Blood Culture Process Improvement

Kathy Callahan[1], Sheeja George[1], Karen Phillips[1], Margaret Shea[1], Anne Beall[2], Anna Keiger[2], Doug Harrington[2], Robert Tibbetts[1], Linoj Samuel[1]

[1]Department of Microbiology, Henry Ford Health, Detroit, MI, USA

[2]bioMérieux, Salt Lake City, UT

BACKGROUND

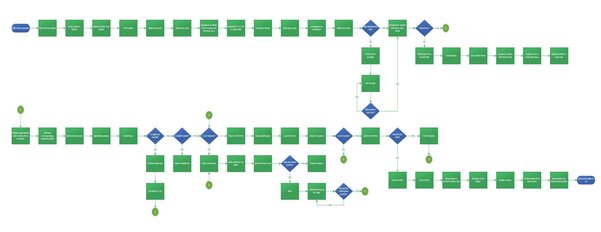
- Rapid, accurate identification of the bacteria or fungi causing bloodstream infections provides vital clinical information required to diagnose and treat sepsis
- Early diagnosis and appropriate treatment make a critical difference when it comes to improving sepsis patient outcomes[1]
- Providers often wait for finalized cultures to make decisions on patient care and management.

OBJECTIVE

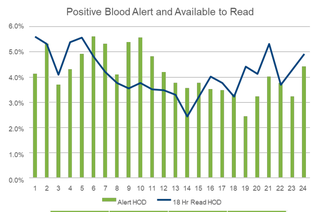
- Optimize blood culture workstream, from sample intake to results release
- Reduce variability, minimize batching, and create flow in the blood culture bench process, shifting process to a time-based approach

METHODS

- Current state process of blood culture workflow mapped with team, identifying 50 steps, 10 decision points, non-standardized workflow steps between shifts, and several feedback loops



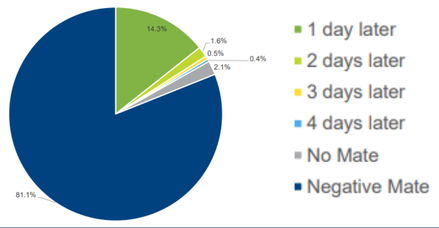
- Implemented timed reads (18h vs previous 12 hours) based on the length of incubation
- Other workflow improvements: eliminated use of work card, added positive bottle call, continuous flow workup process utilizing FLEXPREP™ on second screen, VITEK®MS and VITEK®2 supplies "live" at the bench, and color-coded lanes to organize current workups
- Discontinued "waiting for the mate" on single positive bottles

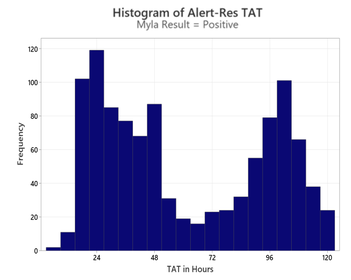


Current	7am	11am	8pm
< 18 Hrs	7.3%	20.0%	23.9%
18-24 Hrs	27.9%	7.0%	13.9%
> 24 Hrs	0.0%	0.0%	0.0%

