

Shifting Surgical Site Infection Denominators and Implication on NHSN Reporting



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Abstract

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. SSIs, 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 (1/1/15-12/31/17) 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 2 different denominators: NHSN denominators versus 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: 11 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. 5 hospitals reported 7 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.

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.

Background

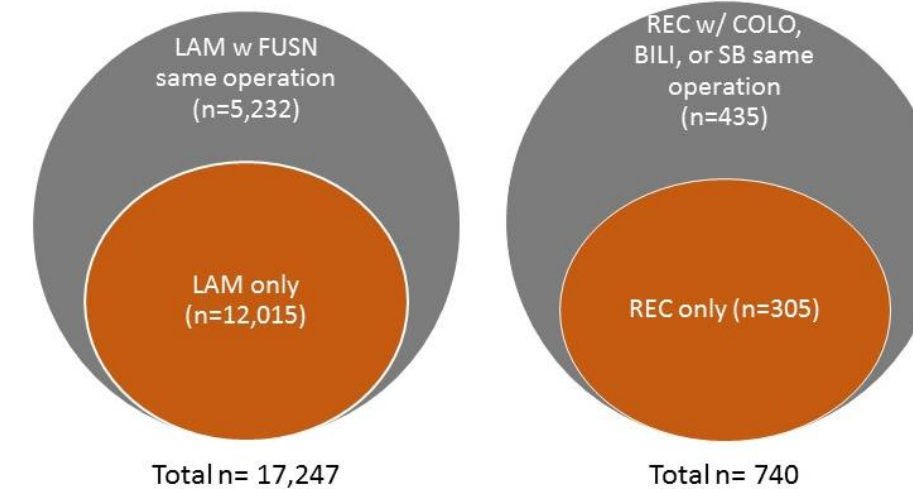
- When multiple procedures are performed during a single operation, National Healthcare Safety Network (NHSN) rules currently require that each operation is counted in the surgical site infection (SSI) denominator of each NHSN surgical category.
- However, SSI numerators are only counted for the highest-ranking surgical procedure category
- This calculation method may lead to inaccurate SSI rate calculations

Methods

- Analyzed 3 years of data (12/31/14-1/1/18)
- Laminectomy and Rectal Surgery data from Duke Infection Control Outreach Network (DICON)
- Calculated SSI rate according to current NHSN rules
- Calculated SSI rate with adjusted denominators, which only counted the surgery in the denominator if it was the only procedure performed during the operation.
- Compared SSI rates with current NHSN denominators and adjusted denominators

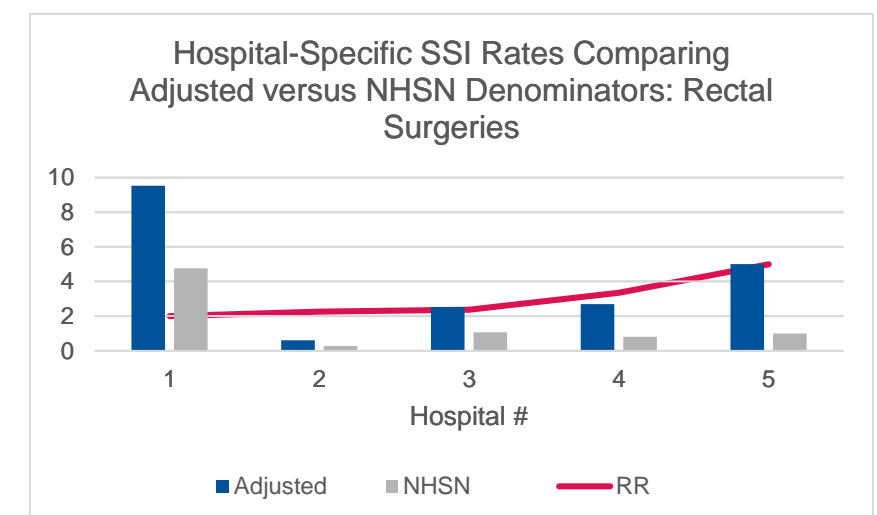
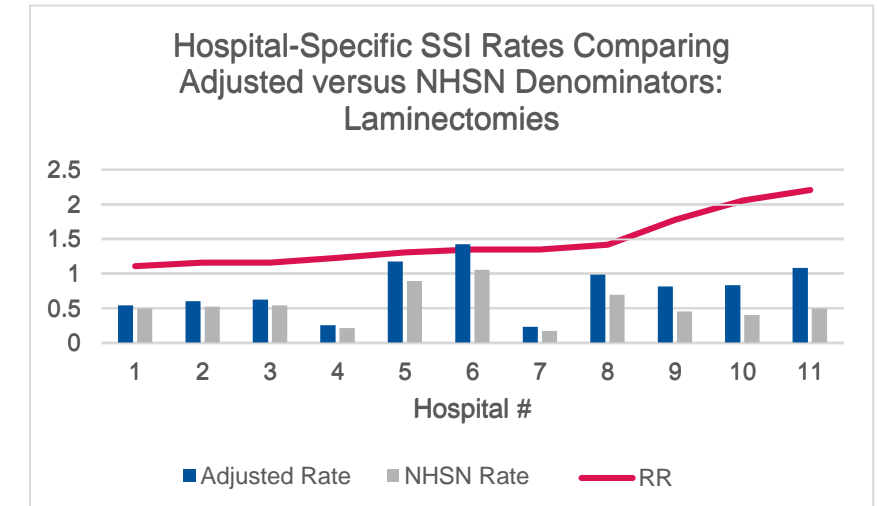
Results

Comparison of SSI Rates Using Adjusted versus NHSN Denominators: Overall Results



| | # of Hospitals | Total SSIs (numerator) | NHSN Denominator | Adjusted Denominator | Adj vs. NHSN SSI Rate Ratio |
|-----|----------------|------------------------|------------------|----------------------|-----------------------------|
| LAM | 11 | 87 | 17,247 | 12,015 | 1.44 |
| REC | 5 | 7 | 740 | 305 | 2.43 |

NHSN Procedure Key: LAM – laminectomy; FUSN – spinal fusion; REC – rectal surgery; COLO – colon surgery; SB – Small bowel surgery; BILLI – biliary surgery



Conclusions

- The current method of calculating SSI rates underestimates true SSI rates
- Current calculations impact lower-ranked procedures that are commonly performed in conjunction with higher-ranked procedures
- Calculating SSI rates with denominators that only count the procedure if it was the only surgery performed will provide more accurate SSI rates.