Cumulative Antibiotic Exposure and Risk for Candidemia

Duke University

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Financial Disclosures

None

Hypotheses

- Antibiotics alter the microbiome and allow for yeast
  - Abundance
  - Expansion
  - Opportunism

- Broad-spectrum antibiotic use increases the risk for invasive candidiasis
  - Spectrum of activity
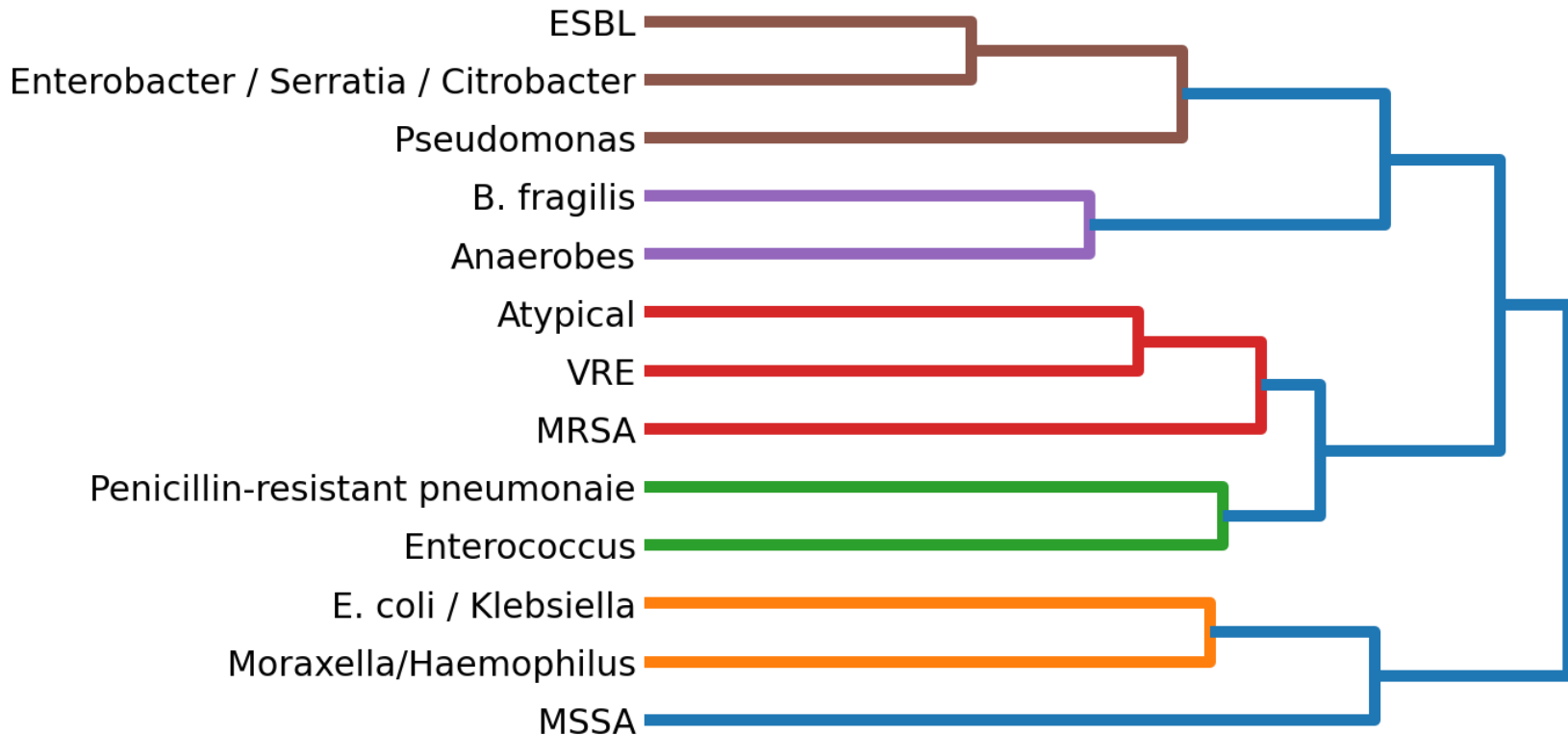 - Duration of therapy

Antibiotic Utilization

Antibiotic Spectrum

	MSSA	Anaerobes	Moraxella / Haemophilus	E. coli / Klebsiella	Penicillin-resistant pneumoniae	B. fragilis	Pseudomonas	ESBL	Enterobacter / Serratia / Citrobacter
Meropenem	▨	▨	▨	▨	▨	▨	▨	▨	▨
Ceftriaxone	▨	▨	▨	▨	▨				

Reference: Gerber, et al. Infect Control Hosp Epidemiol. 2017.

