RES-340

Trends in Carbapenem-resistant Enterobacterales and the *In Vitro* Activity of Aztreonam-avibactam Against Isolates Collected in the Asia/Pacific Region, 2019-2023 as a Part of the ATLAS Global Surveillance Program

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Introduction

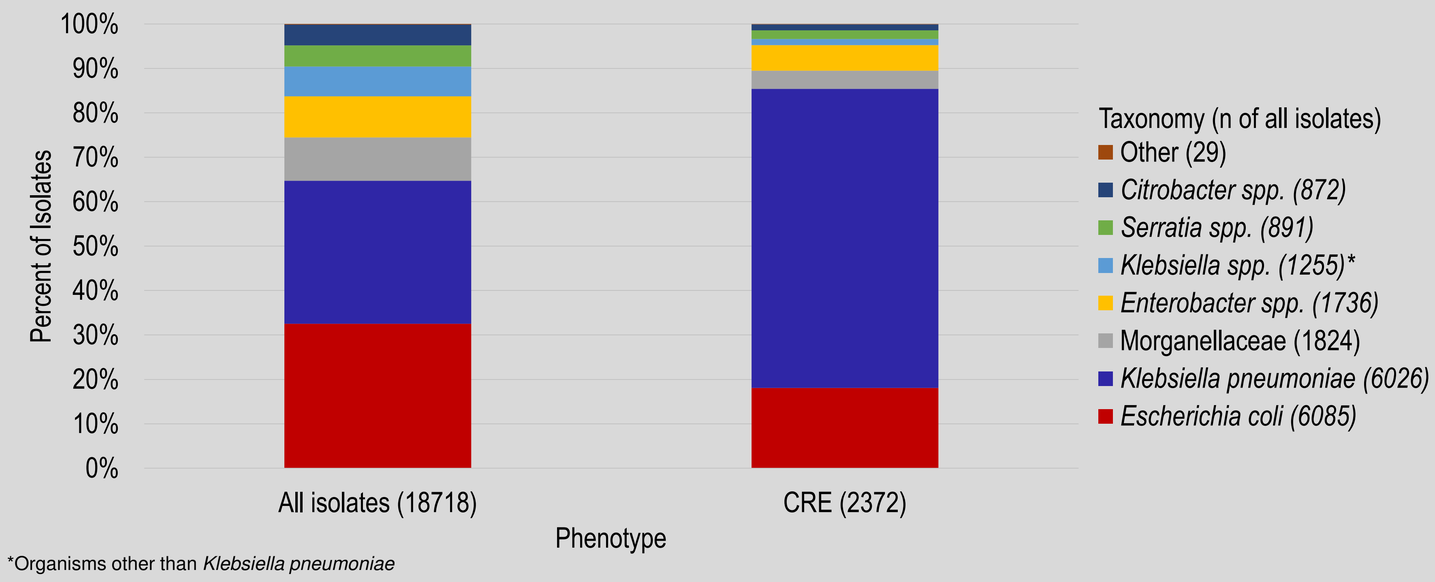
Aztreonam-avibactam is an approved therapeutic in the United States and Europe. Aztreonam is stable to hydrolysis by metallo-β-lactamases (MBLs), while avibactam inhibits class A, C, and some class D β-lactamases, often co-carried by MBL-positive isolates. This study shows trends in carbapenem-resistant Enterobacterales (CRE) among isolates collected from 2019-2023 in Asia/Pacific (APAC) as a part of the ATLAS Global Surveillance Program [1]. Also presented is the *in vitro* activity of aztreonam-avibactam against CRE.

Methods

- 18718 isolates were collected from 41 sites in 9 countries in APAC that participated in five consecutive years of surveillance.
- Antimicrobial susceptibility was according to CLSI broth microdilution [2] and CRE defined by meropenem MIC >1 µg/mL. The interpretation of aztreonam-avibactam activity was according to EUCAST breakpoints [3].
- The number of each species submitted from each site was dictated by a protocol: approximately 33% *Klebsiella pneumoniae*, 33% *Escherichia coli*, and 33% other Enterobacterales.
- The Cochran-Armitage test was used to assess longitudinal trends in CRE and ATM-AVI susceptibility.

