

# Impact of COVID-19 interventions on *M. tuberculosis* transmission in uMkhanyakude: an interrupted time series analysis

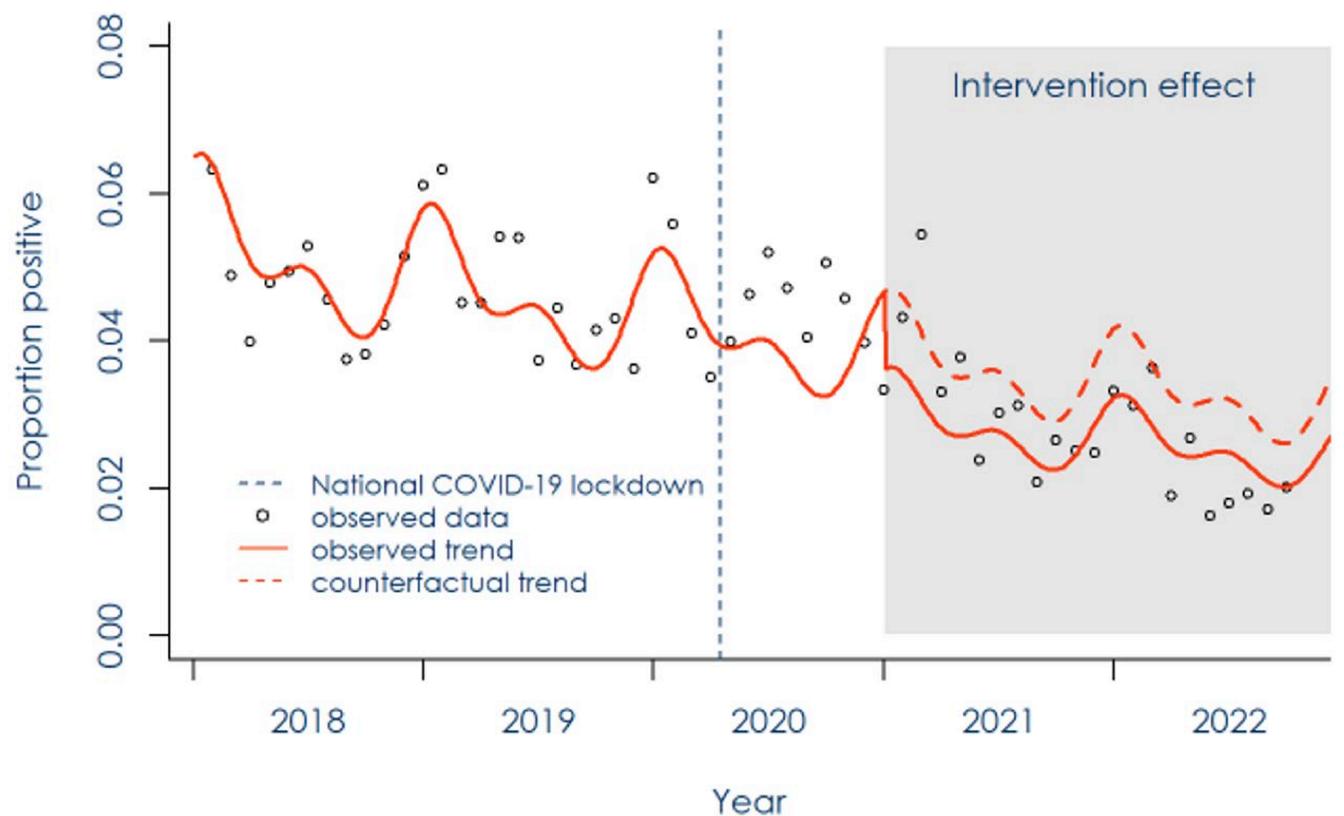
Palwasha Khan,<sup>1,2</sup> Limakatso Lebina,<sup>1</sup> Sadiyya Sheik,<sup>1</sup> Leonardo Martinez,<sup>3</sup> Stephen Olivier,<sup>1</sup> Dickman Gareta,<sup>1</sup> Alison Grant,<sup>1,2</sup> Willem Hanekom,<sup>1</sup> Kathy Baisley,<sup>1,2</sup> Kobus Herbst<sup>1</sup>

<sup>1</sup> Africa Health Research Institute <sup>2</sup> London School of Hygiene & Tropical Medicine <sup>3</sup> Boston University School of Public Health

