CDPH
Chicago Department of Public Health

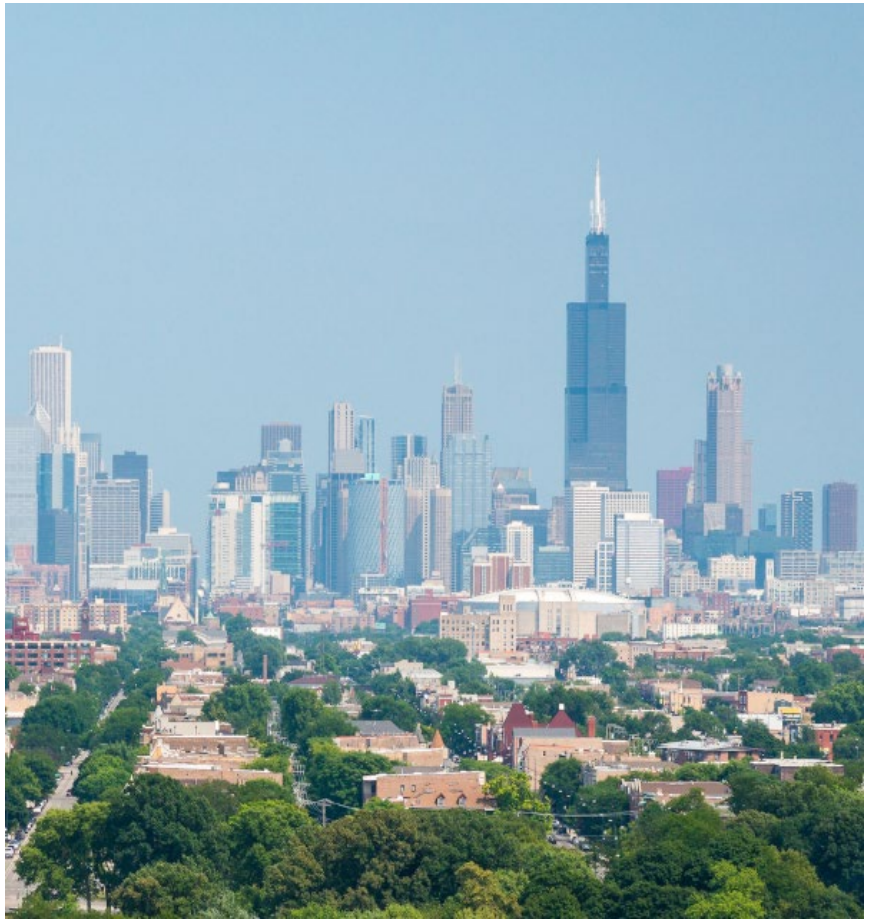
Air Pollution in Chicago: Status and Opportunities

Environmental Protection and Energy Committee
April 2, 2025
Dr. Olusimbo Ige,
Commissioner, CDPH

CDPH's Office of Environmental Permitting & Inspection (OEPI)

MISSION

Protect public health and the environment by reducing environmental risks in Chicago.



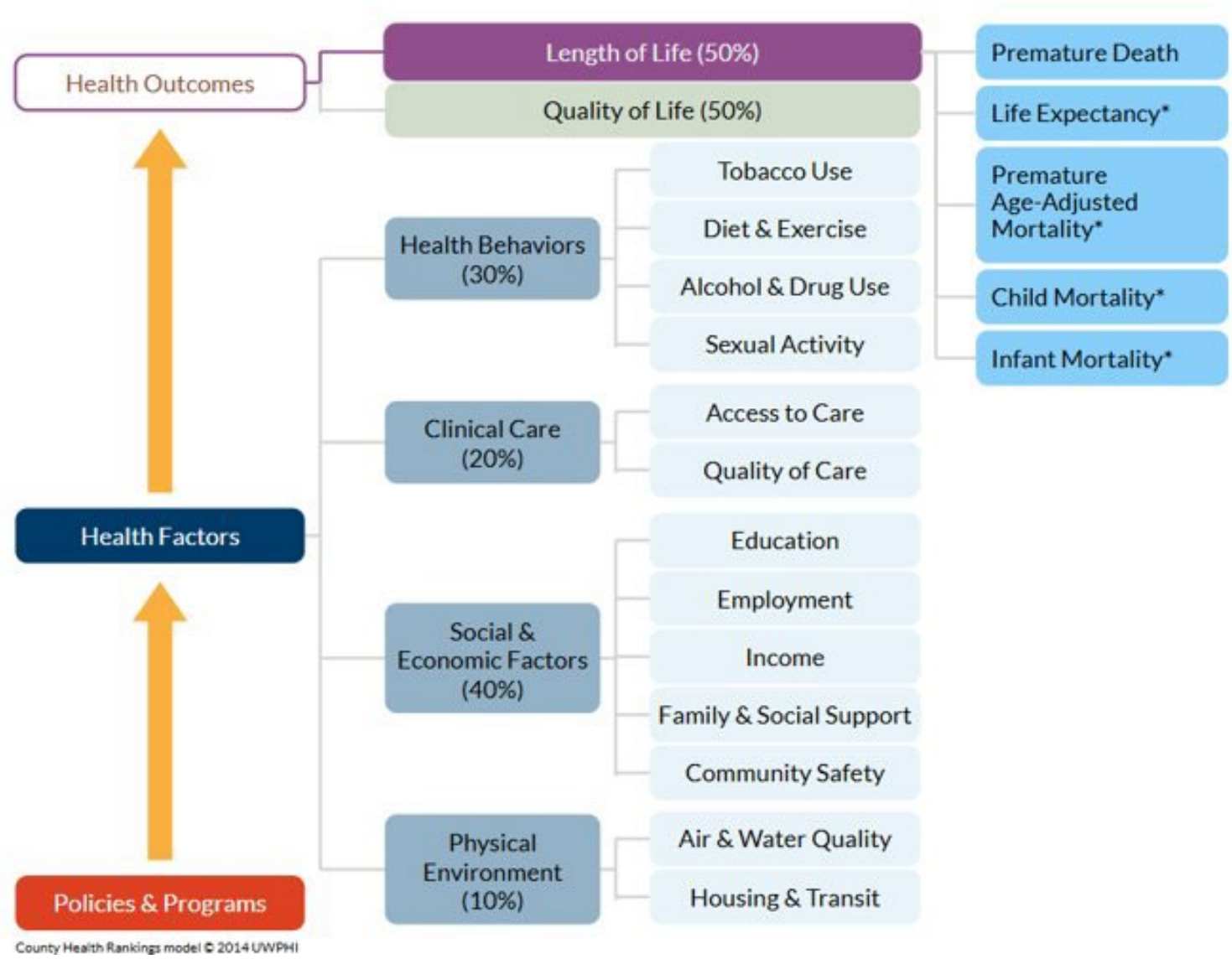
Learn more

Air Pollution is a Public Health Issue

Foundational Public Health Services

Required Areas of Practice for Governmental Public Health Bodies, per the Public Health Accreditation Board (PHAB)

