

BACKGROUND

Surgical site infection (SSI) surveillance traditionally requires manual chart review of every targeted procedure across the full postoperative window (approximately 1900 procedures per year). At University Medical Center of Southern Nevada, a 541-bed academic medical center, four infection preventionists (IPs) perform this exhaustive work, detracting from other meaningful infection prevention activities. We are systematically investigating an Epic electronic health record (EHR)-embedded report that uses an algorithm to flag possible SSIs using eight clinical indicators. Institutions commonly deploy such tools without verifying how they work.

PURPOSE

This ongoing quality improvement project set out to optimize the EHR surveillance tool algorithm and minimize the procedures requiring manual chart review without sacrificing SSI capture.

METHODS

A four-year cohort of 7,622 inpatient procedures and 204 confirmed SSIs, spanning 2022 to 2025, was locked as an immutable reference standard. Successive algorithm configurations were tested against it one indicator setting at a time, using an iterative Plan-Do-Study-Act cycle structure informed by anomalies identified in the preceding cycle. Every cycle utilized a two-by-two confusion matrix to evaluate reduction in cases to review and capture failure rate, with SSI capture as a fixed imperative. A concurrent time study, currently covering six of ten procedures, is underway to characterize and quantify the work capacity returned to IPs by the optimization of the report's configuration.

“40 hours returned to our team every year...

And we're not done.”

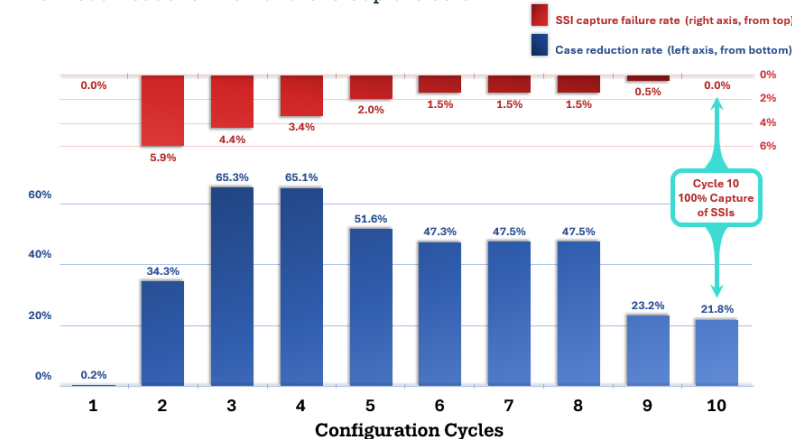
*40 hours estimate based on Cycle 10 findings



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Algorithm Performance by Configuration Cycle

Workload Reduction Vs. Failure to Capture SSIs



Cycle	Configuration State	Procedures Flagged	Case Reduction	Sensitivity	Specificity	PPV	NPV	SSIs Missed	SSI Failure Rate
1	Algorithmic report activated (configuration uncharacterized)	7607	0.2%	100.0%	0.2%	2.7%	100.0%	0	0.0%
2	Keywords deactivated	5005	34.3%	94.1%	35.1%	3.8%	99.5%	12	5.9%
3	Rogue Diagnosis settings reset to vendor configuration; Labs activated	2648	65.3%	95.6%	66.9%	7.4%	99.8%	9	4.4%
4	L08.9 code added to Diagnosis group for all 10 NMSN procedures	2663	65.1%	96.6%	66.8%	7.4%	99.9%	7	3.4%
5	Antibiotics activated with institution-defined configuration	3689	51.6%	98.0%	53.0%	5.4%	99.9%	4	2.0%
6	Keyword "pus" activated	4019	47.3%	98.5%	48.5%	5.0%	99.9%	3	1.5%
7	Keyword "pus" relegated to note type "Progress Note"	3998	47.5%	98.5%	48.8%	5.0%	99.9%	3	1.5%
8	Characterization of indicators: Chief Complaints, Labs, Antibiotics, Returns to Surgery	3999	47.5%	98.5%	48.8%	5.0%	99.9%	3	1.5%
9	Imaging indicator activated at Foundation configuration	5851	23.2%	99.5%	23.9%	3.5%	99.9%	1	0.5%
10	Keyword "wound infection" added to note type Progress Note	5958	21.8%	100.0%	22.4%	3.4%	100.0%	0	0.0%

Figure 1. Algorithm Performance by Configuration Cycle. [Original graphic]. Workload reduction compared to failure to capture SSIs; Baseline data set from 2022-2025 includes 7,622 procedures with 204 confirmed SSIs. Adapted from University Medical Center of Southern Nevada, 2026.

RESULTS

Ten cycles were completed. At default settings the algorithm removed only 0.2% of procedures from review. Deactivating the counterproductive keywords indicator cut volume by more than one-third but missed twelve infections; investigation revealed that the diagnosis indicator had been configured with clinically incongruous codes for more than eight years. Adding this correction yielded the highest aggregated reduction at 65.3% but still missed nine SSIs. Iteration continued until Cycle 10, when all 204 SSIs were flagged: 100.0% sensitivity at 21.8% case reduction. Non-SSI cases were timed at an average 5 min 41 sec for review, yielding an estimated annual average time of 39 hr 24 min returned to IPs (Cycle 10 configuration).

CONCLUSIONS

Iterative optimization achieved complete SSI capture while removing approximately one in five procedures from manual review. Because underreporting is a data integrity failure rather than an acceptable tradeoff, configuration was expanded until no SSIs were missed. A long-standing configuration error, invisible in routine use, demonstrated that algorithmic tools can fail silently and that structured interrogation by frontline clinicians can remediate those failures. Work to narrow indicator settings beneath the established capture ceiling continues with passive sensitivity monitoring activities surfacing SSIs as a validation mechanism.

REFERENCES

References available upon request and QR code scan.

