

# Prevalence of Carbapenemases and Antimicrobial Activity of Aztreonam-Avibactam and Comparator Agents Among a Global Collection of Enterobacterales

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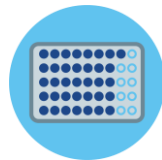
## Objective

We evaluated the presence of carbapenemases among carbapenem-resistant Enterobacterales (CRE) isolates collected during 2020 and documented the activity of aztreonam-avibactam and comparators against isolates stratified by carbapenemase type.

## Methods



8,074 Enterobacterales isolates were consecutively collected (1 per patient) from hospitals in the Asia-Pacific region (8 centres in 6 countries), Europe (34 centres in 18 countries), and Latin America (8 centres in 6 countries).

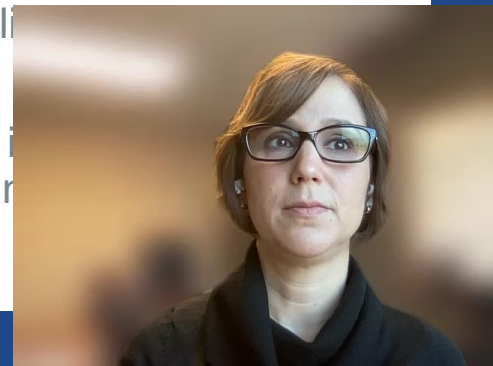


Isolates were susceptibility tested by broth microdilution method.

- An aztreonam-avibactam PK/PD susceptible breakpoint of  $\leq 8$  mg/L was applied for comparison.
- EUCAST and FDA breakpoints were applied for comparators.



CRE (imipenem or meropenem, CLSI criteria) isolates were submitted to whole genome sequencing and analyzed for lactamase-encoding genes.

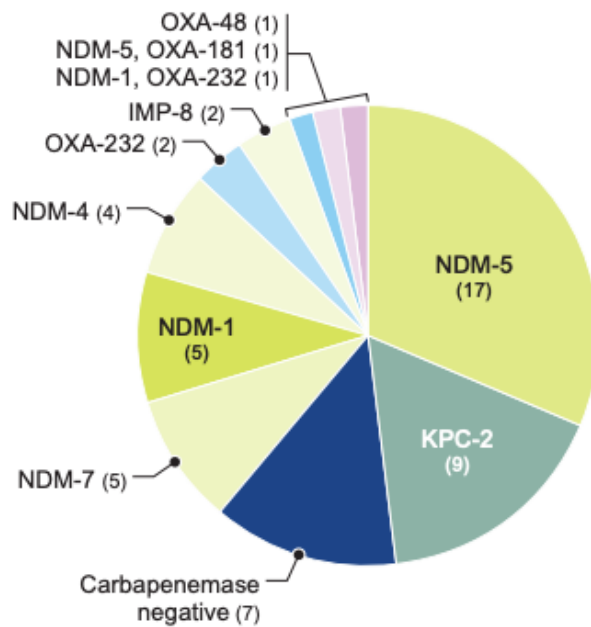


# Results

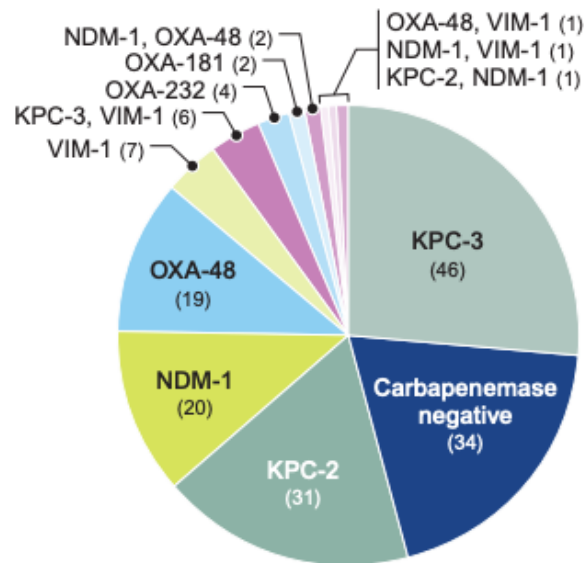
- Among the isolates tested, 296 (3.7%) were CREs.
- Carbapenemases were detected among 251 isolates (84.8% of the CRE; 3.1% overall).
- Isolates were divided by enzyme class for further analysis.
- Serine carbapenemases included KPC, OXA-48-like and IMI-4.

