Surgical Site Infection Determination in Epic® ICON: A Utilization Model

Sarah Elizabeth Totten, Dr.PH, M(ASCP), CIC[1], Shane Hansen, MT(ASCP)SC, MSM(IT), Michelle Barron, MD[3] and Larissa Pisney, MD[3]
[1]Infection Prevention and Control, University of Colorado Hospital, Aurora, CO, [2]UCHealth Memorial Hospital, Colorado Springs, CO, [3]Division of Infectious Diseases, University of Colorado School of Medicine, Aurora, CO

Contact Information:
SarahElizabeth.Totten@uchealth.org

73021

Background

Prior to 2016, our hospital used microbiology results alone to investigate surgical site infections (SSI). Previous studies show that this practice can miss as many as half of clinically significant infections.[1] To improve accuracy for fiscal year 2016, SSI surveillance was done by manual chart review of 100% of the surgeries we report to CDC's National Healthcare Safety Network (NHSN). While more accurate, this process was time and labor intensive. In May 2016, we began using Epic® ICON as our data mining software. ICON can abstract (create denominator data), determine SSI status (create numerator data) and upload to NHSN. Data indicates that partially automated SSI surveillance reduces manual chart review but our team found that many charts were being reviewed unnecessarily using the ICON foundation system.[2] We developed a modified computerized algorithm within ICON that would not only capture SSIs but limit the number of charts requiring manual review by an Infection Preventionist.

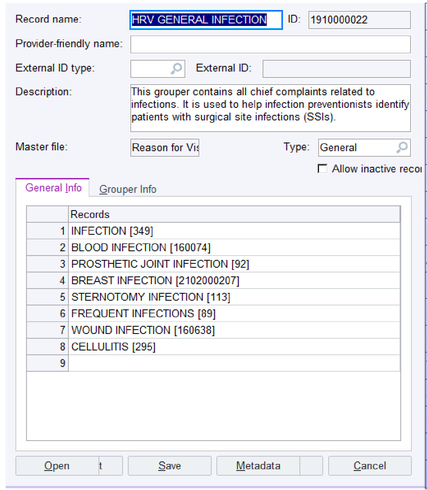
Methods

Algorithm variables within Epic® ICON were modified to limit data collection to the following parameters: readmission, chief complaint, surgical log, diagnosis, antibiotic administration 48 hours post-operatively and specific microbiology results. We excluded 31 key words that were part of the Epic® ICON foundation system from our algorithm. For example we removed the keyword "infection" which flagged whenever "no infection" was charted. The chief complaints grouper was most important as it allowed only meaningful complaints to be considered. Microbiology results were also limited to only include aerobic/anaerobic, fungus, AFB and wound cultures. To validate the algorithm, it was run retrospectively for fiscal year 2016. Screen shots for specific settings are shown in Figure 1.

Results

There was 100% concordance of results comparing SSIs identified using manual chart review to the use of our computerized algorithm. Table 1. shows the average number of charts requiring review pre and post implementation.

Figure 1. Chief Complaints Used and Key Words Removed in Modified Algorithm



Keywords Omitted	
Fever	Apnea
Erythema	Bradycardia
Dehiscence	Lethargy
Manually Opened	Cough
Inflammation	Nausea
Fluctuance	Vomiting
Fluid Collection	Dysuria
Fluid With Rim	Wound Infection
Abscess	Infection
Post-Op Infection	Pus
Purulent	Cellulitis
Drainage	Nodular
Tenderness	Hyperthermia
Swelling	Sinus Tract
Redness	Chills
Heat	Surgical Site Infection
Hypothermia	Foul Smelling

Figure 2. Four Step Approach to SSI Surveillance

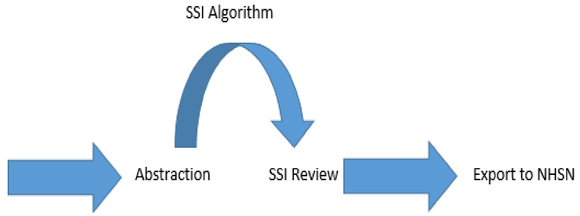


Table 1. Comparison of Charts Requiring Review Pre and Post Implementation

	Monthly Average with Manual Chart Review	Monthly Average with Computerized Algorithm	Improved Efficiency
BRST	63	27	57%
COLO	43	21	52%
HYST	38	7	82%
HPRO	72	30	59%
KPRO	59	27	55%
CBGB	30	5	83%

Conclusion

Careful modification of the ICON foundations system resulted in a 55% decrease overall in the need for chart review without affecting accuracy of reporting. These modifications also create a simplistic four step approach to SSI surveillance that is reproducible and easy to train new Infection Preventionists to follow which is shown in Figure 2.

References

1. Putnam LR, Ostovar Kermani TG, Le Blanc A, Anderson KT, Holzmann-Pazgal G, Lally K, Tsao K. (2017). Surgical Site Infection Reporting: More Than Meets the Agar. *Journal of Pediatric Surgery*, 52, 156-160.
2. Knepper B, Young H, Jenkins T, & Price C. (2013). Time-Saving Impact of an Algorithm to Identify Potential Surgical Site Infections. *Infection Control & Hospital Epidemiology, 34*(10), 1094-1098.