

was near zero appear to support the conclusion that CDI incidence and hospital mortality of patients is nearly the same across all 4 regions and seasons. We would suggest a replacement conclusion that there is a very similar CDI risk across regions and seasons, with possible exception of particular subsets (eg, older adults).

The study by Argamany et al¹ has many of strengths, including large sample size, clear study design, excellent writing, an excellent discussion section that includes a thorough examination on the limitations of the data set, and finally, a focus on an important problem in infection control. Despite these strengths, because of the near-zero effect sizes of the findings, the conclusion of the study that the CDI incidence and patient mortality differed significantly across regions and seasons is not sufficiently supported. We suggest that there is no need at this time to redirect resources or implement targeted control measures according to region and seasons.

References

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Conflicts of interest: None to report.

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Response to "Effect of geographic region and seasonality on *Clostridium difficile* incidence and hospital mortality"



To the Editor:

We appreciate the comments regarding our recently published article on the regional and seasonal variation in *Clostridium difficile* infection (CDI) among hospitalized patients in the United States.¹ We agree that measuring effect size is important in any study, particularly with a large sample size where small variations between groups could result in a statistically significant difference. However, effect size is calculated without accounting for the meaning of the measures used. We believe that the use of Cohen's criteria² without regard to clinical significance results in underestimation of the importance of our study findings.

From a public health perspective, the regional and seasonal variations in CDI incidence and mortality identified in our study are meaningful. Based on the actual percentage difference between the

regions with the lowest (West, 6.2%) and highest (Midwest, 7.3%) mortality observed in our study, patients hospitalized with CDI in the Midwest have a 17.7% higher rate of death than hospitalized patients in the West. Similarly, a patient in the Northeast (8.0 CDIs/1,000 discharges) is 63% more likely to be hospitalized with CDI than a patient in the West (4.9 CDIs/1,000 discharges). If the observed regional and seasonal rates were reduced across the United States to the lowest rates observed in our study, a total of 42,532 cases of CDI and 1,595 deaths could be avoided each year. Using conservative estimates, each case of CDI results in an additional \$2,871 in costs, potentially leading to an additional economic burden of approximately \$122 million annually in our study.³ We do not believe that these numbers can be safely ignored.

Finally, we agree that the regional and seasonal effects differed based on the measure of interest (ie, mortality vs incidence); however, this is not an inconsistency in our findings. It is quite plausible that one region might have higher mortality among patients with CDI, whereas another might have higher CDI incidence caused by differences in population characteristics and patient care. This calls for differential application of interventions to reduce the burden of CDI (eg, enhanced recognition and treatment to prevent mortality, improved antibiotic stewardship and infection control measures to reduce incidence), but does not invalidate the results.

In summary, we believe that focusing on statistical measurements alone risks leaving the human and economic consequences of CDI to be forgotten. The regional and seasonal variations identified in our study are not of minimal consequence. We affirm our original conclusion that the results of this study may be used to direct preventative and therapeutic resources where and when they are needed most.

References

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