Implementation of a Clinical Decision Support Panel to Optimize Urine Culture Ordering

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Background

- Standard urine culture collection techniques have a high risk of false positive results in catheterized patients
- IDSA guidelines recommend replacing long-term catheters before specimen collection for cultures
- Clinical decision support (CDS) may aid in appropriate urine testing and collection techniques thus reducing diagnostic error
- Our Objective was to evaluate the effect of a CDS tool on urine culture orders and antibiotic use in catheterized patients

Figure 1. Order Panel Design

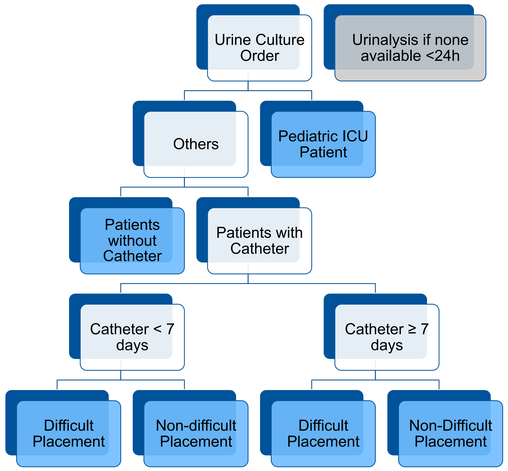


Figure 2.

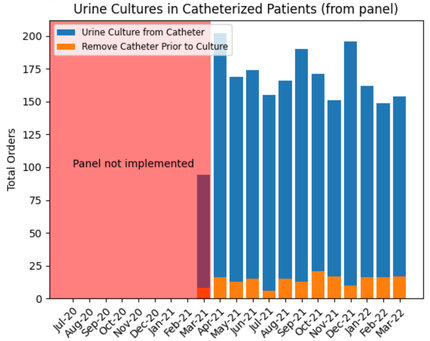


Figure 3.

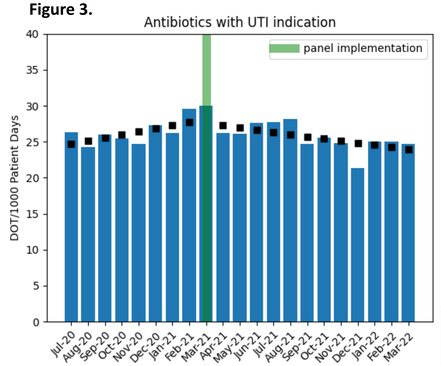


Figure 4.

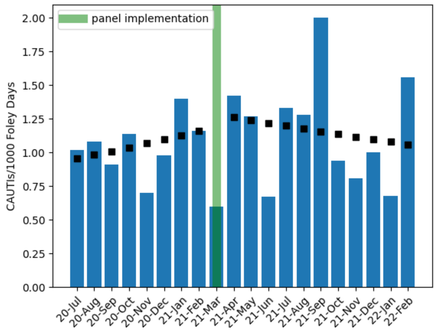
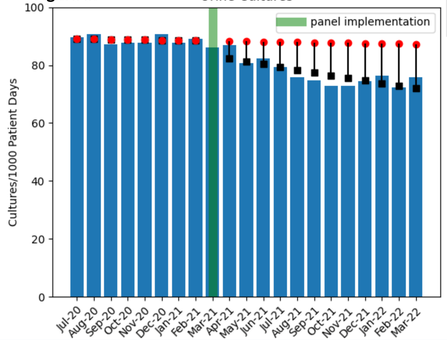


Figure 5.



Black boxes indicate Poisson regression model estimates

Red circles indicate predicted outcome without 'intervention'

Methods

- CDS order panel implemented 3/2021, identifies: if a urinalysis was ordered, special patient populations (i.e., PICU), presence and duration of an indwelling urinary catheter, If catheter had difficulty with placement (Fig.1)
- Retrospective evaluation of CDS order panel: Pre-implementation (7/2020-3/2021) and Post-implementation (4/2021-3/2022). Analysis via Poisson Regression

Results

- 69,280 urine culture orders were included within the study period
- Catheter removal selected from the panel in 183 of 2133 (8.5%) instances of ordering a urine culture when a catheter was detected
- During the post-implementation period, there was a decrease in trend of antibiotic use with UTI indications (Figure 3, 2.8% decrease/month, $p<0.05$)
- Similarly, there was a decrease in urine culture orders (Figure 5, 1.1% decrease/month, $p<0.05$)
- No significant change in CAUTI rates or catheter utilization post-intervention
- There was no change in numbers of safety events related to catheter insertion (2 pre-, 0 post-intervention)

Conclusions

- CDS can aid in optimizing urine culture collection practices and serve as a reminder for removal or replacement of long-standing catheters before urine culture
- Diagnostic test decision support can modify downstream outcomes such as antibiotic utilization
- We did not observe any unintended consequences like catheter trauma as a result of our intervention
- The recommended interval of 7 days for prompting catheter removal or replacement provides a feasible time frame, as compared to prior studies that have recommended replacement too early (24-48hrs) or too late (14 days)