

INTRODUCTION

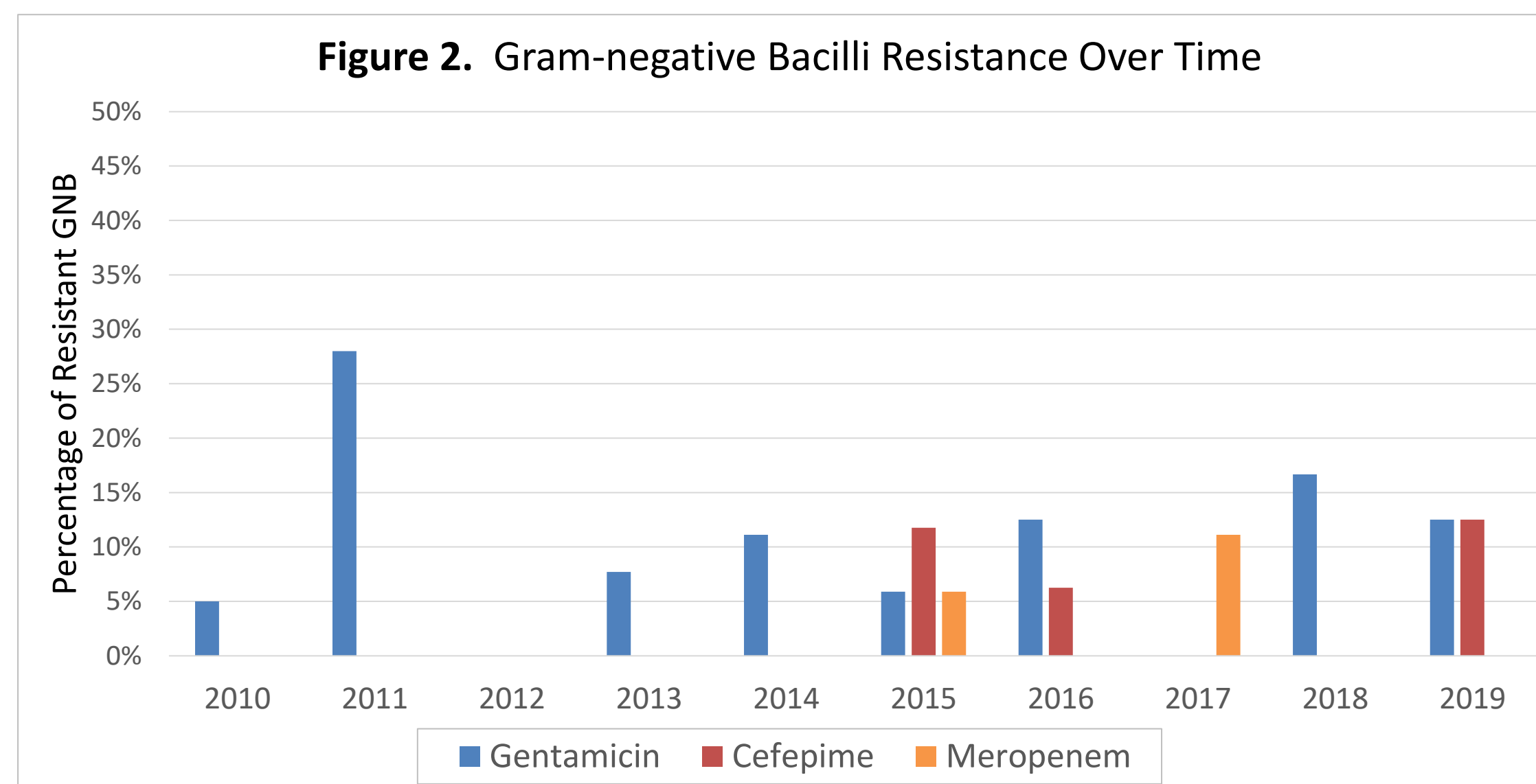
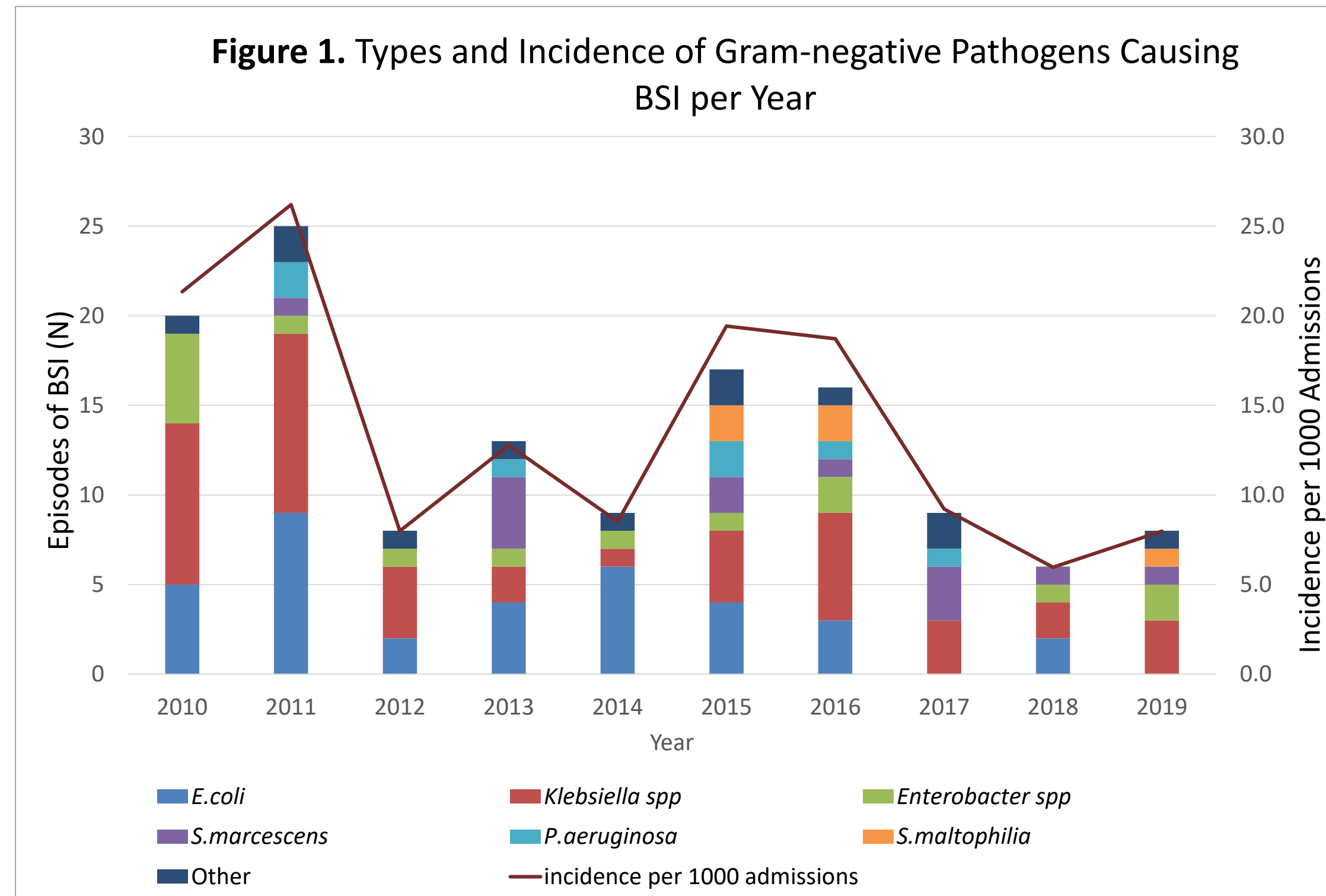
- Bloodstream infections (BSIs) caused by Gram-negative bacilli (GNB), particularly with multidrug resistance, cause substantial morbidity and mortality in NICUs worldwide¹.
- From September 2004-October 2007, we previously reported low rates of gentamicin resistance (25%) in commonly isolated GNB, i.e., *Escherichia coli* and *Klebsiella* species, supporting gentamicin as empiric therapy in our Neonatal ICU².
- In the current study, we assessed GNB BSI rates and potential changes in GNB resistance patterns.

