

COMMENTARY

Casablanca Redux: We Are Shocked That Public Reporting of Rates of Central Line–Associated Bloodstream Infections Are Inaccurate

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Rick Blaine (Humphrey Bogart): How can you close me up? On what grounds?

Captain Renault (Claude Rains): I'm shocked, shocked to find that gambling is going on in here!

Annina (Joy Page): Monsieur Rick, what kind of man is Captain Renault?

Rick: Oh, he's just like any other man only more so.

In the 1942 film *Casablanca*, Humphrey Bogart plays Rick Blaine, an American expatriate who owns an upscale nightclub and gambling casino in the Moroccan city of Casablanca.¹ Rick's Café Americain is temporarily shut down when the singing of "La Marseillaise" enrages a local Gestapo officer, Major Strasser. Strasser demands that his subordinate, Captain Renault, shut down the club. Claude Rains's subsequent line, "I am shocked, shocked that gambling is going on in here," has become a standard tongue-in-cheek rejoinder to any blatantly obvious but widely ignored truth. Everyone in Rick Blaine's club, including the local police, were fully aware that gambling was one of the main forms of entertainment in Rick's Café Americain. When forced by Major Strasser, however, the local police were obligated to feign shock and dismay.

Most experts in infection prevention are fully aware that a substantial portion of the data used for the public reporting of institution-specific rates of hospital-acquired infection (HAI) are subject to overt and subtle types of ascertainment biases, inaccuracies, misguided incentives, fuzzy definitions, and outright errors.^{2,3}

We believe that inaccuracies in publicly reported data on rates of HAIs are an obvious and serious problem. However, most hospital administrators, hospital epidemiologists, and practicing physicians publicly ignore these issues, and they, like Captain Renault, may be forced to express shock and dismay when outside agencies or the press confront and publicize some or all of the preceding basic problems in measurement and reporting.

The Department of Health and Human Services recently

posted facility-specific standardized infection ratio (SIR) scores for rates of central line–associated bloodstream infection (CLABSI) on the Hospital Compare website (<http://www.hospitalcompare.hhs.gov>).⁴ This website provides hospital-specific SIR scores related to CLABSI in 3 general rankings: better, worse, or approximately the same as the national average. Links available at this website also allow the public to view graphs comparing the SIR score for CLABSI of an individual hospital with the average SIR score of other hospitals in the state.

The Hospital Compare website also ranks all American hospitals by SIR score, which currently ranges from 0 to 4.57. This ranking is an attempt to underscore the poor performance of hospitals with high SIR scores and to highlight the "good performance" of hospitals with lower SIR scores. Beginning in October 2012, the Hospital Compare website will include data on surgical outcome measures that are submitted on a voluntary basis by hospitals that participate in the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP).⁵

Data used to calculate SIR scores for CLABSI are from mandatory reports to the National Patient Safety Network (NHSN). Hospitals submit data about the number of CLABSI events, the total number of central line–days, and the types of intensive care unit in which the CLABSI occurred. The SIR further adjusts for both hospital bed size and medical school affiliation.⁶

Collecting data on rates of CLABSI is unequivocally a useful local performance measure for intensive care and hospital unit leadership. Indeed, calculation of and feedback from such data have numerous positive benefits.^{7–10} Clearly, as we and other investigators have noted, hospitalwide and unit-specific rates of CLABSI are dependent on a number of local factors related to patient mix, disease severity, and the proportion of patients with severe underlying immunosuppressive conditions.^{11–13} These factors are inadequately or incom-

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pletely addressed in the current Hospital Compare website data reports. Similar problems will likely arise when performance data from ACS NSQIP are posted online.

However, there is a bigger problem that has received little attention in the medical literature. Now that websites such as Hospital Compare provide detailed hospital-specific data on a variety of performance measures, how can we reasonably deal with the fundamental problems of inaccurate collection or reporting of outcomes? Are people who inaccurately collect and report outcome data, like Captain Renault, indeed like every person, but more so?

As a result, we believe that 2 additional problems must be addressed regarding the data available from Hospital Compare: (1) no data are submitted about the number of blood culture results obtained or the total number of patients with BSIs, and (2) the Centers for Medicare and Medicaid Services (CMS) does not check the accuracy of case detection of CLABSI in individual hospitals. Specifically, federal-level validation audits are not randomly or periodically performed in hospitals that report extremely low rates of CLABSI or other HAIs.

Our informal discussions with other hospital epidemiologists, our experience in evaluating the source of infection in hundreds of bacteremic intensive care unit (ICU) patients, and common sense have led us to suspect that many hospitals do not accurately report their true rates of CLABSI, using current NHSN definitions. In some cases this may reflect an unwillingness of local staff to accept these definitions as accurate or fair; in other situations it may reflect an unconscious desire to hedge or reduce their rate of CLABSI to avoid criticism and negative consequences from their local supervisors in the press, clinicians, or the general public who review their publicly reported data. And, as discussed below, there is genuine confusion as to how to apply the current NHSN definitions. If clinicians inappropriately or illogically fear or anticipate negative feedback about the rate of CLABSI in their institutions, they may consciously or subconsciously fail to obtain blood culture results for every patient with a possible or likely BSI. Simply put: no culture equals no infection, using standard definitions of CLABSI. We are not aware of any studies that have looked at the frequency at which blood cultures are performed in ICUs of varying size and type.

Infection preventionists can make errors of commission or omission when determining whether an individual patient had a CLABSI. Some infection preventionists who collect and report surveillance data may apply loose or nonstandard criteria when adjudicating whether a BSI in an individual patient is a true CLABSI. Indeed, even the definition of what constitutes a central line may be adjudicated differently in different hospitals. We are aware that peripherally inserted central catheters are not uniformly deemed to be central lines in all hospitals. Finally, simple clerical errors may occur in the process of collecting or reporting outcome data.

