

NHSN Procedure Denominator Optimization

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PURPOSE

The National Healthcare Safety Network (NHSN) employs the Standard Infection Ratio (SIR) as a benchmarking tool to monitor and track incidences of Surgical Site Infections (SSIs) in healthcare settings. The SIR is calculated by dividing the *observed number of infections* by the *predicted number of infections*. The predicted number of infections is calculated by a logistic regression model which adjusts for several risk factors that have been found to be significantly associated with differences in infection incidence. During chart abstraction, the Infection Preventionists observed that EPIC's capture of some of these risk factors was suboptimal resulting in fewer adjustments to SSI risk than was clinically indicated. This could result in fewer predicted infections, a higher SIR, and increased monetary penalties for the organization related to the higher SIR.

BACKGROUND

LOL underwent a transition to the EPIC Electronic Health Record (EHR) system in 2017, and since 2018, there has been no subsequent review of the hierarchies used in procedure denominator mapping. This mapping should reflect the most recent NHSN guidelines for reporting. Most of the information required for denominator reporting is auto-populated from surgical procedure documentation. Additional information is pulled from other areas of the patient chart (examples: diagnosis and MAR.) Infection Prevention, Quality leads, and Surgical Services leads reviewed the accuracy of EPIC's capture of procedure denominator risk parameters. Optimizations to denominator reporting were implemented throughout the health system and monetary impacts were multiplied by the number of facilities in FMOLHS.

In scope included the following risk parameters specific to COLO, KPRO, and HPRO: *Emergency, Trauma, Diabetes Mellitus, General Anesthesia, ASA score, Wound Class, Scope, Closure Technique, HPRO Procedure Type, and KPRO Procedure Type.*

APPROACH

Infection Preventionists utilized the Plan-Do-Study-Act (PDSA) model to

1. review current state EHR mapping,
2. identify areas which may be modified,
3. provide optimization requests to EPIC analysts,
4. analyze results after optimization, and
5. discuss areas which may need further optimization requests.

Review started with the risk adjustment parameters of *Emergency* and *Trauma*. Subsequent risk parameters were reviewed on an individual basis. To sustain improvements and ensure compliance with NHSN reporting requirements, Infection Prevention will review NHSN quarterly newsletters and annual Patient Safety Component publications.

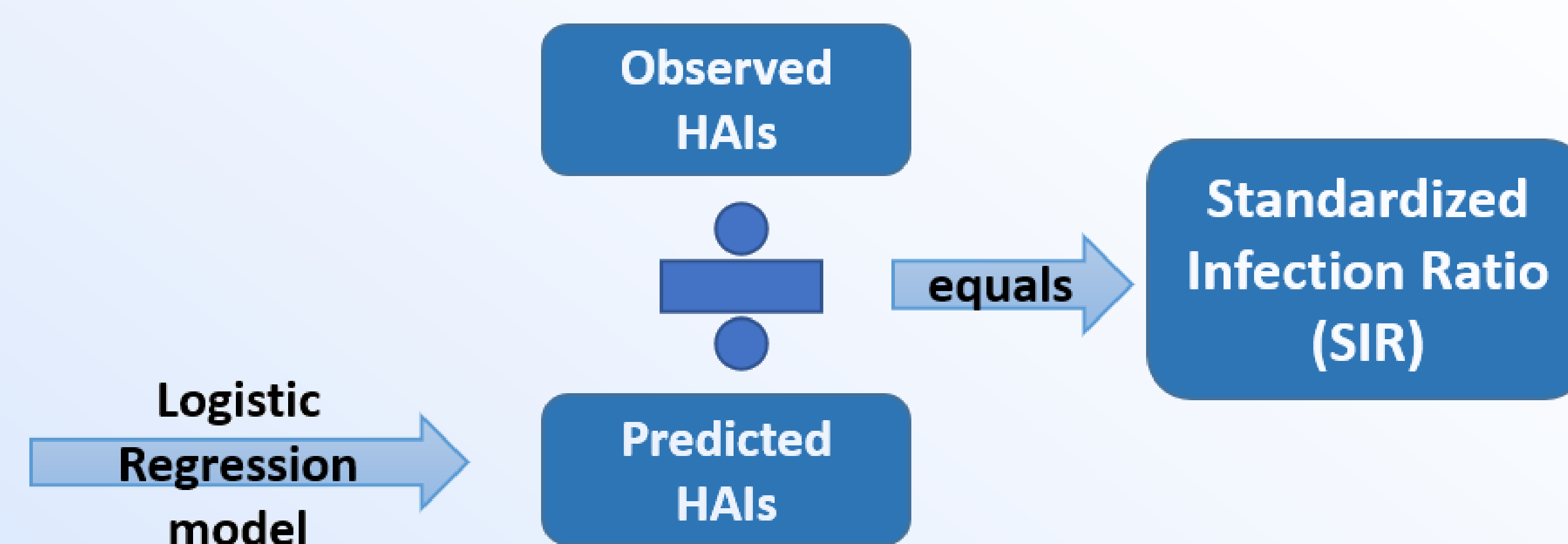
RESULTS

Our aim was to capture a greater number of risk factors to report to the National Healthcare Safety Network (NHSN), in order to increase the Predicted Number of Infections. To achieve this, we utilized the Fiscal Year 2023 SIR goals for COLO, HPRO, and KPRO, and the NHSN Complex A/R SSI data report to calculate a new goal metric, namely the Predicted Number of Infections divided by the Procedure Count. As of May 1, 2023, all ten risk parameters have completed phase 1 optimization. Although the increases observed in the goal metrics for all three procedure types were not statistically significant, they demonstrated a relative increase from the baseline. Currently, we are conducting an analysis to determine which parameters may benefit from phase 2 optimization.

CONCLUSION

This project has emphasized the potential shortcomings of relying solely on Electronic Health Record (EHR) automated capture of reportable data. However, through a collaborative effort among the Infection Prevention team, Surgical Services, and EPIC analysts, measurable improvements were achieved in reporting the clinical risks associated with Surgical Site Infections to the National Healthcare Safety Network (NHSN).

Risk Factors



Procedure Type	Baseline	Goal	Optimization Average	Relative Change from Baseline	P-value
COLO	0.0363	0.0386	0.0373	2.75%	0.217017281
HPRO	0.0091	0.0196	0.0111	21.98%	0.877299224
KPRO	0.0046	0.0100	0.0048	4.35%	0.275475337

Baseline time frame: September 2021- August 2022
 Optimization time frame: September 2022- April 2023
 Data Source: NHSN Adult Complex Admission/Readmission SSI Data by Procedure
 Data current as of May 1, 2023
 Statistical analysis to calculate P-value by analysis of variance (ANOVA)