Unfair Air: Highlighting Spatial Inequities in the District of Columbia

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DISTRICT OF COLUMBIA

- 705,000 people
- 68 sq mi/170 km
- 46% black, 37% white, 11% Latinx, 4% Asian
- 14% foreign born
- $82,605 average HH income
- 16% poverty rate
DISTRICT OF COLUMBIA

Black: $3,500
White: $284,000

The net worth of white households in DC is 81 times higher than black households.

Between 2007 and 2014, the median household income in DC increased by $10,000 but remained flat for black households.

There are 43,000 D.C. residents who qualify as “extremely low-income.”

91% of “extremely low-income” families are African-American.

108,732 DC residents lived below the poverty line in 2012.

115,119 residents lived below the poverty line in 2017.

DC has the highest food assistance program use percentage in the U.S.

DC has a $22,803 median student loan balance, the highest among any U.S. metropolitan area.
Asthma and Race in DC

Figure 1. ED Visits by District Zip Code – 2015
Asthma as primary, secondary, or tertiary diagnosis, ages 0-17.

Majority White, Black, and Latinx neighborhoods in DC
PM2.5 related mortality

Few neighborhoods have high PM$_{2.5}$-related mortality rates within a predominantly non-black population.

Where PM$_{2.5}$-related mortality rates are elevated, the proportion of black residents also tends to be increased.
Air Monitoring in the District

• 14 cities dust-fall measurement study 1931-1933
• 10 cities SO₂ & ozone study 1953-1954
• National Air Sampling Network 1953-1959
• Continuous Air Monitoring Program 1962/1963
  • First continuous measurement program: Ozone, SO₂, NO₂, NO, CO, total oxidants, total hydrocarbons
  • 7 cities: New Orleans, Chicago, Philadelphia, Cincinnati, San Francisco, Los Angeles, and Washington, DC (at CAMP Station)
## DOEE Air Monitoring Network Overview

<table>
<thead>
<tr>
<th>Site Name</th>
<th>Chemicals Measured</th>
<th>Location Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>McMillan Reservoir</td>
<td>PM$<em>{2.5}$, PM$</em>{10}$, O$_3$, SO$_2$, NO$_X$, CO</td>
<td>Urban</td>
</tr>
<tr>
<td>River Terrace Education Center</td>
<td>PM$_{2.5}$, O$_3$, NO$_X$</td>
<td>Urban / overburden community</td>
</tr>
<tr>
<td>I-295 Near-Road Station</td>
<td>PM$<em>{2.5}$, PM$</em>{10}$, NO$_X$, CO</td>
<td>Urban / overburden community</td>
</tr>
<tr>
<td>King Greenleaf Rec Center</td>
<td>PM$<em>{2.5}$, PM$</em>{10}$</td>
<td>Urban / overburden community</td>
</tr>
<tr>
<td>Takoma Rec Center</td>
<td>O$_3$, NO$_X$</td>
<td>Urban</td>
</tr>
</tbody>
</table>

[Map of DOEE Air Monitoring Network](#)
Air Monitoring Stations

McMillan Monitoring Site

Near Road Monitoring Site

King Green Leaf Monitoring Site
Air Monitoring Stations

McMillan Monitoring Site

River Terrace Monitoring Site
Long-term PM$_{2.5}$ trends In the District

- Annual PM$_{2.5}$ levels have gradually declined each year since 2004 in the District.

![Graph showing PM$_{2.5}$ mass concentration (µg/m$^3$) from 2002 to 2020 for River, Hains Point, McMillan, Near-Road, and the 2012 Annual PM2.5 NAAQ Standard. The graph indicates a declining trend over the years.](@DOEE_DC)
PM$_{2.5}$ 24-Hour Design Values Trends

PM$_{2.5}$ Design Values Compared to the 24-hour NAAQS in the District from 2002 - 2020
IVY CITY (Ward 5) GEORGETOWN (Ward 2)
PM$_{2.5}$ trends in the District

Daily average PM$_{2.5}$ (µg/m$^3$) by monitor, month, and year from 2018 - 2021, excluding data on July 4 & 5
Hourly PM$_{2.5}$ ($\mu g/m^3$) from July 1-8 from 2018 to 2021

Photo Credit: Anthony Quintano
Moving Forward

Community Scale Monitoring
• Deploying hyperlocal mobile monitoring
• Pilot of four neighborhoods - beginning soon
• District wide-baseline FY23

Ward 8 Monitoring Site
• Introducing a new monitoring site in an underserved community
• Funds under ARPA

Continued Community Outreach
• Keeping residents of the District engaged through:
  – Clearing the Air workshops
  – Air Quality Awareness Week
  – Tabling community events
THANK YOU!
Acknowledgments

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Questions?