Results

Figure 1. Taxonomy of organisms in this study



*Organisms other than *Klebsiella pneumoniae*

Figure 2A. Rates of carbapenem-resistant Enterobacterales among those collected in 2023, by country

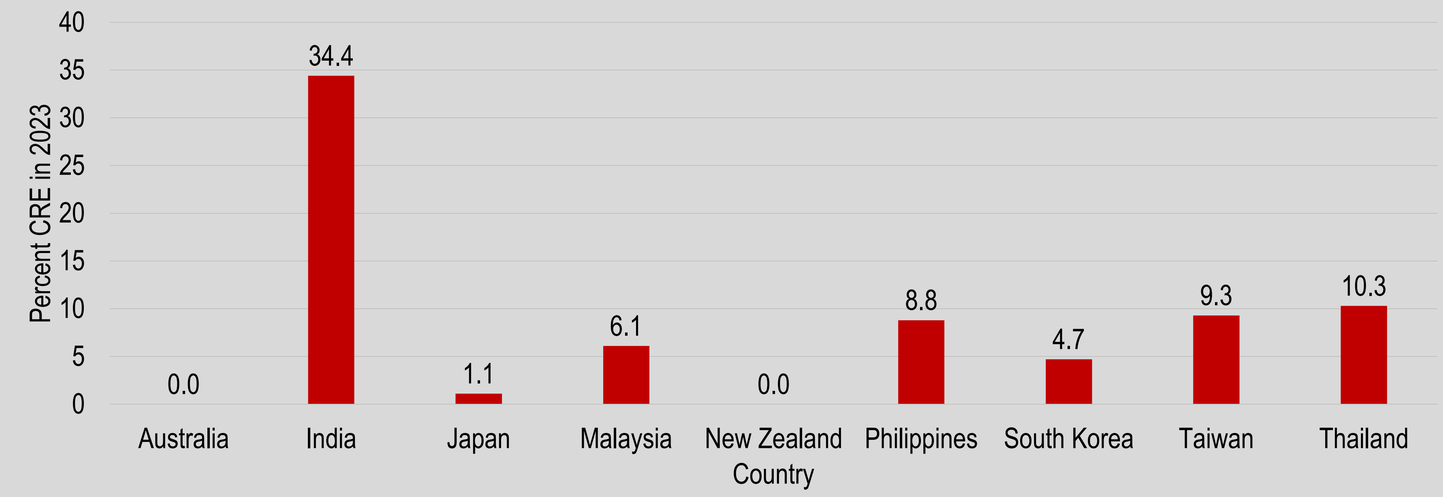
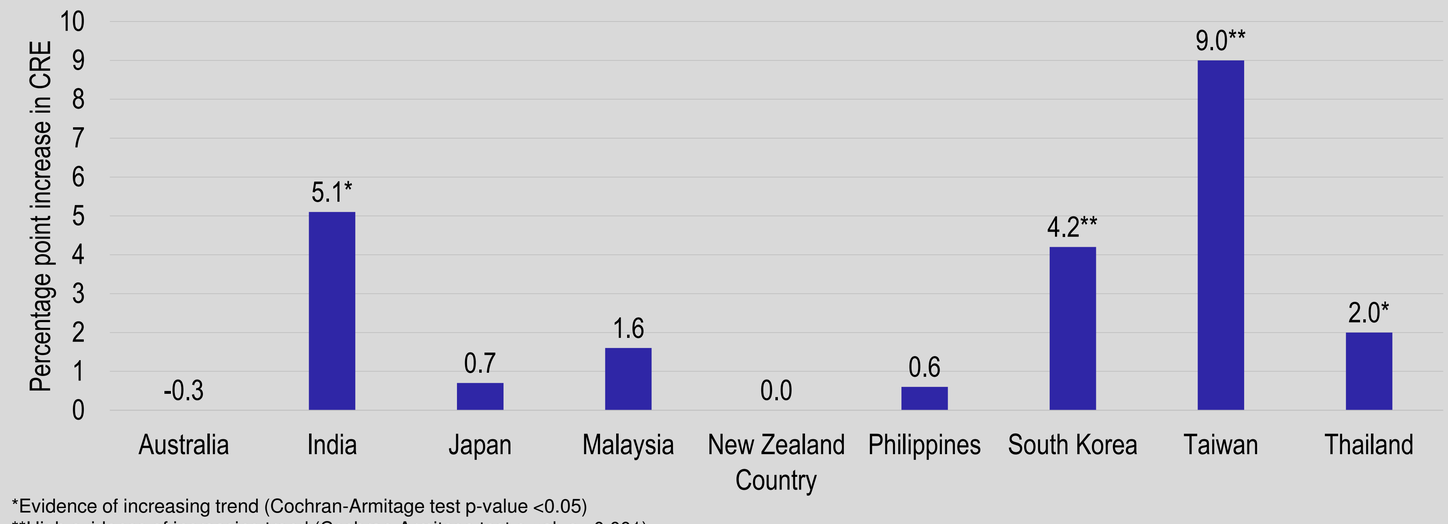


