

**Quality Improvement of antibiotic use in the NICU**

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Antibiotics are the most commonly used medication in the NICU. The overuse of antibiotics is the most common reason for EOS and LOS in premature infants that are in the NICU. For the safety and well-being of premature infants to make a full recovery and get to go home with their families there is a critical need for evidence-based quality improvement study to be done to help lower the use of antibiotics in premature newborns. Quality improvement is data driven studies that enhance patient outcome by refining processes and reducing errors (QSEN, 2020).

### **Article Summary**

Antibiotics are the most common medication in the NICU. “A significant side effect of early antibiotic exposure during the perinatal period is disruption of the normal development of intestinal microbiota in the newborn. Also, using antibiotics in premature newborns makes them more susceptible to late-onset sepsis (LOS) (sepsis occurring at or after 72 hours of life),<sup>5,6</sup> necrotizing enterocolitis (NEC),<sup>7</sup> fungal infections,<sup>8</sup> bronchopulmonary dysplasia,<sup>9</sup> severe retinopathy of prematurity, and higher mortality” (Pantoja, 23). The goal of this project was to lower the use of unnecessary antibiotic use in the NICU to help lower the LOS. For the results of the study all the newborns admitted to NICU, the AUR decreased, for EOS from 137 to 32 days per 1000 patient days (77% reduction) and for LOS from 277 to 121 days per 1000 patient days (56% reduction) (Pantoja, 23).

## **Introduction**

This study is a qualitative study done to stop the overuse of antibiotics in the NICU setting. By stopping the overuse of antibiotics, they were able to lower the cases of LOS by 56% and EOS by 77% over the time they were doing this study (Pantoja,23). This study used PDSA cycles for newborns at risk of EOS and LOS. The goal of this study was to decrease the antibiotic usage rate as safely as possible. Strategies like “antibiotic time-outs” were used in newborns who were stable and had a negative blood test for EOS (Pantoja,23).

## **Overview**

This study uses quality improvement strategies to reduce the overuse of antibiotics in the NICU. The study shows that the use of antibiotics so early on in life makes premature babies more susceptible to late onset sepsis. Antibiotic use during infancy is also associated with obesity, asthma, allergic disorders, and inflammatory bowel disease (Pantoja,23). Elimination of antibiotic use in infants would be ideal but, sometimes that is not possible so the goal is to eliminate the overuse of antibiotics so that as many cases of EOS can be avoided. This study uses evidence-based practice to prevent EOS in the NICU setting following the QSEN standard of care by improving quality of care and safer outcomes of these preterm babies.

## **Quality Improvement**

The research in this study strictly focuses on lowering the number of cases of EOS and LOS in the NICU caused by the use of antibiotics in infants. I do not see how this specific study could be implemented in other areas of the hospital. EOS is sepsis in the first 72 hours of life, so it is specific to infants. LOS is also specific to infants; those two terms are used to help identify

the age when the onset of sepsis starts. For other areas of the hospital to lower their sepsis rates they would need to conduct an entirely new study.

### References

Pantoja A, Sveum S, Frost S, Duran A, Burks J, Scherneck C, Feinberg M. New strategies to Reduce Unnecessary Antibiotic Use in the NICU: A Quality Improvement Initiative. *Pediatr Qual Saf.* 2023 Jun 7;8(3):e659. doi: 10.1097/pq9.0000000000000659. PMID: 38571732; PMCID: PMC10990351.

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