OPTIMIZATION OF THE URINE CULTURE PROCESS AT TEXAS CHILDREN'S HOSPITAL

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BACKGROUND

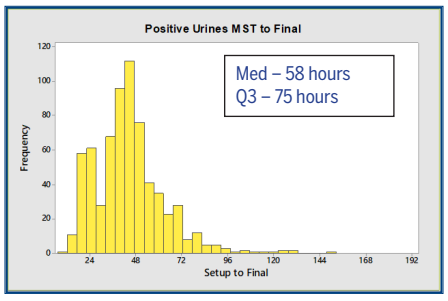
Prolonged turnaround times (TAT) for urine culture results can negatively impact patient care and antibiotic stewardship[1]. Traditional laboratory workflows often involve reading cultures only during a single shift, leading to delays for both positive and negative results. Continuous process improvement (CPI) initiatives offer a structured approach to optimize workflow efficiency and facilitate timely reporting of urine culture results.

OBJECTIVE

Implement time-based urine culture analysis with MALDI-TOF support to improve turnaround time, reduce costs, and enhance lab efficiency.

METHODS

Our gap analysis—a systematic evaluation to pinpoint variances between current laboratory processes and optimal performance—identified crucial inefficiencies, particularly in the scheduling of urine culture readings. Addressing this, we instituted a time-based microbiology approach, synchronizing the readings across shifts to match peak efficiency periods. This ensured continuous monitoring and intervention, optimizing state times, which refer to the duration a sample stays within a specific process phase. By processing cultures in smaller, more frequent batches aligned with staff shifts and employing advanced identification and susceptibility testing through VITEK MS (MALDI-TOF ID) and VITEK 2 (AST), we achieved a streamlined workflow. This method enabled consistent workflow management, continuous reporting, and a reduction in turnaround times, substantially improving our laboratory's responsiveness and operational efficiency.



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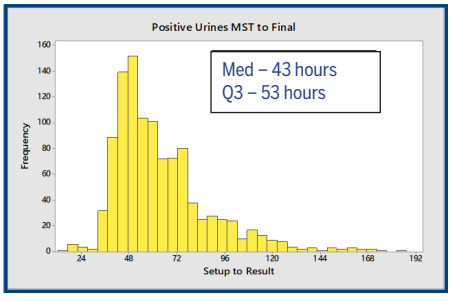

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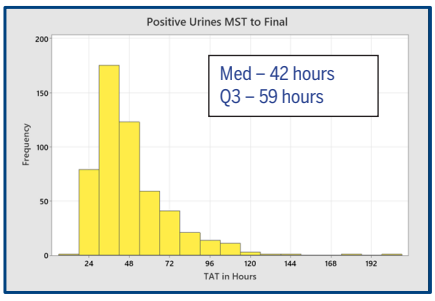

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RESULTS

- In the post-improvement event we were able to demonstrate a decrease in TAT by 15 hours post-implementation for positive cultures; which has potential implications to impact patient care and antimicrobial stewardship interventions.
- Elimination in workflow variability reduced Q3 post-implementation.
- Turnaround time for positive and negative urine cultures has remained consistently reduced for the last 7 years.
- Similar reduction of a median > 20 hours for turnaround time has been sustained over the last 7 years with negative urine cultures.

DISCUSSION

- New technology (eg: MALDI-TOF) needs to be adopted in the context of broader workflow optimization.
- The reduction in turnaround times has potential implications for patient care, allowing for faster clinical decision-making.

KEY RESULTS:

- Decrease in TAT by 15 hours post-implementation
- Sustained reduction of a median > 20 hours for turnaround time
- Elimination in workflow variability
- Consistently reduced turnaround time

CONCLUSIONS

- Introducing time-based microbiology allows for sustained process improvement and technology adoption.
- The urine culture optimization project at TCH successfully met its objectives, showcasing the benefits of process analysis and targeted improvements in a clinical lab setting.
- Uninterrupted workflow allows for more continuous and timely information available to clinicians for making patient management decisions.
- Texas Children's won the GJ Buffone Pathology Quality Improvement Award for this CPI.

REFERENCES

1. Bailey AL, Burnham CD. Reducing the time between inoculation and first-read of urine cultures using total lab automation significantly reduces turn-around-time of positive culture results with minimal loss of first-read sensitivity. Eur J Clin Microbiol Infect Dis. 2019;38(6):1135-1141.

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