

Treatment Choices for Carbapenem-Resistant Enterobacterales: An Emerging Infections Network Survey

Samuel E. Cincotta¹, Belinda E. Ostrowsky¹, Jessica Howard-Anderson², Susan E. Beekmann³, Philip M. Polgreen³, and Maroya S. Walters¹
¹Centers for Disease Control and Prevention, ²Emory University School of Medicine, ³University of Iowa Carver College of Medicine

BACKGROUND

- Carbapenem-resistant Enterobacterales (CRE) infections are highly resistant to most antibiotics, including carbapenems, which are commonly used to combat multidrug-resistant bacterial infections.
- New antibiotics offer additional treatment options for CRE infections, but data are limited on healthcare provider decision making.
- We used a scenario-based survey to understand treatment selections and the potential drivers and barriers of these decisions.

METHODS

- We surveyed providers through the Infectious Diseases Society of America (IDSA) Emerging Infections Network (EIN) in November 2023 to understand the current management of CRE infections in the context of new therapeutics.
- Our survey included four CRE infection scenarios to ascertain antibiotic selection.
- Selections were classified as suggested, alternative, or not in guidance according to the 2023 IDSA Guidance on the Treatment of Antimicrobial Resistant Gram-Negative Infections.
- We asked respondents about barriers to use of selected antibiotics.

RESULTS

- Overall, 441 (28%) of 1566 EIN members who have ever participated in surveys responded.
- All respondents practice adult infectious diseases and 240 (55%) had less than 15 years of experience since fellowship.
- 337 (76%) reported treating a CRE infection in the last year.
- 104 (24%) did not report treating a CRE infection, of which 93 (89%) did not continue the survey.
- Antibiotic selections for the four scenarios are shown in Figures 1 and 2.
- Barriers to selection for ceftazidime-avibactam (CAZ/AVI) and cefiderocol are shown in Figure 3.

