



# A Multidisciplinary Approach to Carbapenem Stewardship at a Large Community Hospital in Brooklyn, New York

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## Introduction and Purpose

- Carbapenem-resistant gram-negative organisms are listed as urgent and serious threats by the Centers for Disease Control.<sup>1</sup>
- Antibiotic stewardship utilizing methods described by the Infectious Diseases Society of America and others are recommended to improve the use of broad-spectrum antibiotics such as carbapenems.<sup>2,3</sup>
- We sought to use prospective audit and feedback in combination with antimicrobial stewardship rounds by Infectious Diseases physicians and pharmacists to reduce meropenem use.
- We further sought to examine the incidence of carbapenem resistant gram-negative organisms isolated from adult hospital units before and after the intervention.

## Methods

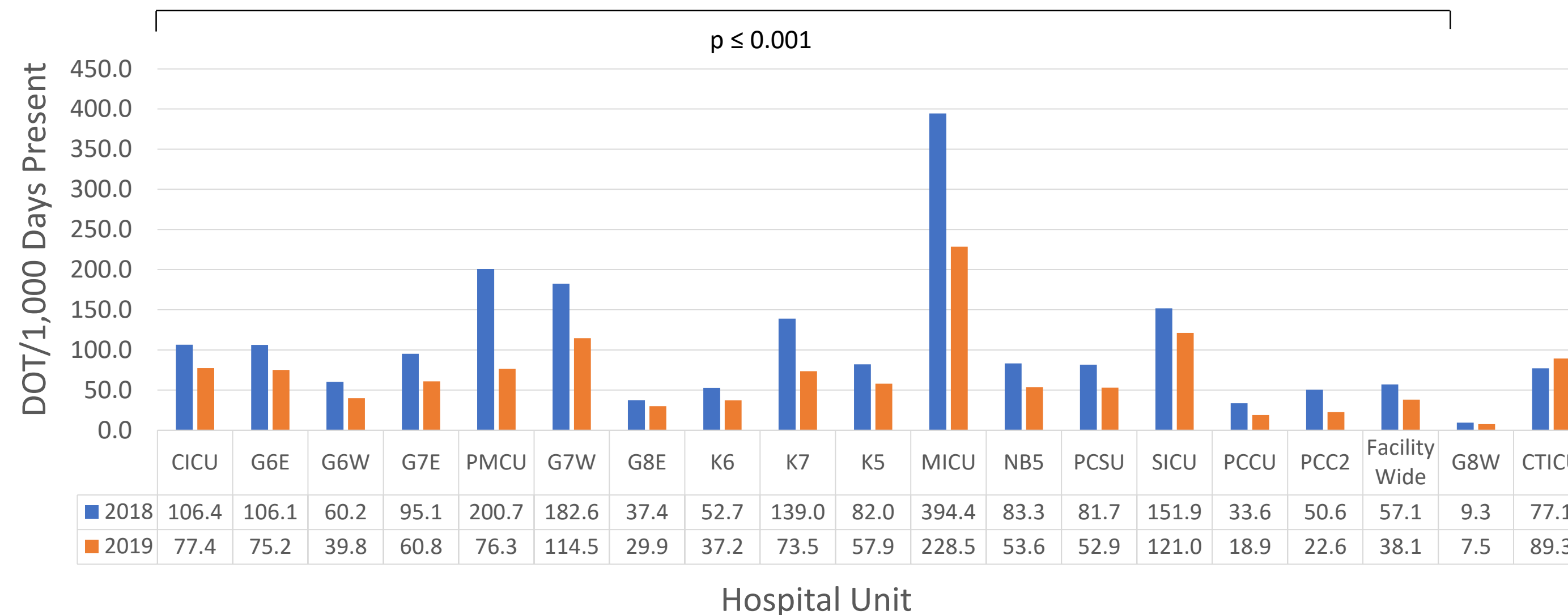
- A multidisciplinary team consisting of three Infectious Diseases (ID) pharmacists and physicians was formed in January 2019.
- Prospective audit and feedback was utilized daily for all patients receiving meropenem in the hospital.
- Weekly stewardship rounds in the Intensive Care Unit (ICU) were attended by one pharmacist and one physician.
- A second ID physician attended interdisciplinary rounds on rotating medical units daily using a handshake stewardship approach.
- The meropenem days of therapy (DOT) per 1,000 days present was calculated for each adult unit of the hospital in 2018 and 2019.
- The percentage rate of *Pseudomonas aeruginosa* susceptible to meropenem was compared among isolates collected in each hospital unit and the overall hospital.
- All Emergency Room, outpatient, and pediatric Isolates were excluded. Duplicate isolates collected from any site were excluded within 14 days of the initial culture.
- The incidence of other carbapenem resistant organisms including *Klebsiella pneumoniae*, *Acinetobacter baumannii*, and *Stenotrophomonas maltophilia* were also compared.
- The susceptibility rate of antibiotics to *Pseudomonas aeruginosa* and days of therapy from 2018 and 2019 were compared using the chi-square test of proportions.

