

Sepsis in Infants: Less Common, More Deadly

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Key Findings

- Neonatal sepsis diagnosis rates declined steadily from 2015 to 2023. The most pronounced reductions were among Black infants, whose sepsis rate dropped by nearly half, from 2.4% in 2015 to 1.3% in 2023.
- However, mortality among infants diagnosed with sepsis increased over the same period, rising from 5.6% to 8.9% for Black infants and from 3.9% to 7.3% for White infants between 2015 and 2023.
- Overall, neonatal sepsis followed by all-cause death within the first year of life occurs in fewer than 0.15% of infants.

Neonatal sepsis is a leading cause of morbidity and mortality in the first weeks of life and is a critical marker of neonatal care quality. Neonatal sepsis can come from pathogen exposure in utero, during delivery, or in the hospital or community. Studies have shown disparities in neonatal sepsis by race and ethnicity, but less is known about how that has evolved over recent years.¹

To understand trends in neonatal sepsis and subsequent mortality in the first year of life, we studied 7,710,439 babies born between 2015 and 2023. Neonatal sepsis rates declined steadily from 2015 to 2023, as seen in Figure 1a. Black infants had the highest sepsis rate at the beginning of the study period (2.4%) and experienced a sharper decline than infants of other races, reaching 1.3% in 2023. White, Hispanic, and infants of another race followed similar downward trends, though had lower rates than Black patients throughout.

In contrast to diagnosis rates, all-cause mortality by the first birthday among infants diagnosed with neonatal sepsis rose substantially over the study period. Black infants experienced an increase from 5.5% in 2015 to 8.9% in 2023. White infants had a similar trend, rising from 3.9% to 7.3%. Despite this, the proportion of all babies who received both a sepsis diagnosis and then died before age one remained the same among Hispanic infants and White infants and decreased among Black infants and those of another race or ethnicity. Of note, neonatal sepsis followed by all-cause death in the first year of life remains uncommon, occurring in fewer than 0.15% of infants.

Neonatal Sepsis Rate by Race and Year

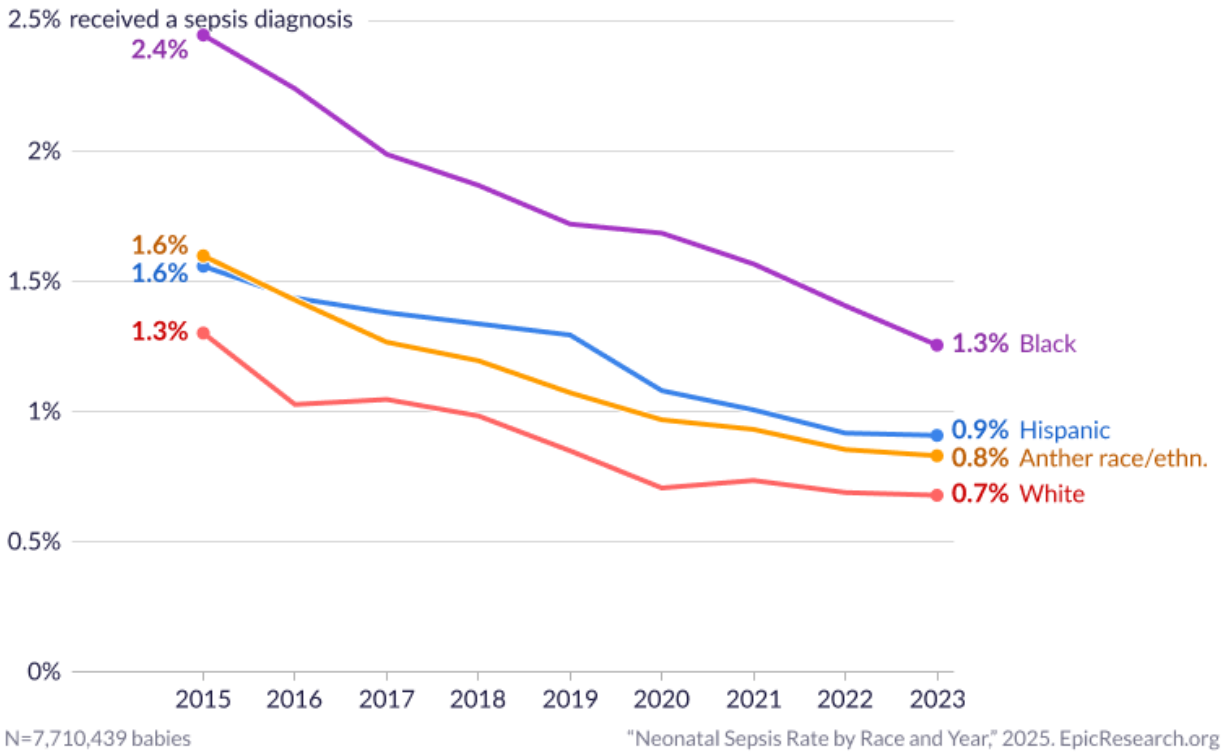


Figure 1a. The proportion of babies diagnosed with neonatal sepsis among all live births from 2015 to 2023.