**Figure 1. Carbapenemases by region**

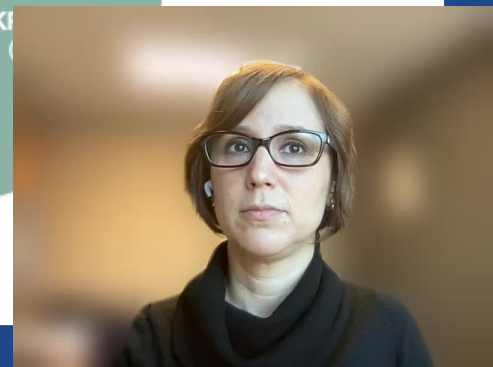
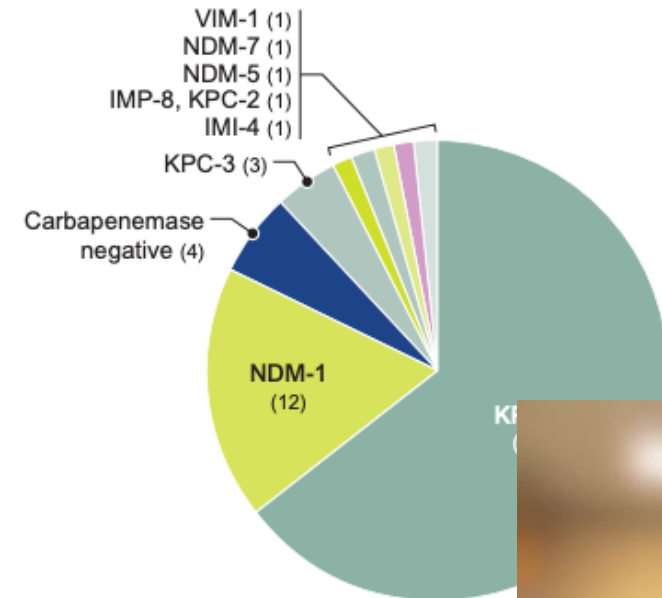
## A. Asia-Pacific