Antibiotic Spectrum

Methods

- Time-to-event analysis
  - Counted days of therapy for each antibiotic given on each admission
  - Antibiotic days were counted up until candidemia onset
  - Antibiotic exposure was censored at hospital discharge

- Antibiotic spectrum index
  - Days of antibiotic therapy (DOT) were transformed to
  - Days of antibiotic spectrum coverage (DASC)

- Univariable analysis
  - Plotted cumulative hazard of candidemia based on differential exposure between spectra
  - Log-rank test ($\alpha = 0.05$)

- Multivariable analysis
  - Drew on existing literature to account for other candidemia risk factors
  - Cox proportional hazard regression

Patient population

- Hospitalized adults
- 1/1/2016 - 12/31/2021
- Admitted to Duke's 3 hospitals
  - Academic medical center
  - Two community hospitals

Exclusions

- Outside hospital transfers
- Candidemia within 48 hours of arrival
- Admitted less than 48 hours
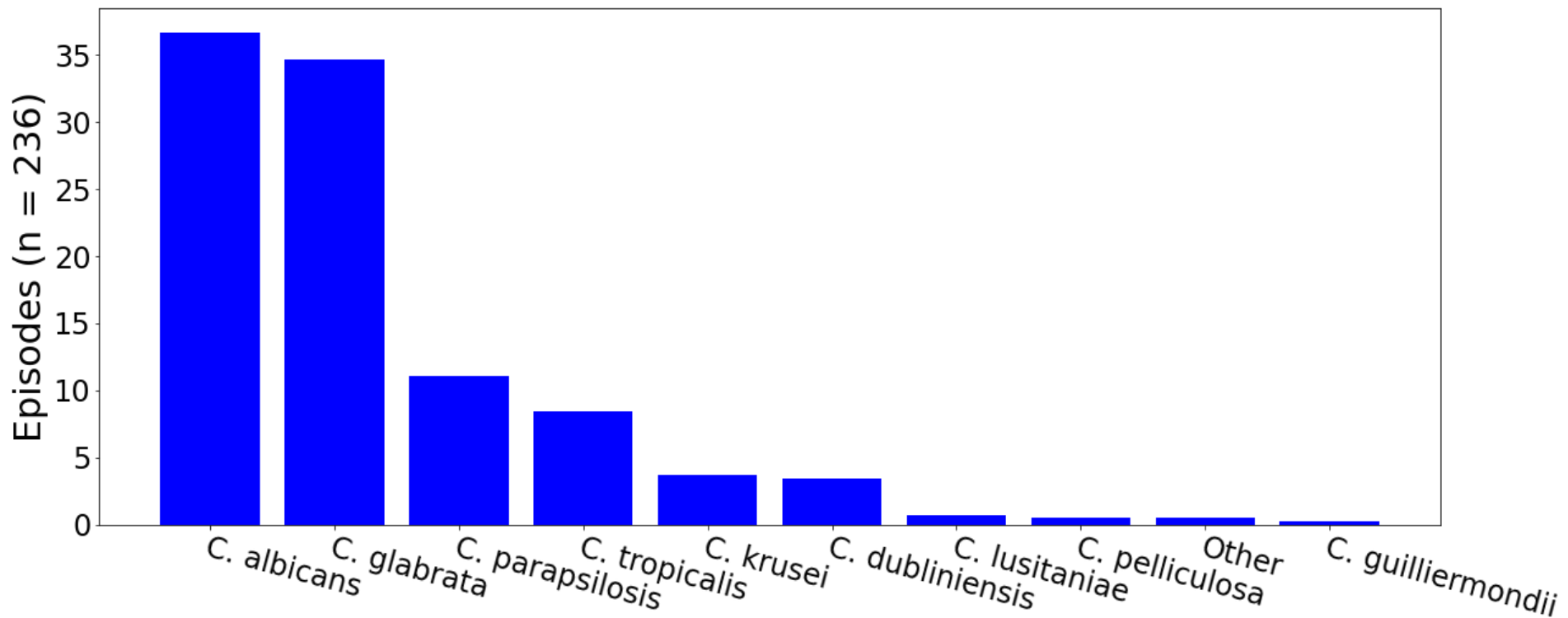
1,285,101 days of antibiotic therapy

