The Effects of Toxic Air Pollution and Climate Change on Maternal and Child Health: A Scoping Study of Underserved Communities and Research Needs

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Research Theme: Environmental Stressors and Equity

Research Questions: What are the independent and joint effects of exposures to hazardous air pollutants (HAPs) and ambient temperature extremes on maternal and child health? How do these effects differ across socioeconomic groups?

Data: Data from the US Environmental Protection Agency's Risk-Screening Environmental Indicators Geographic Microdata, and Oregon State's PRISM temperature data will be spatially and temporally linked to North Carolina birth records data.

Abstract:

This study will formalize a research plan to (i) quantify the independent and joint effects of exposure to hazardous air pollutants (HAPs) and ambient temperature extremes on maternal and child health, and (ii) establish whether the estimated effects are systematically different across locations (e.g., rural, urban, mountains, coastal plain) and socioeconomic groups (e.g., race, ethnicity). A generalizable methodology using federally available, nationwide datasets of pollution exposures and temperature extremes will be developed and then as a proof-of-concept applied to birth records data for North Carolina. The study will utilize geospatial analysis tools to identify general patterns and areas of concern, as well as quasi-experimental methods to identify potentially causal associations between exposures to HAPs, extreme temperatures, and adverse maternal health and birth outcomes (e.g., hypertensive disorders of pregnancy, preterm births, and low birthweight). By integrating multiple datasets and interdisciplinary empirical methods, this research seeks to advance the understanding of interactive health pathways by which pollution and climate stressors impact underserved populations.