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Purpose

- The rapid identification of microorganisms is paramount for targeted antibiotic treatment for serious bloodstream infections (BSI).¹
- The automated nanoparticle probe microarray-based nucleic acid test is an assay for Gram-Positive Blood Culture (BC-GP) and Gram-Negative Blood Culture (BC-GN) that identifies bacterial targets and resistance markers in 2.5 hours from positive blood cultures.²
- These molecular technologies have significantly reduced the time to optimal antibiotics in adults,^{3,4} but data is lacking for pediatric population.^{5,6}
- The subtle, nonspecific nature of clinical signs and the rapid progression of neonatal sepsis make prompt diagnosis and antibiotic treatment crucial. Any delay in antimicrobial therapy places a neonate with sepsis at greater risk of mortality.⁷

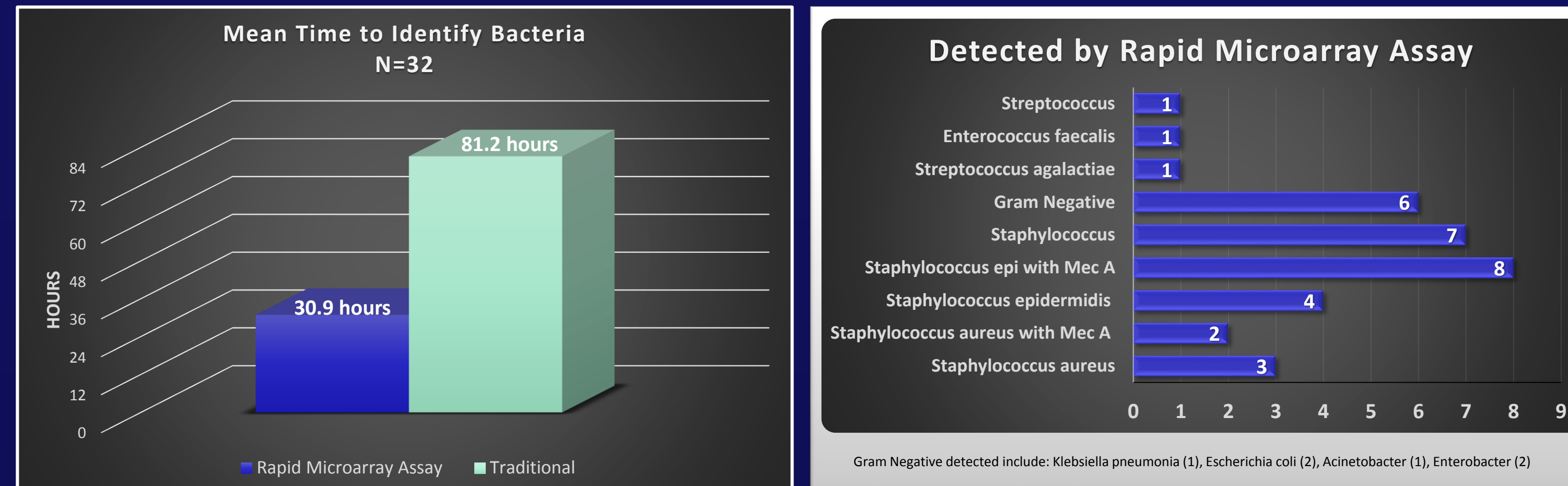
Objective

- To evaluate the outcomes from implementation of a rapid microarray assay for bacterial identification in combination with a pharmacist-directed antimicrobial stewardship protocol in pediatric patients in a tertiary-care hospital.

Methods

- Retrospective data collection
- Included all pediatric patients with positive blood cultures that were tested with automated microarray BC-GP and/or BC-GN assay at Lutheran Hospital
- Pediatric population included: neonatal intensive care unit (NICU), pediatric intensive care unit (PICU), general pediatric floor
- Data collection included: age, gender, length of stay, date/time of blood sample collections, date/time of rapid BC-GP and/or BC-GN assay results, date/time of final culture results, date/time of antibiotic orders, date/time of antibiotic discontinuation, physician notification, pharmacist intervention
- Pharmacists were instructed to notify prescribers of results and recommend appropriate antimicrobial therapy based on targeted treatment chart.
- Outcomes were assessed for pediatric patients with positive blood cultures tested with rapid BC-GP and/or BC-GN assay compared with time to traditional culture results.
- The primary outcomes were mean time to optimal antibiotic therapy following assay results and mean time antibiotics were avoided before final culture results.

