

Seasonality of Surgical Site Infections Across the UHealth System: An Analysis of 352,074 Operations



Surgical Outcomes
and Applied Research

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Background

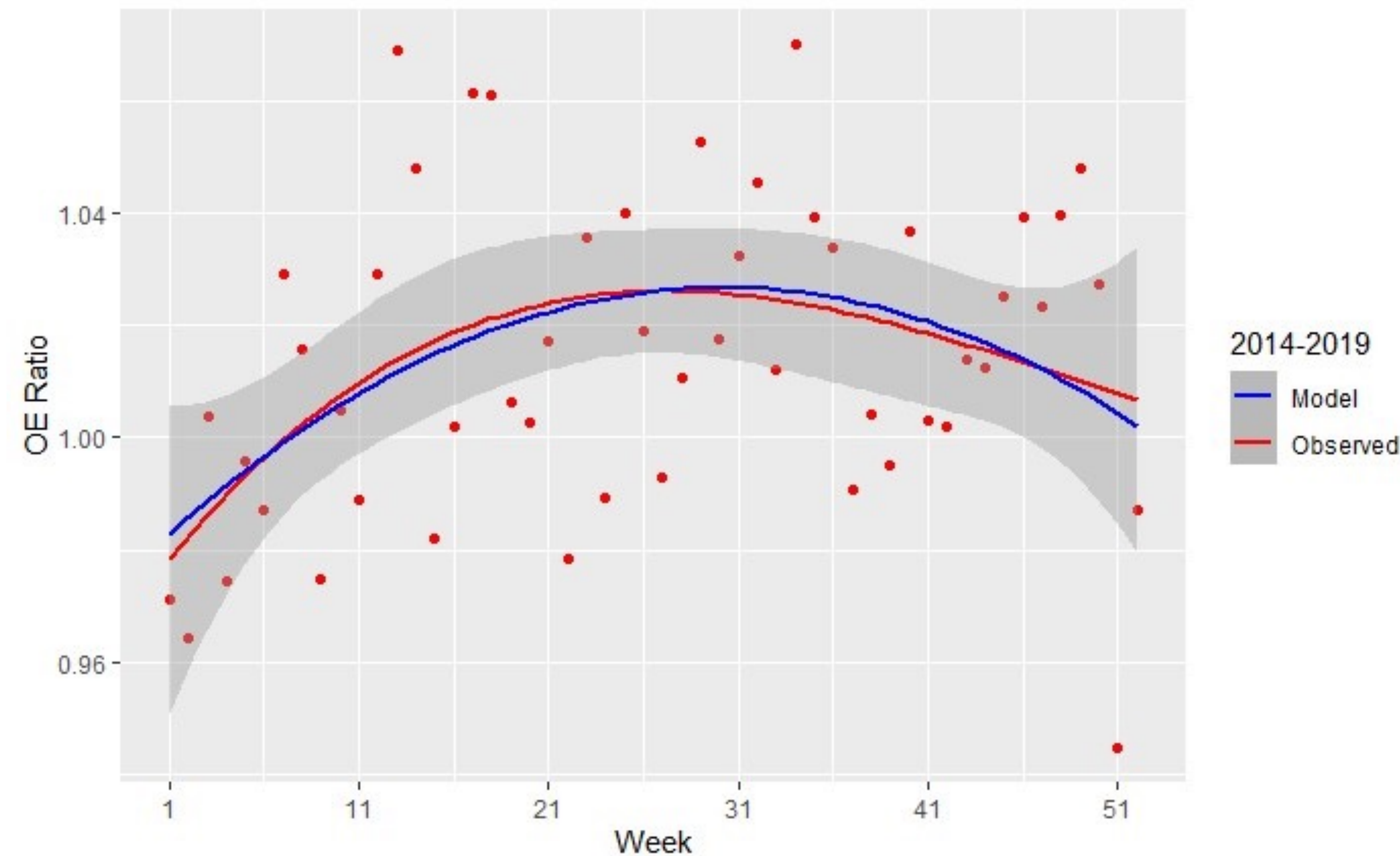
- Approximately 15 million people undergo surgery each year, and between 0.5-5.2% will develop a surgical site infection (SSI).
- SSIs increase length of stay and are the leading cause of readmissions, increased medical debt, and post-surgical morbidity and mortality.
- Various factors can impact the incidence of SSIs, including medical history, age, type of procedure, and season.
- **Hypothesis:** the incidence of SSI at the UHealth system varies over the course of the year.

Methods

- This was a retrospective review of surgeries at UHealth from 2014-2019.
- Observed/Expected (OE) Ratios were estimated using previously published Automated Surveillance of Postoperative Infections (ASPIN) models.
- Seasonality was modeled using a cubic smoothing spline and a generalized linear mixed model with a quadratic transformation of week of the year.

Results

- 352,074 surgeries were included in the analytic cohort.
- 58.7% were female, 80.6% were white, and 61.2% were ASA Class I or II.
- 24.3% were general surgery and 29.6% were orthopedic surgery cases.
- 38.5% of surgeries were performed at Anschutz Medical Campus, 32.6% at the North Campus, and 28.8% at the South Campus.



- SSIs are seasonal within the UCH system, with the highest rates around weeks 22-36 (end of May – beginning of September) (P value <0.01).
- Secondary findings: UCH had more SSIs than the other hospitals (P value <0.01), but this did not correspond to a specific spike in July.

Conclusions and Implications

- We incorporated novel applications of artificial intelligence methods to predict preoperative risk and postoperative probability of SSI.
- Our results support prior work suggesting a significant peak in SSIs during summer months
- Our work differs from previous studies because we investigated various surgical subspecialties within a single healthcare system, encompassing cases from teaching and non-teaching hospitals.
- This study is important because it opens the conversation about the importance of temporal planning in surgical outcomes.
- A secondary endpoint of this study is demonstrating the functionality of ASPIN to predict preoperative and identify postoperative infectious complications.
- Further research is needed to understand this increase beyond what is expected, given the patient's risk factors.