Putting quality on the tuberculosis agenda

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Disclosures

No financial/industry conflicts

I serve as a consultant or member:

a) Bill and Melinda Gates Foundation

b) Scientific Advisory Committee of FIND, Geneva

c) Access Advisory Committee of TB Alliance, NY

d) STAG-TB of WHO, Geneva

e) Program Steering Group, TB REACH, Stop TB Partnership
Epi Methods, Hershey’s Kisses & IGRAs

“Statistical Aspects of the Analysis of Data from Retrospective Studies of Disease” JNCI, 1959; 22: 719 - 748

Nathan Mantel & William Haenszel

Annals of Internal Medicine


Dick Menzies, MD, MSc; Madhukar Pai, MD, PhD; and George Comstock, MD, DrPH
Dr George W. Comstock

- BCG vaccine trial in Muscogee County, Georgia and Puerto Rico
- Isoniazid preventive chemotherapy trial in the Bethel region in Alaska
- “Epidemiologic Basis for TB Control” Course
Tuberculosis in the past
Tuberculosis today

2015 GLOBAL TB BURDEN

10.4 million people
FELL ILL FROM TB

That’s 28,500 people every day

TB AMONG TOP TEN CAUSES OF DEATH

1.8 million people
DIED FROM TB
IN 2015
including 400,000
WITH HIV + TB

That’s over 4,900 people every day

TB IS PREVENTABLE AND CURABLE
My hypothesis:
poor quality of care & implementation failures are major threats for ending TB
Macro level indicators of poor quality

**ACCESS TO TB CARE 2015**

6.1 million people had access to quality TB care

4.3 million people missed out

Better reporting, diagnosis and access to care will close this gap

**2015 DRUG RESISTANT TB**

Only 1 in 5 people needing treatment for multidrug-resistant TB actually received it

50% of those who started MDR-TB treatment were cured

Better detection, prevention and cure will address the crisis of multidrug-resistant TB
TB deaths: a key quality indicator

TB is one of the top 5 causes of death at ages 30-69 in India, whereas in China, TB is no longer one of the top 10 causes.
The Tuberculosis Cascade of Care in India’s Public Sector: A Systematic Review and Meta-analysis

Ramnath Subbaraman1,2*, Ruvandhi R. Nathavitharan3,4, Srinath Satyanarayana5,6, Madhukar Pai3, Beena E. Thomas4, Vineet K. Chadha8, Kiran Rade9, Soumya Swaminathan10, Kenneth H. Meyer3,11
MDR-TB Care Cascade in South Africa

<table>
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<tr>
<th>Stage</th>
<th>Estimated TB Burden</th>
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<tr>
<td>MDR-TB burden</td>
<td>IHME</td>
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<tr>
<td>Tested MDR-TB</td>
<td>WHO</td>
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<td>Diagnosed MDR-TB</td>
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<td>Notified / Treated MDR-TB</td>
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<td>Treatment success</td>
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Relative gaps (burden - IHME estimates): 40%
Relative gap (burden - WHO estimates): 30%
Absolute gaps in cascade (IHME-WHO): 15-21%

NDOH, BMGF and partners
Latent TB care cascade

Case study of India

THE WALL STREET JOURNAL

India in Race to Contain Untreatable Tuberculosis

By Geeta Anand

MUMBAI—India’s slow response to years of medical warnings now that the country has turned into an incubator for a mutant strain of tuberculosis that is proving resistant to all known treatments, raising alarms of a new global health hazard.

“We finally have ended up with a virtually untreatable strain” of tuberculosis in India, said Dr. Zahir Udwalid, one of the country’s leading TB authorities.

In December, Dr. Udwalid reported in a medical journal that he had four tuberculosis patients resistant to all treatment. By January, he had a dozen cases, then 15.

A government backlash began immediately. Anonymous health-ministry officials denied the reports through media outlets. They accused Dr. Udwalid and his colleagues of stirring a panic.

A Mumbai city health official seized patient samples for verification in government labs.

In April, the government quietly confirmed the strain, according to internal Indian health-ministry documents reviewed by The Wall Street Journal.

The number of known cases in India is small but growing, and the strain has spread to other countries, including South Africa, where it is now a top priority, and to Asia, where it is a major concern.