Air Quality Contributes to How Long and How Well People Live

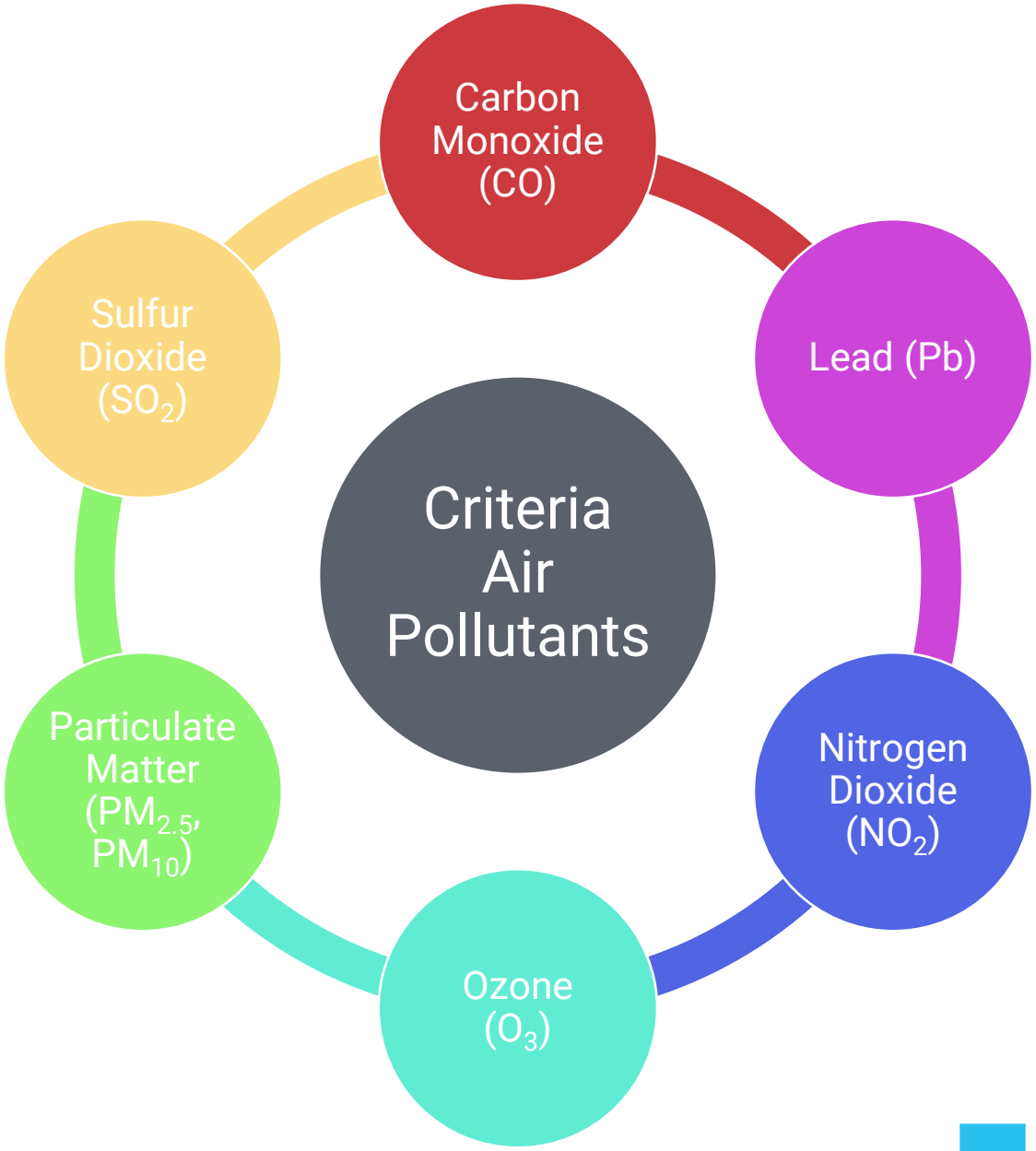


Source: County Health Rankings & Roadmaps. New Model of Health. Explore health topics | County Health Rankings & Roadmaps

Air Pollutants Are Regulated

- The Clean Air Act requires US EPA to set National Ambient Air Quality Standards (NAAQS) for six commonly found air pollutants known as criteria air pollutants
- NAAQS establish the maximum allowable levels to protect public health and the environment
- States are required to take action to reduce emissions and improve air quality

Air pollution, in all forms, is responsible for more than 6.5 million deaths each year globally (NIEHS).



Particulate Matter ($PM_{2.5}$ and PM_{10})

