

**TITLE:** First detection of the *mcr-1* gene in clinical carbapenemase-producing *Klebsiella pneumoniae* isolates in Brasília, Brazil

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## ABSTRACT

Colistin is a last-resource drug for the treatment of infections caused by carbapenemase-producing (CP) *Enterobacteriaceae* strains. Reports on resistance to colistin have become each time more frequent and have worried physicians worldwide. In 2015, the plasmid-mediated colistin resistance gene *mcr-1* was first detected in isolates of *Escherichia coli* and *K. pneumoniae* recovered in China. Since then, several reports on *mcr*-mediated colistin resistance have been detected worldwide, including Brazil. Additionally, other *mcr* variants, like *mcr-2* and *mcr-3* have been described. This study aims to analyze the presence of *mcr-1*, *mcr-2* and *mcr-3* genes in polymyxin-resistant and susceptible isolates of CP *K. pneumoniae*. We addressed a contemporaneous (2014 to 2016) collection (n = 142) of clinical strains of *K. pneumoniae* (55,6% *bla*<sub>KPC</sub>-positive strains, 42,3% *bla*<sub>NDM</sub>-positive strains and 2% *bla*<sub>KPC+NDM</sub>-positive strains) collected as part of a carbapenem-resistance surveillance program carried out in hospitals in Brasília-DF, Brazil. Bacterial identification and antimicrobial susceptibility profiles were performed with Vitek-MS and MicroScan systems. Detection of *mcr-1*, *mcr-2* and *mcr-3* genes was performed by PCR in all CP *K. pneumoniae* isolates. All tested isolates were negative for the presence of *mcr-2* and *mcr-3* genes. However, four isolates were positive for the *mcr-1* gene (three were positive for *bla*<sub>KPC</sub> and one for *bla*<sub>NDM</sub>). Forward sequencing of three *mcr-1* amplicons showed identity ranging from 94 to 98% (cover varying from 82 to 91%) with *mcr-1* gene of *K. pneumoniae* deposited on Genbank under the accession no. KY706360.1. This study reports the first detection of *mcr-1* in CP *K. pneumoniae* strains isolated from clinical samples in Brasília. It is important to maintain molecular surveillance on *mcr* gene dispersion mostly in carbapenemase-producing strains once treatment options are very limited when facing strains with this antibiotic co-resistance profile.

**Keywords:** carbapenemase; colistin resistance; *Klebsiella pneumoniae*; *mcr*.

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