“The community has been too conservative,” said Dr. Soumya Swaminathan, head of India’s National Institute for Research in Tuberculosis. “For treatments, Dr. Udwalid said, “We’ve got nothing.”

Ashok Kumar, head of India’s tuberculosis coalition Please turn to page A12

How Fight to Tame TB Made It Stronger

The WHO and a growing chorus of global health experts are now calling for a significant overhaul in the way nations deal with drug-resistant tuberculosis. The WHO’s TB strategy, along with the countries that use it, failed to adapt quickly enough to the disease formed more powerful, resistant strains.

“The TB community has been too conservative” on a global scale, said Punam Dabas, until recently a senior official in the WHO’s India tuberculosis program. “We should have pushed sooner for a more aggressive, comprehensive approach toward drug resistance, he said this month in an interview.

“Then, there was a cost in failing to do that. We’re paying that cost today.”

The WHO played a particularly sizable role in designing the tuberculosis program in India, which has seen a steady decline in regular TB. But India and other poor countries are now in the midst of an epidemic of drug-resistant strains—deadlier and harder-to-treat varieties of one of the world’s top infectious-disease killers.

O.P. Khatri, who headed India’s TB program more than a decade ago, called the epidemic of resistant TB in Mumbai “a recipe for disaster.” The WHO should have known it was so bad and bear responsibility, he said.

“What has the WHO been doing?”

In pilot testing across India this year of a new diagnostic method, some 6.6% of untreated TB patients were drug-resistant—suggesting far higher rates than the 2% to 3% levels India and the WHO have cited for years. The test was a collaboration of international aid groups and India’s government.

At one clinic in Mumbai, research showed more than one quarter of 566 TB patients tested in recent months were resistant to the most powerful treatment, according to data obtained by The Wall Street Journal through India’s Right to Information Act. The results are preliminary, but in the absence of any nationwide survey they offer a sense of what India’s drug-resistance rates might be.

Please turn to page A12
Indian TB Programme: DOTS coverage is high (quantity is good!)

Source: RNTCP
AND YET...

India: 2.8 million of the global burden of 10.4 million new TB cases!

29% of the 1.8 million deaths in 2015
An average TB patient in India is diagnosed with TB after a delay of 2 months, and is seen by 3 healthcare providers before diagnosis.
Patients often switch between providers; Doctors also switch between public and private sectors!

India’s healthcare market: fragmented, heterogeneous, privatized, unregulated

>80 percent of India’s health care is private
70% of primary care visits to unqualified providers
So, how good is the quality of TB care in India?

Quality of tuberculosis care in India: a systematic review

47 studies, measuring knowledge or self-reported practices

Showed poor adherence to most standards, with public doing better than private
Simulated patient studies in India: measuring real practice (vs. knowledge)
Use of standardised patients to assess quality of tuberculosis care: a pilot, cross-sectional study

Johnas Das, Aditi Khawar, Benjamin Daniel, Smitha Sathyanarayanan, Anamika Sobhanbanjan, Sridhar Beggiah, Raminder K Gill, Virendra Das, Madhukar Pai

Summary
Background Existing studies of the quality of tuberculosis care have relied on recall-based patient surveys, questionnaire surveys of knowledge, and prescription or medical record analysis, and the results mostly show health-care provider's knowledge rather than actual practice. No study has used standardised patients to assess clinical practice. Therefore we aimed to assess quality of care for tuberculosis using such patients.

Methods We did a pilot, cross-sectional validation study of a convenience sample of consenting private health-care providers in low-income and middle-income areas of Delhi, India. We recruited standardised patients in apparently good health from the local community to present four cases of presumed pulmonary tuberculosis and one case of confirmed tuberculosis and suspected multidrug-resistant tuberculosis to a randomly allocated health-care provider. The key objective was to validate the standardised-patient method using three criteria: negligible risk and ability to avoid adverse events for providers and standardised patients, low detection rates of standardised patients by providers, and data accuracy across standardised patients and audit verification of standardised-patient recall. We also used medical vignettes to assess providers' knowledge of prescribed tuberculosis. Correct care management was benchmarked using Standards for Tuberculosis Care in India.

