

TB SHIELD

Air monitoring to strengthen TB infection control and reduce TB transmission at health facilities in high TB burden settings

INTRODUCTION

TB SHIELD is a collaborative project to demonstrate proof of concept for air sampling of tuberculosis bacteria, *Mycobacterium tuberculosis* (Mtb), in three health facilities at three high TB burden districts of Nepal. We also aim to develop the tools to sequence DNA of TB bacteria collected on air cartridges. We will explore the potential application for strengthening evidence-based infection control to reduce nosocomial transmission.

PARTNERS

University of Wisconsin, University of Melbourne, Ministry of Health and Population, National Tuberculosis Control Center, Provincial Health Directorate, Birat Nepal Medical Trust, Center for Molecular Dynamics - Nepal, GENETUP Nepal, NATA Morang, TB Nepal, Health offices, municipalities and TB partners.



FUNDER

INKFISH



OBJECTIVES

1. Assess whether *Mycobacterium tuberculosis* (Mtb) can be captured by air samplers to be placed in three TB hostels at three locations in Nepal
2. Determine whether TB bacteria captured by air samplers can be sequenced and how it compares to Mtb sequences derived from the resident patients
3. Assess whether simple, feasible, low cost and sustainable interventions can reduce the amount of Mtb DNA detected in the air in healthcare facilities



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PROJECT
SITES

SITES, DISTRICTS

- ★ TB Nepal, Banke
- ▲ GENETUP, Kathmandu
- NATA, Morang



TARGET BENEFICIARIES

People living with Multi Drug Resistant Tuberculosis, family members and health care workers

ACTIVITIES

1. Air sample collection by deploying up to two air samplers in each of the three TB hostels.
2. Elute air samples on-site, test them with a Cepheid GeneXpert MTB/RIF cartridge and check if TB bacteria are alive using Mycobacterial Growth Indicator Tube (MGIT) assays.
3. Co-design interventions that are feasible in each site, evaluate whether the intervention can reduce the Mtb burden in the air, and determine the best strategy for sampling in the presence or absence of the intervention.
4. Develop methods to sequence Mtb DNA from air cartridges and individual sputum samples
5. Analyze data to assess feasibility of air sampling to evaluate and refine health facility infection control measures

EXPECTED OUTCOMES

1. 450 air samples collected and analyzed to detect the Mtb DNA.
2. Mtb sequencing methods developed and Mtb DNA samples successfully sequenced in Nepal
3. The capacity of laboratory staff for Mtb sequencing strengthened
4. New knowledge of the potential of air sampling to improve infection control
5. A policy brief developed and findings shared with the national policy makers.

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