Poster #: 786

Facility reported vs. CLSI MIC breakpoint comparison of Carbapenem not-susceptible (Carb-NS) *Pseudomonas aeruginosa* (PSA) from 2016-2019: A multicenter evaluation

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Background

- CLSI lowered the *P. aeruginosa* (PSA) Carbapenem (Carb) breakpoint minimum inhibitory concentrations (MICs) in 2012.
- It often takes several years for commercial antimicrobial susceptibility testing (AST) device manufacturers and microbiology labs to incorporate revised breakpoints.
- We used the BD Insights Research Database, which includes ~13% of annual hospital admissions in the US[1], to compare facility-reported rates of Carb-NS PSA to those assigned by applying 2012 CLSI MIC breakpoints for a large nationwide collection of isolates from 2016-20[2,3].

Methods

- All adults with a positive non-contaminant PSA culture (first isolate per 30-day period from blood, respiratory, urine, skin/wound, intra-abdominal, or other) in ambulatory and inpatient settings from 298 US hospitals from Q1 2016 to Q4 2020 were evaluated (BD Insights Research Database [Becton, Dickinson & Company, Franklin Lakes, NJ]).
- Facility-reported antimicrobial susceptibility results were based on lab information system feed designations of susceptible (S) or NS (intermediate [I] or resistant [R]) for PSA as S/NS to imipenem (IPM), meropenem (MEM), and doripenem (DOR) per commercial panels.
  - Where available, MICs were interpreted using CLSI 2012 Carb breakpoints (µg/ml) of ≤2 (S), 4 (I), and ≥8 (R). These breakpoints are identical to those in the current CLSI M100 Ed. 31 (2021) standard[2,3].
- For evaluable PSA isolates we compared susceptibility results as reported by the facility to those using CLSI MIC breakpoints.
- Two proportion Z tests were used to assess the difference between facility-reported and revised susceptibility results overall and by hospital demographics. P-values <0.05 indicate a significant difference between facility-reported and revised CLSI MIC breakpoints in NS determinations.

Results

- Overall, 86.9% (255,844/294,426) of non-duplicate PSA isolates with facility reported IPM/MEM/DOR susceptibility interpretations also had interpretable MIC results. These were termed the evaluable populations.
- S rates were 84.9% and 83.3% as reported by facilities and determined by CLSI criteria, respectively (Figure 2).
- Facilities under-reported Carb-NS by 9.8% compared with CLSI criteria; 10.4% and 7.7% of R and I isolates, respectively, were missed by facility reporting (Table 1).

Results

Figure 1. NS evaluations in PSA for imipenem/meropenem/doripenem.

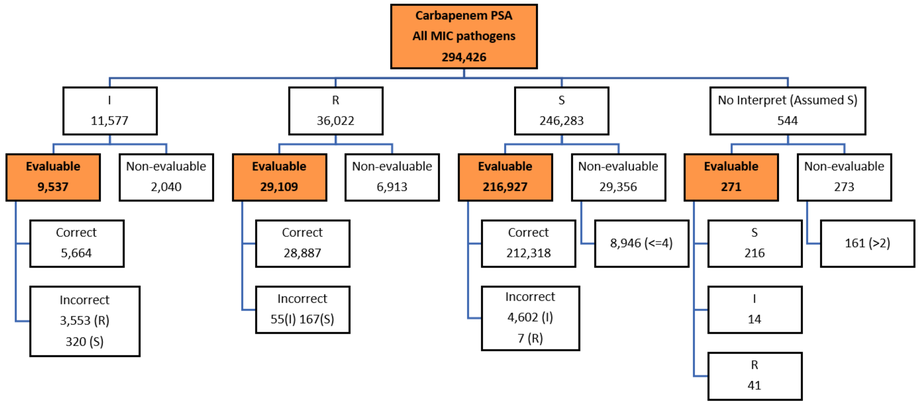
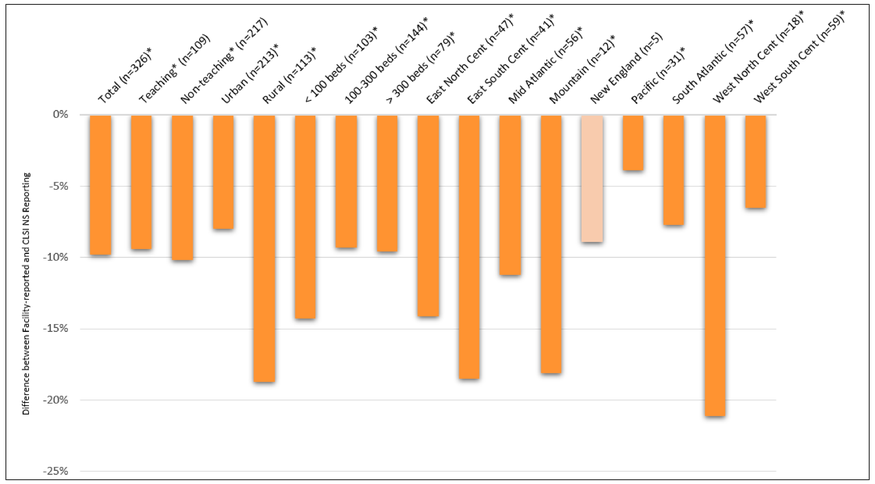


Table 1. Comparison of S/NS for facility-reported and CLSI imipenem/meropenem/doripenem breakpoints in PSA.

IPM/MEM/DOR interpretations for PSA			
Interpretation (MIC; µg/mL)	**Facility Reported: n (%)**	**Revised per CLSI: n (%)**	**Underreporting by Facility vs. Revised per CLSI (%)**
I (4)	9,537 (3.7%)	10,335 (4.0%)	↓ 7.7%
R (>=8)	29,109 (11.4%)	32,488 (12.7%)	↓ 10.4%
S (<=2)	217,198 (84.9%)	213,021 (83.3%)	

Figure 2. Carb NS underreporting by hospital demographics (n = facility count; * p < 0.03 [darker color]) for imipenem/meropenem/doripenem.



Conclusions

- Systematic application of CLSI breakpoints in 2016-20 would have had minimal impact on PSA S rates in the US.
- However, facility reporting failed to identify ~10% of Carb-NS isolates in this study's subset of US hospitals. This discordance was significant across hospital demographics and regions.
  - Smaller hospitals (<100 beds) in rural areas may be particularly at-risk of failure to identify Carb-NS
- Facilities should know their local epidemiology, decide if under-reporting might be an issue, and then assess if there is any impact on their patients.
- Further analyses are required to understand whether the Carb-NS reporting discordances as seen in this analysis also apply more broadly to other hospitals in the US.

References
1. Centers for Disease Control and Prevention. Antibiotic resistance threats in the United States, 2019. November 2019. Available at: www.cdc.gov/DrugResistance/Biggest-Threats.html. Accessed September 16, 2021.
2. CLSI. Performance Standards for Antimicrobial Susceptibility Testing. 31st ed.
3. CLSI supplement M100. Clinical and Laboratory Standards Institute; 2021

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