

TITLE: FIRST DETECTION OF *bla*_{NDM} GENE DERIVED FROM BIOLOGICAL MATERIALS OF DOMESTIC ANIMALS IN BRAZIL

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ABSTRACT:

Emergence of acquired carbapenemases and their worldwide dissemination are a major global threat to antibiotic era and represent a major clinical challenge in both human and veterinary contexts. Carbapenems are broad-spectrum beta-lactam antibiotics employed for treatment of serious infections, usually considered as the last-line available therapy against multidrug-resistant (MDR) Gram-negative bacterial infections like those caused by extended spectrum beta-lactamase (ESBL) pathogens. The *New Delhi metallo-beta-lactamase* (NDM) was named after being discovered in India, in 2009, and has been isolated in several parts of the world. Until now, the occurrence of NDM appeared to be restricted mainly to humans, however the prevalence and characteristics of MDR genes in *Enterobacteriaceae* originating from companion animals are still not well known. Thus, this study aimed to investigate the occurrence of carbapenemase encoding genes in bacteria resistant to carbapenems, isolated from clinical materials samples of domestic animals. There were considered bacterial isolates from dogs (97 strains) and cats (24 isolates) showing phenotypic resistance to carbapenems, identified during routine microbiological investigation between July 2018 and April 2019 in Joinville, Southern Brazil. Phenotypic resistance to carbapenems and the susceptibility profile to other common antimicrobials were determined by the disc-diffusion agar method. In addition, Modified Carbapenem Inactivation Method (mCIM) was used for phenotypic confirmation of carbapenemases in *Enterobacteriaceae*. The presence of *bla*_{NDM} gene was confirmed by Real-time Polymerase Chain Reaction employing TaqMan probes at Central Laboratory of Public Health of Paraná, in Curitiba, Brazil. In this study, there were identified two isolates (*Klebsiella pneumoniae* and *Enterobacter cloacae*) with MDR profile, carrying the *bla*_{NDM} gene derived from dogs urine. To our knowledge, this is the first report of NDM identified in clinical isolates derived from domestic animals in Brazil. Of note, the *bla*_{NDM} gene may be located in readily transferable plasmids, increasing the variety of transmission vectors of resistance to carbapenems, also considering that the species carrying the gene identified in this study are widely distributed and shared among the environment, animals and humans.

Keywords: *New Delhi metallo-beta-lactamase*, carbapenemase, multidrug resistance, *bla*_{NDM} Gene, *Enterobacteriaceae*, Domestic Animal

Development Agency: This study was funded by the Research Support Fund of the University of Region of Joinville (FAP / UNIVILLE).