CONTACT INFO: Sam Cincotta, VENS@cdc.gov

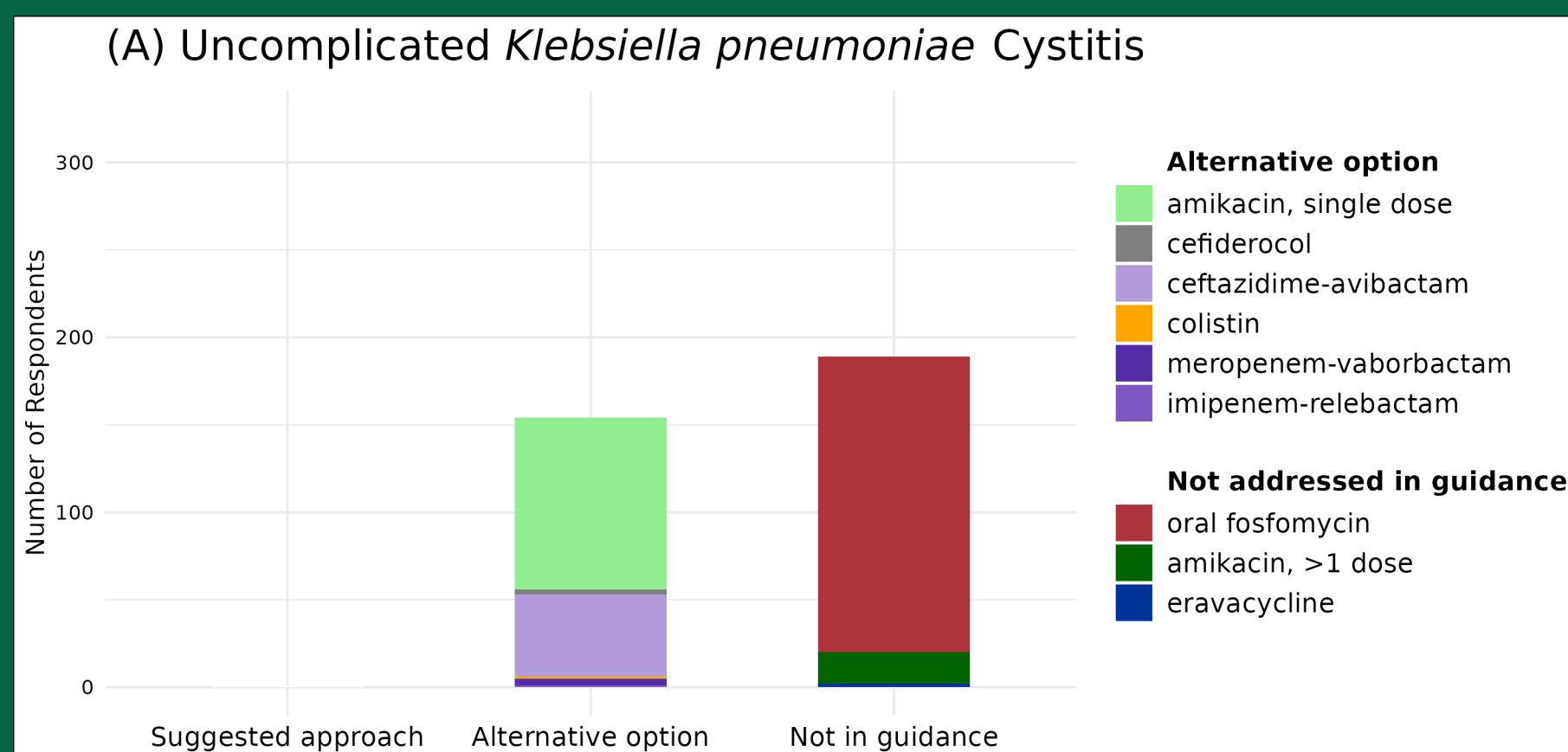


Survey Link

Figure 1. Antibiotic selections for urinary tract infection scenarios.

(A) 57-year-old female with history of recurrent urinary tract infections but otherwise healthy with good renal function presents to the hospital.

- Urine culture grew *Klebsiella pneumoniae* resistant to meropenem, ertapenem, and the preferred suggested treatment options for uncomplicated cystitis caused by CRE (nitrofurantoin, trimethoprim-sulfamethoxazole, and ciprofloxacin).



(B) Same patient presented instead with pyelonephritis; same susceptibility testing results.

