

## **Abstract**

### **Disparate Exposure to Fine Particulate Air Pollution in Formerly Redlined Cities: Chicago, Dallas, and Fort Worth**

Clare Ennis MacLise Kane, MSEER MGPS

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Supervisor: Sheila Olmstead

The Global Burden of Disease (GBD) determined in 2019 that fine particulate matter (PM<sub>2.5</sub>) pollution is the largest environmental health risk in the United States and globally. The leading sources of PM<sub>2.5</sub> pollution in the United States are combustion sectors like power generation and residential energy use. People of color are disproportionately exposed to PM<sub>2.5</sub> pollution and have higher rates of asthma, which is known to be triggered by PM<sub>2.5</sub> exposure. This thesis evaluates satellite PM<sub>2.5</sub> pollution in three formerly Home Owner’s Loan Corporation (HOLC) “redlined” cities (Chicago, Dallas, and Fort Worth) to determine if low-grade HOLC neighborhoods within these HOLC graded cities are disparately exposed PM<sub>2.5</sub> pollution. Residents currently living in historically low-grade HOLC neighborhoods in Chicago are exposed to significantly higher levels of PM<sub>2.5</sub> pollution than high-grade HOLC neighborhoods. Although results for DFW were not statistically significant, a positive relationship between increase in HOLC grade and PM<sub>2.5</sub> concentrations was found. Additionally, formerly low-grade HOLC neighborhoods had significantly higher asthma rates in 2017 than high-grade HOLC areas in all three cities. All three cities also have qualitative examples of citizens who are residing in formerly

redlined neighborhoods, experiencing high concentrations of PM<sub>2.5</sub> pollution from surrounding industry, and experiencing poor health outcomes. These findings further support efforts by communities of color to understand energy equity and advocate for environmental justice policies in their neighborhoods as well as the Environmental Protection Agency's (EPA) goal to understand the air quality concerns in overburdened communities and the health impacts these have on residents.

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