Mortality Rate Among Infants Diagnosed with Neonatal Sepsis

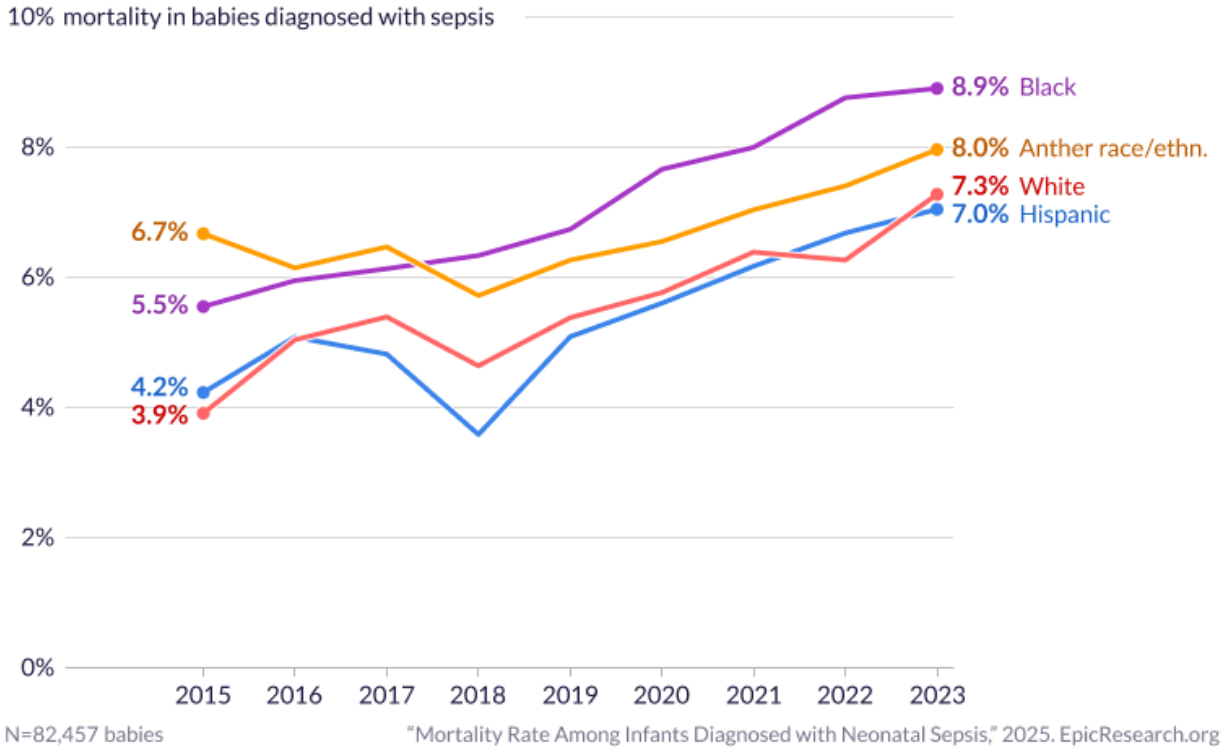


Figure 1b. The proportion of babies diagnosed with neonatal sepsis who died by their first birthday.