162,913 admissions
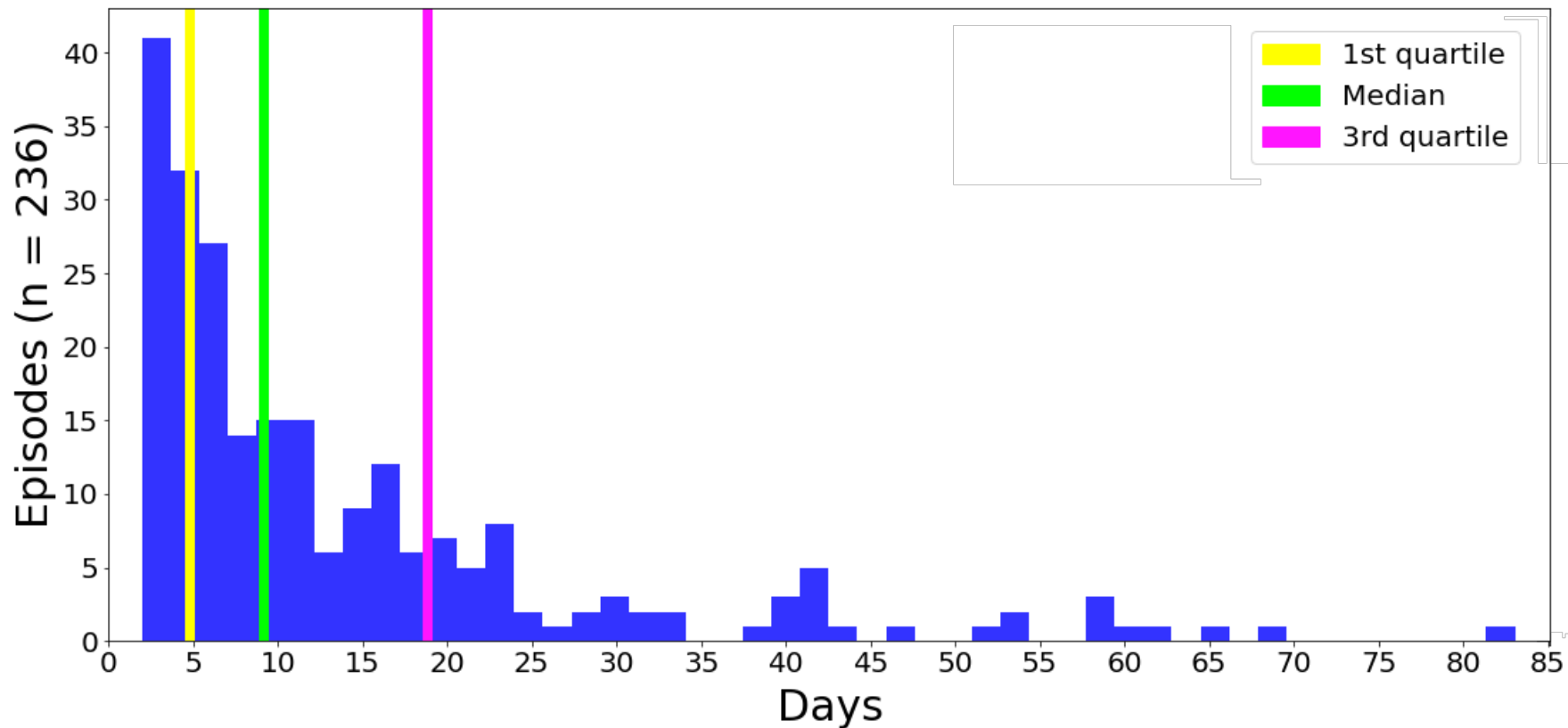
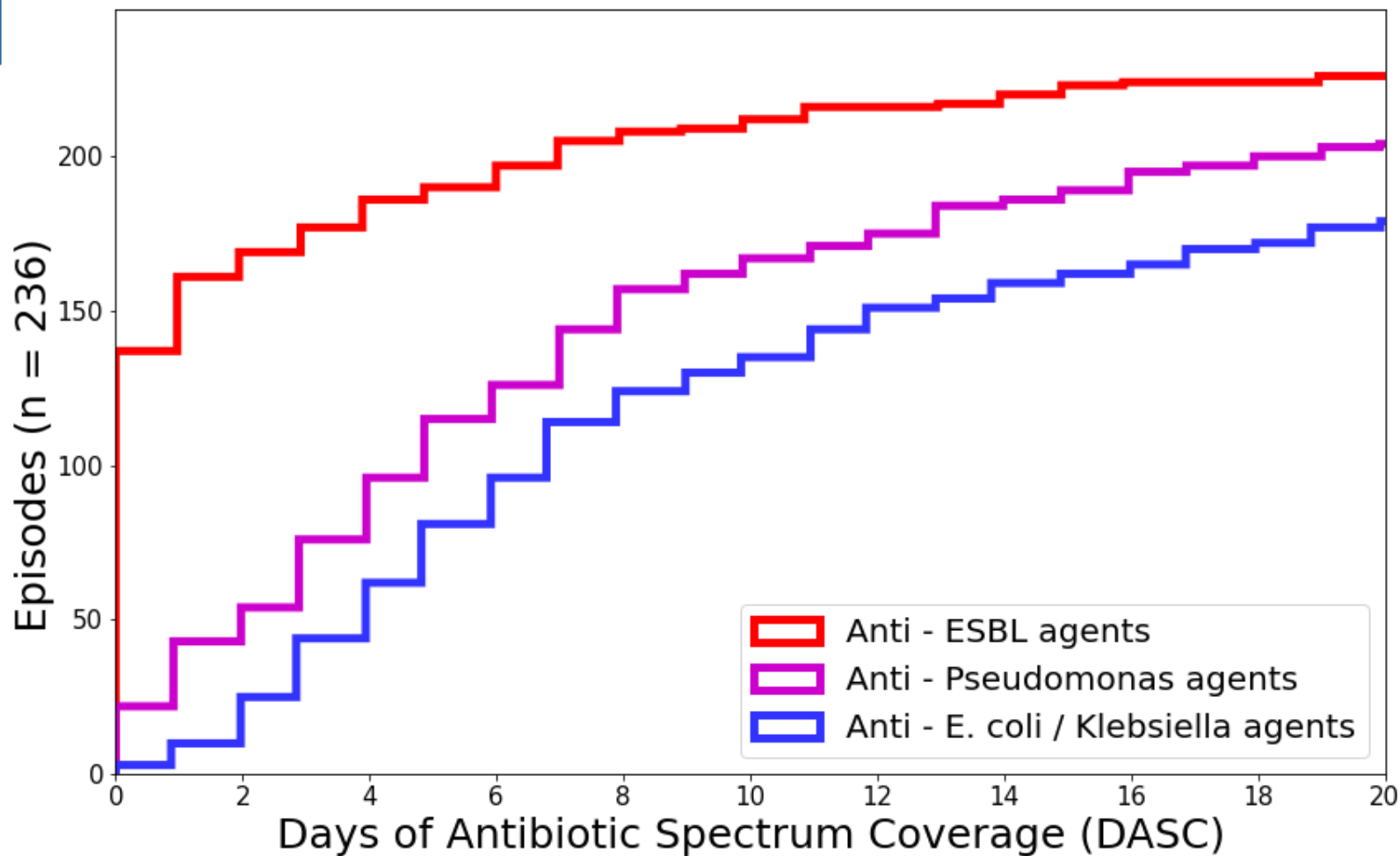236 episodes of candidemia

