Universal MRSA Decolonization of Critically Ill Patients: An intervention to decrease central line associated bloodstream infections

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BACKGROUND

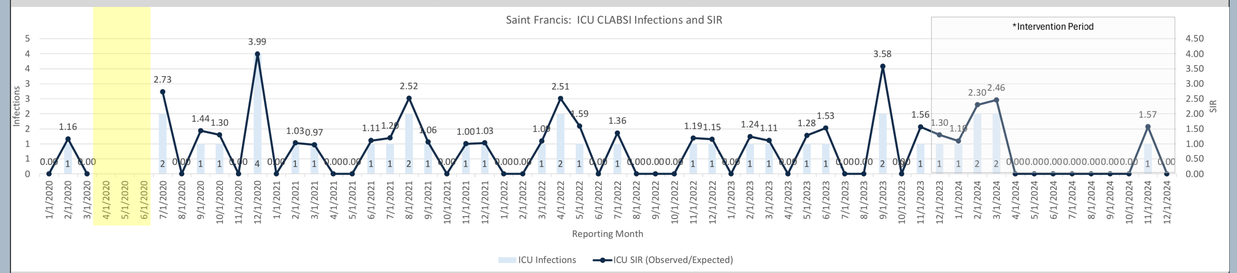
- Many studies have demonstrated that daily chlorhexidine bathing in the ICU is successful at reducing HAIs.
- The REDUCE MRSA trial in 2013 then looked at the use of intranasal mupirocin to determine what was more effective for infection reduction; targeted or universal MRSA decolonization.
- Their results demonstrated that universal decolonization is superior at reducing both MRSA + cultures and all cause bloodstream infections. The methods by which they performed universal decolonization was with daily chlorhexidine baths and intranasal mupirocin twice daily.
- There were some concerns regarding the practicality of the REDUCE MRSA trial. One concern was the potential for mupirocin resistance over time. With the Mupirocin Iodophor swap out trial in 2021, mupirocin was shown to have similar rates of effectiveness when comparing it to the 2013 trial.
- We implemented the REDUCE MRSA 2013 protocol at our institution with the goal of reduce central line associated bloodstream infections (CLABSIs).

METHODS

- All patients admitted to the med/surg ICU and cardiac ICU at St Francis Hospital starting in December of 2023 received daily intranasal mupirocin and chlorhexidine bathing regardless of their MRSA status.
- The primary outcome assessed was the CLABSI rate per month.
- The secondary outcomes include the standard infection ratio and CLABSI per central line day.
- We compared CLABSI data from pre-initiation of the universal MRSA decolonization (2020- 2023) vs post-initiation data (2023 – 2024).
- We used unpaired t testing to assess the CLABSI rate per month and used a negative binomial regression model to calculate the standard infection ratio according to the NHSN 2015 national baseline.

STATISTICS

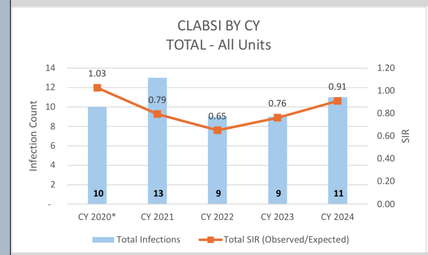
CLABSI per month in the ICU: January 2020 – December 2024

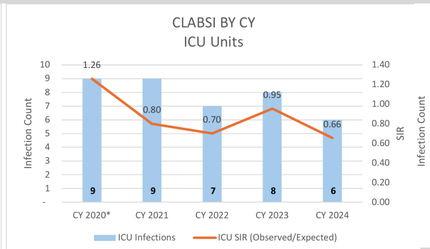


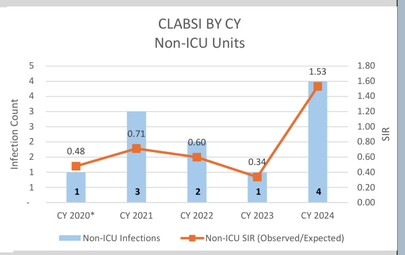
Highlighted area indicates gap in data due to CMS Extraordinary Circumstances Exception (ECE) offered during COVID and/or CMS decision to not report hospital infection data for those months.

*Intervention of universal MRSA decolonization with intranasal mupirocin was initiated December 2023 in the ICU units.

CLABSI by Calendar Year: 2020 – 2024 – Total, ICU, and Non-ICU







EQUATIONS

$$\text{CLABSI Rate*} = \frac{\text{\# CLABSIs identified}}{\text{\# central line-days}} \times 1000$$

$$\text{SIR} = \frac{Observed\ (O)\ HAIs}{Predicted\ (P)\ HAIs}$$

$$logit\ (\hat{p}) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_i X_i \text{ , where:}$$

α = Intercept

β_i = Parameter Estimate

X_i = Value of Risk Factor (Categorical variables= 1 if present, 0 if not present.

i = Number of Predictors

RESULTS

- We had a total of 6 CLABSIs in the ICU the year after initiating universal MRSA decolonization.
- The number of CLABSIs per month decreased from 0.65 per month from 2020-2023 down to 0.50 per month in 2024.
- The SI ratio from 2024 was 0.66, while the average SI ratio from 2020-2023 was 0.927.
- The CLABSI per central line day was 0.72 in 2024, compared to 0.77 from 2020-2023.

LIMITATIONS

- This is analyzing monthly data rather than an at an individual level, which makes it difficult to assess for statistical significance.
- 5 of the 6 CLABSIs occurred during January through March, which brings up the question if introducing these new changes required time for nurse training and compliance to improve.

CONCLUSIONS

- Our results suggest that universal MRSA decolonization in the ICU may decrease the number of CLABSIs.
- We will continue to collect more data in the coming years to assess for statistical significance.
- We recommend further research to see if there are potential benefits of universal MRSA decolonization in other areas of the hospital like step down units where MRSA infection rates are also high.

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