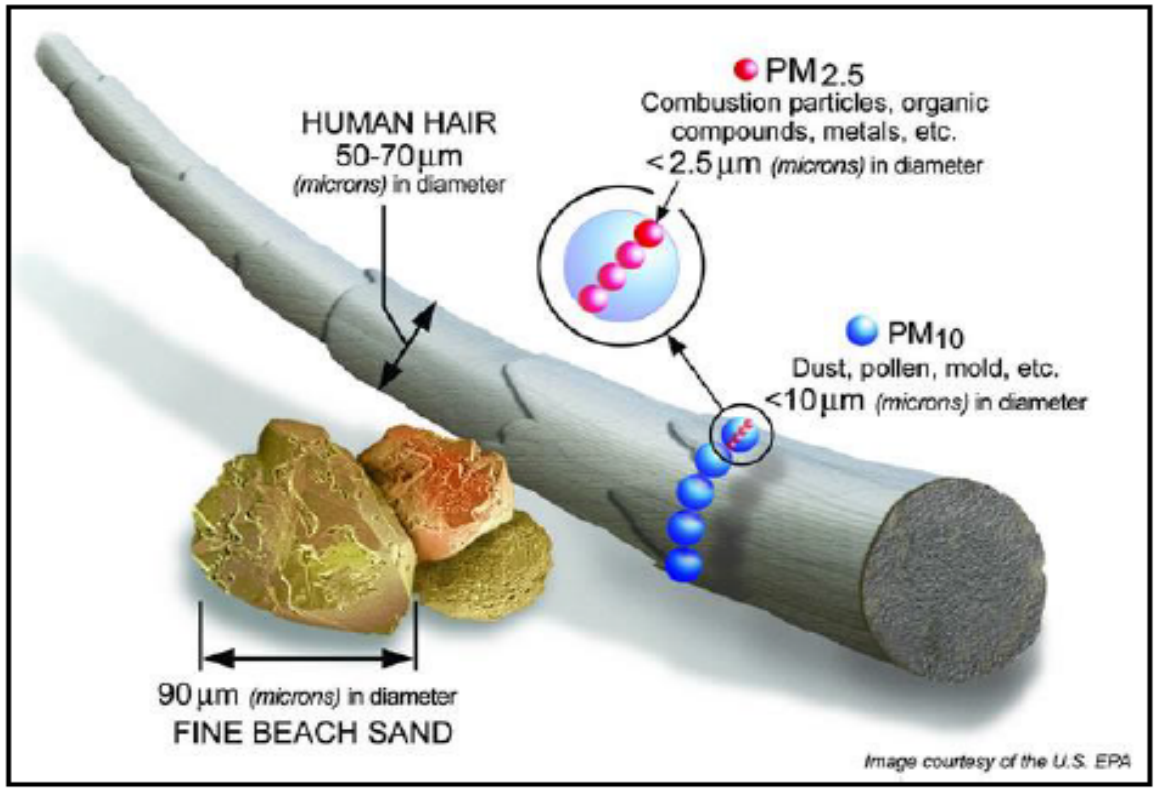


Figure 2-5. Particulate Matter Size Ranges

$PM_{2.5}$ TYPICAL HOURLY CONCENTRATION RANGE:
0 to 100 µg/m3
(100 to 1,000 µg/m3 near wildfires)

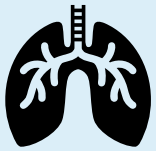
$PM_{2.5}$ SOURCES:
- Fuel combustion
- Dust
- Agriculture
- Fires
- Formation in the atmosphere due to chemical reactions

PM_{10} TYPICAL HOURLY CONCENTRATION RANGE:
0 to 40 µg/m3
(500 to 1,000 µg/m3 in dust storms)

PM_{10} SOURCES:
Dust (e.g., agriculture, roads, construction), brake/tire and engine wear from mobile sources, and fires

Health Impacts of Air Pollution

- Heart issues



- Lung issues

- Worsens asthma and other respiratory conditions

- Eye, nose & throat irritation

- Reproductive health issues

Most Impacted Populations

- Older adults

- People with underlying health conditions

- Outdoor workers

- Children & pregnant people

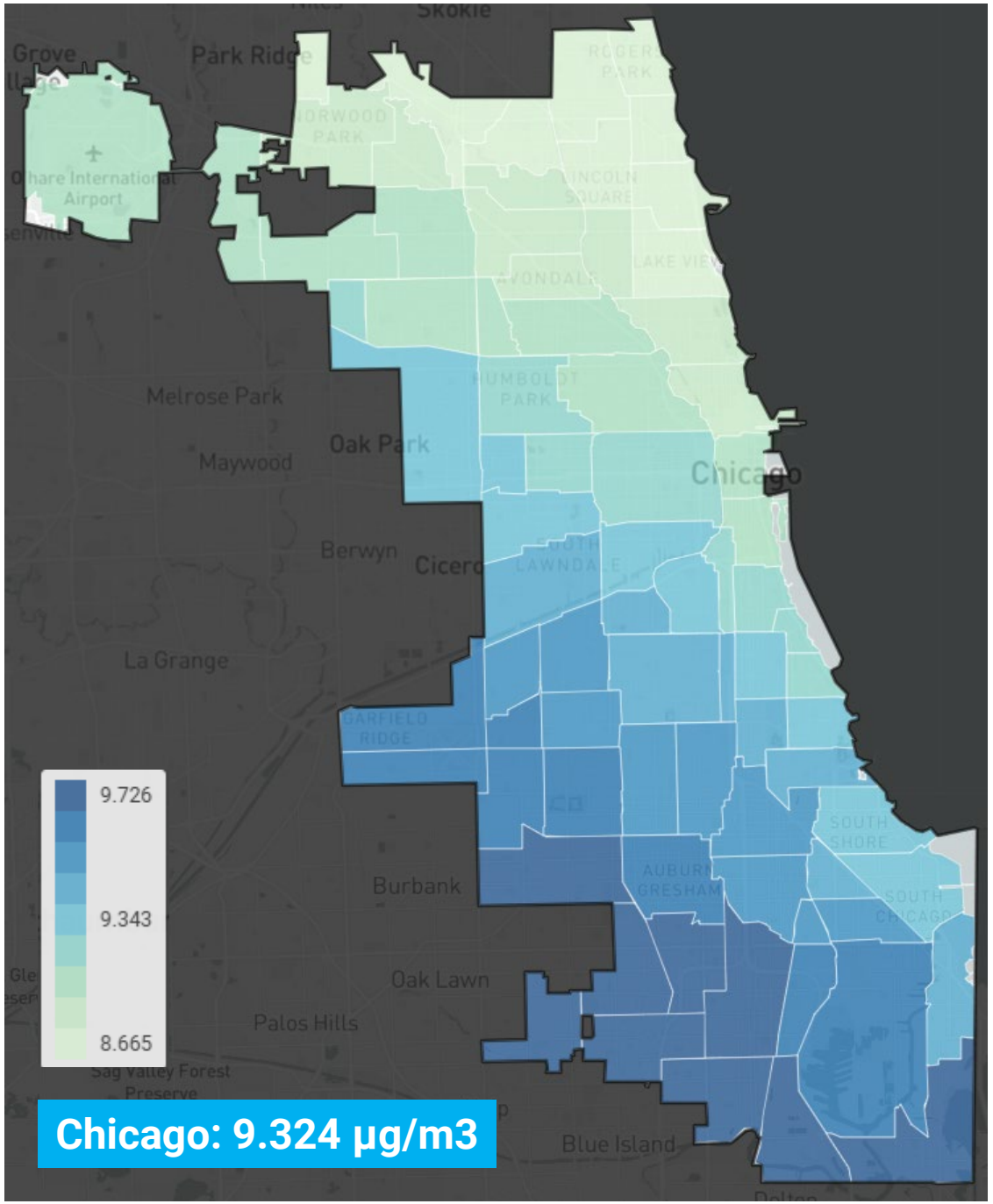
- People living near heavy traffic and industry