## References

1. CDC. Antibiotic Resistance Threats in the United States, 2019. Atlanta, GA: U.S. Department of Health and Human Services, CDC; 2019
2. Barlam et al. *Clinical Infectious Diseases* 2016 May 15;62(10):e51-77
3. Mani et al. *Clinical Infectious Diseases*, ciaa1279

## Results

### Meropenem DOT per 1,000 days Present



### Number of Carbapenem-resistant Isolates

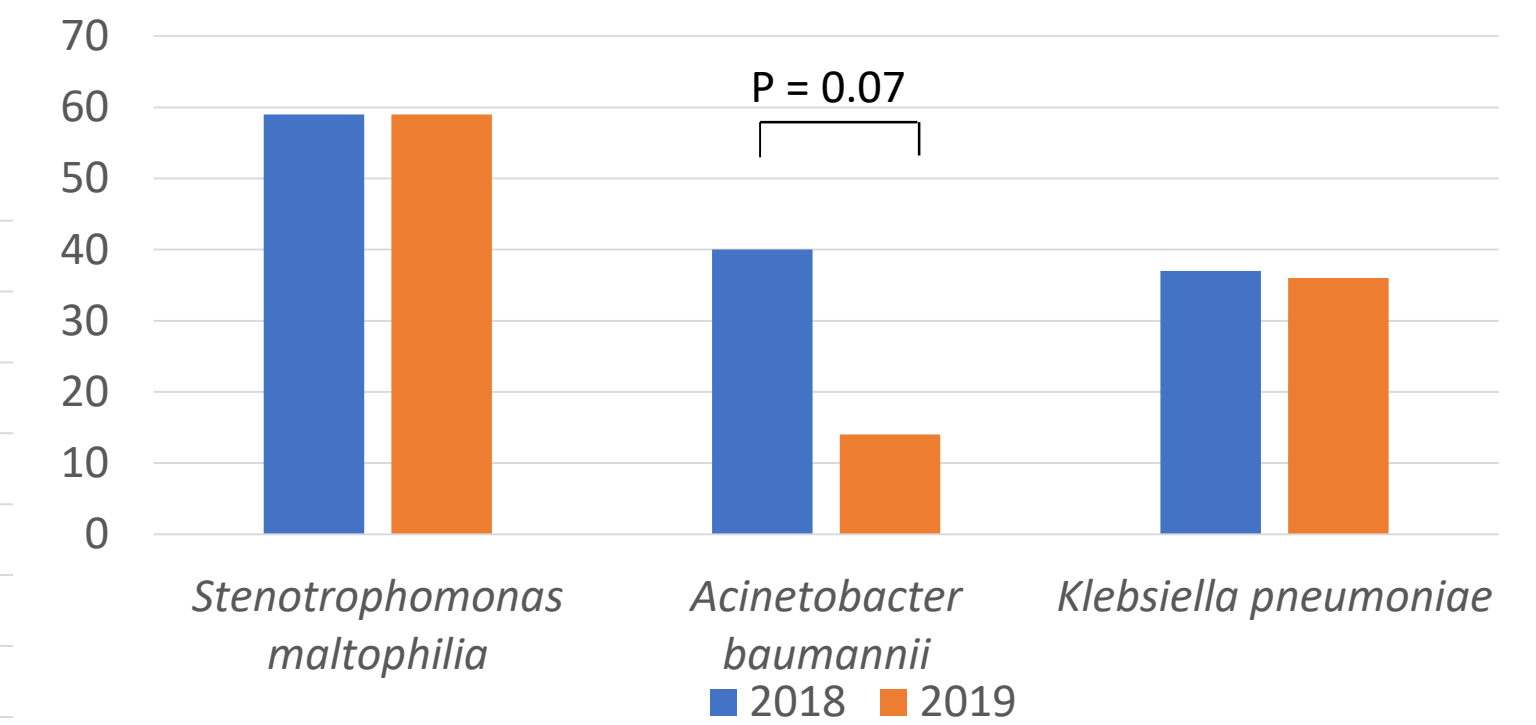
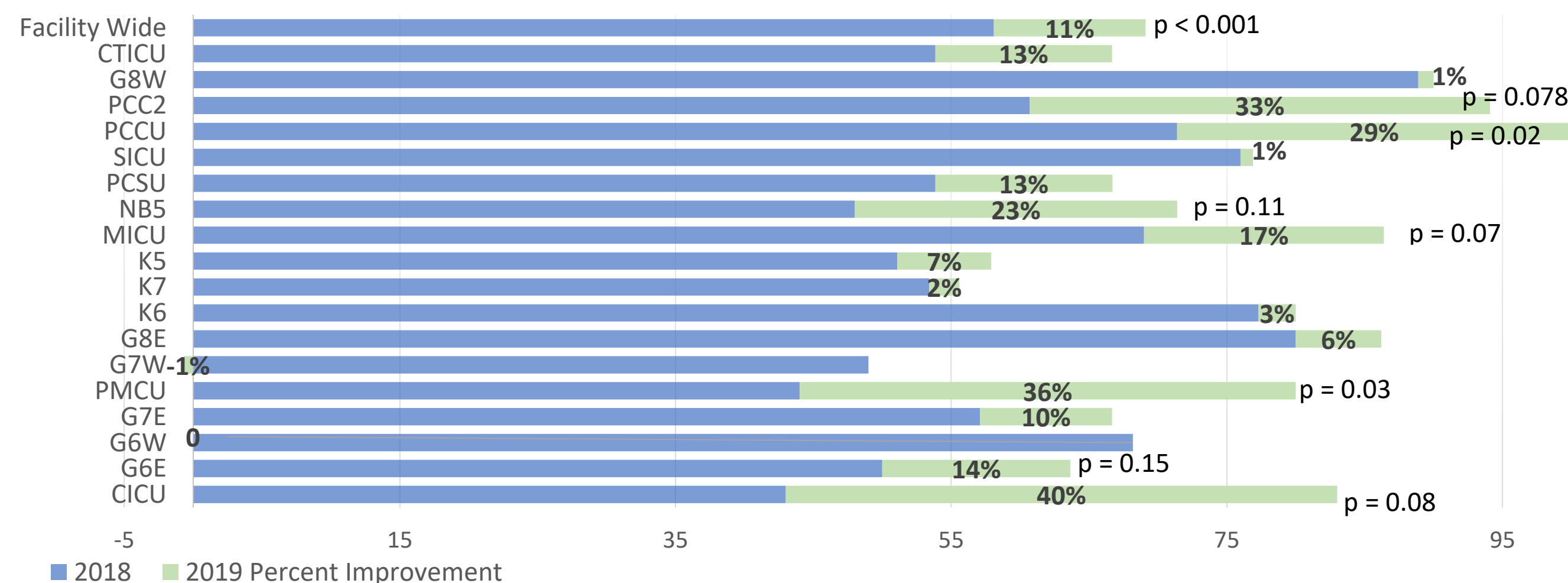


