# Ability to predict C-diff mortality nearly doubled with new guidelines

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Infection from Clostridioides difficile bacteria, pictured above, is the most common health care-associated infection in the United States, causing an estimated 12,800 deaths each year. Credit: University of Houston

*Clostridioides difficile* infection (CDI) is the most common health care-associated infection in the United States, causing an estimated 12,800 deaths each year. The deadly and notoriously stubborn superbug, C. diff has been hard to spot and harder to stop. In 2017, two organizations leading the war on C. diff updated their guidelines for assessing patients and the severity of their infections. Now a University of Houston team, led by Kevin Garey, professor of pharmacy practice and chair of the UH College of Pharmacy Department of Pharmacy Practice and Translational Research, has proven that specific updates were well advised. Garey is reporting his findings in the journal *Open Forum Infectious Diseases*.

"Whenever changes to national guidelines are based on expert opinion only, that is an opportunity to do a research project to see if those experts were correct," said Garey, who was, in fact, one of the experts at the table. Such was the case for the 2017 guidelines from The Infectious Diseases Society of America (IDSA) and Society for Healthcare Epidemiology of America (SHEA) whose guidelines for C. diff treatment and diagnosis are widely considered one of the most influential on the planet, according to Garey.

The change in the guidelines revolved around how to assess damage to the kidney caused by the fluid loss associated with severe CDI. Kidney damage can be detected when blood levels show increased creatinine, a waste product formed when creatine in muscles breaks down. A normal range for serum creatinine (SCr) level is generally below one milligram per deciliter of blood (1mg/dL).

"There are several ways to use creatinine to determine if someone has kidney damage. A common method is to use at least a 50% increase in creatinine from a previous measurement, but in many cases this prior measurement doesn't exist," said Garey.

For the new guidelines, IDSA and SHEA recognized this problem and chose another method to determine kidney damage; namely simply using a creatinine value above 1.5 mg/dL at the time of infection to indicate kidney damage. However, this change was based on expert opinion and had not been tested scientifically.

Garey and his team of UH pharmacy students, postdocs, research scientists and faculty set out to prove the criteria was valid, and they found remarkable success in the new severity classification.

"Using the new single creatinine measurement above 1.5 to define CDI severity was fourfold more predictive in identifying patients likely to die during their hospitalization," said Garey. "When combined with increased white blood cell count, another severity predictor, the newly revised severity

predictor was twofold better at predicting mortality."

The newly revised severity assessment allows doctors to understand when they have a severely ill patient at high risk for mortality and tailor treatment accordingly.

Garey and team studied 705 adult patients hospitalized with CDI in several hospitals around Houston.

"The revised SCr criterion was independently associated with increased odds of mortality when analyzed as a single criterion and combined with WBC as per the IDSA-SHEA severity guidelines," reports Garey.

Equally great, said Garey, is that UH students did much of the work. "This is a wonderful demonstration that professional pharmacy students can learn science and at the same time provide meaningful science to the world. You can sleep easier at night knowing UH is looking through the fine details of guidelines and making sure recommendations are correct," said Garey.

**More information:** Travis J Carlson et al. Assessment of Kidney Injury as a Severity Criteria for Clostridioides Difficile Infection, *Open Forum Infectious Diseases* (2020). DOI: 10.1093/ofid/ofaa476

Provided by University of Houston

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