Findings Between Feb 2, and March 28, 2014, we recruited and trained 17 standardised patients who had 250 interactions with 100 health-care providers. 29 of whom were qualified in allopathic medicine (ie, they had a Bachelor of Medicine & Surgery [MBBS] degree), 20 of whom practised alternative medicine, and 31 of whom were traditional health-care providers with few or no qualifications. The interactions took place between April 4 and April 23, 2014. The proportion of detected standardised patients was low [19%] detected out of 323 interactions among providers who completed the follow-up survey, and standardised patients' recall correlated highly with audio recordings (rho=0.65 [95% CI 0.53-0.70]), with no safety concerns reported. The mean consultation length was 6 min (95% CI 5.5-6.6) with a mean of 18 (79-26-64) questions or examinations completed, representing 35% (33-38) of essential check-list items. Across all cases, only 57 (18-25) of 358 were correctly managed. Correct management was higher among MBBS qualified doctors than other types of health-care provider (adjusted odds ratio 2.41 [95% CI 1.74-3.43], p<0.006). Of the 65 providers who completed the vignettes, knowledge in the vignettes was more consistent with STCI than their actual clinical practice—eg, 50 (73%) ordered a chest radiograph or sputum test during the vignette compared with seven (20%) during the standardised-patient interaction: OR 0.04 (95% CI 0.02-0.05) p<0.001.

Interpretation Standardised patients can be successfully implemented to assess tuberculosis care. Our data suggest a big gap between private provider knowledge and practice. Additional work is needed to substantiate our pilot data, understand the knowledge gap in provider behaviour, and to identify the best approach to measure and improve the quality of tuberculosis care in India.

Use of standardised patients to assess antibiotic dispensing for tuberculosis by pharmacies in urban India: a cross-sectional study


Summary
Background India's total antibiotic use is the highest of any country. Patients receive prescription-only drugs directly from pharmacies. Here we aimed to assess the medical advice and drug dispensing practices of pharmacies for standardised patients with presynamed and confirmed tuberculosis in India.

Methods In this cross-sectional study in the three Indian cities Delhi, Mumbai, and Patna, we developed two standardised patient cases: first, a patient presenting with 2-3 weeks of pulmonary tuberculosis symptoms (Case 1); and second, a patient with microbiologically confirmed pulmonary tuberculosis (Case 2). Standardised patients were scheduled to present each case once to sampled pharmacies. We defined ideal management for both cases as a referral to a health-care provider without dispensing antibiotics or steroids or both.

Findings Between April 1, 2014, and Nov 29, 2015, we sampled 622 pharmacies in Delhi, Mumbai, and Patna. Standardised patients completed 1200 (60%) of 2044 interactions. We recorded ideal management (defined as referrals without the use of antibiotics or steroids) in 70 (13%) of 559 Case 1 interactions, 95% CI 11-16, and 73 (22%) of 326 Case 2 interactions, 95% CI 18-34. Antibiotic use was significantly lower in Case 2 interactions (P=0.016) of 601, 95% CI 13-19, than in Case 1 (231 [79%] of 599, 95% CI 33-72). First-line antibiotics were not dispensed in any city. The differences in antibiotic or steroid use and number of medicines dispensed between Case 1 and Case 2 were almost entirely attributable to the difference in referral behaviour.

Interpretation Only some urban Indian pharmacies correctly managed patients with presumed tuberculosis, but most correctly managed a case of confirmed tuberculosis. No pharmacy dispensed tuberculosis drugs for either case. Absence of a confirmed diagnosis is a key driver of antibiotic misuse and could inform antimicrobial stewardship interventions.


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**SP1**: Classic case of suspected TB (2-3 weeks of productive cough, fever, weight loss – “presumed TB”)
SP2: Classic case of suspected TB who has already taken antibiotics (2-3 weeks of cough/fever, and has taken amoxicillin for a week – “presumed TB, after antibiotics”)

Variation: carries abnormal CXR
SP3: Chronic, productive cough (for 1 month) with 2+ positive smear result from the public sector (“TB case”)
**SP4**: Chronic, productive cough with previous history of incomplete TB treatment, and currently having a positive smear result from the public sector (possible MDR-TB)
Results from the pilot study in Delhi demonstrated low levels of correct management.

