

# **Prevalence and cost estimation for identifying positive tuberculosis among household contacts in Mandalay City, Myanmar**

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## **Abstract**

Contact tracing for tuberculosis (TB) is a recommended measure to improve the case detection rate; however, actual implementation in a country is limited and low detection rate has been reported. Household contacts of a known index TB case is high risk group which more strategic action for contact tracing is essential to achieve the goal of World Health Organization (WHO) End TB strategy. This study thus aimed to assess TB case detection among household contacts by the integrated approach in Myanmar. A cross-sectional study was conducted in Mandalay City, Myanmar. Household contacts of index TB cases who had been receiving treatment for at least 3 months was prospectively investigated by the integrated approach which included the modification of screening methods and active facilitation of screening investigations as follow. Initial chest x-ray (CXR) was performed for all contacts at the responsible facilities. It was followed by sputum specimen collection for those aged  $\geq 15$  years and the gene Xpert MTB/RIF examination was performed according to national guideline. The transportation of all household contacts to CXR health facilities and transportation of sputum for smear and gene Xpert MTB/RIF examination centers were arranged by research team to ensure the all household contacts receiving all investigations. Of 174 household contacts, 115 were  $\geq 15$  years and 59 were  $< 15$  years. Total number of TB cases detected among the household contacts was 13.8%. Positive TB cases among the contacts aged  $\geq 15$  years were 12.2% (14/115). Clinical TB cases (presence of clinical signs and symptoms and abnormal CXR) among those aged  $< 15$  years were 16.9% (10/59). The high-risk household contacts of contracting TB were being a caretaker of an index case, smoking, passive-smoking and drinking. The integrated approach of TB contact tracing by special arrangement for CXR, sputum and the gene Xpert MTB/RIF examination yielded high TB case detection in high TB prevalence area. A modified conventional model included screening for TB signs and symptoms, sputum examination for those with positive signs and symptoms and chest X-ray (CXR) for those with negative sputum results. An interventional model included CXR, sputum examination if abnormal CXR and Xpert MTB/RIF assay for those with negative sputum results. Estimated costs within each model were stratified by age  $< 15$  years and age  $\geq 15$  years. The additional cost per TB case detected for the interventional model was

US\$ 35.41 compared to the modified conventional model. The probability that the interventional model was cost-effective using a threshold of US\$ 100 per case detected was 81% (83% for those aged  $\geq 15$  years and 65% for those aged  $< 15$  years). The interventional model was more cost-effective for detecting one more pulmonary TB case in household contacts compared to the modified conventional model. Logistic and financial administration is needed to strengthen contact tracing. Further research on high-risk household contacts should be considered for increasing yield in detection of TB cases among household contacts.