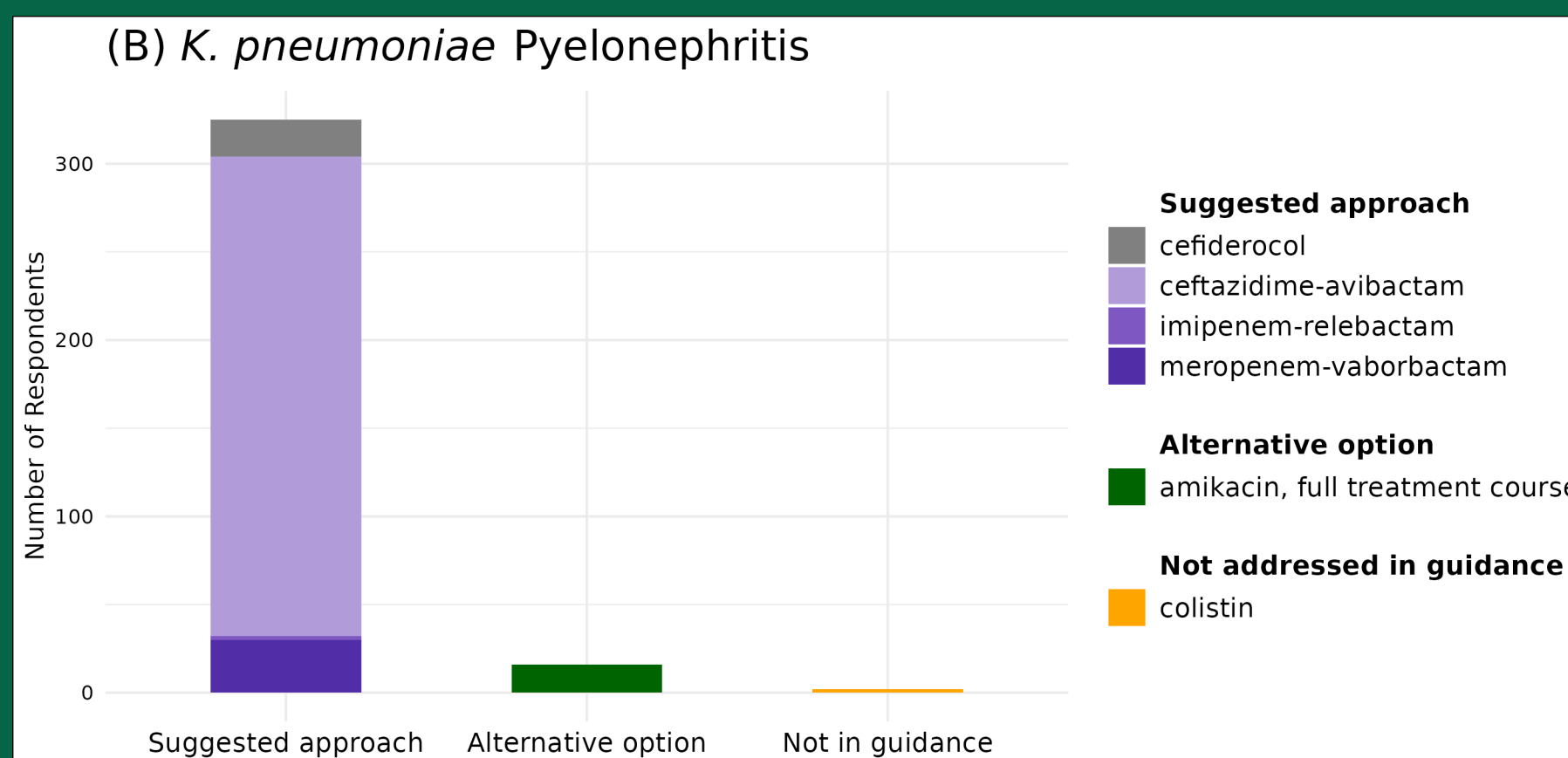
