

Title: Dataset associated with "Unequal airborne exposure burden to toxic metals is associated with race, ethnicity, and segregation"

Abstract:

Communities of color have been exposed to a disproportionate burden of air pollution across the United States for decades. Yet, the inequality in exposure to known toxic elements of air pollution is unclear. Here, we find that populations living in racially segregated communities are exposed to a form of fine particulate matter with over three times higher mass proportions of known toxic and carcinogenic metals. While concentrations of total fine particulate matter are two times higher in racially segregated communities, concentrations of metals from anthropogenic sources are nearly ten times higher. Populations living in racially segregated communities have been disproportionately exposed to these environmental stressors throughout the past decade. We find evidence, however, that these disproportionate exposures may be abated through targeted regulatory action. For example, recent regulations on marine fuel oil not only reduced vanadium concentrations in coastal cities, but also sharply lessened differences in vanadium exposure by segregation.

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Format of data files – .csv

File Information – This dataset contains annual and county-level mean concentrations and mass proportions of fine particulate metals (aggregated from the EPA's CSN/IMPROVE networks), associated minimum detectable limit for each monitor, as well as racial and ethnic demographic population data. This dataset is aggregated from publicly available air pollutant data from the EPA (<http://views.cira.colostate.edu/fed/QueryWizard/Default.aspx>) and the US Census Bureau (<https://data.census.gov/cedsci/>). This dataset is used to examine the association of racial residential segregation with fine particulate metal concentrations. The time period ranges from year 2009 to 2019.

Variable Information:

- Columns labeled "XX_concentration" report the annual and county-level mean concentration in ug m-3
- Columns labeled "XX_content" report the mass proportion of fine particulate metals relative to PM2.5 mass
- Columns labeled "XX_mdli" report the minimum detectable limit for that species at that monitor. In the case of more than one monitor in the county, this column reports the average.
- Columns labeled "DI_XX" report the dissimilarity index for the racial/ethnic group using the non-Hispanic White population as the reference population (see associated manuscript for details), where "NHB" corresponds to non-Hispanic Black and "native_amer" to "Native American".
- Columns labeled "XX_pop_county" report the county population of the respective

racial/ethnic group. These groupings reflect the identification made by individuals in US Census Bureau data. "NHW" refers to "non-Hispanic White".

- "CountyFIPS" refers to the county FIPS code.
- "Latitude" and "Longitude" reflect the coordinates of the monitor in degrees. In the case of more than one monitor per county, these columns averages.

Data sources:

The Federal Land Manager Environmental Database (FED). 2020. EPACSN data for 01/01/2009 - 01/01/2019 obtained from the FED website (<https://views.cira.colostate.edu/fed>) on 07/23/2021.

The Federal Land Manager Environmental Database (FED). 2020. IMPAER data for 01/01/2009 - 01/01/2019 obtained from the FED website (<https://views.cira.colostate.edu/fed>) on 07/23/2021.