Management of febrile neonates (0-90 days) is written about extensively in pediatric literature. The length of stay (LOS) and duration of antimicrobial therapy for an otherwise well-appearing febrile infant often depends on a variety of factors, one of the most common being the time to a negative blood culture. Due to lack of definitive national recommendations, infants may receive extended antibiotic courses and prolonged LOS. Initial recommendations described in the 1980s recommended at least 48 hours of empiric antibiotic treatment based on time to positivity in manually observed blood culture systems. Despite improvements in automated continuous-monitoring blood culture systems, Nguyen determined there have been no changes to LOS in febrile neonates during the period from 2006-2012.

The purpose of this retrospective analysis is to assess the time to blood culture positivity and LOS in febrile neonates at Advocate Children’s Hospital network. With this information, we aim to standardize the antibiotic therapy duration by implementing evidence based clinical guidelines.

**Methods**

A retrospective chart review using ICD-10 codes for sepsis was performed for patients aged less than 90 days admitted to Advocate Children’s Hospital over a one year span. ICD-10 codes included: bacteremia; bacterial sepsis of newborn, unspecified; disturbance of temperature of newborn, unspecified; other bacterial sepsis of newborn; other Gram-negative sepsis; other specified sepsis; sepsis due to Escherichia coli; sepsis due to streptococcus, group B; sepsis of newborn due to streptococcus, group B; unspecified organism; severe sepsis with septic shock. Patients were excluded if they were only seen in the Emergency Department and not admitted, if they were transferred from an outside institution, or if they had cultures obtained at a time other than upon admission.

The duration of antibiotic therapy was calculated using the time of the first dose of antibiotics the patient was given and the time of the last dose. Based on antibiotic coverage the mean time to positivity was 20 hours with a range of 15 - 33 hours. The organisms identified included 5 group B Streptococcus (GBS), 1 methicillin sensitive Staphylococcus aureus (MSSA), 1 Bacillus species, 1 Staphylococcus hominis. The patient with MSSA bacteremia had previous cardiac surgery and was found to have mediastinitis at the time of admission.

**Blood Culture Data:** All 62 patients received empiric antibiotics. The average duration of antibiotics was 22 to 75 hours. Antibiotic duration varied from 24 to 48 hours for febrile neonates with positive cultures. A total of 8 (12.5%) positive blood cultures were identified.

-• All 8 blood cultures were positive within 36 hours and 7 blood cultures (87.5%) were positive within 24 hours.
-• One culture resulted at 33 hours for Staphylococcus hominis.
-• The mean time to positivity was 20 hours with a range of 15 - 33 hours.
-• The organisms identified included 5 group B Streptococcus (GBS), 1 methicillin sensitive Staphylococcus aureus (MSSA), 1 Bacillus species, 1 Staphylococcus hominis.

The patient with MSSA bacteremia had previous cardiac surgery and was found to have mediastinitis at the time of admission.

**Urinary Culture Data:** 59 out of 62 patients had urine cultures sent. All 62 patients received empiric antibiotics. The average duration of antibiotics was 22 to 70 hours for febrile neonates with positive cultures.

For febrile neonates with negative blood and urine cultures and no other diagnosis requiring admission the LOS averaged 48 hours, with a range of 22 to 75 hours.

**Antibiotic Duration**

All 62 patients received empiric antibiotics. The average duration of antibiotic coverage for febrile neonates with negative blood and urine cultures was 65 hours, with a range of 25 to 417 hours. When patients with other indications for antibiotics, including necrotizing enterocolitis and pneumonia, were removed the average duration of antibiotics was 53 hours, with a range of 25 to 128 hours.

**References**

1. Astorga MC, Piscitello KJ, Menda N, et al. Antibiotic stewardship in the neonatal intensive care unit with significant reduction in the duration of antibiotic use, without significant changes in safety outcomes 6, 9. Utilizing the results from this small study, in conjunction with published data, next steps will be to standardize and decrease the duration of antibiotic use in febrile well-appearing neonates by the development and implementation of a standardized order set. In addition to the order set, the quality improvement group plans to educate pediatric providers regarding the initial study results and the new standardized order set.

**Conclusion**

Our analysis of time to positivity of blood cultures demonstrates that there is area for improvement in our institution in regard to standardizing antibiotic therapy, decreasing duration of antibiotics and subsequent LOS in well appearing febrile infants. The data supports decreasing empiric antibiotic therapy and admission duration to 36 hours in order to achieve this goal, we will develop and implement an EMR order set with automatic 36 hour stop dates built in.