Black/White Maternal Morbidity Disparity at the US County Level and its Association with Structural Racism

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Introduction

- Racial disparities in Non-Hispanic Black (NHB) to Non-Hispanic White (NHW) maternal morbidity rates are well documented but the association with structural racism at the United States (US) county level has not been adequately studied
- The Structural Racism Index (SRI), a county-level index composed of multiple socioeconomic indicators was used to investigate its relationship to observed differences in racial disparities in maternal morbidity across US counties

Methods

Data source:
- National Vital Statistics Birth Certificate Database
- From years 2019 to 2021
- Geography linked files identified <u>county</u> of birth

Composite Adverse Maternal Outcome Score (CAMOS):
- blood transfusion, ruptured uterus, unplanned hysterectomy, and intensive care unit admission,

Exclusions:
- Counties with < 10 CAMOS events
- Counties with < 50,000 Black residents

Statistical Approach

Predictor variable:
- Standardized factor scores were derived from the Structural Racism Index for each county

Outcome variable:
- CAMOS rate disparity between NHB and NWH patients during the period 2019-2021 for each county

Analyses:
- Linear regression analyses of the CAMOS rate by race
- Adjusted for county level social vulnerability using the Social Vulnerability Index (SVI)

Results

- A total of 154 counties met study criteria
  → **70%** of the US Black population
- CAMOS rate in NHB patients was **7.6** per 1000 births
- CAMOS rate in NHW patients was **4.9** per 1000 births
- CAMOS disparity driven by **transfusion** and **ICU admission**
- After adjusting for overall social vulnerability using SVI:
  →each standard deviation increase in the SRI score led to **8%** increase in NHB-NHW CAMOS rate disparity (aRR 1.08, 95% CI 1.01-1.15)

Discussion

Strengths
- Novel composite, multidimensional measure of structural racism at the county level
- Predictive of differences between counties in the <u>magnitude</u> of the NHB/NHW disparity in maternal morbidity

Limitations:
- Unable to obtain SRI factor scores for all US counties
- There is no "gold standard" to measure racism
- Structural racism measures are based on people who self-identified as being of one race only (Black)
- Did not account for individual level risk factors such as comorbidities

Conclusion

There are marked racial disparities in maternal morbidity rates at the county level in the US, and structural racism as measured by the SRI is associated with their magnitude

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There are **marked racial disparities** in maternal morbidity in the United States, and **structural racism**, as measured by the Structural Racism Index, is **associated with their magnitude**.

