

URINE PROCESS IMPROVEMENT TO DECREASE TURNAROUND TIME (TAT) AND IMPROVE WORKFLOW

Tampa General Hospital, Tampa, Florida

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BACKGROUND

Tampa General Hospital (TGH) has a solid organ transplant program, is a Level 1 trauma center licensed for 1,120 beds, and was selected as a bioMérieux Antimicrobial Stewardship Center of Excellence in 2022.

An assessment was performed by the bioMérieux Lab Consultancy team in September 2022, followed by alignment with TGH on the plan to move forward with microbiology process improvement in phases.

Phase 1 SCOPE: Urine Cultures from received in lab to final result

Focus on updating protocols to impact patient outcomes and improve workflow.

CURRENT STATE

- Positive urine culture median turnaround time (TAT): 66 hrs
- Negative & mixed urine culture median TAT: 49 hrs
- Over 50% of cultures are read outside of the optimal 18–24 hour window
- Plate reading on day shift only
- Positive urine cultures: 50%
- Negative urine cultures: 22%
- Mixed urine cultures: 28%

OBJECTIVES

Initial State	Objective
48-hour protocol in place for all urine cultures	Update the Urine Protocol (SOP)
44% of cultures read between 18–24 hours	Increase the percentage of cultures read initially at 18–24 hours
Large batch morning read of plates on day shift only	Implement reading plates in smaller batches
Bottlenecks, workcards and tech review	Streamline and improve workflow

ROOT CAUSE ANALYSIS

- Large batch of new cultures is pulled from the incubator at approximately 10 AM each day after reading the old cultures
- Workcards are matched to the plates
- Workups documented on workcards and in Sunquest
- Plates are handed off for MALDI-TOF and VITEK® 2 setup
- 94% of VITEK 2 instruments are loaded after 11 AM, are completed across multiple shifts, but 71% of results are finalized between 1 PM–5 PM the following day.



COUNTERMEASURES

- Updated the urine procedure to best practice guidelines for non-sterile urines
- Implemented multiple reads, and a screen and sub, with a plan to add an additional second shift read after training is complete
- All reads contain urine cultures no younger than 18 hours growth
- Implemented visual management tools to indicate culture age and ready-to-read time
- Eliminated paper workcards
- Updated and streamlined the canned comments in Sunquest for mixed cultures to discourage add-on testing of contaminant isolates
- Simplified review process
- Leveraged the capabilities of the bioMérieux solution to maximize efficiency and remove the chance for error
- Created a standard work document to ensure the integrity of the new process
- 5S of the urine bench for necessary supplies (Sort, Set in order, Shine, Standardize, and Sustain)
- Used a data driven approach to define an optimized culture reading schedule

Incubation Chart (Urines Only)		
Color	Time placed in incubator	Scheduled time to read
Yellow	07:00—12:59	07:00
Purple	13:00—16:59	11:00
Green	17:00—19:59	14:00
Blue	20:00—06:59	Screen & Sub (No later than 1 PM)
<ul style="list-style-type: none">• Inoculation places plates in appropriate color rack based on time placed in incubator.• Tech pulls appropriate color rack based on assignment and read time.• Blue Screen & Sub—prior to 1 PM, flip through plates looking for any growth; these are too young to read on day one, so subculture the plates with growth and place all plates in the yellow rack.		

