County-level Structural Vulnerabilities in Maternal Health and Geographic Variation in Infant Mortality

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Objective: To evaluate whether community factors that differentially affect the health of pregnant people contribute to geographic differences in infant mortality across the US.

Study design: This retrospective cohort study sought to characterize the association of a novel composite measure of county-level maternal structural vulnerabilities, the Maternal Vulnerability Index (MVI), with risk of infant death. We evaluated 11 456 232 singleton infants born at 22 0 of 7 through 44 6 of 7 weeks' gestation from 2012 to 2014. Using county-level MVI, which ranges from 0 to 100, multivariable mixed effects logistic regression models quantified associations per 20-point increment in MVI, with odds of death clustered at the county level and adjusted for state, maternal, and infant covariates. Secondary analyses stratified by the social, physical, and health exposures that comprise the overall MVI score. Outcome was also stratified by cause of death.

Results: Rates of death were higher among infants from counties with the greatest maternal vulnerability (0.62% in highest quintile vs 0.32% in lowest quintile, [P < .001]). Odds of death increased 6% per 20-point increment in MVI (aOR: 1.06, 95% CI 1.04, 1.07). The effect estimate was highest with theme of Mental Health and Substance Abse (aOR 1.08; 95% CI 1.06, 1.09). Increasing vulnerability was associated with 6 of 7 causes of death.

Conclusions: Community-level social, physical, and healthcare determinants indicative of maternal vulnerability may explain some of the geographic variation in infant death, regardless of cause of death. Interventions targeted to county-specific maternal vulnerabilities may reduce infant mortality.

Journal:

The Journal of Pediatrics
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