayan R, Klein EY, Darley S, Adeyi O. Global investments in TB control: economic benefits. *Health Aff (Millwood)*. 2009;28:w730–w742.

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