OBJECTIVES

- To observe the incidence trends of GNB BSI in a tertiary NICU from 2010-2019
- To assess potential changes in GNB resistance patterns
- To evaluate continued use of gentamicin as empiric therapy for GNB in our NICU

METHODS

- We retrospectively reviewed GNB BSIs that occurred in infants ≥ 3 days old admitted to a level IV academically affiliated NICU from 2010-2019.
- During the study period, antimicrobial stewardship strategies included:
 - Pre-approval for broad spectrum antibiotics including Cefepime and Meropenem: 2010-2019
 - Post-prescription review: 2017-2019
- We collected GNB types and resistance to Gentamicin, Cefepime, and Meropenem.
- Data analysis included frequency of GNB type per year, incidence per 1000 admissions, and regression analysis.



RESULTS

- During the study period, NICU admissions ranged from 855-1057 per year.
- Annual incidence of GNB BSIs ranged from 8-26 per 1000 admissions (**Figure 1**) and decreased during the 10-year period ($p < 0.001$).
- The types of GNB causing BSIs each year are shown (**Figure 1**).
- Among the 131 GNB identified, the most common GNB were *Klebsiella* spp* (n=48, 37%), *E. coli* (n=21, 16%), *Enterobacter* spp. (n=15, 11%) and *Serratia marcescens* (n=12, 9%).
- Overall, 14.5%, 3.8%, and 2.3% of GNB were resistant to gentamicin, cefepime, and meropenem, respectively; resistance to the latter agents did not emerge until 2015 (**Figure 2**).

*includes *Klebsiella pneumoniae*

LIMITATIONS

- Did not monitor utilization
- Did not assess antimicrobial stewardship adherence

CONCLUSIONS

- From 2009-2019, the incidence of GNB BSIs decreased in our NICU.
- We found stably low rates of gentamicin resistance, supporting the continued use of gentamicin for empiric antibiotic therapy for GNB.
- While relatively rare, resistance to the broad spectrum agents cefepime and meropenem increased.
- To maintain low resistance rates, effective antimicrobial stewardship efforts should continue.
- NICU-specific antibiograms should be implemented to facilitate assessment of resistance trends.

References:

1. Dramowski A, et al. Paediatr Int Child Health. 2015;35:265-72.
2. Smith A, et al. Pediatr Infect Dis J 2010;29:831-35.

ACKNOWLEDGMENTS

Funding: Irene Frantzis is supported by NIAID T32 AI007531.