Public-private TB models can consider mediating referral across providers to minimize loss to follow-up

Private sector engagement in the tuberculosis cascade of care: a meta-analysis of TB REACH projects

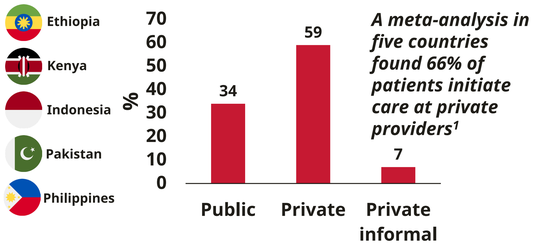
Luca ZWEERS[1], Harry Laurence Selby COLEMAN[1], Mirjam BAKKER[1], Toufiq RAHMAN[2] & Jacob CRESWELL[2]

1. KIT Royal Tropical Institute, Amsterdam, the Netherlands
2. Stop TB Partnership, UNOPS, Geneva, Switzerland

1. Background

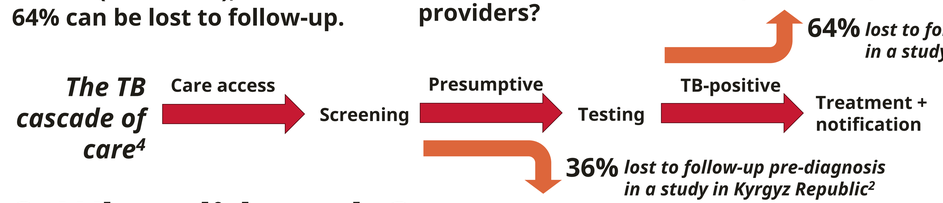
1a. As much as two-thirds of TB patients in high TB-burden countries can seek care from private providers

1b. Yet, evidence that when patients are referred across private and public providers between steps of the TB cascade of care (see below), as much as 64% can be lost to follow-up.



A meta-analysis in five countries found 66% of patients initiate care at private providers[1]

1c. So, what factors reduce loss to follow-up for TB patients referred across public and private providers?



2. What did we do?

2a. Meta-analysis of 62 TB REACH interventions from 2011-2020 with private sector engagement.

Dependent variables	Independent variables
Proportion of patients lost to follow-up between: Screening → TB positive (NNS*) Presumptive → Tested TB positive → Treatment	Continent of project Private provider type Diagnostic tool Public-private model Referral mediation

**Inverse of number needed to screen (NNS)*

2b. Analysis

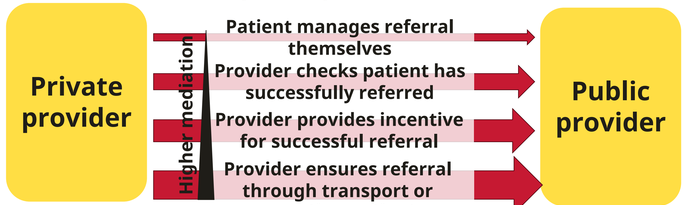
a) Calculated weighted, pooled proportions using a random effects model

b) Disaggregate proportions across independent variables to assess their effect on loss to follow-up

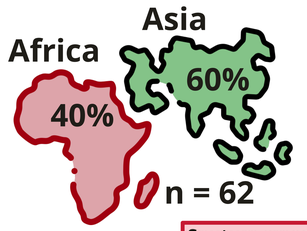
Five public-private models of TB care

	Private provider	Public provider
Model 1	Screening	Diagnosis, treatment and notification
Model 2	Screening and diagnosis	Treatment and notification
Model 3	Screening, diagnosis and treatment	Notification
Model 4	Screening, diagnosis and notification	Treatment
Model 5	All	

Four types of referral mediation between private and public providers



3. What came out?



3a. Descriptives

Type of provider		
Informal private providers	4	6%
Private pharmacies and drug stores	15	24%
Private formal providers	14	23%
Private labs	3	5%
Private formal facilities	7	11%
Multiple	19	31%

Sputum smear microscopy was the most common diagnostic tool used (45%), followed by GeneXpert (35%), followed by a combination (13%).

In 47% of interventions, providers ensured referral between screening and diagnosis, 11% incentivized referral and another 11% checked referral, while 29% left it to patients.

Public-private model		
Model 1 (Screening only)	20	32%
Model 2 (Testing)	0	0%
Model 3 (Public notif. only)	14	23%
Model 4 (Public treatment)	0	0%
Model 5 (Comprehensive)	15	24%
Multiple	9	15%
Other	4	6%

Between diagnosis and treatment, 53% of interventions checked referral had taken place, 32% left it to patients, and 8% and % ensured referral and incentivized it, respectively.

3b. Meta-analysis

- **NNS was lower** for Asian (189 [172-213]) compared to African projects (476 [400-556]).
- **Private pharmacies and drug stores** (n = 11) had the highest NNS of 500 [417-667], while the formal private providers (n = 10) had the lowest of 217 [172-294].
- **Mediating referral** between screening and testing resulted in a higher proportion of presumptive individuals being tested (83.2%; 95%CI: 80.5-85.8) compared to interventions where people managed referral themselves (74.4%; 95%CI: 66.6-82.3).

4. So what?

Public-private models with referrals across key junctures of the TB cascade of care can consider mediating referral to minimize loss to follow-up

For more information
m.bakker@kit.nl

1. Hanson C, Osberg M, Brown J, Durham G, Chin DP. Finding the missing patients with tuberculosis: lessons learned from patient-pathway analyses in 5 countries. The Journal of infectious diseases. 2017 Oct 1;216(suppl_7):S686-95.
2. Madybaeva D, Duishekeeva A, Meteliuk A, Kulzhabaeva A, Kadyrov A, Shumskaia N, Kumar AM. "Together against Tuberculosis": Cascade of Care of Patients Referred by the Private Health Care Providers in the Kyrgyz Republic. Tropical Medicine and Infectious Disease. 2023 Jun 10;8(6):316.
3. Khan BJ, Kumar AM, Stewart A, Khan NM, Selvaraj K, Fatima R, Samad Z. Alarming rates of attrition among tuberculosis patients in public-private facilities in Lahore, Pakistan. Public health action. 2017 Jun 21;7(2):127-33.
4. MacPherson P, Houben RM, Glynn JR, Corbett EL, Kranzer K. Pre-treatment loss to follow-up in tuberculosis patients in low-and lower-middle-income countries and high-burden countries: a systematic review and meta-analysis. Bulletin of the World Health Organization. 2013 Nov 22;92:126-38.

Acknowledgements: TB REACH grantees; icons from flaticon.com (Xinh Studio; FreePik; GoodWare)