Background. Catheter-associated urinary tract infections (CAUTIs) are among the most common hospital-acquired infections. CAUTIs have gained attention due to public reporting and reimbursement implications. Urine cultures are often obtained for inappropriate indications, which can falsely elevate CAUTI rates. Our objective was to determine the impact of a new evidence-based urine culture algorithm on our CAUTI rates.

Methods. This quality improvement project was implemented at a 1,541 bed academic medical center in New Haven, CT. Our CAUTI performance improvement (PD) team, a collaboration between nurses, infectious disease physicians and urologists, developed a urine culture algorithm for catheterized patients in October 2017. This algorithm recommends directed evaluation of fever in a catheterized patient based on Infectious Disease Society of America guidelines (Figure 1). Education about appropriate culturing and catheter utilization was initiated November 2017, the algorithm was approved on December 27, 2017, and included in the electronic medical record February 2018. The incidence rates (IR) of CAUTI per 1,000 catheter days (CD), urine cultures ordered, catheter utilization days, and central line-associated bloodstream infection (CLABSIs) rates were compared for the quarter pre- and post-algorithm implementation.

Results. Our CAUTI IR decreased by >40% from 1.4 to 0.8 per 1,000 CD for the quarters pre- and post-algorithm implementation, respectively (Figure 2). Average monthly urine cultures ordered in catheterized patients decreased by 28% from 120 (fourth quarter, 2017) to 84 post algorithm implementation (first quarter, 2018, Figure 3). The average monthly catheter days decreased by 1.5% (4,409 days in fourth quarter, 2017 to 4,342 in first quarter, 2018). Despite the decrease in urine cultures ordered, we did not see a compensatory increase in CLABSI rates during the post-implementation period.

Conclusion. Thoughtful culturing through algorithm-directed evaluation of fever based on signs and symptoms combined with staff education about culturing and catheter utilization led to reduction in unnecessary urine culture orders and CAUTIs. Our next steps are to evaluate the impact of this algorithm on antibiotic utilization and C. difficile rates, and examine the sustainability of these interventions over time.
2120. The Culture of Culturing Catheterized Patients: A Multi-Hospital Survey of Nurses and Physicians

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Background. Many cases of catheter-associated urinary tract infection are actually asymptomatic bacteriuria (ASB) that does not require antibiotic treatment. A positive urine culture often drives initiation of antibiotics in ASB. There is a growing need to focus on the culture of culturing. The aim of this project was to evaluate our current practice of obtaining urine cultures in catheterized patients and find opportunities for education.

Methods. This study was conducted at three hospitals with 1541, 383, and 206 beds in the Yale New Haven Health System in CT between January 10, 2018 and March 12, 2018. Electronic and paper surveys were distributed to medical and nursing staff. The survey included questions related to indications for ordering urine cultures in catheterized patients. Appropriateness of culturing was assessed based on Infectious Diseases Society of America guideline recommendations. A 12-point score was calculated with 1 point for each incorrect answer. The differences between the mean scores were analyzed by analysis of variance and t-tests. Data were analyzed using STATA Version 15.

Results. We received 618 complete responses from 330 (54%) nurses and 256 (41.4%) physicians. Mean scores for Hospitals 1, 2 and 3 were not significantly different (4.79, 5.61, 4.87; Figure 1). Physicians scored higher than nurses (4.2 vs. 5.1, P < 0.01). Peri-urologic surgery, despite being an acceptable indication, was one of the least-selected answers (18%). Nurses were more likely to order urine culture for appearance (61% vs. 20%, P < 0.01) and odor (73% vs. 37%, P < 0.01), when compared with physicians (Figure 2).

Conclusion. Our data show that current urine culture ordering practice in a large teaching healthcare system is not evidence based. This survey reveals knowledge gaps and the need to address practice competencies, suggesting the need for periodic audits and education in diagnostic stewardship. Future studies should focus on impact and sustainability of educational interventions in these groups.

2121. Shifting Surgical Site Infection Denominators and Implication on NHSN Reporting

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Background. Per National Healthcare Safety Network (NHSN) rules, when multiple procedures are performed during a single operation, the operation is counted in the surgical site infection (SSI) denominator of each NHSN surgical procedure category. SSls, however, are counted only in the highest-ranking procedure category. These rules result in procedures that are ineligible to have an associated SSI being counted in SSI denominators.

Methods. We analyzed 3 years (January 1, 2015–December 31, 2017) of laminectomy and rectal surgery SSI data from hospitals in the Duke Infection Control Outreach Network (DICON) that used ICD procedure codes to assign denominators per NHSN definitions. We compared SSI rates using two different denominators: NHSN denominators vs. reduced denominators that counted only primary laminectomy and rectal surgery procedures. We calculated rate ratios (RR) to compare the NHSN and adjusted SSI rates for each procedure for all hospitals that reported at least 1 SSI.

Results. Eleven hospitals reported 87 infections following 17,247 laminectomy procedures. The overall SSI rate increased by 44% when only primary procedures were counted in the denominator (RR 1.44); but individual hospital RR ranged from 1.10 to 2.20 (Table 1). 5 hospitals reported seven SSIs following 740 rectal procedures. The overall SSI rate increased by 143% when only primary procedures were counted in the denominator (RR 2.43), but individual hospital RR ranged from 2.00 to 5.00 (Table 1).

Conclusion. NHSN's method for calculating SSI denominators underestimates true SSI rate. The current method particularly impacts procedures that are frequently performed in conjunction with higher-ranking NHSN procedures. Counting only primary procedures in procedure category denominators would provide higher, more accurate SSI rates.

Table 1. Comparison of SSI Rates Calculated Using Adjusted Denominators vs. NHSN Denominators

| Procedure            | Hospital | Adjusted Rate | NHSN Rate | RR |
|----------------------|----------|---------------|-----------|----|
| Laminectomy Procedures |          |               |           |    |
| Hospital 1           | 1        | 0.55          | 0.50      | 1.10 |
| Hospital 2           | 2        | 0.61          | 0.53      | 1.15 |
| Hospital 3           | 3        | 0.63          | 0.55      | 1.16 |
| Hospital 4           | 4        | 0.26          | 0.22      | 1.22 |
| Hospital 5           | 5        | 1.18          | 0.90      | 1.30 |
| Hospital 6           | 6        | 1.43          | 1.06      | 1.34 |
| Hospital 7           | 7        | 0.24          | 0.18      | 1.34 |
| Hospital 8           | 8        | 0.99          | 0.70      | 1.41 |
| Hospital 9           | 9        | 0.82          | 0.46      | 1.77 |
| Hospital 10          | 10       | 0.84          | 0.41      | 2.05 |
| Hospital 11          | 11       | 1.09          | 0.50      | 2.20 |
| Overall              |          | 0.72          | 0.50      | 1.44 |
| Rectal Surgeries     |          |               |           |    |
| Hospital 1           | 1        | 9.52          | 4.77      | 2.00 |
| Hospital 2           | 2        | 0.60          | 0.27      | 2.27 |
| Hospital 3           | 3        | 2.53          | 1.07      | 2.37 |
| Hospital 4           | 4        | 2.70          | 0.81      | 3.35 |
| Hospital 5           | 5        | 5.00          | 1.00      | 5.00 |
| Overall              |          | 2.30          | 0.95      | 2.43 |

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