UNIVERSITY OF MIAMI
OFFICE of CIVIC & COMMUNITY ENGAGEMENT

SCAN360

Climate and Health:
Particulate Matter and Air Quality

Particulate matter (PM) is a type of air pollution that contains liquid and solid components from hundreds of chemicals. These particles are mostly a byproduct of industrial and engine emissions. PM2.5 is the smallest subtype that poses the greatest risk; at under 2.5 microns they can easily enter the deepest areas of the lungs, increasing the risk of lung cancer and other adverse health outcomes.[1]

Air Quality and Lung Cancer in Miami-Dade County

While primary risk factors for lung cancer continue to center around smoking and tobacco exposure, particle pollution has been evidenced as another major cause. This type of outdoor air pollution also has a disproportionate effect on communities of lower socioeconomic status largely due to limited emissions regulation and enforcement.

Our analysis assesses the association between increased PM2.5 concentration and lung cancer incidence across Miami-Dade census-designated-places (CDPs). Our findings (see Table 1) demonstrate that areas with highest recorded daily PM2.5 concentrations experienced 28% increased lung cancer incidence compared to places with the lowest PM2.5 concentrations (1.28 IRR; *p<.0001*). Our analysis adjusts for age and socioeconomic status.

The map provided below highlights a local cluster of Miami-Dade places within the group of highest PM2.5 levels and increased lung cancer incidence. This area covers the neighboring cities of Homestead, Florida City, and Leisure City, with maximum PM2.5 levels at 37.4, 36.5, and 34 ug/m3, and lung cancer incidence rates of 53, 51, and 57 per 100,000 people, respectively. Primary sources of emissions in this region include **A. Major roadways, B. Homestead Air Force Base, and C. Homestead-Miami Speedway** (see corresponding map labels).

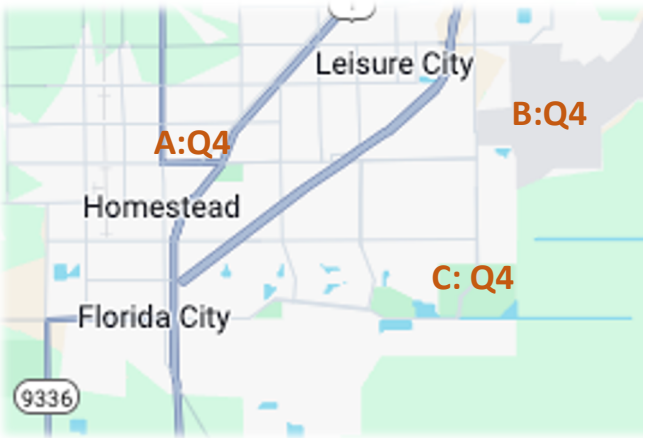

Table 1. PM2.5 Concentration & Lung Cancer Incidence

PM2.5 (Quartiles)	*Incidence Rate Ratio (IRR)*
Q1 (15.8-17.1 ug/m3)	*Reference Level*
Q2 (17.2-19.6 ug/m3)	1.137
Q3 (20.4-24.8 ug/m3)	1.178
Q4 (24.9-37.4 ug/m3): *highest relative daily concentration*	1.283 *(28% relative increase in incidence)*

**Data sources: 2015-2019 FCDS (cancer incidence); 2016 EPA (PM2.5)*

To stay up to date on the air quality in your neighborhood, you can visit the EPA's interactive air quality map (https://gispub.epa.gov/airnow); if and when concentrations are elevated, it is recommended to limit time outdoors in addition to wearing a well-fitting and appropriately rated face mask.[2]

1. *https://www.epa.gov/pm-pollution/particulate-matter-pm-basics*
2. *https://molekule.com/blogs/all/what-is-pm-2-5-and-how-can-you-reduce-your-exposure*

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