Two statewide studies have assessed the sensitivity and specificity of publicly reported rates of CLABSI. In Connecticut,

the estimated sensitivity was 60%;¹³ in Oregon, it was 72%.¹⁴ The specificity of categorizing a BSI as a CLABSI was high in both studies; however, the methods used to validate a diagnosis of CLABSI were different. Surprisingly, the authors of the statewide study in Oregon estimated that only 8% of all positive blood culture results for ICU patients were due to CLABSI.¹⁴ However, because it appears that skin contaminants and non-ICU-acquired BSIs were included in the preceding calculation, it was not possible to determine the proportion of ICU patients with ICU-acquired BSIs that were CLABSIs.

At present, hospitals with exceptionally low publicly reported rates of CLABSI or other outcome-of-care measures are generally assumed to have outstanding programs. However, to our knowledge, ongoing or continuous external auditing systems are not used nationally to verify that such reported low rates are accurate.

With the launch and widespread use of websites such as Hospital Compare, hospitals that carefully, accurately, and honestly report their rates of CLABSI and other outcomes will be inappropriately punished for their honesty unless fair systems exist to ensure that all publicly reported outcome data are accurate. The current lack of a valid universal system of data validation or verification could lead to even more problems with inaccurate reporting of rates of HAI. A number of common examples underscore this point: the Internal Revenue System (IRS) is clearly aware that if a large percentage of American taxpayers believe that there are no measures to detect and punish citizens who do not accurately report their income, the integrity of our current system for voluntary reporting of income and payment of taxes will collapse. Indeed, virtually all citizens are aware that the IRS has a system of targeted and random audits, with stiff fines for taxpayers who are found to have submitted inaccurate information on their income and taxes due. The risk of an IRS audit is an authentic and powerful enough stimulus for most citizens to accurately report their income and honestly pay their taxes.

We are unaware of any systematic efforts by CMS to verify whether hospitals that report extremely low rates of CLABSI or other outcome measures are accurately reporting their outcomes. Although a number of state health departments have undertaken validation projects related to public reporting of CLABSI,¹⁵ it is not likely that these validation efforts will be ongoing or long term. Unless this situation changes, we believe that this problem and its ramifications will grow over time.

We recommend 3 simple measures to improve the utility of currently reported data on CLABSI. First, hospitals that report data about rates of CLABSI should be asked to submit data about the total number of blood cultures that were obtained. This would allow the simple calculation of rates of blood cultures performed per patient or per central line-days.

Second, the number of blood cultures with positive results for true pathogens should be noted, and the proportion of BSIs that are CLABSIs should be calculated and reported.

Publishing these additional data would help to assure knowledgeable observers that an individual hospital or hospital care unit with very low rates of CLABSI has not achieved this low rate because of failure to obtain cultures from patients with potential BSIs. Furthermore, hospitals with high rates of nosocomial BSI but exceptionally low rates of CLABSI may need to justify why such a small percentage of their total number of BSIs are CLABSIs. As in the detection of surgical site infections, it is true that “the more you look [for CLABSIs] the more you find.”¹⁶ In other words, hospitals that appropriately and regularly obtain blood cultures from febrile patients are more likely to detect BSIs. Hospitals that have highly successful programs to reduce the rates of CLABSI should have a correspondingly overall lower rate of BSI than hospitals that do not while continuing to obtain blood cultures from febrile patients with possible or suspected line-related infections. Although it is true that hospitals with highly effective infection prevention programs may indeed have lower numbers of febrile patients and thus are less frequently required to perform blood cultures, this hypothesis has not been tested. Similarly, we are not aware of any studies examining the proportion of all BSIs that are attributable to CLABSI in individual patient care units or hospitals.

Our third proposed measure is to perform selective periodic or random auditing of hospitals that have exceptionally low or high rates of CLABSI. Unlike taxpayers, who face consequences if they fail to accurately report their income and pay their taxes, hospitals that fail to accurately report their local rates of CLABSI are fully aware that their data will be unchallenged. So in essence, hospitals that play by the rules and accurately detect and report all of their CLABSIs are punished by being honest, while hospitals that either do not routinely obtain blood culture results from patients with possible CLABSI or do not accurately publicly report their cases of CLABSI reap potential benefits in terms of marketing and prestige. Even an announcement by CMS of a program to periodically audit a proportion of hospitals for the accuracy of their data on CLABSI could have an enormous impact on the subsequent behavior of epidemiologists and clinicians in these individual facilities. Initially, audits could be focused on hospitals that report either exceptionally low numbers of blood cultures or low proportions of BSIs that are deemed to be CLABSIs.

We believe that the current status quo is unfair. Fixing this problem will require more than the threat of verification of the accuracy of reported data. Better metrics, better methods of surveillance, and more reliable and specific surveillance definitions are needed. Without better metrics to assess the validity of the data that are publicly reported about CLABSIs, we believe that the potential for cheating will become even more widespread than the gambling that was going on in the fictional Café Americain.

The Centers for Disease Control and Prevention has announced that it is developing validation practices that can be incorporated into the NHSN system as business rules or data

quality reports. The Healthcare Infection Practices Advisory Committee is also considering modifications of the current NHSN surveillance definitions.¹⁵ We support these changes but remain skeptical that only minor changes in the current NHSN surveillance definitions, internal data entry practices, or better education of infection preventionists will solve many of the problems discussed above.

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