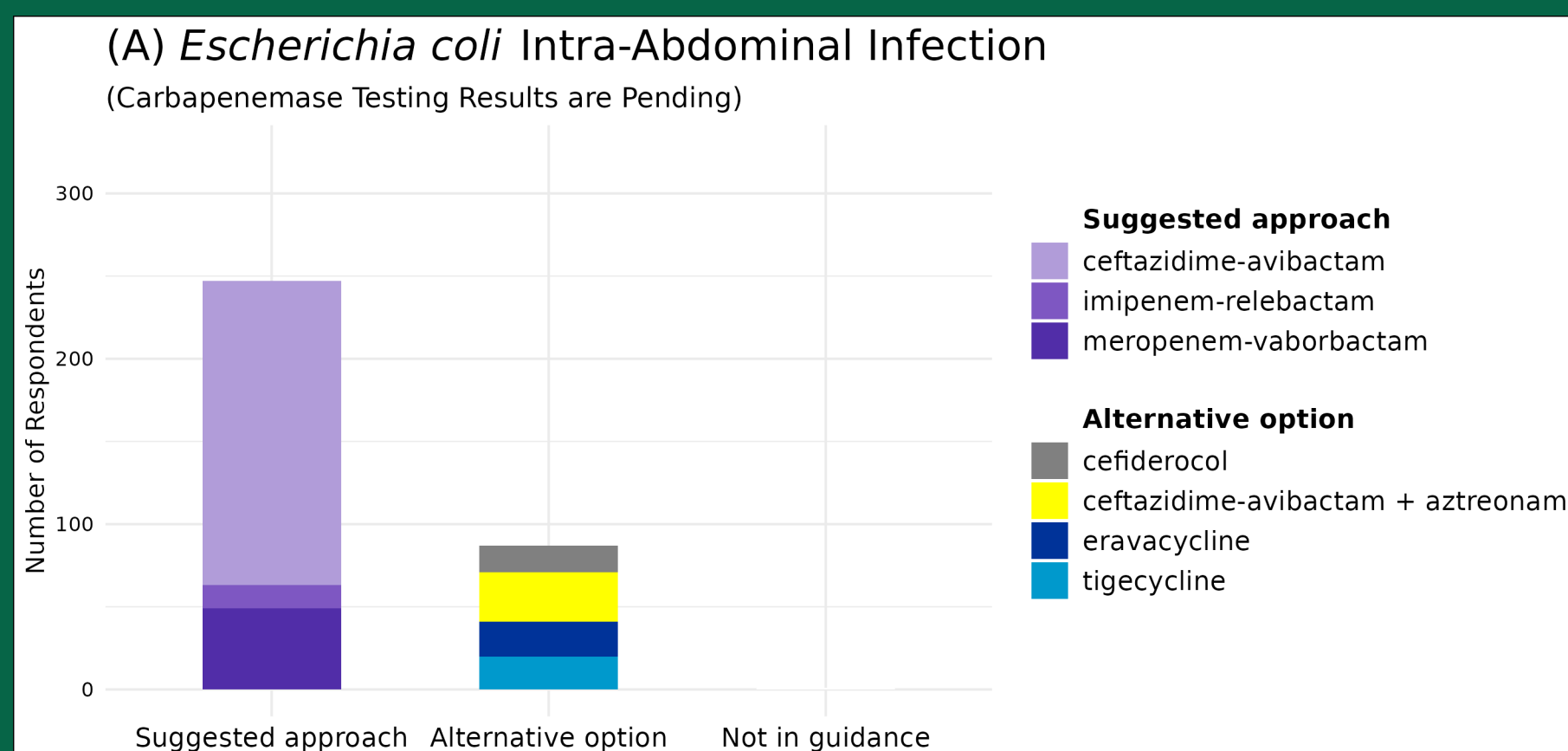