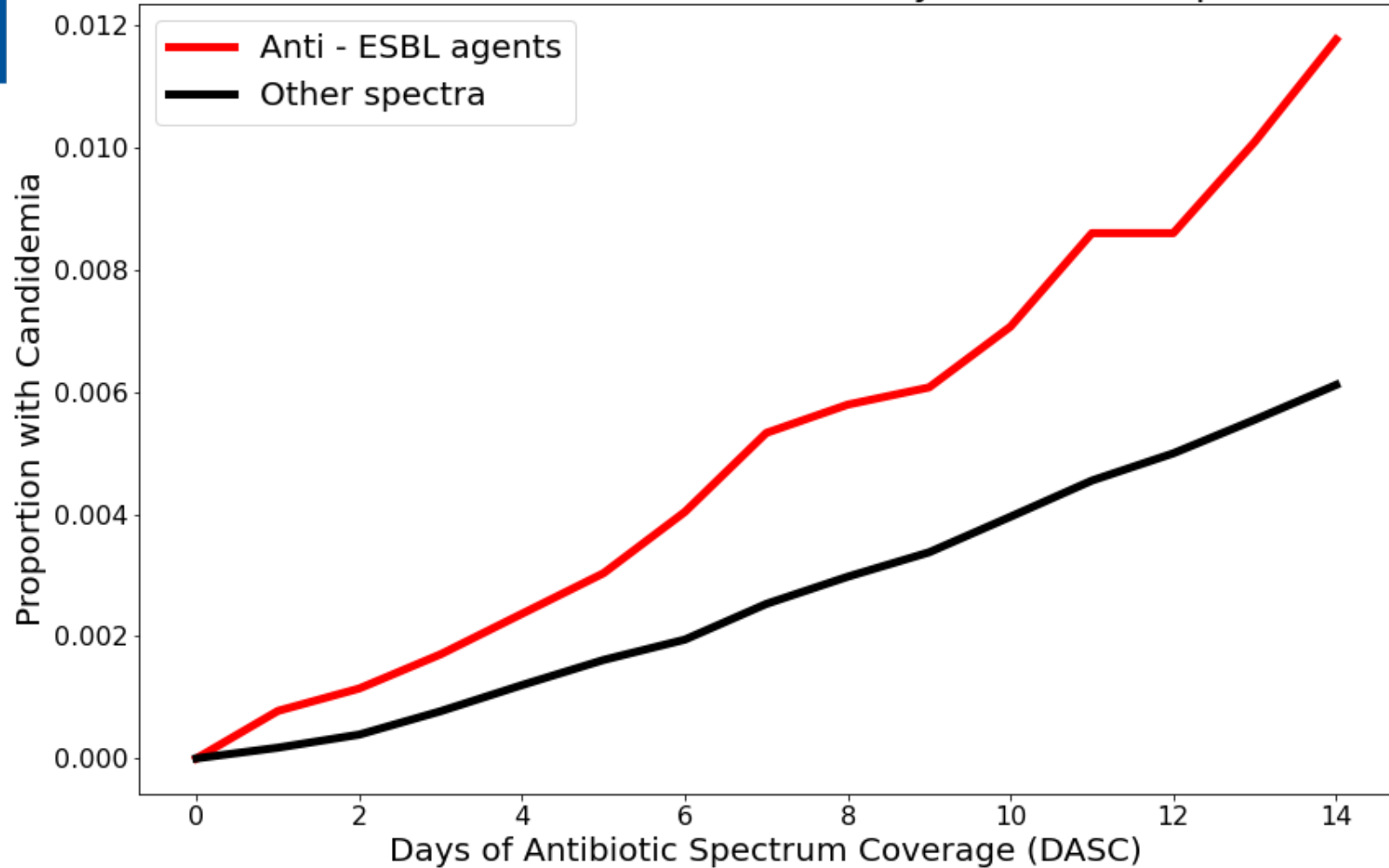Candida Species in Blood Culture

Time from Admission to Candidemia