Figure 1: Negative & Mixed Urine Receive to Result

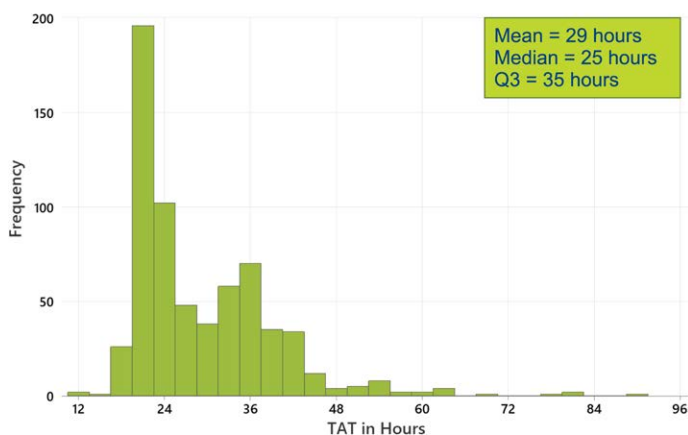


Figure 2: Positive Urine Receive to Result

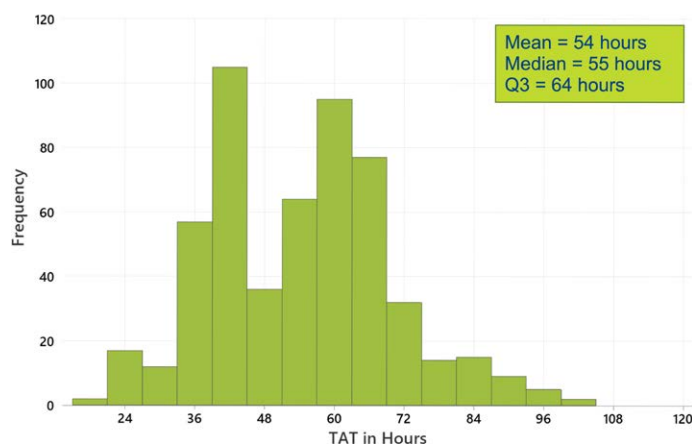


Figure 3: Negative & Mixed Urine Receive to Result Performance Before & After

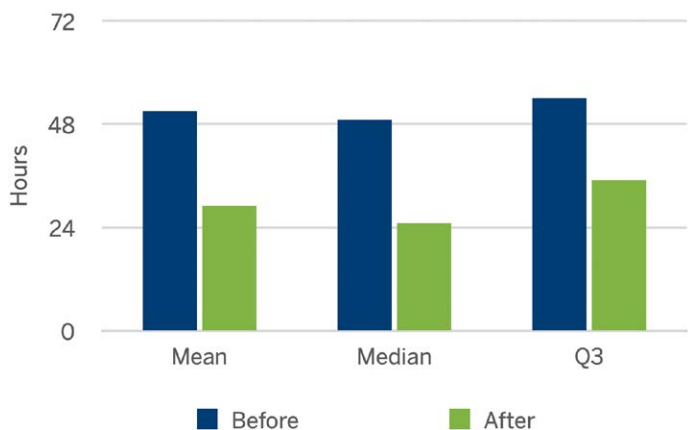
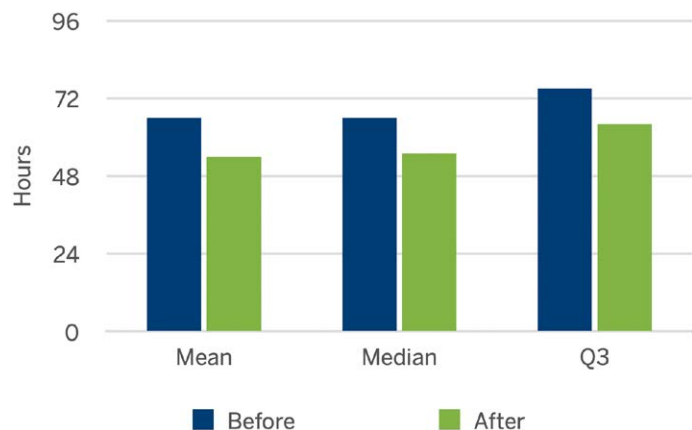


Figure 4: Positive Urine Receive to Result Performance Before & After



Mean=the average turn-around time in hours

Median=the middle number of the turn-around hours with 50% being higher and 50% being lower

Q3=the third quartile is the 75th percentile, meaning that 75% of the turn-around times fall within this number

MEASURE BENEFITS

- Positive urine culture median TAT decreased by **12 hours**
- Negative & mixed urine culture median TAT decreased by **24 hours**
- **100%** of cultures are now read initially at 18–24 hours
- Plate reading is performed throughout the day in smaller batches decreasing bottlenecks and improving workflow
- Less add-on test requests as a result of the process improvements
- Positive feedback from pharmacy and lab staff

FOLLOW-UP ACTIONS

- Continue to monitor the process.
- Complete training for second shift technologist to read cultures and finalize results.
- Collect and analyze additional data after implementing the second shift read.
- Implement the urine reflex criteria to decrease volume of negative cultures.

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