Figure 2. Antibiotic selections for intra-abdominal infection scenarios.

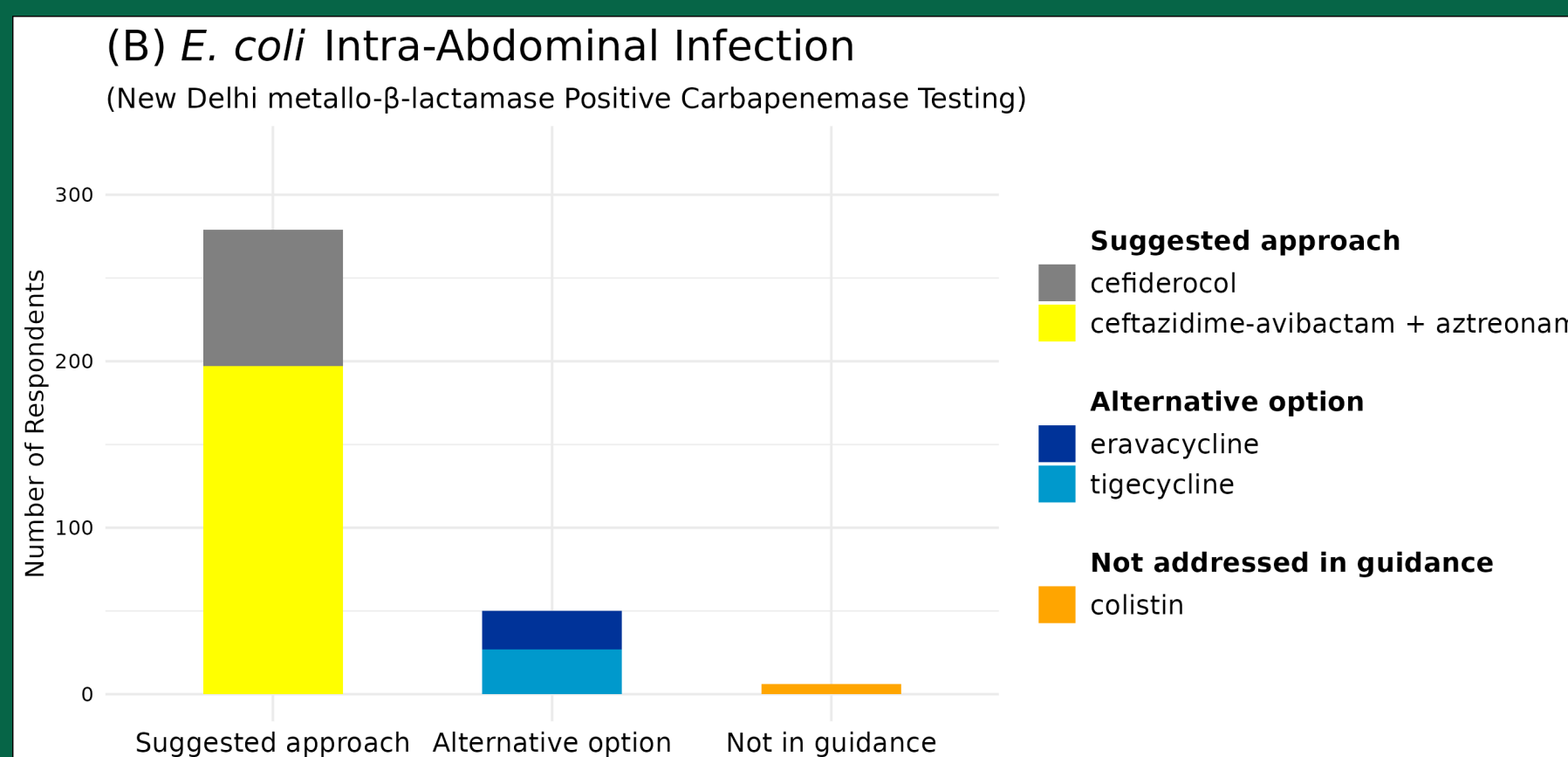
(A) 64-year-old intensive care unit patient has peritonitis and an intra-abdominal abscess.

- Peritoneal fluid culture grew *Escherichia coli* resistant to meropenem and ertapenem.
- Blood cultures are negative and carbapenemase testing is pending.
- Past medical history does not indicate international travel.



