Automation of Standardized Infection Ratio (SIR) to Reduce Manual Work and Support Targeted and Flexible Analysis of Healthcare-associated infections (HAIs)

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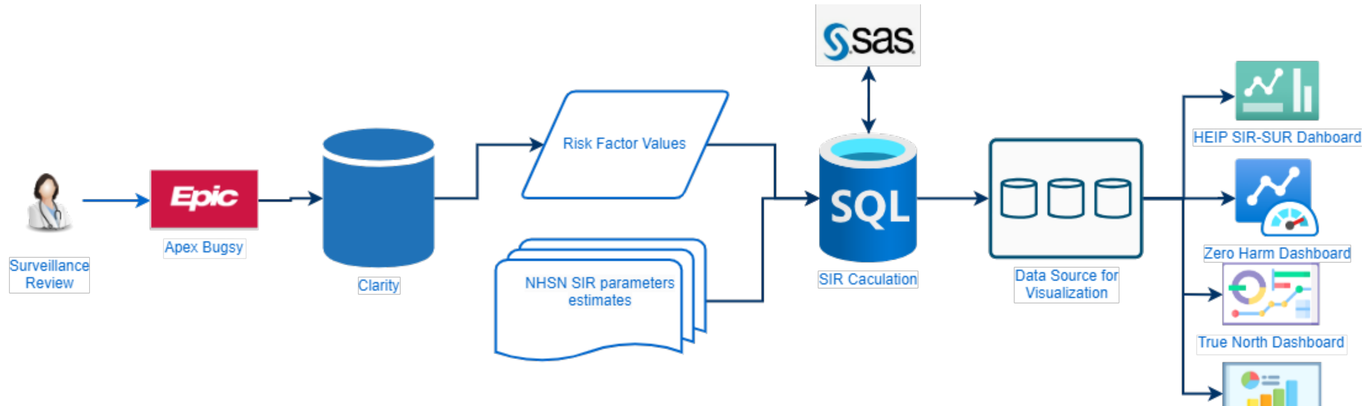
Background

- At the University of California, San Francisco (UCSF Health) one of the True North strategic priorities is to Achieve Zero Harm.
- Enterprise goals for healthcare-associated infections (HAIs) are set using the standardized infection ratio (SIR).
- The SIR and the standardized utilization ratio (SUR) are primary summary measures used by the CDC's National Healthcare Safety Network (NHSN) to risk adjust HAIs and device utilization.
- Broad data accessibility is critical for our HAI reduction efforts, however the NHSN web-based application does not currently allow a secure a data feed from NHSN to local data sources.

Methods

Following the parameter and parameter estimates produced by NHSN's logistic regression and negative binomial regression models, we calculated the number of predicted infections via our department's structured query language (SQL) database. This data is extracted and calculated daily using SQL and Statistical Analysis System (SAS) programming, with metadata-driven configuration and parameterization, all from which we built Tableau dashboards available via an enterprise Tableau server.



Results

- UCSF is the 1st to accomplish this flexible, 100% automated, SIR/SUR data source in the UC Health system.
- This automated process eliminated the following monthly manual work: generation of 16 NHSN reports saving 40 hours (25%) of FTE resources.
- Provided timely enterprise access to SIR and SUR based analysis to drive reduction efforts.
- Filled 2 analytic gaps that the NHSN web application currently does not provide:
  - Surgical site infection (SSI) Targeted Assessment for Prevention (TAP) report for adult and pediatric NHSN procedure categories.
  - Separate adult/pediatric monthly hospital onset *C. difficile* SIR.

Goal

Eliminate manual workflow and create a more flexible data source to support HAI analytics:

- ✓ Develop an automated and dynamic end-to-end data architecture for SIR/SUR calculations, to feed Tableau dashboards.
- ✓ Ensure automation is 100% aligned with NHSN analysis.
- ✓ Build the data source to be flexible to allow for periodic updates to the risk models and facility characteristics.
- ✓ Provide timely SIR and SUR data to drive improvement efforts.

Figure 1: SIR Dashboard by Metric and Population

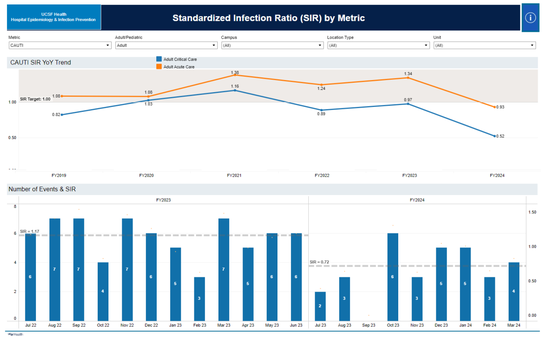


Figure 2: TAP Dashboard by Metric and Population

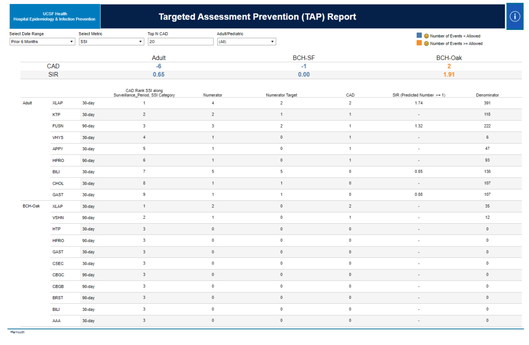
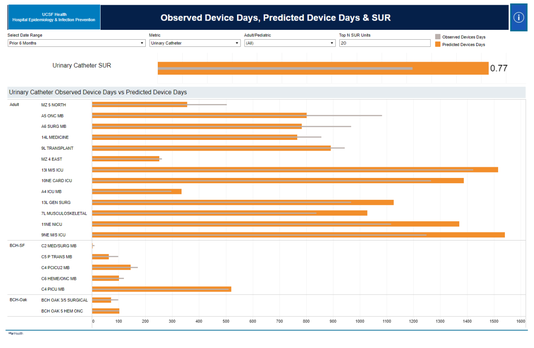


Figure 3: SUR Dashboard by Metric and Population



Conclusions

This automated approach to calculating the SIR and SUR delivers timely and dynamic analysis with operational efficiency, allowing interventions to be focused and prompt.