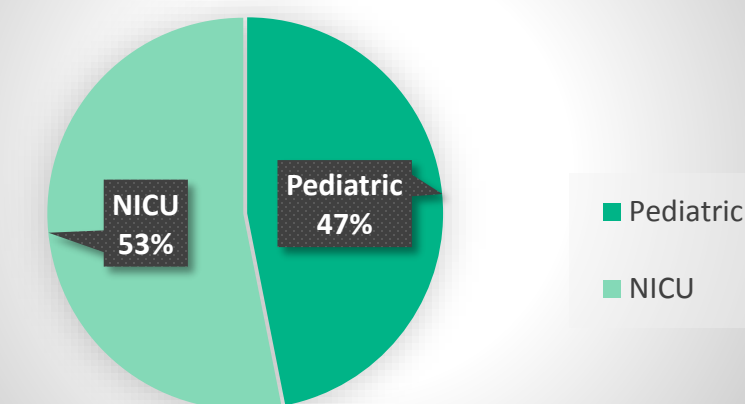
Preliminary Results



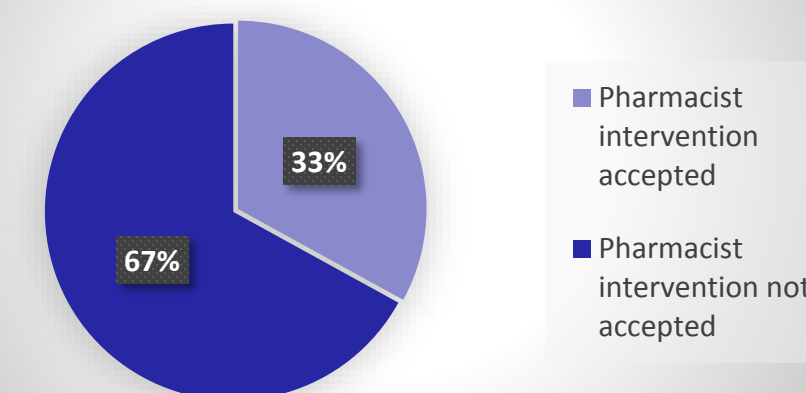
Preliminary Results

Total Patients	32 patients
Mean Age	1.68 years (range 1 day-16 years)
Male	72% (23)
Mean LOS	32.6 days (range 2-139)

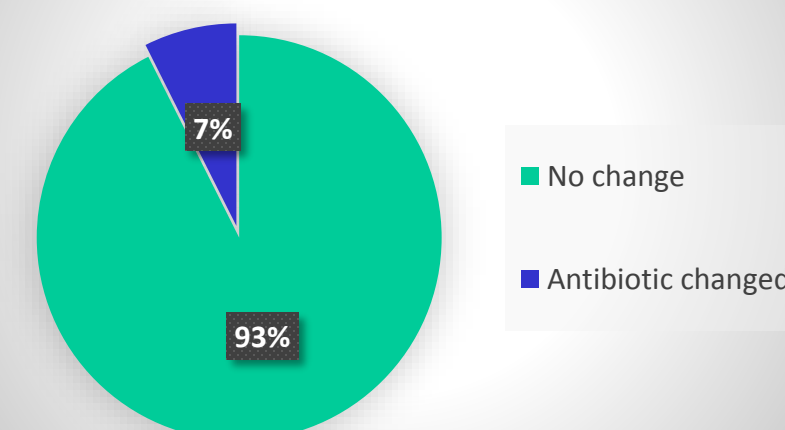
Patient Population



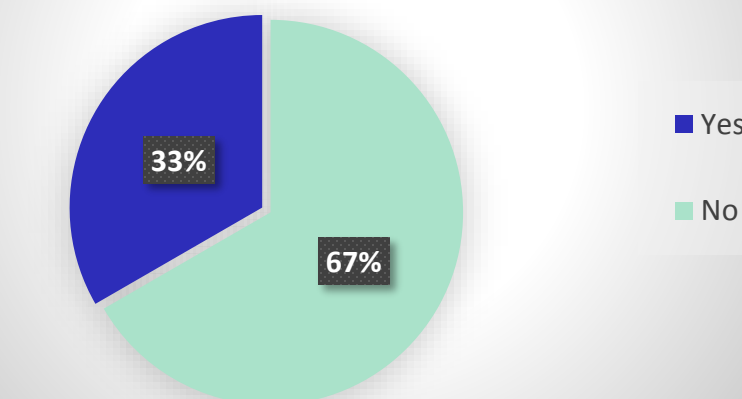
Pharmacist intervention made in 56% of cases



Antibiotic changes following rapid microarray assay result



Antibiotics at time of final culture consistent with assay directed recommendations



Conclusions

- Rapid diagnostics reduced the time to bacteria identification in blood culture by 50 hours over traditional culture methods.
- Neonatal sepsis was the most common diagnosis and coagulase negative staph was the most common pathogen detected.
- Pharmacists had minimal interaction with neonatologists and pediatric intensivists prior to rapid identification testing.
- The majority of pharmacist interventions were simply reporting the results without recommending changes in antibiotics per protocol.
- Additional education for pharmacists and pediatricians on the appropriate recommendations at the time of rapid test will be implemented.
- The development of a pediatric specific recommendation chart will be implemented.
- Detection of gram negative bacteria with rapid diagnostics decreased time to optimal antibiotics.

References

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Disclosure Panel

Authors of this presentation have the following to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation:

Rebecca Thompson: Nothing to disclose
Angel Heyerly: Has served as speaker for Nanosphere
Gordon Bokhart: Nothing to disclose