## 1. Introduction

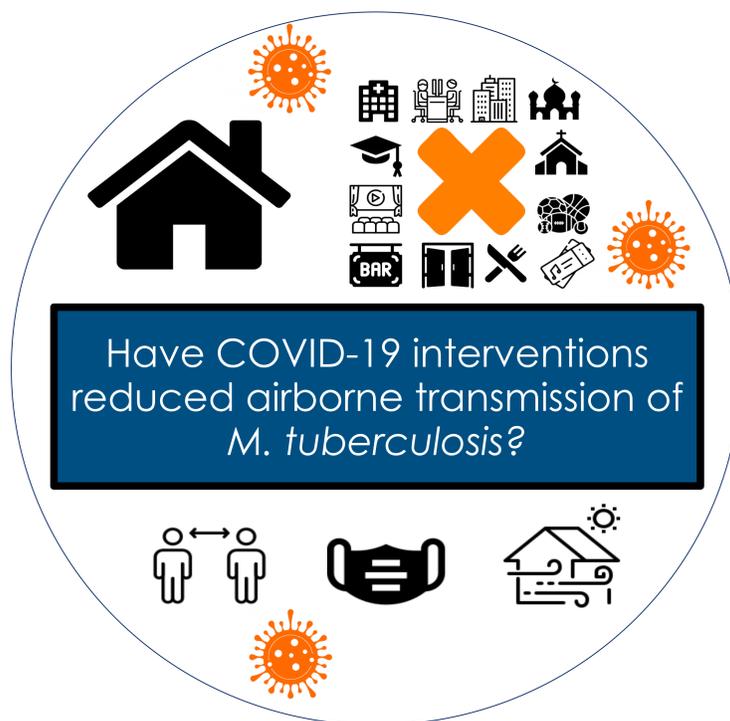
- The impact of the COVID-19 pandemic on *Mycobacterium tuberculosis* transmission is unknown
- Broad non-pharmaceutical interventions (lockdown, social distancing, mandatory mask use) may decrease community *M. tuberculosis* transmission
- Sputum Xpert MTB/RIF Ultra (Ultra) assay is the primary test used to screen for pulmonary tuberculosis (PTB) in South Africa
- *Hypothesis*: a reduction in proportion testing positive on Ultra may reflect a reduction in PTB incidence as a result of decreased transmission
- **Aim**: to assess impact of non-pharmaceutical (NPI) COVID-19 interventions on PTB screening test-positivity using routine National Health Laboratory Services (NHLS) Xpert Ultra data

**Figure.** Monthly sputum Ultra test-positivity in Umkhanyakude district, 2018 - 2022



## 2. Materials and methods

- Design:** Interrupted times series analysis of sputum Xpert Ultra
- Setting:** All healthcare facilities in uMkhanyakude district, KwaZulu Natal
- Period:** January 2018 to September 2022
- Outcome:** monthly proportion test-positive
- Intervention:** Effect of NPI were set to start with a 9-month lag after the 31st March 2020. The lag reflects time taken for reduction in transmission to translate into reduced TB incidence, i.e. time between infection and detectable clinical disease.
- Analysis:** Quasi-Poisson segmented regression model adjusted for population age and sex distribution and seasonality (using harmonic functions of time). Total number of tests per month were included as an offset.



## 3. Results

- A total number of 213,487 Ultra sputum tests were analysed
  - N= 114,388 in pre-intervention
  - N= 99,099 in post-intervention
- Mean number tested per month:
  - N = 3177 in pre-intervention
  - N = 4710 in post-intervention
- Mean monthly proportion test-positive:
  - 0.05 in the pre-intervention
  - 0.03 in the post-intervention
- Male to female ratio screened:
  - 0.61 in pre-intervention
  - 0.48 in post-intervention
- **Model adjusted relative risk 0.74 (95% confidence interval: 0.62 – 0.97)**
- Main findings Illustrated in figure above

## 4. Conclusion

- We found strong evidence for a 26% reduction in the test-positivity of sputum Ultra tests in the post-intervention period compared to the pre-intervention period.
- This reduction in test-positivity in uMkhanyakude district may reflect a reduction in PTB incidence as a result of decreased community *M. tuberculosis* transmission following implementation of COVID-19 NPI.
- However, residual confounding by changes in population tested may account for some of the effect observed.
- These findings need to be triangulated with analyses using other relevant data before firm conclusions about the effect of COVID-19 interventions on reducing airborne transmission of *M. tuberculosis* can be made.