Tables and Figures

Table 1: Individual components and overall Composite of Adverse Maternal Outcome Score (CAMOS) by SRI quartile in US Counties with >50K Black residents, 2019-2021, (n = 154 counties)
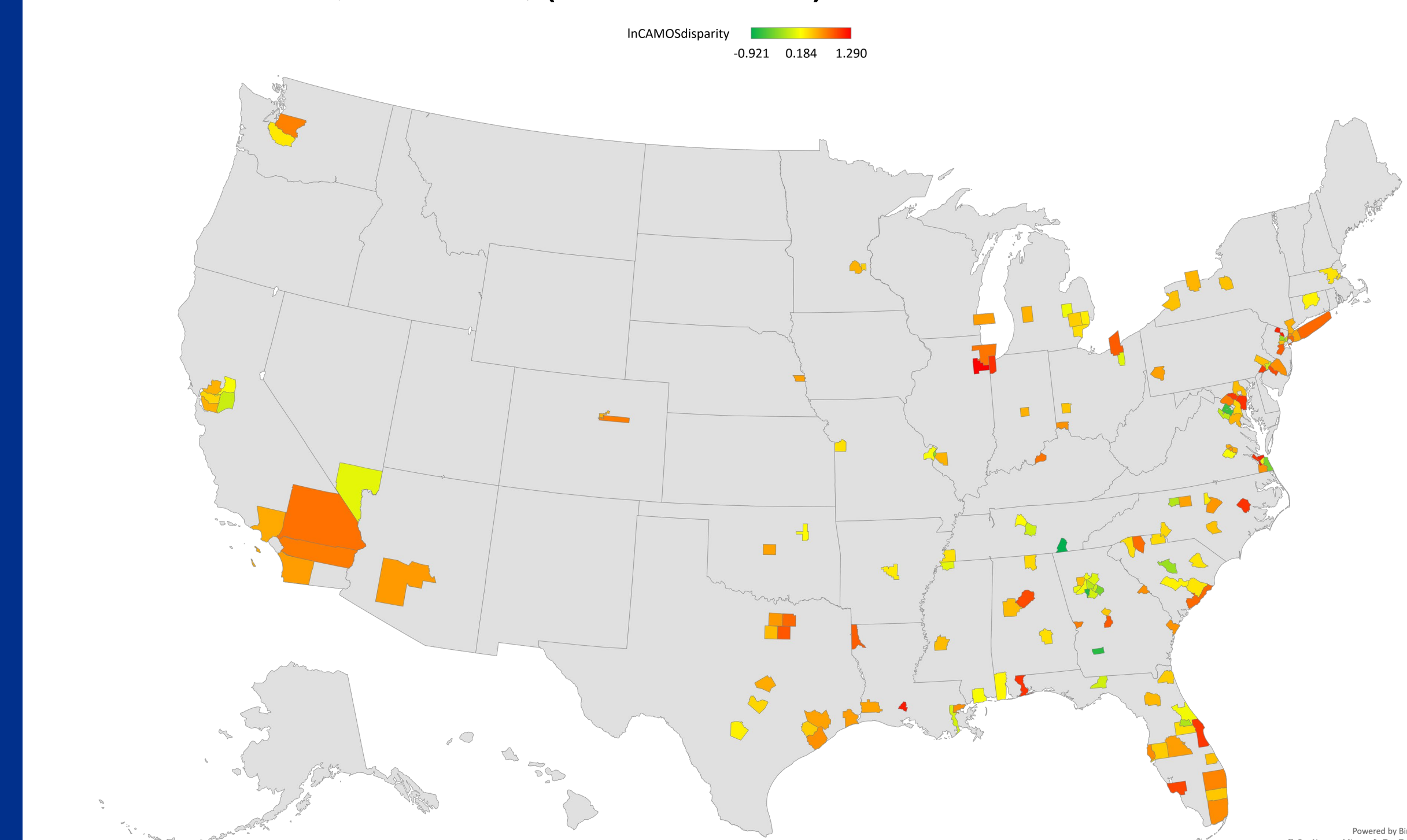
	Total Births (N=2,794,915)	SRI 25%ile (n=445,806)	SRI 50%ile (n=726,945)	SRI 75%ile (n=717,413)	SRI 99%ile (n=904,751)	p-value
Maternal transfusion Yes, n(%)	11,260 (0.40)	1,515 (0.34)	2,377 (0.34)	2,076 (0.29)	5,292 (0.59)	<0.001
Ruptured uterus Yes, n(%)	1,004 (0.04)	241 (0.05)	215 (0.03)	188 (0.03)	360 (0.04)	<0.001
Unplanned hysterectomy Yes, n(%)	1,247 (0.04)	183 (0.04)	277 (0.04)	305 (0.04)	482 (0.05)	<0.001
Admission to ICU Yes, n(%)	5,172 (0.19)	670 (0.15)	1,275 (0.18)	1,320 (0.18)	1,907 (0.21)	<0.001
Composite MAO* Yes n (%)	16,462 (0.59)	2,319 (0.52)	3,632 (0.50)	3,382 (0.47)	7,129 (0.79)	<0.001

*includes transfusion, ruptured uterus, unplanned hysterectomy, ICU admission

Table 2: Relationship between structural racism factor scores and racial disparity between Non-Hispanic Black and Non-Hispanic White CAMOS rates in US counties adjusted for Social Vulnerability, 2019-2021 (N=154)

Outcome variable	Regressors	Rate Ratio	95% CI	p-value	Multiple R²
Log of Black CAMOS rate	Bivariate	1.18	1.06-1.31	0.002	0.06
	SVI	1.18	1.07-1.31	0.002	0.07
Log of White CAMOS rate	Bivariate	1.01	0.99-1.21	0.07	0.02
	SVI	1.01	0.99-1.21	0.07	0.03
Log of ratio of Black to White CAMOS rates	Bivariate	1.08	1.01-1.15	0.03	0.03
	SVI	1.08	1.01-1.15	0.03	0.03

Figure 1: Magnitude of the NHB/NHW CAMOS rate ratio in counties with >50K Black Residents, 2019-2021, (n=154 counties)

Figure 2: Correlation between county structural racism factor scores and the logged ratio of county-level Non-Hispanic Black to Non-Hispanic White CAMOS rates in US counties1, 2019-2021 (N=154)