P151

In Vitro Activity of Ceftazidime-avibactam and Comparator Agents Against Enterobacterales Isolates Collected from Respiratory Sources in the Asia/Pacific Region, 2020-2024

A. Zurlo[1], G. Stone[2], K. Perez[2], P. Irani[3], M. Estabrook[1]
[1]IHMA, Inc., Schaumburg, IL, USA
[2]Pfizer Inc., New York, NY, USA
[3]Pfizer (UK), Ltd., Surrey, UK

IHMA
2122 Palmer Dr.
Schaumburg, IL 60173
Tel: +1.847.303.5003
Fax: +1.847.303.5601
www.ihma.com

Introduction

Ceftazidime-avibactam (CAZ-AVI) is a therapeutic agent consisting of a third-generation cephalosporin ceftazidime and a diaza-bicyclooctane β-lactamase inhibitor avibactam that inhibits Class A, C, and some Class D β-lactamases produced by Gram-negative bacteria. The *in vitro* activities of CAZ-AVI and comparator agents were evaluated against clinical isolates of Enterobacterales collected from lower respiratory tract (LRT) infections in the Asia/Pacific (APAC) region as part of the ATLAS global surveillance program from 2020-2024 [1].

Materials & Methods

- 4,363 Enterobacterales isolates from the LRT were collected from 43 sites in 10 countries: Australia, Hong Kong, India (excluding 2024 isolates not available for molecular characterization), Japan, Malaysia, New Zealand, Philippines, South Korea, Taiwan, and Thailand. These were compared to 14,128 isolates collected from 170 sites in 46 countries in the rest of the world, excluding North America (RoW).
- Antimicrobial susceptibility was determined by broth microdilution according to CLSI guidelines [2] and interpreted using CLSI 2026 breakpoints [3] while FDA breakpoints were used for tigecycline [4].
- Meropenem-nonsusceptible (MEM-NS) isolates were screened for β-lactamases by PCR and Sanger sequencing (2020-2023) or WGS (2024). PCR+Sanger sequencing was performed as previously described [5]. WGS was by Oxford Nanopore sequencing (Promethion R10 flow cells) and genes encoding β-lactamases were detected using AbriTAMR [6] which uses the AMRFinderPlus database [7].

Results Summary

- *K. pneumoniae* was the most commonly identified organism among MEM-NS isolates for both APAC and RoW (Figure 1a and Figure 1b).
- *E. coli* comprised 16% of MEM-NS+metallo-β-lactamase-positive (MBL-POS) Enterobacterales isolates in APAC compared to 3% in RoW (Figure 1a and Figure 1b).
- Carbapenem-resistant Enterobacterales (CRE) represented the 16.0% of all collected isolates from APAC and the 9.1% of those from RoW.
- More NDM, OXA-48-like, and NDM+OXA-48-like carriage was identified among CRE in APAC compared to RoW. On the other hand, more KPC carriage was observed in RoW (Figure 3).
- CAZ-AVI was active against isolates from APAC (90% susceptible) and RoW (96.3% susceptible); fewer isolates were susceptible to comparator agents except against tigecycline (Table 1).
- Of MBL-negative isolates carrying KPC or OXA-48-like carbapenemases, 97.0-98.4% were susceptible to ceftazidime-avibactam regardless of region of collection (Table 1).

Conclusion

Ceftazidime-avibactam demonstrated potent *in vitro* activity against lower respiratory tract Enterobacterales isolates, including those that produced KPC or OXA-48-like carbapenemases.

