

Did the introduction of an Xpert MTB/RIF-based algorithm increase the proportion of bacteriologically confirmed pulmonary tuberculosis cases in Cape Town, 2010-2013: An Interrupted Time Series Design?

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Background: The aim of this study was to determine whether the proportion of bacteriologically confirmed (BactConf) pulmonary tuberculosis (PTB) cases notified in Cape Town in 2010 to 2013 increased with the introduction of Xpert.

Methods: Proportion of Bacteriologically confirmed PTB was assessed using a time series analysis as primary health care facilities (PHC) in the city of Cape Town transitioned to Xpert®-based algorithm. We used the electronic TB register (ETR) to identify the full sequence of sputum tests from 142 PHC during 48- month time points from 2010-2013. Difference in the proportion of BactConf PTB cases diagnosed between algorithms were estimated using binomial generalised linear model.

Results: A total of 89,489 PTB cases met the eligibility criteria, the smear/culture – based algorithm included 46,555 PTB cases and the Xpert-based algorithm 42,934 PTB cases. (Figure 1) Furthermore, 57,694 PTB cases were bacteriologically confirmed, of whom 51.5% with smear/culture-based algorithm and 48.49% with Xpert-based algorithm ($p < 0.001$). Age, HIV status, ART treatment

and era were associated with bacteriologically confirmation. The trend in the proportion of bacteriologically confirmed PTB over time varied from 72.1% at T1 and 54.3 at T20 (time marked by the introduction of the Xpert-based algorithm), then increase up to 77.6% at T48. The binomial generalized linear regression analysis showed an increase in cases with Xpert-based algorithm of 0.5% (95% CI 1.004 to 1.006) ($p < 0.001$) per time-point. (Figure 2)

Discussion and Conclusion: As demonstrated by many studies that rapid, more sensitive molecular tests, such as Xpert have the capacity to address the limitations of smear and culture. However, very little are known on their use in routine operational conditions. Increased test sensitivity may not translate into an increase in the proportion of bacteriologically confirmed TB cases on treatment. This study showed that the introduction of an Xpert®based algorithm did not increase the proportion of BactConf PTB cases as expected.