96% of positive bottles alert within first 48 hours

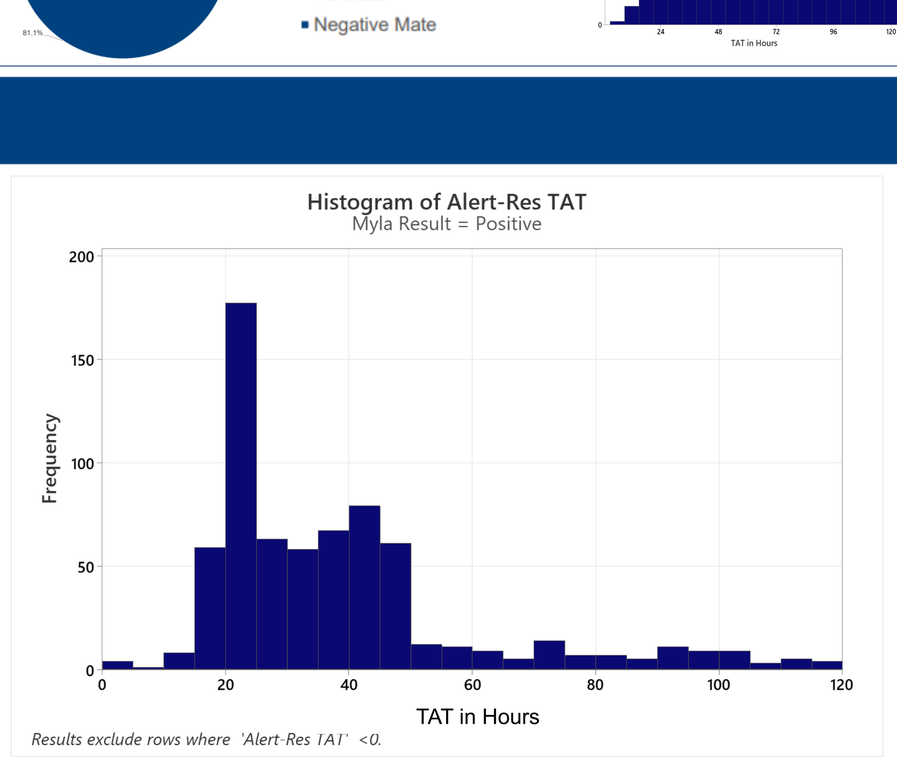
81% of the time, the mate will not alert positive at all

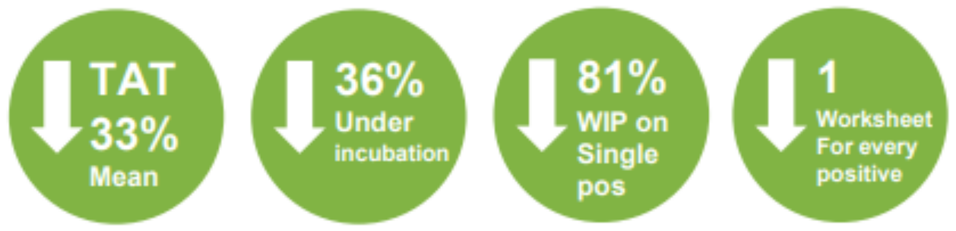




RESULTS

- Median time from positive alert to final result reduced from 49h to 33h
  - 32% reduction (median)
- Paperwork in the reading process was reduced to zero
- 85% of cultures were read at the right time, improved from 49% pre-intervention
- Work in progress reduced by 81% by not waiting for the second bottle in single positive sets





DISCUSSION

- Time to result for blood cultures has been shown to directly impact patient mortality
- Microbiology laboratories are challenged for staffing and resources
- Henry Ford Clinical Microbiology laboratory processes blood cultures 24/7
- Workflow analyses and process improvement can demonstrate significant potential for efficiency, improved resource utilization and time to result.
- Early final result for blood cultures (20h mean reduction in time to final) can facilitate provider decision-making and better antimicrobial stewardship.

CONCLUSIONS

- Eliminating the process of waiting for second bottle positivity to finalize blood culture results reduced variability in TAT and WIP for single bottle positivity
- Future investigation with ASP team on improvements in TAT and workflow is warranted to determine impact on patient care metrics
- Additional next steps to consider: work with research team to eliminate freezing organisms for long-term storage, interface BIOFIRE® FILMARRAY® Torch to communicate critical BIOFIRE® Blood Culture Identification (BCID2) Panel results as rapidly as possible, and investigate how similar improvement opportunities may impact workflow in urine, receiving, and respiratory processes

REFERENCES

1. Kumar A, Roberts D, Wood K, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. Crit Care Med. 2006;34(6):1589-1596.

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DISCLOSURES

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