Status and Trends over Time

Average Annual $PM_{2.5}$ Concentration ($\mu g/m^3$), Chicago, 2020

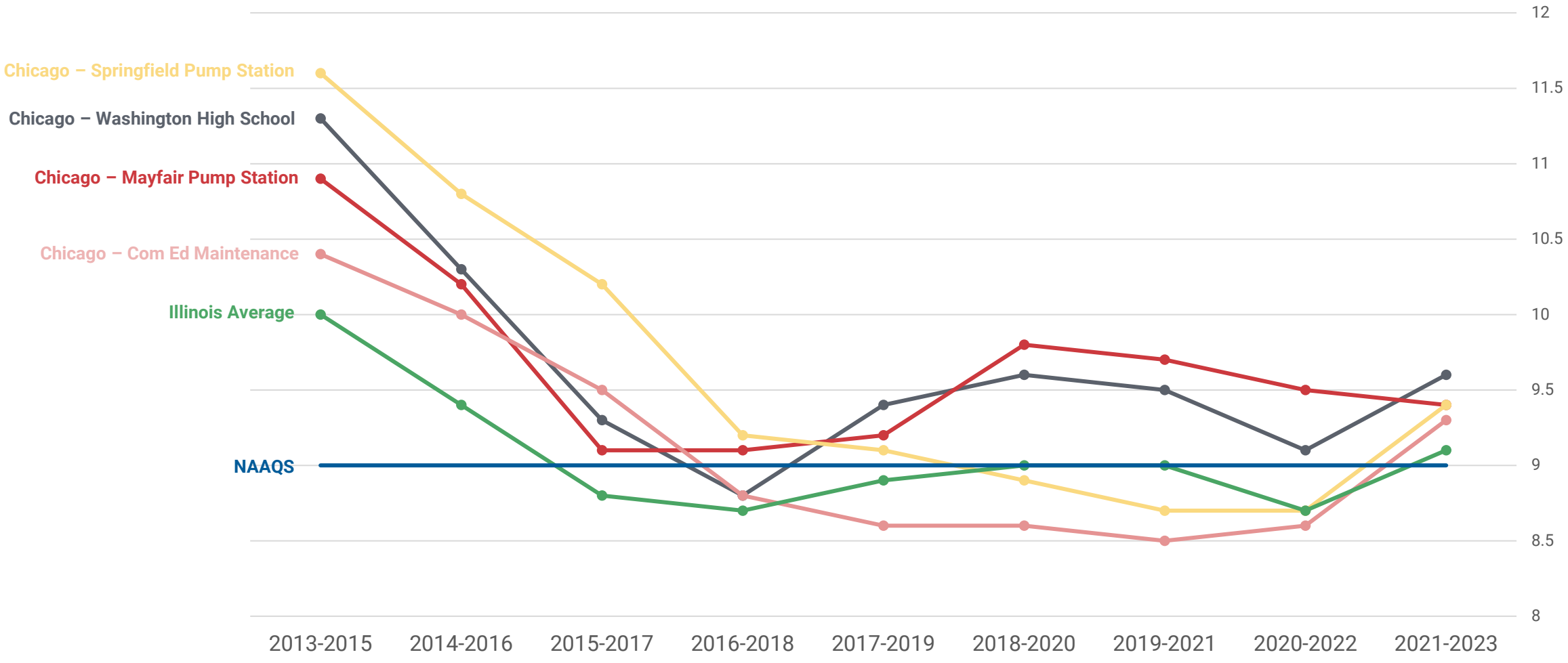
$PM_{2.5}$ refers to fine particulate matter:

- Tiny particles of dust, smoke, and other pollutants
- Small enough to penetrate deep into the lungs
- Emissions from combustion of gasoline, oil, diesel fuel or wood



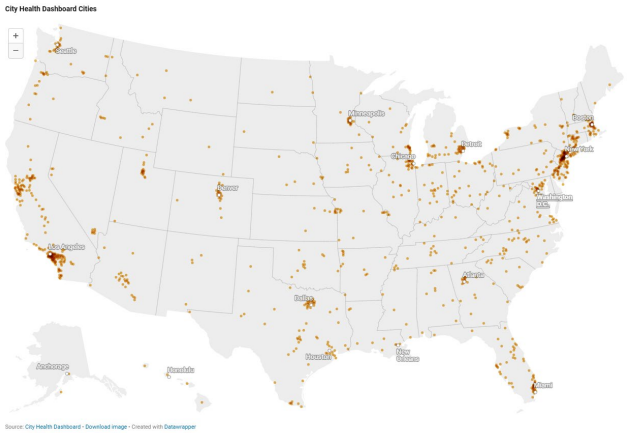
Data: US EPA EJSCREEN
Data Source: Metopio

