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P1072 Occurrence of carbapenemase-producing strains among Enterobacteriaceae urine isolates in three geographic areas in Germany

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Background: Carbapenemase (CP)-producing Enterobacteriaceae (CPE) represent an increasing threat to public health. Infections with these bacteria are associated with higher morbidity, mortality, and healthcare costs. In Germany, the predominant CP produced by Enterobacteriaceae is OXA-48, followed by VIM-1, the KPCs, and NDM-1. We performed a laboratory surveillance study i) to assess the occurrence of CP-producing strains among Enterobacteriaceae isolates from urine specimen and ii) to determine the activity of meropenem (MEM), ceftazidime-avibactam (CZA) and seven other antibacterial agents against these CPE, as part of the European Infection-Carbapenem Resistance Evaluation Surveillance Trial (I-CREST).

Materials/methods: Data were collected from laboratories affiliated to three University hospitals (Berlin, Bonn, Frankfurt/Main) between January and March 2017. All Gram-negative isolates from urine specimens were sub-cultured onto chrome ID® Carba Smart agar plates (bioMérieux) to screen for CPE. Screen-positive CPE were submitted for confirmation of species identification and susceptibility testing to a central laboratory. Susceptibility testing was performed with the broth microdilution method (BMD) using frozen microtitre plates (ThermoFisher Trek Diagnostic Systems) containing the antibiotics. Genetic testing on the carbapenemases was performed at the German National Reference Laboratory for Multidrug-resistant Gram-negative Bacteria.

Results: In total, 3,838 Enterobacteriaceae isolates were screened for CPE. Eighteen of these isolates (0.47%) were considered screen-positive and submitted to the central laboratory. Suspected CPE were *Enterobacter aerogenes* (EAE; n=3), *Enterobacter cloacae* (ECL; n=3), *Escherichia coli* (ECO; n=1), *Klebsiella oxytoca* (KOX; n=1), *Klebsiella pneumoniae* (KPN; n=6), and *Serratia marcescens* (SMA; n=4). BMD MICs of MEM were ≤0.12 mg/l for six isolates and >0.12 mg/l for 12 isolates. 11/3,838 (0.29%; 95% CI: 0.12-0.46%) isolates harbored a CP, all of which had MEM MICs above the EUCAST screening cut-off value of 0.12 mg/l for CPE. Enzymes detected were OXA-48 (n=4), VIM-1 (n=2), KPC-2 (n=1), and NDM-1 (n=4). MICs of CZA were 0.25-0.5 mg/l for the isolates producing OXA-48 or KPC-2 and >32 mg/l for the isolates producing VIM-1 or NDM-1 (see Table).

Conclusions: The results of the study suggest that the CPE rate among Enterobacteriaceae urinary isolates is very likely <0.5% in Germany.

Table: Susceptibility of 11 carbapenemase-producing Enterobacteriaceae isolates towards nine antibacterial agents*

Antibacterial agent	Isolates inhibited at MIC (mg/l)										%S	%R
	≤0.12	0.25	0.5	1	2	4	8	16	32	>32		
Piperacillin-tazobactam		1						1	1	8	9.1	81.8
Ceftazidime-avibactam		2	3							6	45.5	54.5
Imipenem				1	4	3	1	2#			45.5	18.2
Meropenem			3	1	4		2	1#			72.7	9.1
Aztreonam	1	1	1				1			7	27.3	72.7
Levofloxacin	3	2	2			1	1	2#			63.6	36.4
Amikacin	n.t.			5	3	1	1			1	90.9	9.1
Tigecycline		5	2	2	2						81.8	0
Colistin		1	8	1			1				90.9	9.1

*EUCAST clinical breakpoints (v.7.1, 2017) were applied. #Highest conc. tested was 8 mg/l.
n.t., conc. not tested