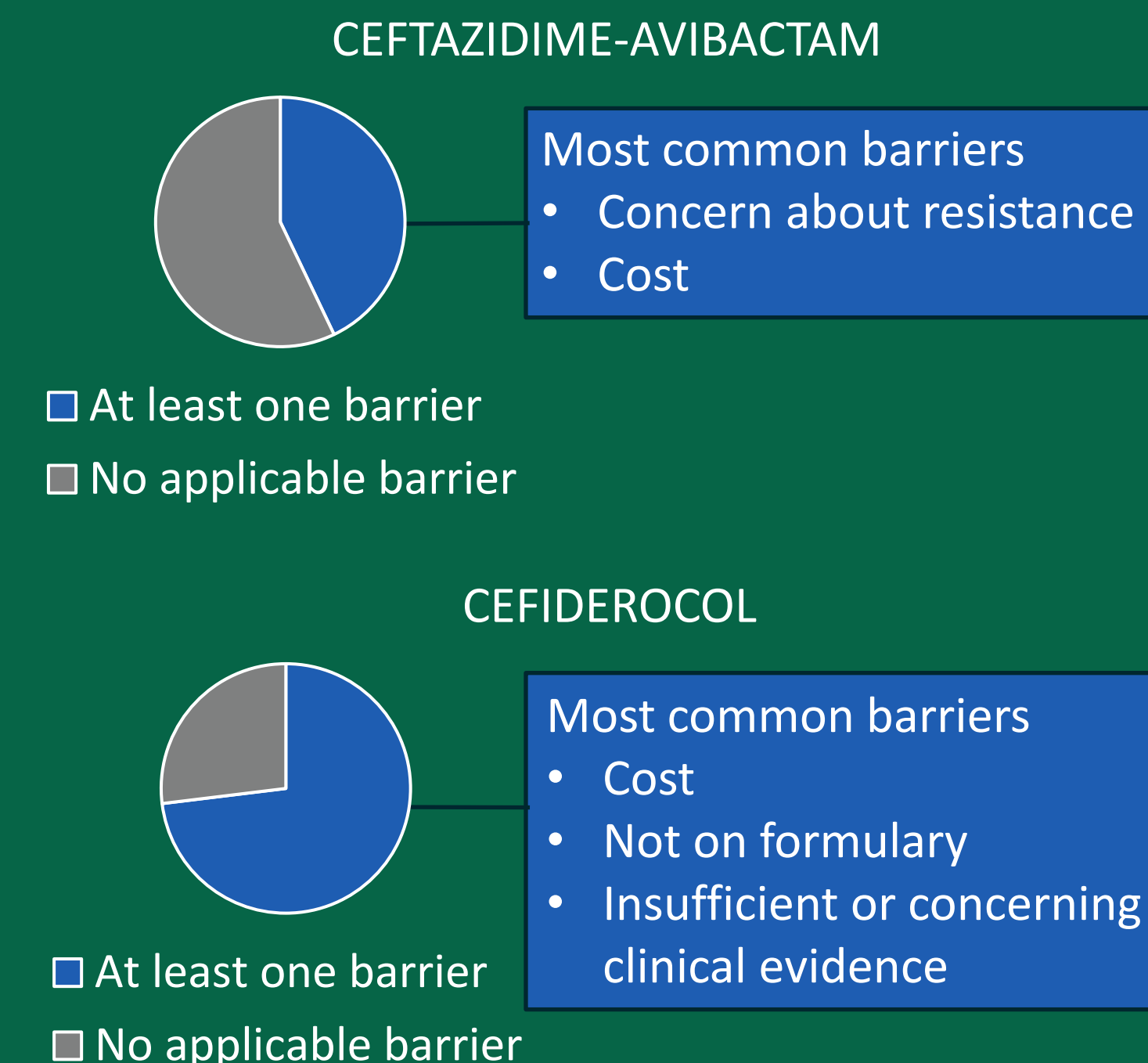
No respondent selected the antibiotic survey options of meropenem (extended infusion) plus amikacin or meropenem (extended infusion) plus colistin, both of which are not suggested in the guidance.

(B) The lab reports that carbapenemase testing detects the presence of New Delhi metallo-beta-lactamase (NDM) for this isolate.



All antibiotic survey options for this scenario are shown in the legend and were selected by at least one respondent.

Figure 3. Barriers to selection



CONCLUSION

- For an uncomplicated urinary tract infection caused by carbapenem resistant *K. pneumoniae* not susceptible to any suggested oral agents, respondents most frequently selected oral fosfomycin, which is suggested for *E. coli* only.
 - Selections were made due to the low clinical severity presented and as an effort to preserve antibiotic activity.
- For the other scenarios, respondents mainly selected agents suggested in the IDSA guidance.
- Among equivalent preferred agents, most respondents selected CAZ/AVI over other combination agents, or CAZ/AVI plus aztreonam over cefiderocol for NDM *E. coli*.
 - The relative preference for CAZ/AVI among similar agents may reflect its longer time in use and that relatively few clinicians reported barriers such as formulary availability and lack of clinical evidence.