Three-Year Annual Mean $PM_{2.5}$ Concentrations (ug/m^3), Chicago, 2013-2023

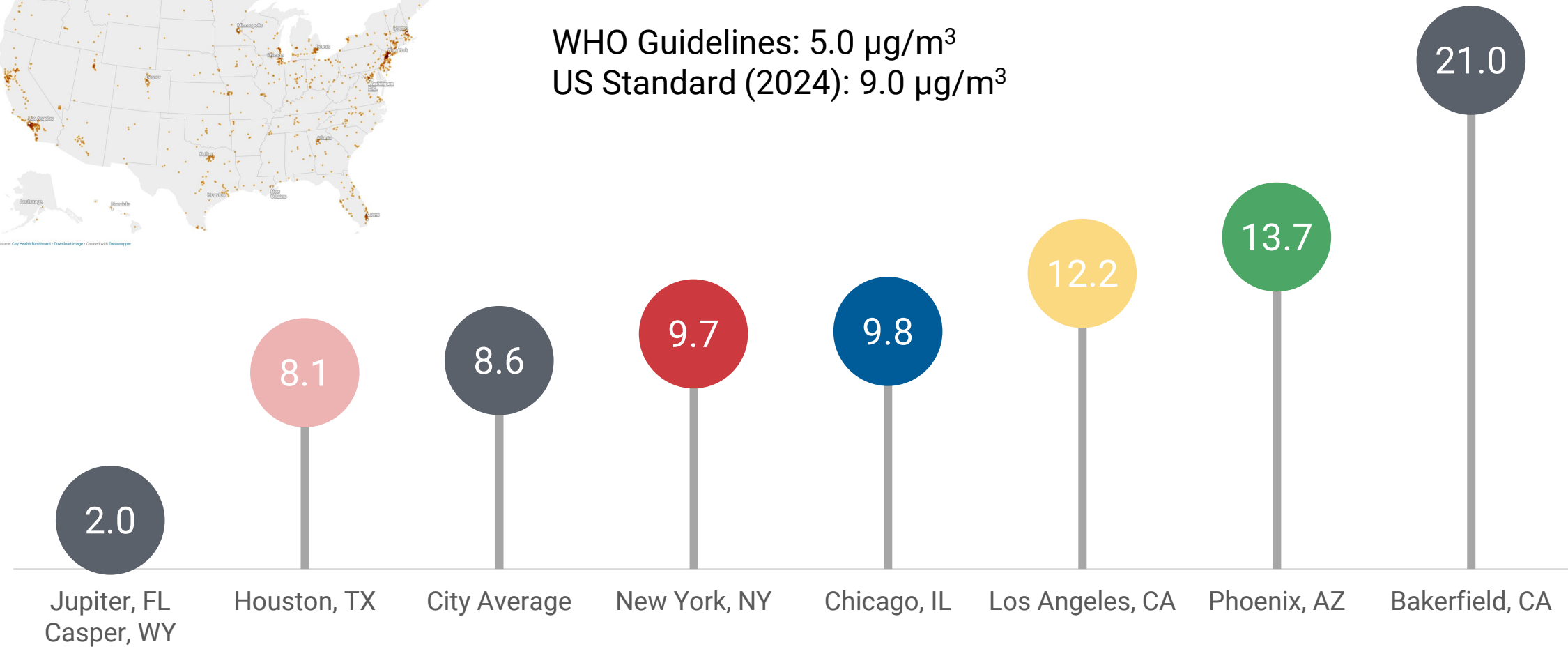


Data Source: Annual Illinois Air Quality Reports

Average Daily $PM_{2.5}$ Concentration ($\mu g/m^3$), December 2023



WHO Guidelines: 5.0 $\mu g/m^3$
US Standard (2024): 9.0 $\mu g/m^3$

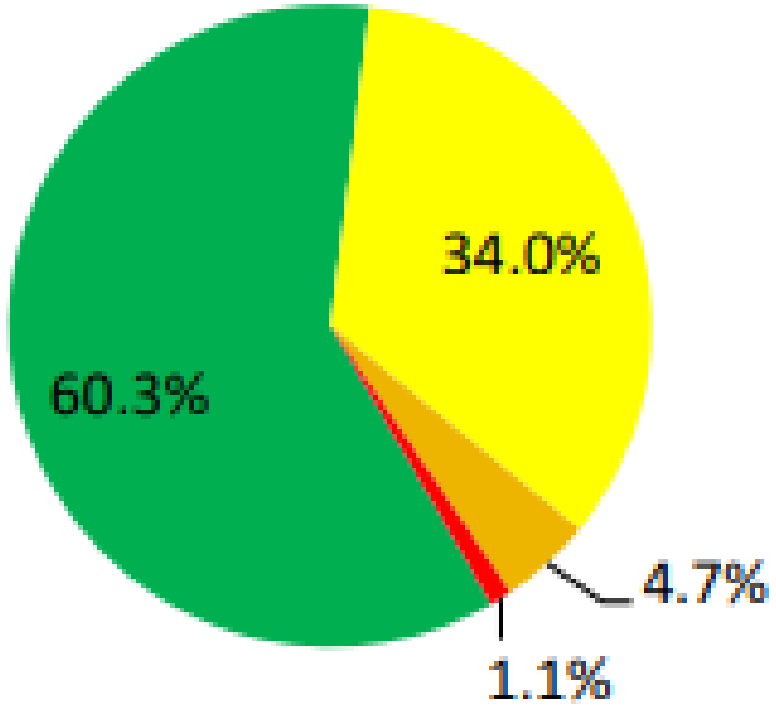


Data Source: City Health Dashboard Home | City Health Dashboard

Air Quality Index (AQI)

Table 4: Air Quality Index Health Concerns		
Air Quality Index Levels of Health Concern	**Numerical Value**	**Meaning**
Good	0 to 50	Air quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51 to 100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health warnings of emergency conditions. The entire population is more likely to be affected.
Hazardous	301 to 500	Health alert: everyone may experience more serious health effects.