Antibiotic Exposure Preceeding Candidemia
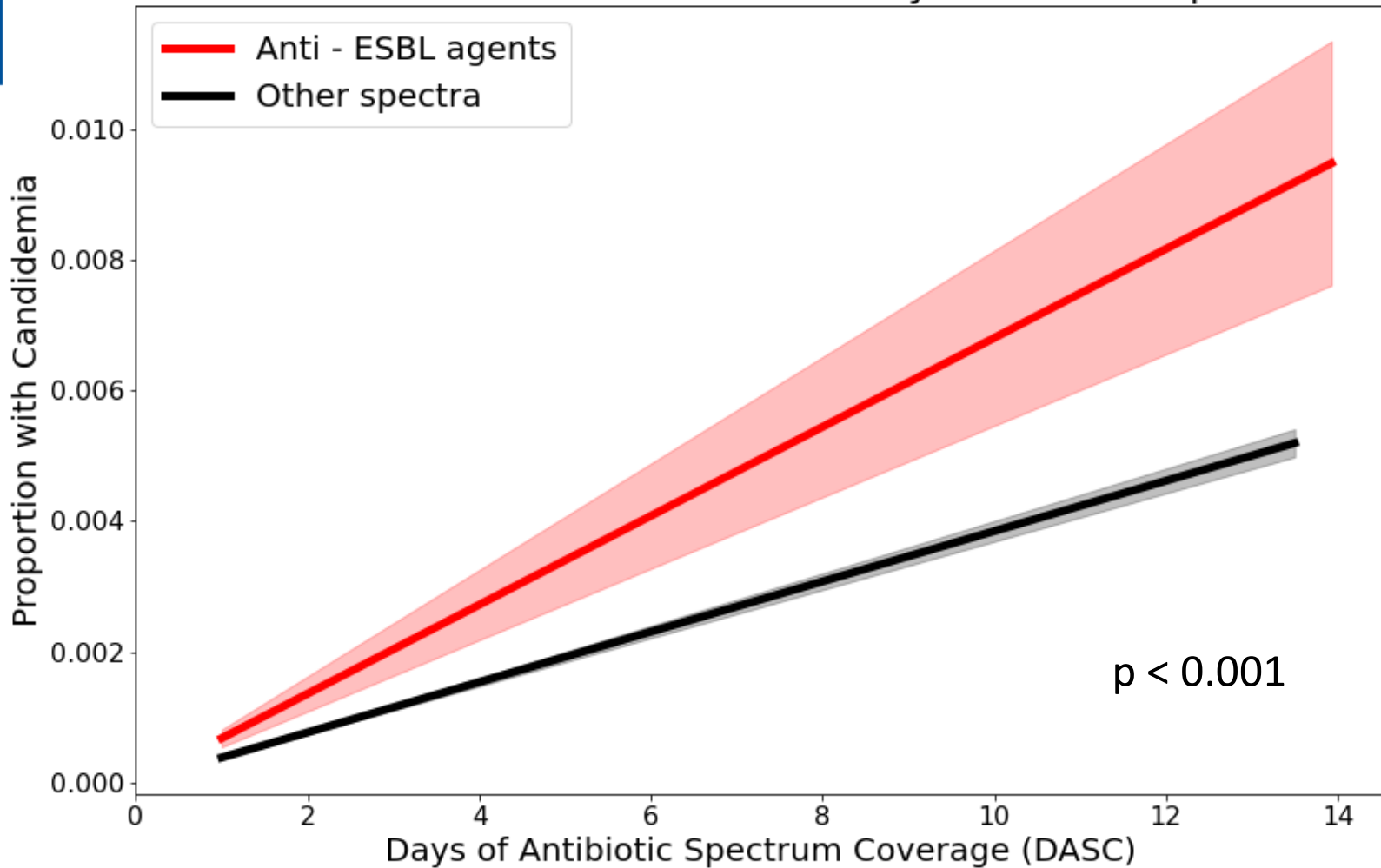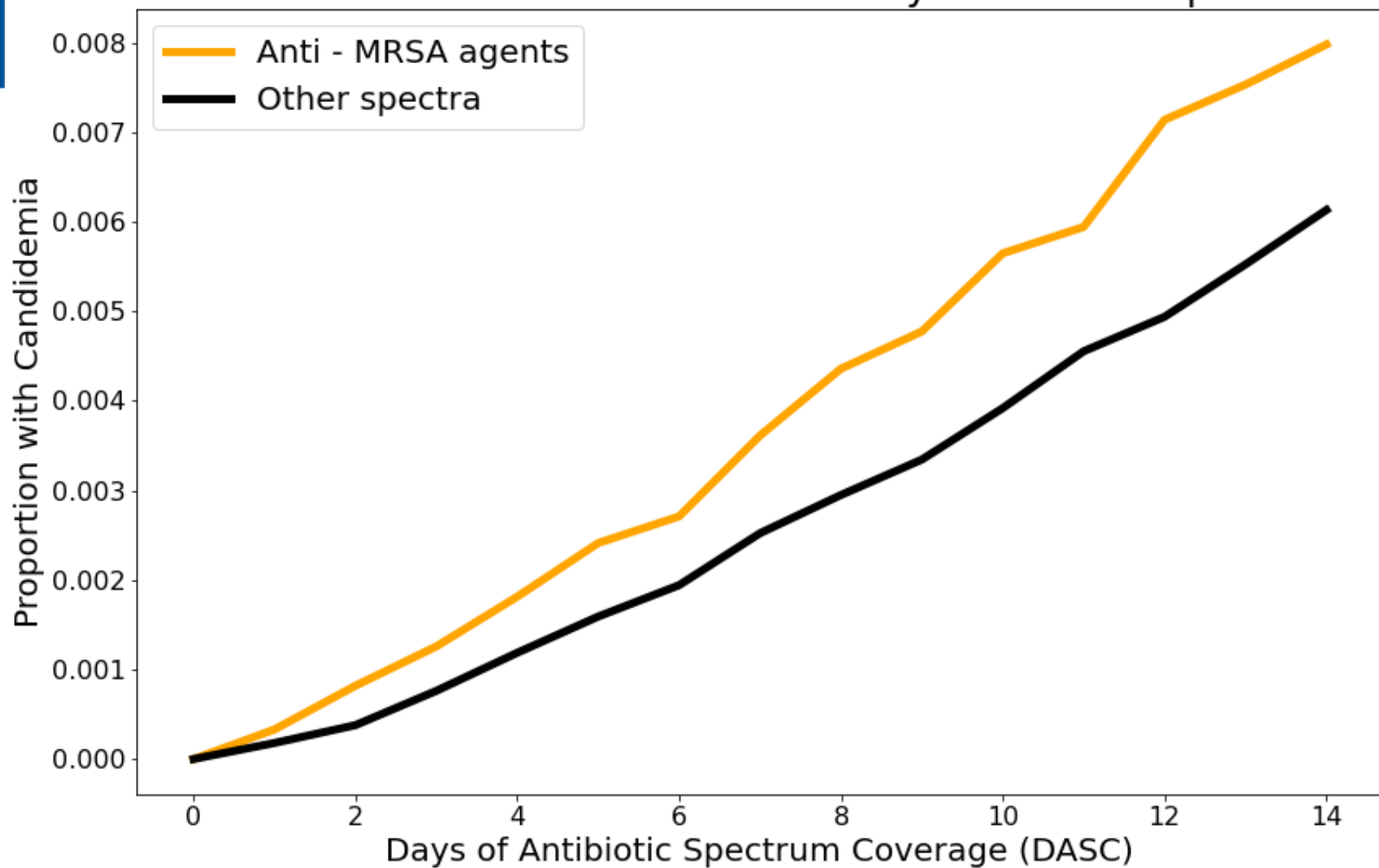
Cumulative Hazard of