References

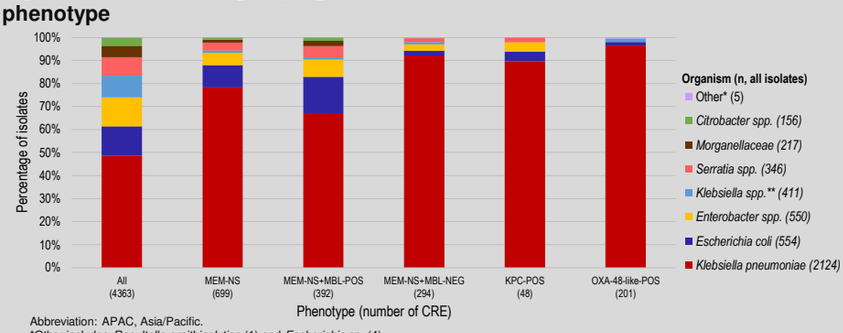
1. Pfizer. ATLAS (*Antimicrobial Testing Leadership and Surveillance*). https://atlas-surveillance.com [Registration required]. Accessed 06MAY2026.
2. Clinical and Laboratory Standards Institute (CLSI), 2024. *Methods for Dilution Antimicrobial Susceptibility Tests for Bacteria That Grow Aerobically*, 12th ed. CLSI Standard M07. Wayne, Pennsylvania 19087-1898 USA.
3. Clinical and Laboratory Standards Institute (CLSI), 2026. *Performance Standards for Antimicrobial Susceptibility Testing.* 36th Ed. CLSI Supplement M100. Wayne, Pennsylvania 19087-1898 USA.
4. *Center for Drug Evaluation and Research. Tigecycline – Injection Products* [Internet]. FDA. Available from: https://www.fda.gov/drugs/development-resources/tigecycline-injection-products. Accessed 06MAY2026.
5. Lob SH, Kazmierczak KM, Badal RE, Hackel MA, Bouchillon SK, Biedenbach DJ, Sahm DF. *Trends in susceptibility of Escherichia coli from intra-abdominal infections to ertapenem and comparators in the United States according to data from the SMART program, 2009 to 2013.* Antimicrob Agents Chemother. 2015;59(6):3606-10.
6. Sherry, N. L., Horan, K. A., Ballard, S. A., et al. *An ISO-certified genomics workflow for identification and surveillance of antimicrobial resistance.* Nature Communications 14, 60 (2023).
7. Feldgarden M, Brover V, Gonzalez-Escalona N, Frye JG, Haendiges J, Haft DH, Hoffmann M, Pettengill JB, Prasad AB, Tillman GE, Tyson GH, Klimke W. *AMRFinderPlus and the Reference Gene Catalog facilitate examination of the genomic links among antimicrobial resistance, stress response, and virulence.* Sci Rep. 2021 Jun 16;11(1):12728.

Acknowledgments

This study was sponsored by Pfizer and funded in whole or in part with Federal funds from the Department of Health and Human Services; Administration for Strategic Preparedness and Response, Biomedical Advanced Research and Development Authority, under Contract No. HHSO100201500029C and 75A50122C00080. IHMA received financial support from Pfizer in connection with the study and the development of this poster. ME and AZ are employees of IHMA. GS, KP, and PI are employees of Pfizer.

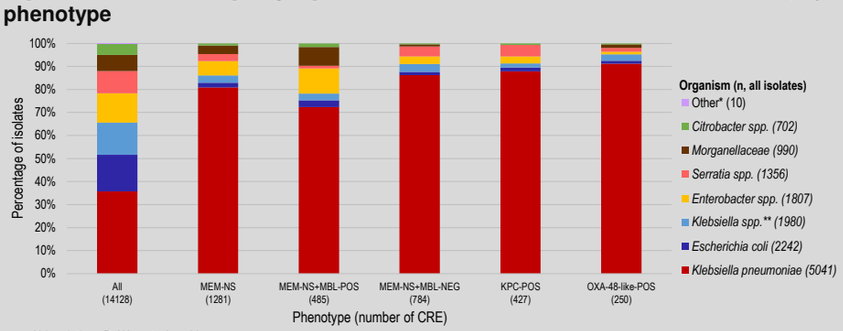
Results

Figure 1a. Taxonomic grouping of Enterobacterales isolates collected in APAC, by phenotype



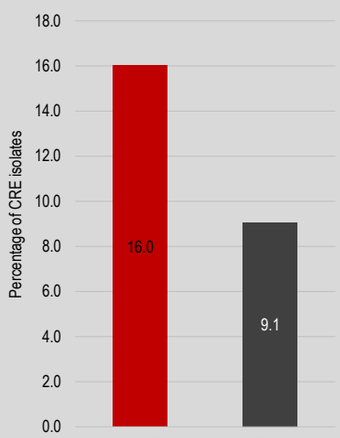
Abbreviation: APAC, Asia/Pacific.
*Other includes *Raoultella ornithinolytica* (1) and *Escherichia* sp. (4).
**Species other than *K. pneumoniae*.