Figure 2B. Change in rates of carbapenem-resistant Enterobacterales among those collected from 2019-2023, by country



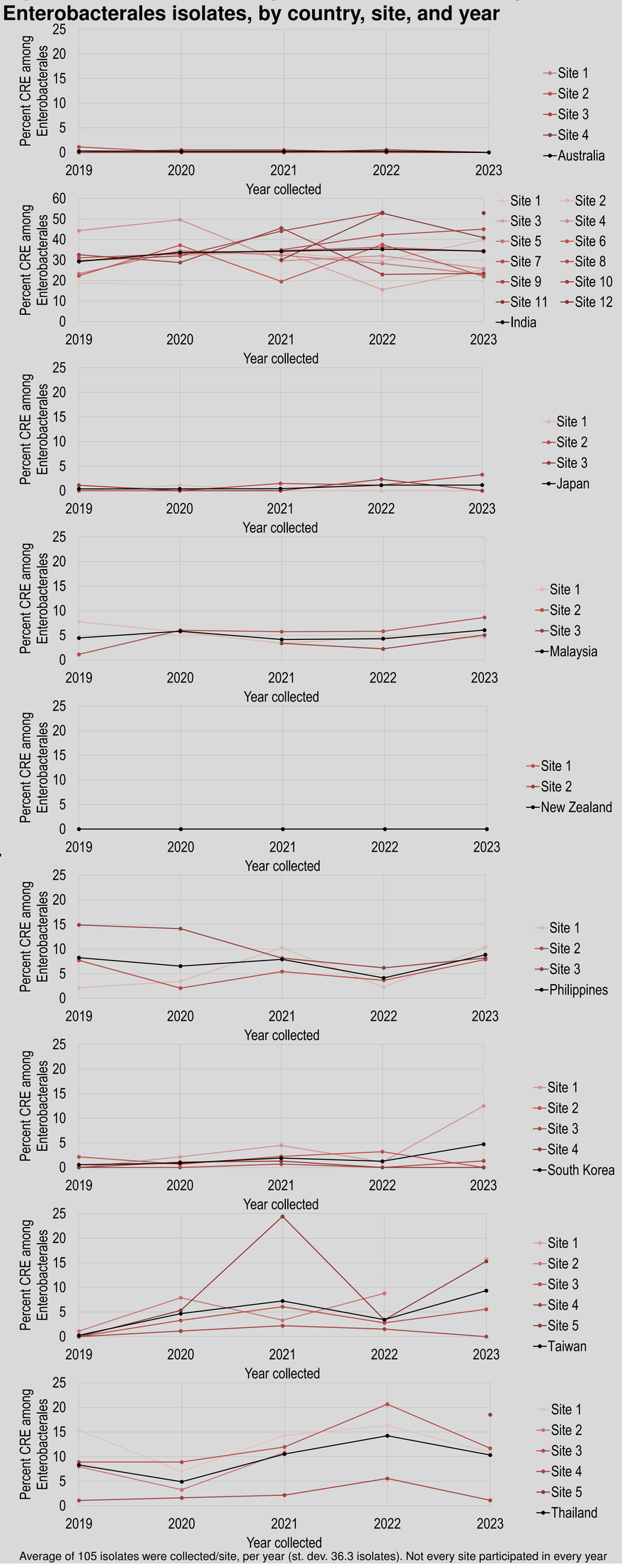
*Evidence of increasing trend (Cochran-Armitage test p-value <0.05)
**High evidence of increasing trend (Cochran-Armitage test p-value <0.001)