Proportion of All Babies Who Were Diagnosed with Neonatal Sepsis Then Died

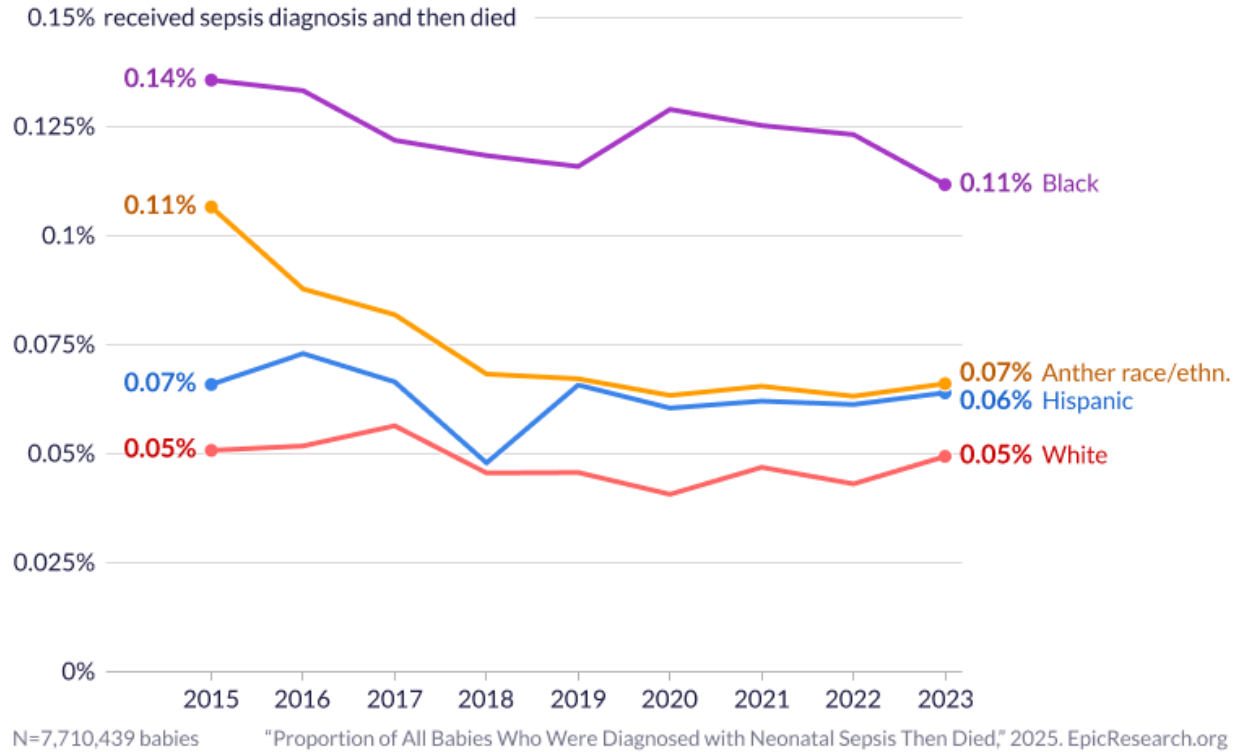


Figure 1c. The proportion of all babies who were both diagnosed with neonatal sepsis and then died by their first birthday.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 300 million patient records from 1,700 hospitals and more than 40,000 clinics from all 50 U.S. states, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Nandakumar V, Hazzaa S, Saker F, Aly H, Mohamed MA. Racial and Ethnic Disparities in Neonatal Sepsis. *Pediatr Infect Dis J.* 2025;44(3):e85-e89. doi:10.1097/INF.0000000000004572

Data Definitions

Term	Definition
Study period	Infants born from 1/1/2015 to 12/31/2023, observed for one year following birth
Study population	Patients with a recorded birth in the study period with: <ul style="list-style-type: none"> • A known delivery method • A known gestational age • A known birth weight
Outcomes	Death: documented date of death in Cosmos within one year of birth
Confounders	Neonatal sepsis: P36* Maternal complications: P00*-P04*
Race and ethnicity	Mutually exclusive categories for Hispanic, Black non-Hispanic, other/multiracial non-Hispanic, and White non-Hispanic
Limitations	We were unable to study the specific cause of death. Analysis is limited to all-cause mortality.

Table 1: Neonatal Sepsis Rate by Race and Year

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Black	2.45%	2.24%	1.99%	1.87%	1.72%	1.68%	1.57%	1.41%	1.26%
Hispanic	1.56%	1.44%	1.38%	1.34%	1.29%	1.08%	1.01%	0.92%	0.91%
Other Race	1.60%	1.43%	1.27%	1.19%	1.07%	0.97%	0.93%	0.85%	0.83%
White	1.30%	1.03%	1.05%	0.98%	0.85%	0.71%	0.73%	0.69%	0.68%

Table 2: Mortality Rate Among Infants Diagnosed with Neonatal Sepsis

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Black	5.55%	5.95%	6.13%	6.33%	6.74%	7.66%	8.00%	8.76%	8.90%
Hispanic	4.23%	5.08%	4.82%	3.58%	5.09%	5.60%	6.17%	6.68%	7.05%
Other Race	6.67%	6.14%	6.47%	5.72%	6.27%	6.55%	7.04%	7.41%	7.96%
White	3.91%	5.04%	5.39%	4.64%	5.38%	5.76%	6.39%	6.26%	7.28%

Table 3: Proportion of All Babies Who Were Diagnosed with Neonatal Sepsis Then Died

	2015	2016	2017	2018	2019	2020	2021	2022	2023
Black	0.14%	0.13%	0.12%	0.12%	0.12%	0.13%	0.13%	0.12%	0.11%
Hispanic	0.07%	0.07%	0.07%	0.05%	0.07%	0.06%	0.06%	0.06%	0.06%
Other Race	0.11%	0.09%	0.08%	0.07%	0.07%	0.06%	0.07%	0.06%	0.07%
White	0.05%	0.05%	0.06%	0.05%	0.05%	0.04%	0.05%	0.04%	0.05%