Candidemia by Antibiotic Exposure
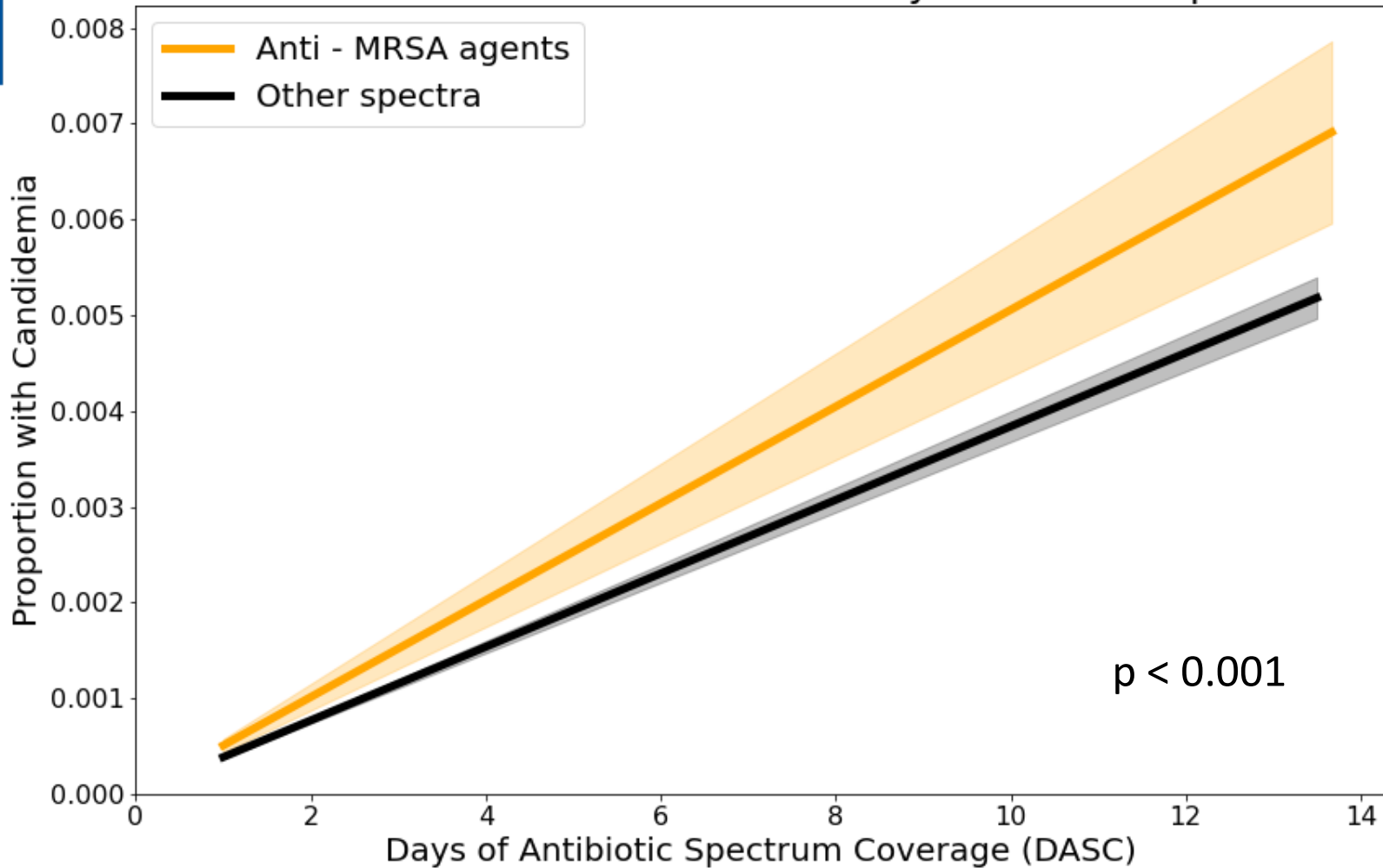
Cumulative Hazard of Candidemia by Antibiotic Exposure

