

COMMENTARY

The Need for Advancements in the Field of Risk Adjustment for Healthcare-Associated Infections

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(See the article by Haley et al, on pages 1–7.)

Healthcare-associated infections (HAIs) have been of concern to infection preventionists and hospital epidemiologists for more than 40 years. However, only in the past decade have these infections drawn increasing attention by stakeholders, such as the public, health insurance carriers, healthcare maintenance organizations, the Centers for Medicare and Medicaid Services (CMS), and politicians.

In this issue, Haley et al¹ report findings from their study investigating potential methodological shortcomings in the current National Healthcare Safety Network (NHSN) estimates of healthcare facility-onset *Clostridium difficile* infection (HO-CDI) rates in New York. The authors observed that the NHSN estimate of statewide incidence of HO-CDI was underestimated by 45% because the denominator data did not accurately represent patient time at risk. Furthermore, the authors identified that elderly and young children were at increased risk of HO-CDI. Consequently, their age-adjusted rates resulted in more meaningful changes in facility rankings compared with those based on NHSN rates.

Many states now require mandatory reporting of HAIs. However, these states greatly differ on which HAIs are reported and how they are reported. Public reporting laws in many states provide for the release of NHSN surveillance data, permitting local newspapers and other media outlets to access these data and publish HAI rates. For instance, *Consumer Reports* now grades hospitals' rates of central line-associated bloodstream infections as an indicator of quality, and the CMS's Hospital Compare website benchmarks hospitals based on central line-associated bloodstream infections, catheter-associated urinary tract infections, and surgical site infections. Making these data widely available affects the public's healthcare choices, and, as a result, it is critical that these data accurately inform patients to facilitate those decisions.

With the broader distribution and use of HAI surveillance data comes a greater responsibility to ensure that surveillance efforts result in unbiased estimates and that the data are

appropriately interpreted. Hospitals across the United States provide care to patients with varying severity of illness and comorbidities. Risk adjustment should control for these patient characteristics, which lead to inherently different baseline risks of HAI, thereby producing rates that allow for fair comparisons of the quality of infection control practices between facilities. Proper risk adjustment would prevent healthcare facilities from being penalized simply because they care for sicker patients.

While the Centers for Disease Control and Prevention has made efforts to improve their risk-adjustment methodology, agencies that mandate public reporting should realize that efforts to identify the appropriate variables for risk adjustment should be made at the onset of surveillance efforts, that is, before starting national reporting for new measures. Identification of appropriate variables for risk adjustment prior to the start of reporting is essential as it ensures that facilities will collect the data necessary to adequately perform the risk adjustment. In addition, periodic reassessment of the risk-adjustment methodology is good practice, as advancements in medical care may result in changes to patient-level risk of HAI and, accordingly, what variables should be adjusted for. Because no statistical test or gold standard exists to determine the optimal set of variables for risk adjustment,² it is essential that the patient characteristics selected include those repeatedly identified in the literature as risk factors for HAI and thus hold credibility and face validity with experts in the field. Furthermore, lessons can be gained from other specialties, such as the Society of Thoracic Surgeons, that have been reporting risk-adjusted cardiac surgery outcomes for the past 24 years.³ The latest revisions in risk-adjustment methodology from this group focused not only on the rigor of statistical methods but also on transparency of the subjective decisions made to provide for increased face validity.^{4–8}

To ensure fair and accurate comparisons of rates between facilities, measures of the degree of variability between rate

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estimates should also be incorporated in reports. In the research literature, we would not accept a comparison of rates without confidence intervals, *P* values, or measures of variance. With the responsibility of public reporting also comes the responsibility of public education. Efforts should be made to assist the public to understand and interpret these measures in HAI reports. Furthermore, strategies are needed to ensure appropriate comparisons of HAI rates similar to the margins of error commonly reported by the media with election polling results.

We believe numerous organizations should move quickly to elevate the science of reporting of HAIs. At present, the science of risk adjustment for HAIs is grossly lacking.^{9–11} This area needs multiple investigative groups working to improve the methods for risk adjustment. Improved risk adjustment will lead to better interpretation of the data by the public and, in turn, better efforts by hospitals to decrease HAI rates.

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