



# Use of a whole genome sequencing-based approach for *Mycobacterium tuberculosis* surveillance in Europe in 2017–2019: an ECDC pilot study

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The implementation of a WGS-based surveillance system for monitoring the emergence of MDR-TB outbreaks in Europe is feasible and has the potential to provide supporting evidence to better elucidate cross-border transmission patterns <https://bit.ly/2ZTnPjk>

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**ABSTRACT** Whole genome sequencing (WGS) can be used for molecular typing and characterisation of *Mycobacterium tuberculosis* complex (MTBC) strains. We evaluated the systematic use of a WGS-based approach for MTBC surveillance involving all European Union/European Economic Area (EU/EEA) countries and highlight the challenges and lessons learnt to be considered for the future development of a WGS-based surveillance system.

WGS and epidemiological data of patients with rifampicin-resistant (RR) and multidrug-resistant (MDR) tuberculosis (TB) were collected from EU/EEA countries between January 2017 and December 2019. WGS-based genetic relatedness analysis was performed using a standardised approach including both core genome multilocus sequence typing (cgMLST) and single nucleotide polymorphism (SNP)-based calculation of distances on all WGS data that fulfilled minimum quality criteria to ensure data comparability.

A total of 2218 RR/MDR-MTBC isolates were collected from 25 countries. Among these, 56 cross-border clusters with increased likelihood of recent transmission ( $\leq 5$  SNPs distance) comprising 316 RR/MDR-MTBC isolates were identified. The cross-border clusters included between two and 30 resistant isolates from two to six countries, demonstrating different RR/MDR-TB transmission patterns in Western and Eastern EU countries.

This pilot study shows that a WGS-based surveillance system is not only feasible but can efficiently elucidate the dynamics of in-country and cross-border RR/MDR-TB transmission across EU/EEA countries. Lessons learnt from this study highlight that the establishment of an EU/EEA centralised WGS-based surveillance system for TB will require strengthening of national integrated systems performing prospective WGS surveillance and the development of clear procedures to facilitate international collaboration for the investigation of cross-border clusters.