Cumulative Hazard of Candidemia by Antibiotic Exposure

Cumulative Hazard of Candidemia by Antibiotic Exposure

Univariable Models: Highest Hazards

Spectra

VRE
ESBL
MRSA
Pseudomonas
B. fragilis

Classes

Carbapenems
Aminoglycosides
Lipo/Glycopeptides
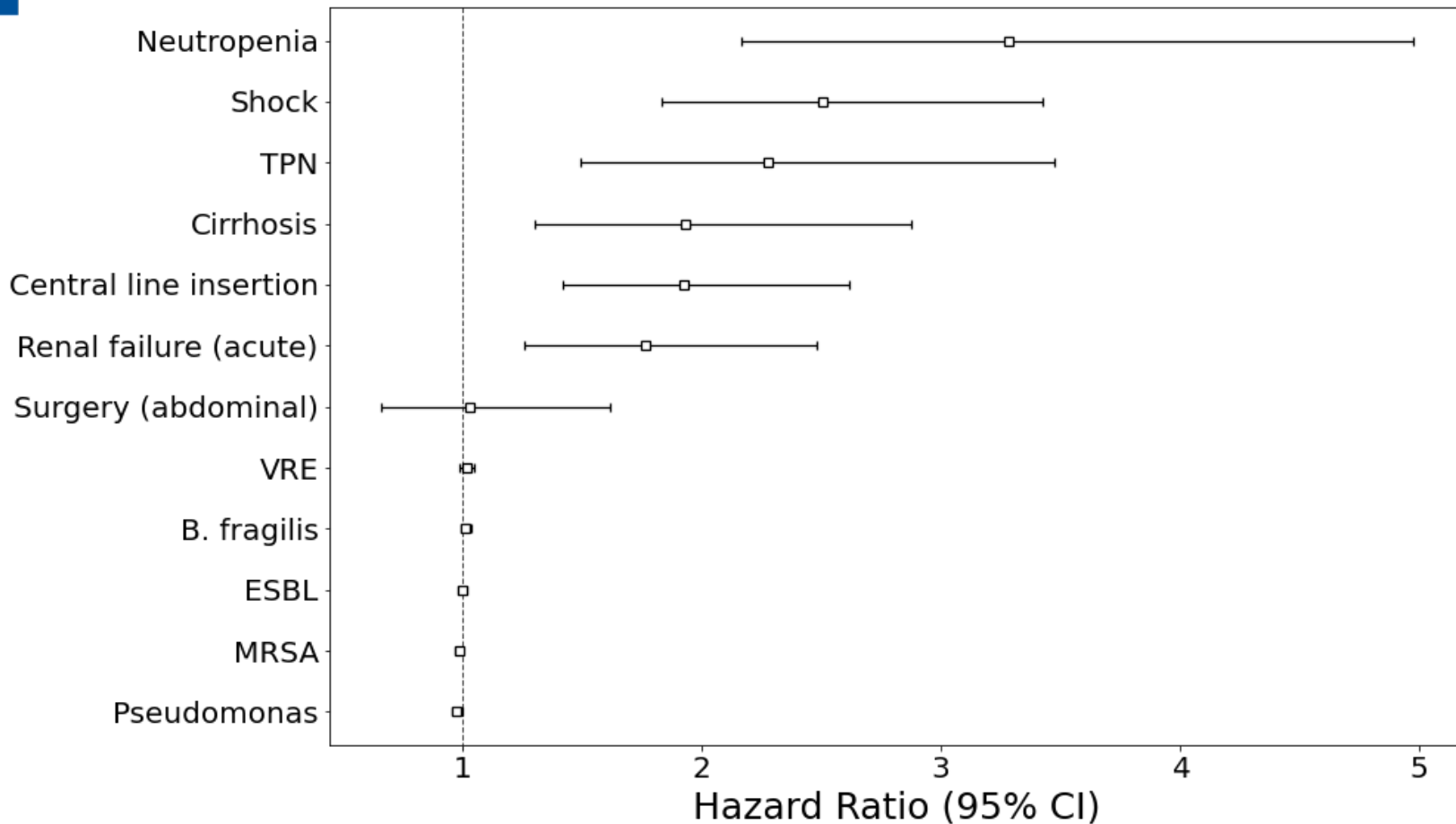
Agents

