



## Reduction trend of *mcr-1* circulation in Emilia-Romagna Region, Italy

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### Abstract

This study aims to describe trends of *mcr*-positive Enterobacterales in humans based on laboratory surveillance with a defined catchment population. The data source is the Micro-RER surveillance system, established in Emilia-Romagna region (Italy), to monitor the trend of *mcr*-resistance. Enterobacterales isolates from human clinical samples with minimum inhibitory concentration (MIC)  $\geq 2$  mg/L for colistin were sent to the study reference laboratory for the detection of *mcr* genes. Isolates prospectively collected in the period 2018–2020 were considered for the assessment of population rates and trends; further analyses were carried out for the evaluation of clonality and horizontal *mcr* gene transfer. Previous isolates from local laboratory collection were also described. In the period 2018–2020, 1164 isolates were sent to the reference laboratory, and 51 (4.4%) were confirmed as *mcr*-positive: 50 *mcr-1* (42 *Escherichia coli*, 6 *Klebsiella pneumoniae*, 2 *Salmonella enterica*) and 1 *mcr-4* (*Enterobacter cloacae*). The number of *mcr*-positive isolates dropped from 24 in the first half of 2018 to 3 in the whole of 2020 (trend *p* value  $< 0.001$ ). Genomic analyses showed the predominant role of the horizontal transfer of *mcr* genes through plasmids or dissemination of transposable elements compared to clonal dissemination of *mcr*-positive microorganisms. The study results demonstrate a substantial decrease in the circulation of *mcr-1* plasmid genes in Emilia-Romagna Region.

**Keywords** Antibiotic resistance · *Mcr* · Colistin · Enterobacterales · Horizontal transfer · Clonal dissemination · Humans · Antimicrobials for veterinary use · One Health approach

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