State-level nurse workforce diversity and severe adverse maternal outcomes during childbirth

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Racial/ethnic diversification of the healthcare workforce is recommended to address the impact of structural racism on racial/ethnic disparities in maternal health outcomes, though evidence is lacking to support this recommendation.

- **Hypothesis**: A racially diverse registered nurse (RN) workforce is associated with reduced odds of severe adverse maternal outcomes (SAMO) during childbirth
- **Study design:** Observational cross-sectional study of 2017 birth certificate data (CDC)
- **Study sample:** Mothers who gave birth in a hospital in their residence state
- **Exposure:** **Proportion of minoritized racial/ethnic RNs in each state** (American Community Survey; 2013-2017) categorized into 3 terciles (3rd tercile = highest diversity)
- **Primary outcome**: **SAMO rate (eclampsia, blood transfusion, hysterectomy, and ICU admission)** by maternal race/ethnicity
- **Analysis**: Adjusted odds ratios and 95% confidence interval of SAMO by maternal race/ethnicity adjusted for 18 patient and hospital characteristics (multilevel models)

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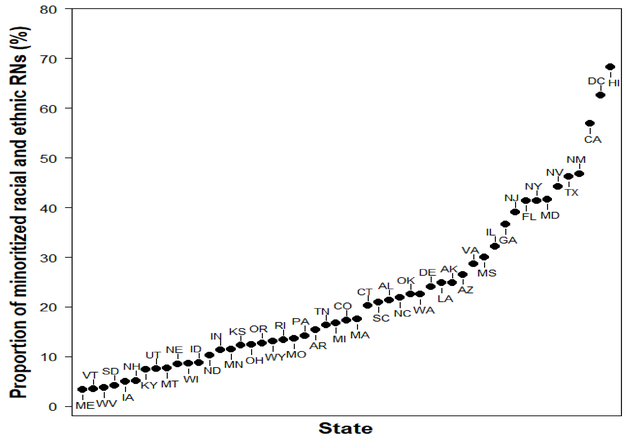
Results

- 3,668,813 birth certificates analyzed
- **Mean state proportion of minoritized RNs = 22.1%**
- SAMO incidence (per 10,000)
  - ✓ Native American = 175.2
  - ✓ Black = 110.2
  - ✓ More than 1 race = 103.6
  - ✓ Asian/Pacific Islander = 73.3
  - ✓ White = 73.7
  - ✓ Hispanic = 69.5
- **Decreased SAMO incidence when the proportion of minoritized RNs increases**, except for Native Americans and more than 1 race people (low count)
- **After adjustment for patients and hospital characteristics, decreased odds of SAMO when the proportion of minoritized RNs increases**, except for Native Americans and more than 1 race people (low count)



Maternal race/ethnicity	SAMO incidence (per 10,000)	Adjusted OR (95% CI)
White (N = 1,879,754)		
Tercile 1 (3.3%-14.2%)	85.3	1.00 (Reference)
Tercile 2 (14.3%-32.2%)	80.5	***0.87 (0.78, 0.98)***
Tercile 3 (32.3%-68.3%)	53.9	***0.68 (0.59, 0.77)***
Black (N = 544,935)		
Tercile 1 (3.3%-21.9%)	130.6	1.00 (Reference)
Tercile 2 (22.0%-41.4%)	105.3	0.94 (0.79, 1.12)
Tercile 3 (41.5%-68.3%)	85.7	***0.80 (0.65, 0.99)***
Hispanic (N = 883,025)		
Tercile 1(3.3%-36.6%)	100.3	1.00 (Reference)
Tercile 2 (36.7%-46.2%)	63.7	***0.78 (0.64, 0.94)***
Tercile 3 (46.3%-68.3%)	51.1	***0.69 (0.58, 0.82)***
Asian/Pacific Islander (N = 253,760)		
Tercile 1 (3.3%-28.6%)	96.9	1.00 (Reference)
Tercile 2 (28.7%-46.2%)	58.7	***0.61 (0.48, 0.77)***
Tercile 3 (46.3%-68.3%)	62.9	***0.50 (0.38, 0.65)***
Native American (N = 28,250)		
Tercile 1 (3.3%-21.9%)	193.0	1.00 (Reference)
Tercile 2 (22.0%-26.5%)	155.3	0.97 (0.64, 1.45)
Tercile 3 (26.6%-68.3%)	171.9	0.89 (0.61, 1.29)
More than one race (N = 79,089)		
Tercile 1 (3.3%-17.3%)	94.4	1.00 (Reference)
Tercile 2 (17.4%-41.4%)	81.8	0.84 (0.64, 1.10)
Tercile 3 (41.5%-68.3%)	135.2	0.89 (0.66, 1.21)

Key points

In this nationwide study of birth certificate data:
a racially diverse RN workforce is associated with significantly reduced odds of SAMO in both non-Hispanic White and minoritized racial/ethnic mothers.

Limitations:

- ✓ Observational study : **Not necessarily causal association**
- ✓ No ICD codes to estimate severe maternal morbidity as **defined by the CDC**
- ✓ No information on RN workforce diversity at the **hospital level**
- ✓ No information on **racial/ethnic concordance** between mothers and RNs

Implications: Implementation of state-level interventions to diversify the workforce:

- ✓ Funding of historically Black Colleges and Universities
- ✓ Funding of pipeline programs and loan repayment programs for underrepresented in medicine and nursing
- ✓ Funding of implicit bias training for persons in admission and selection committees
- ✓ Development and implementation of diversity-related metrics to monitor the effectiveness of intervention