Meropenem
Daptomycin
Amikacin
Cefepime
Metronidazole
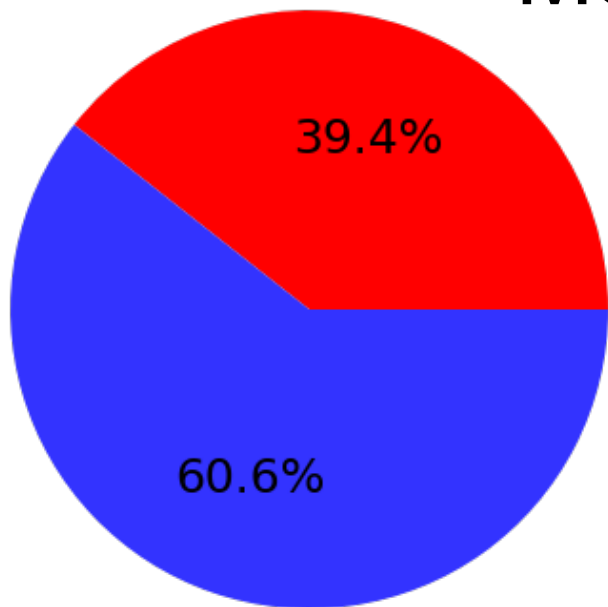
Multivariable Model of Candidemia Risk
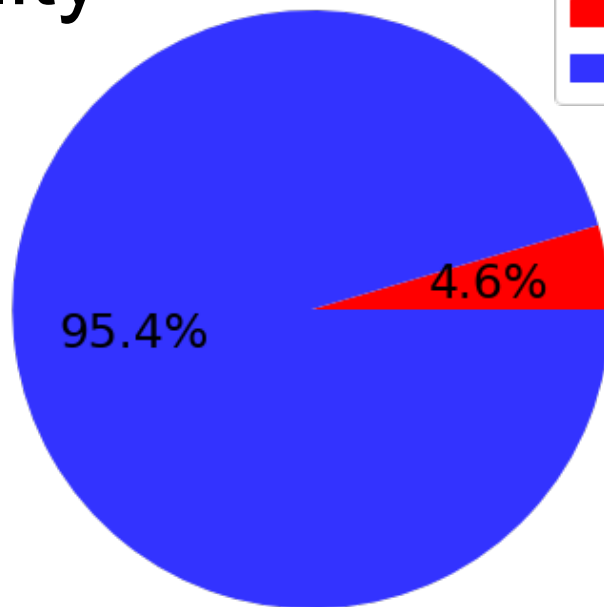
Discussion

- Patients with candidemia <u>are</u> exposed to *broader* spectrum antibiotics

- Candidemia occurs <u>sooner</u> in patients who are exposed to *broader* spectrum antibiotics

- **This study <u>does not</u> provide evidence that broad-spectrum antibiotic exposure lies on the *causal pathway* to candidemia**
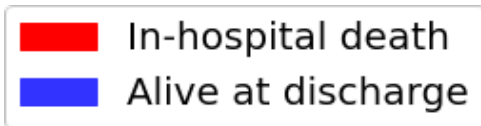
Mortality

Cases

Reference

In-hospital death
Alive at discharge

39.4%

60.6%

95.4%

4.6%

Thank you!

https://dougherty.id