Table 1. *In vitro* activity of aztreonam-avibactam against CRE, by country and year

	Year, Number of CRE (percent susceptible to ATM-AVI)[a]					
Country[b]	**2019**	**2020**	**2021**	**2022**	**2023**	**All years**
India	247 (98.4)	432 (94.9)	434 (93.1)	412 (88.6)	356 (89.6)	1881 (92.6)
Malaysia	8 (8 of 8)	10 (100)	11 (100)	12 (100)	15 (100)	56 (100)
Philippines	22 (100)	18 (100)	21 (100)	11 (100)	25 (100)	97 (100)
Taiwan	1 (1 of 1)	18 (100)	39 (100)	19 (100)	33 (97.0)	110 (99.1)
Thailand	30 (96.7)	27 (100)	46 (97.8)	39 (97.4)	35 (100)	177 (98.3)

[a]. Percent susceptible using EUCAST 2025 breakpoints.
[b]. Only includes countries from which ≥10 CRE were collected from ≥4 years of collection.

Figure 3. Rates of carbapenem-resistance among collected Enterobacterales isolates, by country, site, and year



Year collected
Average of 105 isolates were collected/site, per year (st. dev. 36.3 isolates). Not every site participated in every year

Results Summary

- The predominant organism among CRE was *Klebsiella pneumoniae* (67%) (Figure 1).
- In 2023, CRE rates were highest in India (34.4%) (Figure 2A). Countries with CRE rates of 5-10% were South Korea (5%), Malaysia (6%), Philippines (9%), Taiwan (9%), and Thailand (10%). Australia, Japan, and New Zealand had CRE rates ≤1%.
- The most significant percentage-point increases in CRE were in Taiwan (9.0) and South Korea (4.2) p<0.001, and India (5.1) and Thailand (2.0) p<0.05 (Figure 2B; Figure 3).
- In some cases, the changes in CRE rates could be attributed to individual sites (Site 2, South Korea), while in others, country level trends were echoed across many sites participating in the study (Philippines, Taiwan) (Figure 3).
- ATM-AVI activity was steady against CRE isolates from regions with CRE rates from 5-10% (98.3-100% susceptible) (Table 1).
- Among isolates from India, there was a decrease in the number of CRE susceptible to ATM-AVI (8.8 percentage points, p<0.001). This was due to *E. coli* CRE (n=371), with ≥97.6% of non-*E. coli* CRE (n=1510) collected in India susceptible to ATM-AVI in each year (not shown).

Conclusions

- This study has two limitations. First, a fixed proportion of different species of Enterobacterales were requested from sites, which may not match their overall prevalence at those sites. Second, some sites (11/41) did not participate in all five years of surveillance.
- CRE rates rose significantly in several APAC countries, with notable increases in Taiwan, South Korea (driven by one site), India, and Thailand. These findings highlight the growing burden of CRE across the region.
- Despite this trend, aztreonam-avibactam demonstrated potent activity against CRE. Continued surveillance and investigation into emerging resistance mechanisms are essential to inform treatment strategies and containment efforts.

References

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3. The European Committee on Antimicrobial Susceptibility Testing. *Breakpoint tables for interpretation of MICs and zone diameters*. Version 15.0, 2025. http://www.eucast.org

Disclosures

This study was sponsored by Pfizer. GS an KP are employees of Pfizer. ME, HL, and DS are employees of IHMA, which received fees from Pfizer for the conduct of the study and poster preparation.

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