Percent of Days by AQI Level, Chicago, 2023

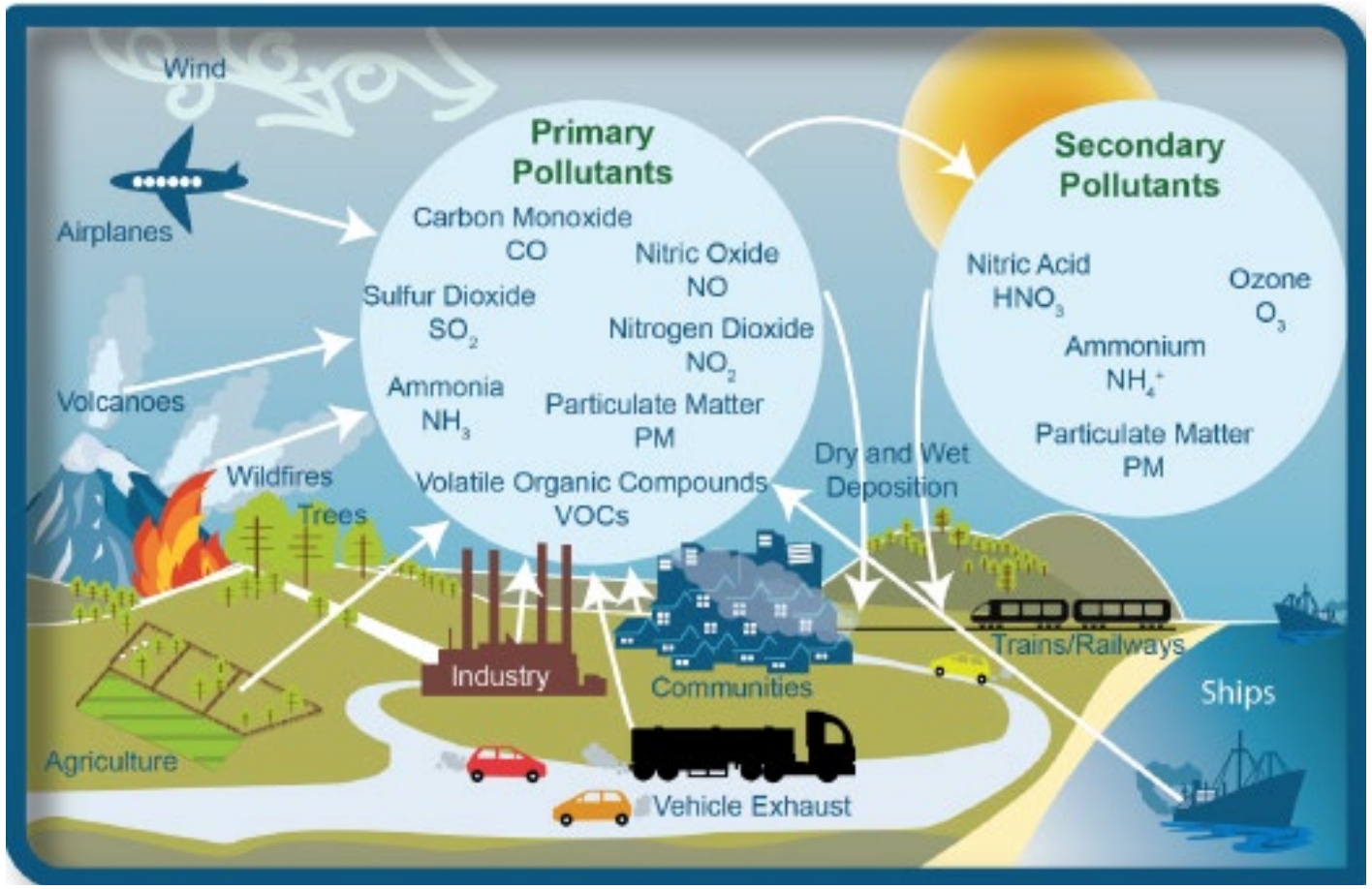


Data Source: Annual Illinois Air Quality Reports

The Chicago Context

Chicago is …

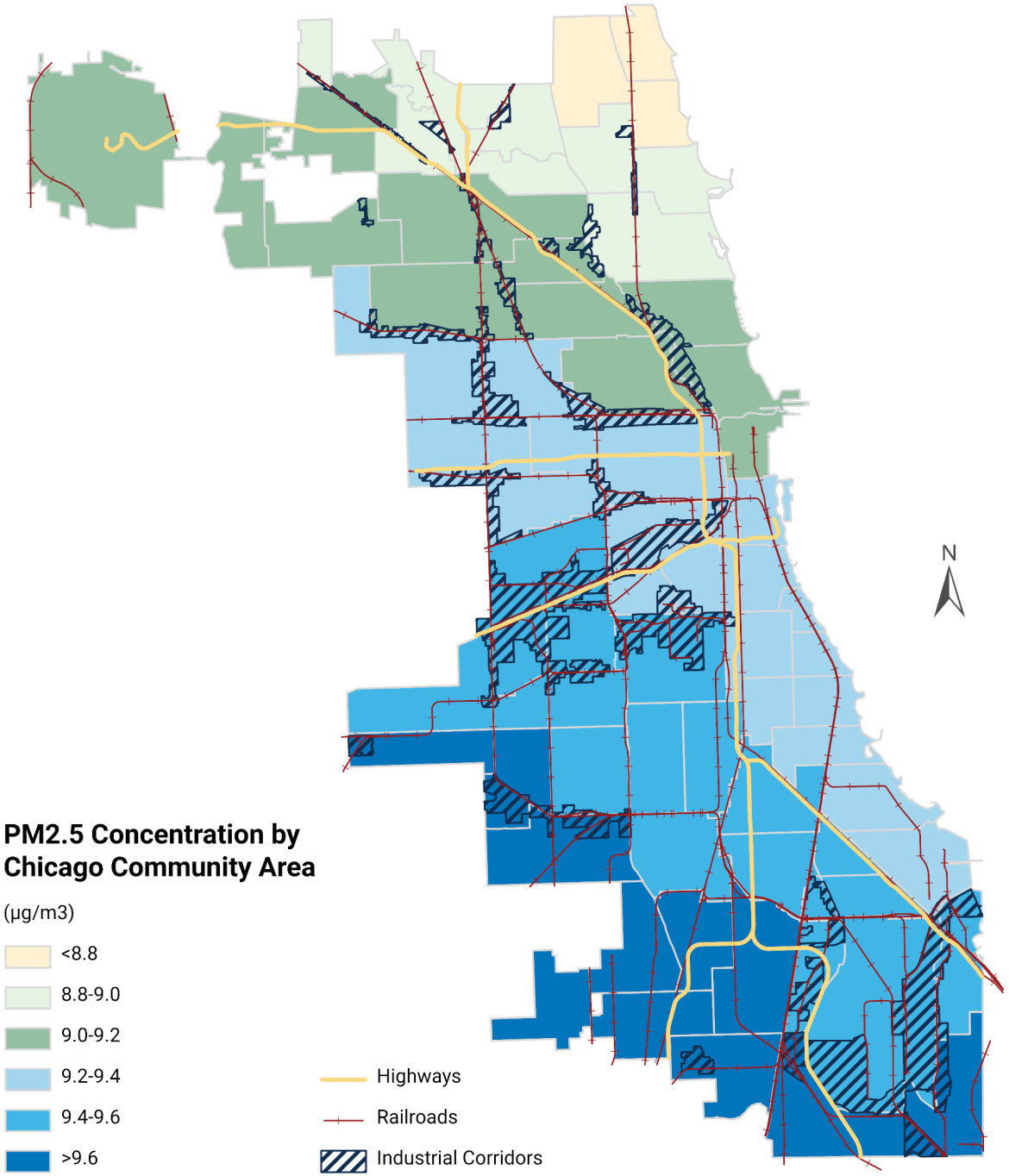
- A transportation hub - air, road and rail
- An industrial hub
- Residentially segregated