## B. Europe

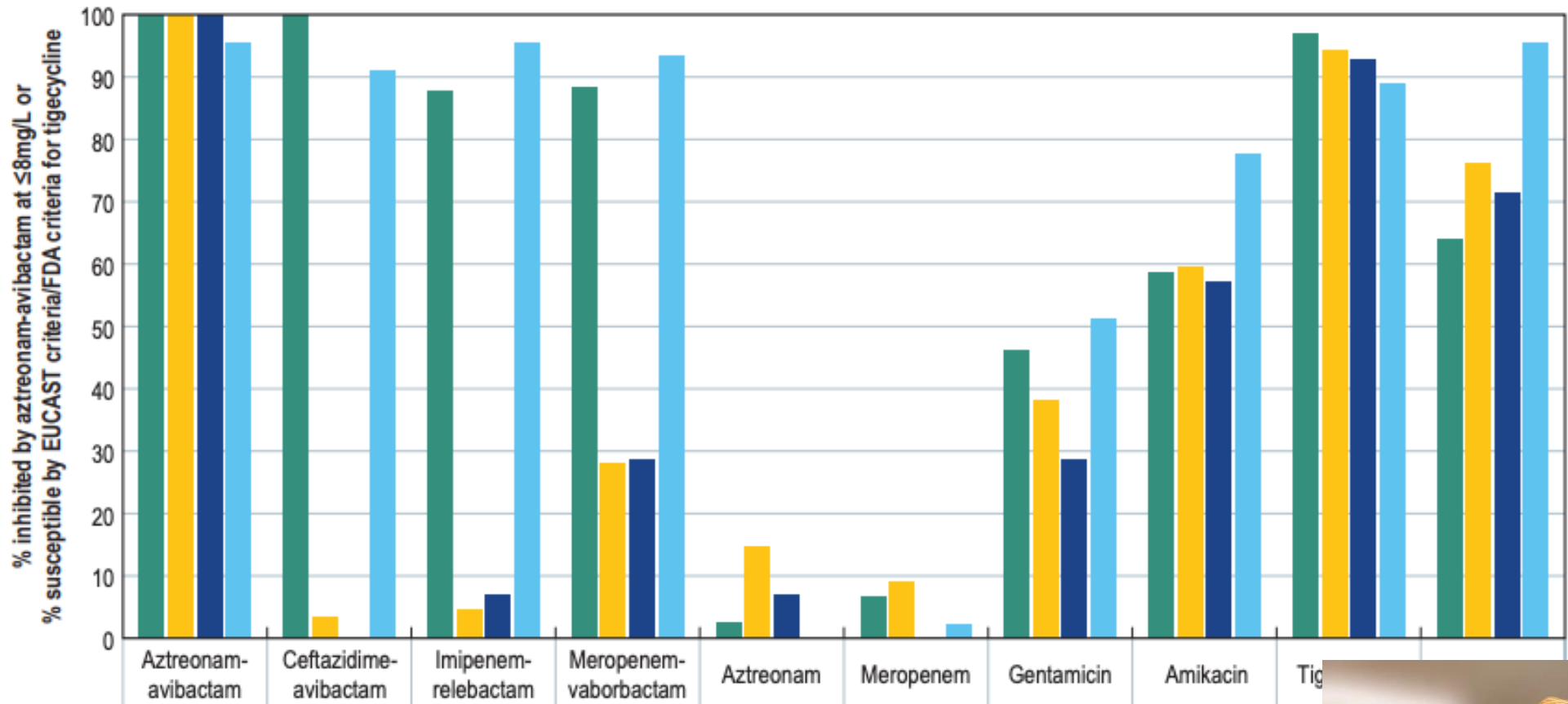


## C. Latin America



# Results

**Figure 2.** Activity of aztreonam-avibactam and comparators against CRE isolates stratified by carbapenemase



	Aztreonam-avibactam	Ceftazidime-avibactam	Imipenem-relebactam	Meropenem-vaborbactam	Aztreonam	Meropenem	Gentamicin	Amikacin	Tigecycline
Serine-carbapenemase (n=162)	100	100	87.7	88.3	2.5	6.8	46.3	58.6	97.5
MBL (n=89)	100	3.4	4.5	28.1	14.6	9.0	38.2	59.6	76.7
Double-carbapenemase (n=14)	100	0	7.1	28.6	7.1	0	28.6	57.1	71.8
Carbapenemase-negative (n=45)	95.6	91.1	95.6	93.3	0	2.2	51.1	77.8	96.0



## Results

- Differently from aztreonam-avibactam that displayed similar activity in all continents, the activity of most comparator agents varied by continent (Table 1).

**Table 1. Activity of antimicrobial agents against CRE isolates by continent**

Antimicrobial agent	% Susceptible <sup>a</sup>		
	Asia-Pacific	Europe	Latin America
Aztreonam-avibactam	100	99.3	100
Ceftazidime-avibactam	38.9	77	75
Imipenem-relebactam	35.2	68.4	75
Meropenem-vaborbactam	42.6	73.6	86.8
Amikacin	88.9	55.2	57.4
Tigecycline	92.6	95.4	95.6
Colistin	72.2	76.3	62.7

<sup>a</sup> EUCAST breakpoints were applied to all agents but tigecycline (US FDA breakpoint) and aztreonam-avibactam ( $\leq 8$  mg/L was applied for comparison)

## Conclusions

- Approximately 30% of the CRE isolates produced MBLs and/or carried double carbapenemases that might include an MBL.
- Aztreonam-avibactam and ceftazidime-avibactam were active against all serine-carbapenemase-producing isolates, including those carrying OXA-48-like genes.
- Ceftazidime-avibactam, imipenem-relebactam, and meropenem-vaborbactam had limited activity against MBL isolates.
- Aztreonam-avibactam exhibited activity against CRE isolates regardless of the enzyme type.

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