USING BIG DATA TO ESTIMATE PRENATAL ENVIRONMENTAL EXPOSURES

Aparna Mangadu[1] (Roger Renteria[2], Sara E. Grineski[2], Timothy W. Collins[3])
[1]Department of Geological Sciences, University of Texas at El Paso
[2]Department of Sociology, University of Utah
[3]Department of Geography, University of Utah

ABSTRACT

Research has revealed that prenatal exposure to environmental hazards is associated with loss in IQ. Prenatal exposures may also be linked to developmental disorders such as intellectual disability and autism. Measuring prenatal exposures directly is costly, time intensive and somewhat invasive, making it hard to scale up to a population-level. Through the use of publicly available data, researchers can assess prenatal exposures to environmental hazards at a low cost. The goal of this project was to use the available data to estimate prenatal exposures for Utah children (based on birth certificate data) to criteria air pollutants, industrial pollutants, and residential lead exposures. We used data from the Center for Air, Climate, and Energy Solutions (CASES) to estimate annual criteria air pollution exposure at the census block group level. We used the US EPA's Risk-Screening Environmental Indicators (RSEI) to estimate annual non-cancer health risks in 810x810 meter grids due to industrial emissions. We used the American Community Survey (ACS) median age of housing stock block group variable to estimate exposure to lead paint and pipes (≤1978, 1978-1985). Children were assigned pollution estimates pertaining to their birth year, based on their home address. Strengths of using secondary data to estimate prenatal exposures include that it is often low cost and available annually, which matches the birth year, and the geographic resolution is sufficient. Limitations include that we only examine residential exposures, neglecting occupational risks; we base lead exposure on birth year and home address, without knowledge of the time-space geography of the parent; and we use annual averages that are not specific to critical windows of pregnancy. The next step in the project is to use these data to examine associations between prenatal hazardous exposures and intellectual disability in children. Examining this association may highlight a health consequence of increased exposure and provide results that emphasize the need for better protections in vulnerable communities.