Adapted from: https://www.mrgscience.com/ess-topic-63-photochemical-smog.html

Diesel Emissions, 2023

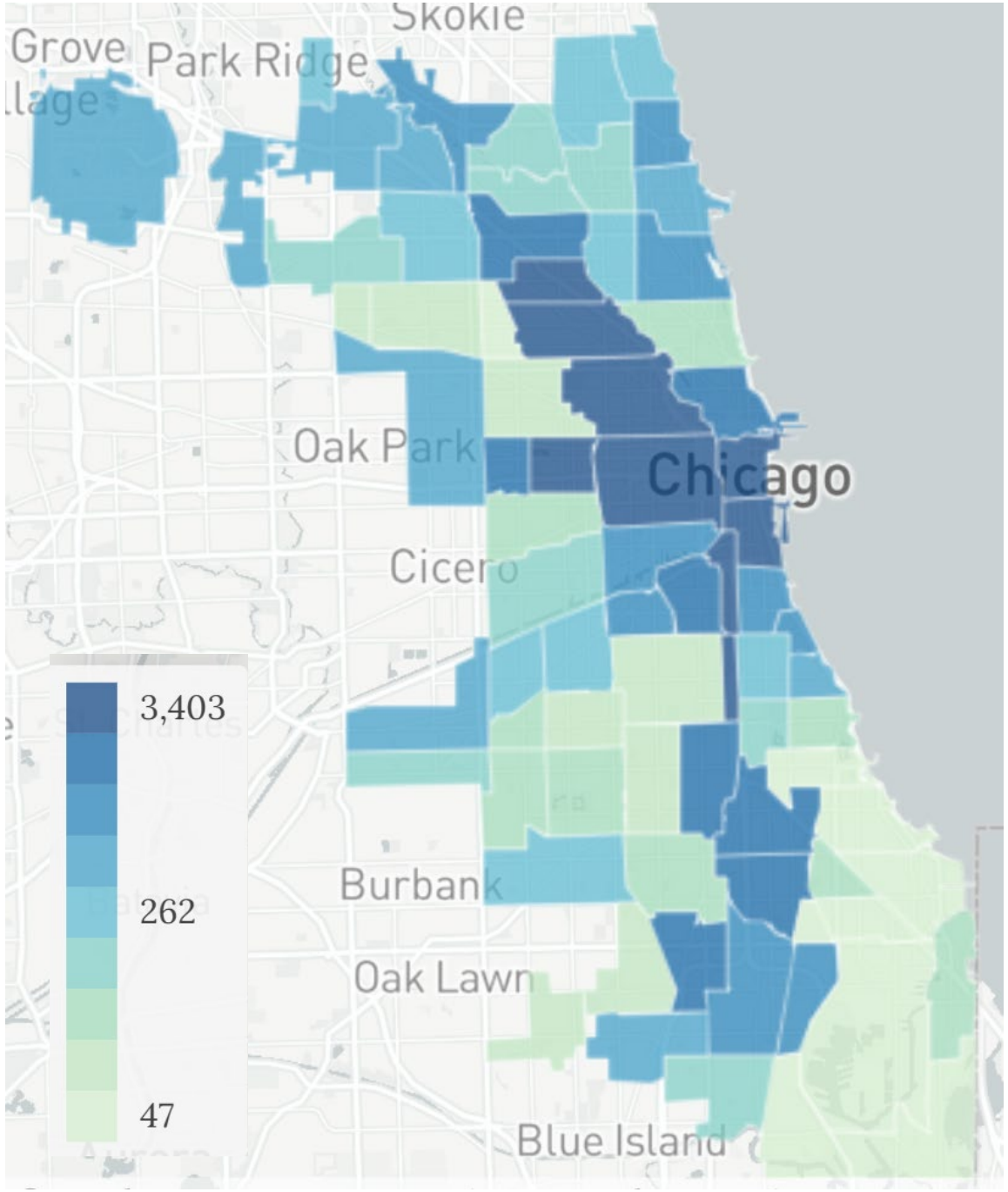
Potential Transportation and Industrial Sources of Diesel Emissions, Chicago, 2023



Data Source: US EPA EJSCREEN via the Chicago Health Atlas (PM2.5), Chicago Department of Technology & Information, GIS (Highways, Railroads, Industrial Corridors)

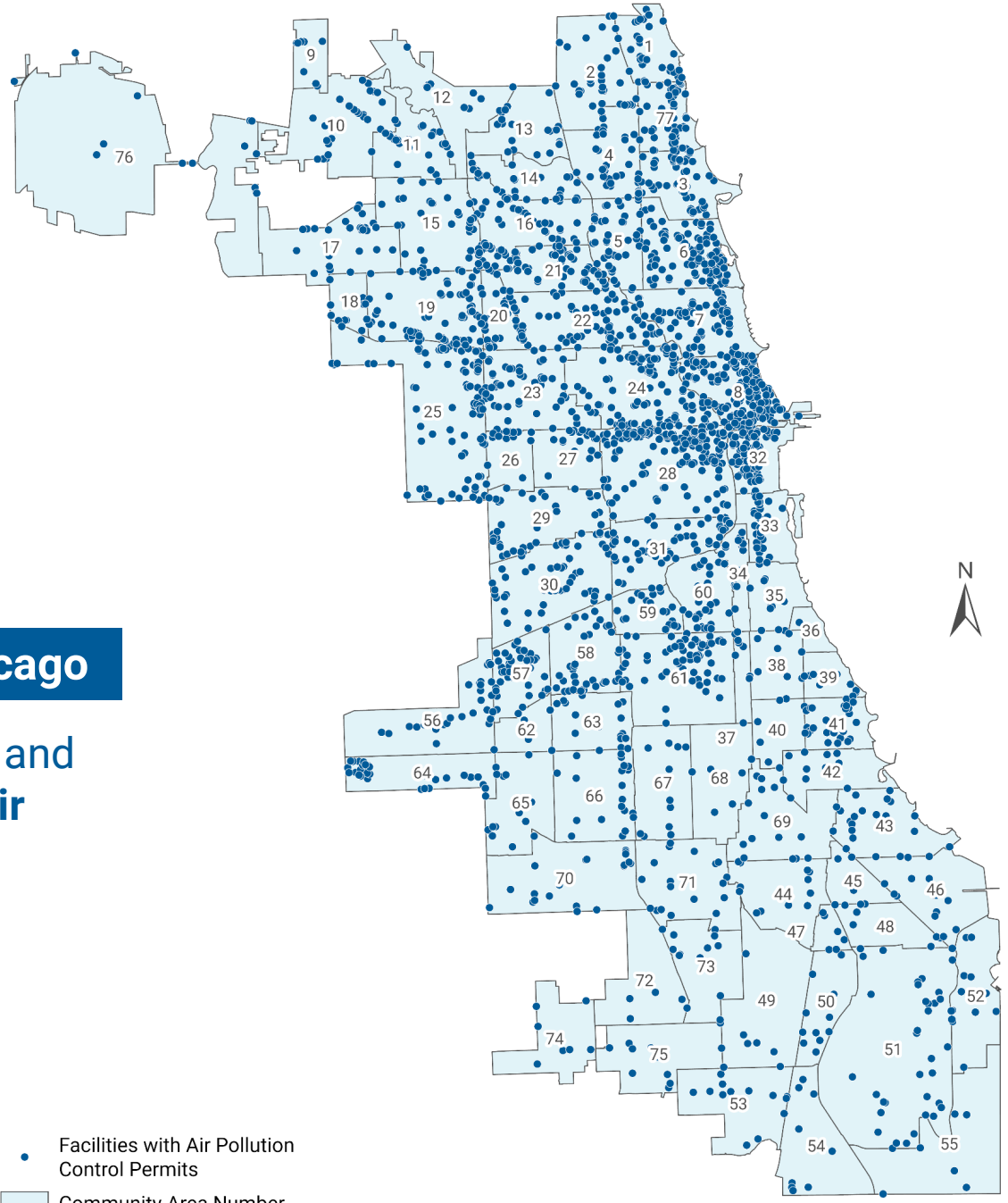
Traffic Intensity (distance-weighted vehicles), Chicago, 2020