SP1: Correct Case Management
SP1: Referral

SP2: Correct Case Management
SP2: Referral

SP3: Correct Case Management
SP3: Referral

SP4: Correct Case Management
SP4: Referral

Providers without MBBS Degree
Providers with MBBS Degree
Know-do gap

In the vignette, 73% ordered a CXR or sputum test

In practice, 10% ordered CXR or sputum test

Das J et al. Lancet Infect Dis 2015
Use of fluoroquinolones in patients with respiratory infections seems to delay the diagnosis of TB by \textit{nearly two weeks}. 
Empirical treatment is widespread

Treatment as diagnosis and diagnosis as treatment: empirical management of presumptive tuberculosis in India

A. McDowell, M. Pai
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Alternative medicine: an ethnographic study of how practitioners of Indian medical systems manage TB in Mumbai

Andrew McDowell and Madhukar Pai*
What drives empirical Rx?


Courtesy: Puneet Dewan
Is it possible to improve quality?

PPIA pilots in India
PPIA pilots, supported by BMGF

Franchise/Interface agencies, Subsidized diagnostics, Free TB drugs, Adherence/retention support Incentives (sometimes), good service & relationship management (always), smart & easy technology.

Attract TB notifications with services
Initiate and sustain TB Rx
Monitor and improve Dx/Rx quality
Case notifications in Mumbai
Uptake of microbiological tests

- Intensive PPIA efforts put to program network to South Mumbai wards
- Resulted in active FPs and GX uptake doubling in 5 months Oct-Mar (169-356 and 1137-2558)
- Rise in “GX issued per active provider” from 5.8 in April’15 to 7.2 in Mar’16
Rif-resistance detection

Detection of Rif resistant cases has more than doubled from 2015 to 2016
So, it is possible to find missing patients & improve quality!

• Did not happen by itself
• Took resources and effort
• Quality Improvement (QI) is deliberate, and takes time and effort!
On Feb 1, India announced TB elimination by 2025!

• VISION: TB-Free India with zero deaths, disease and poverty due to TB
• GOAL: To achieve a rapid decline in burden of TB, morbidity and mortality while working towards elimination of TB in India by 2025
What about $$?

“Cost of implementing the new NSP is Rs 16,649 Crores ($ 2485 Million), and will involve a significant increase over the last NSP budget” – Draft NSP

- Funding appears to have increased by Rs 87 crore over a year to 2017-18, but the revised budget estimates—drawn up after the budget is presented—reveals a drop of Rs 13 crore over 2016-17
- Adjusting for purchasing power parity, the funds available for TB control would be even lower...

http://www.indiaspend.com/cover-story/rs-10290-cr-boost-for-health-hides-funding-cuts-for-key-programmes-33876
Advocacy is critical

They Survived TB. Here Are Their Stories - Everylifecounts.NDTV.com
The patients of tuberculosis need more than just medicines. They need acceptance and care. With this common understanding in mind, TB surviv... everylifecounts.ndtv.com

Experts Speak On Patna Teen Girl's Fight For TB Drug
Written By: Dipak Roy Date: January 17, 2017

Fighting TB requires empowered patients
In this article from India, Deepti Chavan describes the differences in health outcomes when patients are able to access the information they need
Deepti Chavan

Indian Woman Wins Right to Use Last-Resort Tuberculosis Drug
Family of 18-year-old suffering from drug-resistant TB had petitioned court
Doctor’s tenacity nudges government to overhaul TB programme

Haryana-based Dr Raman Kakar learnt that in several cases patients had completed full course of medication on six occasions but the disease still resuscitated, forcing them to seek another dose.
Take away messages

• DOTS coverage - no longer sufficient!
• We need to make patient-centered, quality care the center piece of TB control
• QI should be an integral component of all TB programs
• We need empowered patients to demand quality & hold NTPs accountable
Thank you!  
Merci!!

Grateful to NAR team:

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Secretariat: Menn Biagtan

Collaborators:

Puneet Dewan, BMGF  
Jishnu Das, World Bank  
QuTUB team  
PPIAs: PATH, Mumbai & World Health Partners, Patna

Grant funding:  

![Bill & Melinda Gates Foundation](image)

![Grand Challenges Canada](image)
Review

Quality of tuberculosis care in high burden countries: the urgent need to address gaps in the care cascade

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Open access: http://www.sciencedirect.com/science/article/pii/S1201971216312000