Table 1: *Pseudomonas aeruginosa* Susceptibilities

	2018 488 isolates	2019 447 isolates	P-value
Cefepime	68.8%	75.8%	P = 0.02
Piperacillin/tazobactam	72.8%	75.8%	P = 0.03
Meropenem	58.1%	69.1%	P ≤ 0.001

### *Pseudomonas aeruginosa* Meropenem Susceptibility Improvement (%)



CICU: Cardiac Intensive Care Unit; G6E: Gellman 6 East; G7E: Gellman 7 East; PMCU: Post Medical Intensive Care Unit, G7W: Gellman 7 West, G8E: Gellman 8 East; K5, K6, K7: Kronish 5, 6, 7; MICU: Medical Intensive Care Unit; NB5: New Building 5; PCSU: Post Care Surgical Unit; SICU: Surgical Intensive Care Unit; PCCU, PCC2: Post Cardiac Critical Care; G8W: Gellman 8 West; CTICU: Cardiothoracic Intensive Care Unit

## Conclusions

- These data support the need for multidisciplinary efforts to decrease unnecessary carbapenem use.
- Fewer meropenem-resistant isolates of *Pseudomonas aeruginosa* were identified primarily from the MICU, PMCU CICU, and PCCU.
- Reducing meropenem use did not appear to substantially reduce the incidence of carbapenem resistant *Klebsiella pneumoniae* or *Stenotrophomonas maltophilia*, although a non-significant trend in fewer carbapenem-resistant *A. baumannii* isolates was observed.
- Reducing meropenem use did not appear to negatively impact the susceptibility of cefepime and piperacillin/tazobactam to *Pseudomonas aeruginosa*.