TABLE 2. Urinary Tract Infection Incidence and Prevalence

Formula version	Incidence (measured: 1.9)	Prevalence (measured: 3.2)
Published[a]	0.56	7.60
Adjusted 1[b]	2.29	2.66
Adjusted 2[c]	1.14	5.32

[a] The formula published by Rhame and Sudderth.[1]
[b] Using the minimum antibiotic treatment duration of 7 days as the length of infection.
[c] Using the maximum antibiotic treatment duration of 14 days as the length of infection.

allowed for cases of HCA UTI to be diagnosed on the basis of clinical symptoms only, meaning that we are not necessarily comparing like with like. However, in this scenario, the assumption is that the incidence would be underestimated in a laboratory system. Using the formula as it is presented by Rhame and Sudderth[1] for converting the prevalence to incidence instead shows the laboratory-based incidence to be an overestimation.

Earlier studies have commented on the questionable accuracy of this formula for converting incidence and prevalence data.[4-6] There are important arguments for the poor performance of the conversion. First, the types of data being compared represent different diagnostic criteria. Second, reflecting the argument put forward by Hoare et al,[5] patients who contract HCA UTI are generally older and have comorbidities. Therefore, using their time in the hospital from diagnosis to discharge to reflect duration of infection is unreasonable.

Using antibiotic treatment as a proxy for infection duration greatly improved the comparability of the prevalence and incidence values, and we would recommend amending this formula to the following: $I = P \times (LA/\Delta Rx)$ and $P = I \times (\Delta Rx/LA)$, in which I is incidence, P is prevalence, LA is mean length of stay for all patients, and ΔRx is the duration of infection treatment.

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Redefining the National Healthcare Safety Network's Definition of Catheter-Associated Urinary Tract Infections: The Hazard of Including *Candida* Species

To the Editor—Catheter-associated urinary tract infections (CAUTIs) are a complication of urinary catheterization in hospitalized patients and represent a threat to patient safety.[1] CAUTI surveillance is a key tool to track the prevalence of this complication and measure the impact of prevention interventions. One key component of an effective surveillance program is valid measures of infection. *Candida* species are commonly isolated from the urine of hospitalized patients and may not represent urinary tract infection.[2,3] We believe including *Candida* species as part of the National Healthcare Safety Network (NHSN) surveillance definition introduces

inaccuracy into CAUTI surveillance efforts, making CAUTI surveillance measures imprecise and improvement efforts more difficult to assess.

As an example, at our medical center, an otherwise healthy 28-year-old woman presented with 1 week of productive cough, dyspnea, fevers, myalgias, and diarrhea after frequenting a steam room at her local gym. At admission to the hospital, she was intubated for hypoxemic respiratory failure with septic shock. Computed tomography of the chest revealed extensive, multilobar consolidations with moderate pleural effusions. Blood and sputum cultures obtained at admission showed no growth; however, a urine specimen had antigen test results positive for *Legionella*. The patient remained critically ill and febrile during the first week of hospitalization, but her condition gradually improved.

At admission, the patient had a urinary catheter inserted. On the fourth day of hospitalization, because of the patient's persistent fever, a urine culture was obtained that grew *Candida albicans*. Although both the infectious diseases consult service and the intensive care unit team attributed the patient's fever to severe *Legionella* pneumonia and did not treat the *Candida* colonization, the patient met the NHSN criteria for CAUTI.[4]

In 2013, the NHSN changed the definition of CAUTI such that fever is no longer allowed to be attributed to another cause in patients with a urinary catheter and positive urine culture.[4] Although this change increases the sensitivity of diagnosing CAUTIs for surveillance purposes, the specificity is substantially reduced, as in the case described above, and is less clinically relevant. Catheter-associated bacteriuria and funguria are common (5%–8% daily and 100% by 2 weeks), and national guidelines require that other etiologies of findings such as fever be ruled out before attributing them to a CAUTI and initiating treatment.[1,2]

As Fakih et al[5] and others have pointed out, the definitional change has serious financial implications for hospitals, which are mandated to report CAUTI rates, because Medicare reimbursement is affected by these data. Additionally, physicians may be more likely to inappropriately prescribe antibiotics to patients who, in reality, have asymptomatic bacteriuria but are now classified as having a CAUTI by the new NSHN criteria.[6]

To further illustrate the problematic nature of this new definition in terms of *Candida* species, following the 2013 definitional change, 40% of CAUTIs in our hospital were attributed to *Candida*. This is well above the nationally reported rates of candiduria (3%–32%), and the majority of these cases likely represent asymptomatic candiduria in patients who had alternative explanations for their fever (eg, sepsis from another source, neurologic injury, and trauma).[2]

We suggest that the NHSN revise the current CAUTI definition by removing *Candida* from the list of potential pathogens causing CAUTIs. Although there may be some true CAUTIs related to *Candida*, these are likely uncommon, and exclusion of these cases will have little impact on overall CAUTI rates. The current definitions threaten to create a system in which more than one-third of CAUTIs represent organisms of dubious pathogenicity in the urinary tract and undermine the validity of a tool that is critical for ongoing efforts to improve patient safety among hospitalized persons.

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