



# Association Between Race and Early Antibiotic Use in Newborns Admitted to the Neonatal Intensive Care Unit

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## INTRODUCTION

- Given the risk of early-onset sepsis, providers frequently prescribe empirical antibiotics to newborns admitted to the neonatal intensive care unit (NICU).
- Early and prolonged use of antibiotics in uninfected newborns is associated with many adverse effects and potentially life-threatening complications, particularly among those with very low birth weight (VLBW; <1500g).
- Disparities in neonatal care and outcomes are well documented but association between infant race and early antibiotic use has not been assessed.

## OBJECTIVE

- To determine the association between race and early antibiotic use in newborns admitted to the NICU.

## METHODS

- Retrospective cohort study including newborns admitted to a NICU from 2012-2021 in the Premier Health database, a large, administrative database including more than 700 community and academic centers across the U.S.
- Early antibiotic initiation was defined as any parenteral antibiotic administered within the first 3 days after birth. Prolonged antibiotic duration was defined as early antibiotic initiation that was continued for >4 days.
- Standard descriptive and comparative statistics were performed.
- Multivariable logistic regression, stratified by birth weight  $\geq$  and <1500g, was used to determine the association between infant race and early/prolonged antibiotic use, adjusting for potential confounders.

## RESULTS

Table 1: Demographic and clinical characteristics by infant race

Variable	Non-Hispanic Black N=104,852	Non-Hispanic White N=311,616	Non-Hispanic Asian N=22,541	Hispanic N=58,384	Other/unknown N=367,500
Male sex (n, %)	53.2%	56%	56.1%	55.3%	55%
BW category (using ICD codes; n%)					
• <500g	0.4%	0.1%	0.2%	0.2%	0.2%
• 500-999g	6.3%	2.6%	3.1%	3.9%	3.3%
• 1000-1499g	3.7%	2.4%	2.6%	2.2%	2.8%
• 1500-1999g	7.5%	5.5%	6.5%	4.8%	6.2%
• $\geq$ 2000g	82%	89.4%	87.8%	88.9%	87.5%
Length of stay (med, IQR)	8 (4-20)	7 (4-17)	6 (4-15)	8 (4-17)	7 (4-17)
Surfactant charges (n, %)	10.6%	10.4%	6.2%	8.3%	8.3%
Death (n, %)	0.9%	0.5%	0.6%	0.6%	0.6%
Urban setting (n, %)	94.1%	91%	96.9%	89.1%	91.1%
Geographic region (n, %)					
• Midwest	22.9%	26.2%	18.3%	8.7%	21.4%
• Northeast	12.7%	11.4%	16.6%	6.5%	19.6%
• South	60.2%	49.1%	25.4%	60.7%	37.9%
• West	4.2%	13.3%	39.8%	24.1%	21.1%
Teaching hospital (n, %)	62.4%	51.3%	57.0%	61.0%	56.3%
Early antibiotic initiation	48.9%	44.3%	43.8%	55.2%	48.7%
Prolonged antibiotic duration	9.7%	8.7%	8.5%	16.0%	9.6%

Table 2: Early antibiotic initiation and prolonged duration by infant race.

Outcome	Non-Hispanic Black N=104,852	Non-Hispanic White N=311,616	Non-Black N=393,541
$\geq$ 1500g			
Early antibiotic initiation	45.5%	42.8%	44.3%
Prolonged antibiotic duration	7.9%	7.9%	8.9%
<1500g			
Early antibiotic initiation	78.1%	71.8%	73.5%
Prolonged antibiotic duration	25.5%	22.1%	25.2%

Table 3: Logistic regression models of early initiation and prolonged duration by infant race.

Outcome	OR (95%CI) NHB vs NHW	aOR (95%CI) NHB vs NHW	p
$\geq$ 1500g			
Early antibiotic initiation	1.1 (1.04 - 1.2)	1.09 (1.02 - 1.2)	0.02
Prolonged antibiotic duration	1.0 (0.9 - 1.1)	1.0 (0.9 - 1.1)	0.97
<1500g			
Early antibiotic initiation	1.4 (1.2 - 1.6)	1.4 (1.3 - 1.6)	<0.001
Prolonged antibiotic duration	1.2 (1.03 - 1.4)	1.2 (1.02 - 1.4)	0.03

- In the unadjusted analysis comparing infants of non-Hispanic Black race to non-Hispanic White and other race/ethnicity, stratified by birth weight  $\geq$  and <1500g, there were differences in antibiotic initiation and prolonged duration identified.
- After adjusting for available potential confounders and accounting for clustering by center, non-Hispanic Black infants  $\geq$  1500g had higher odds of antibiotic initiation compared to non-Hispanic White infants.
- Non-Hispanic Black infants <1500g had higher odds of antibiotic initiation and prolonged antibiotic duration compared to non-Hispanic White infants.
- Non-Hispanic Black infants <1500g had higher odds of antibiotic initiation compared to other races/ethnicities.

## CONCLUSION

- We found differences in the initiation and prolonged usage of early antibiotics in newborns by infant race.
- Black infants born weighing less than 1500 grams had higher odds of early antibiotic initiation and prolonged utilization, which may have implications on later adverse neonatal outcomes associated with early antibiotic exposure such as rates of necrotizing enterocolitis.
- Racial disparities in antibiotic use patterns may reflect differential risk of early onset sepsis due to inequities in maternal and perinatal risk factors, inequities in the maternal and perinatal healthcare provided or differential evaluation of sepsis by race by healthcare providers. More research is needed to better understand the drivers of these antibiotic use disparities.

## REFERENCES

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