Figure 1b. Taxonomic grouping of Enterobacterales isolates collected in RoW, by phenotype



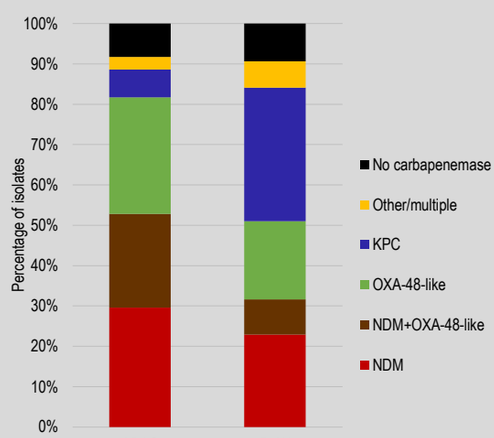
Abbreviation: RoW, rest of world.
*Other includes *Raoultella ornithinolytica* (1), *Raoultella* sp. (1), and *Escherichia* sp. (8).
**Species other than *K. pneumoniae*.

Figure 2. Percent CRE among isolates collected in APAC and RoW



Abbreviations: APAC, Asia/Pacific; RoW, rest of world.

Figure 3. Carbapenemase carriage in Enterobacterales isolates from respiratory sources, by region



Abbreviations: APAC, Asia/Pacific; RoW, rest of world.

Table 1. *In vitro* activity of ceftazidime-avibactam and comparator agents against isolates collected in APAC versus RoW

			Agent, MIC_{90} (μg/mL), percent susceptible[a]															
			CAZ-AVI		CAZ		MEM		MEV		TGC		TZP		AMK		CST	
Region	Phenotype/Genotype	n	MIC_{90}	%S	MIC_{90}	%S	MIC_{90}	%S	MIC_{90}	%S	MIC_{90}	%S	MIC_{90}	%S	MIC_{90}	%S	MIC_{90}	%I[b]
APAC[c]	All	4363	16[e]	**90.0**	>64	62.6	>16	84.0	>16	86.8	2	**96.7**	>64	69.1	>64	84.4	>8	83.6
	MEM-NS	699	>64	40.5	>64	1.3	>16	0.0	>16	17.7	2	**93.1**	>64	0.1	>64	29.5	>8	86.8
	MBL-	294	4	**95.2**	>64	3.1	>16	0.0	>16	31.6	2	**94.2**	>64	0.0	>64	33.3	8	88.1
	KPC+	48	4	**97.9**	>64	2.1	>16	0.0	4	**95.8**	4	89.6	>64	0.0	>64	62.5	>8	85.4
	OXA-48-like+	201	2	**97.5**	>64	2.5	>16	0.0	>16	8.0	2	**96.5**	>64	0.0	>64	24.4	2	**90.0**
RoW[d]	All	14128	1	**96.3**	>64	71.5	0.5	**90.9**	0.12	**95.0**	2	**97.4**	>64	74.2	8	89.5	>8	79.9
	MEM-NS	1281	>64	60.6	>64	4.5	>16	0.0	>16	45.2	2	**94.4**	>64	0.5	>64	35.9	>8	70.6
	MBL-	784	4	**97.2**	>64	7.1	>16	0.0	>16	66.8	2	**94.3**	>64	0.9	>64	45.5	>8	73.6
	KPC-POS	427	4	**97.7**	>64	1.6	>16	0.0	4	**90.6**	2	**96.0**	>64	0.2	>64	45.4	>8	71.9
	OXA-48-like+	250	2	**98.4**	>64	14.4	>16	0.0	>16	19.6	2	**94.4**	>64	0.0	>64	41.2	>8	71.2

Abbreviations: CAZ-AVI, ceftazidime-avibactam; CAZ, ceftazidime; MEM, meropenem; MEV, meropenem-vaborbactam; TGC, tigecycline; TZP, piperacillin-tazobactam; AMK, amikacin; CST, colistin; APAC, Asia/Pacific; RoW, rest of world; NS, non-susceptible; MBL-, metallo-β-lactamase negative; +, positive by PCR or WGS; S, susceptible; I, intermediate.
[a] Susceptible using CLSI 2026 breakpoints. FDA breakpoints were used for tigecycline.
[b] There is no susceptible breakpoint for colistin, the percent intermediate is shown.
[c] APAC includes: Australia, Hong Kong, India (excluding 2024 isolates not available for molecular characterization), Japan, Malaysia, New Zealand, Philippines, South Korea, Taiwan, and Thailand.
[d] Rest of world excludes the United States and Canada.
[e] The MIC_{90} of 16 μg/mL (resistant) appears discordant with the percentage susceptible due to rounding: 89.98% were susceptible.

Presented at ISAAR 2026; June 12-14, 2026; Hong Kong