- Proximity to motor vehicle traffic is associated with increased toxic gases and particulate matter including diesel particulates
- Residential proximity to traffic has been associated with various health impacts, particularly asthma and mortality



Data: US EPA EJSCREEN
Data Source: Chicago Health Atlas

Facilities with CDPH Air Pollution Control (APC) Permits, Chicago, March 12, 2025



2,717 APC permitted facilities in Chicago

APC permits are required for equipment and areas that have a potential to emit **any air contaminant** into the atmosphere.

Data Source: Office of Environmental Permitting & Inspections, CDPH

Bike Lanes, Chicago, 2023

Chicago is a biking city...

- Chicago has the second-highest percentage of commuters riding their bikes to work
- Chicago currently has 478 miles of on and off-street bike trails
  - **Most on the North side**
- Bike lanes contribute to reduced air pollution:
  - Promotes cycling – zero-emission mode of transportation
  - Reduces car traffic – lowers emissions from vehicles

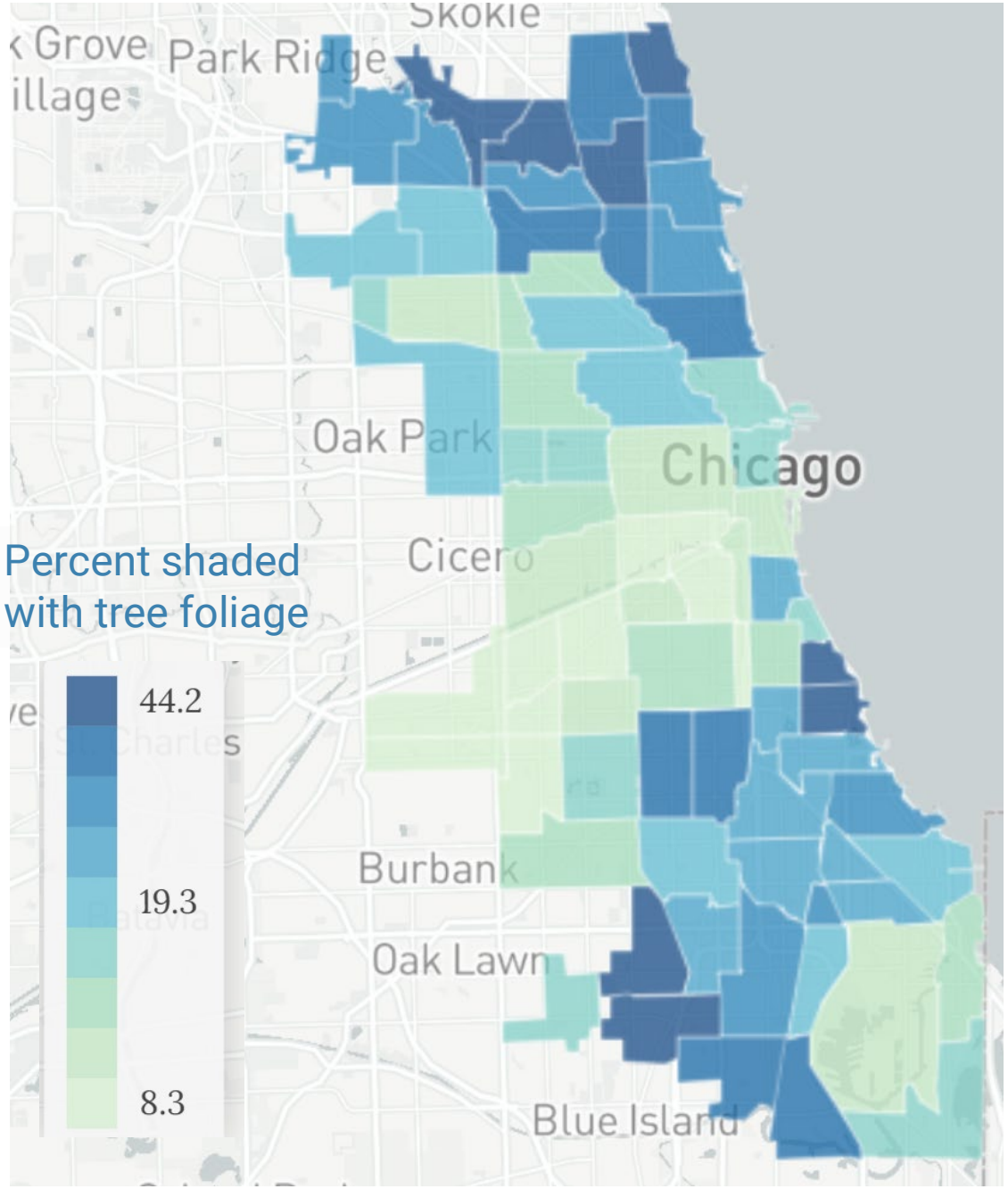
Chicago Bike Network (2025)

Tree Canopy, Chicago, 2017

Chicago is a Tree City...

Trees:

- Improve air and water quality
- Reduce flooding and urban heat island effect
- Reduce energy use by shading buildings
- Improve resident's quality of life by:
  - Reducing crime rates
  - Increasing property values
  - Boosting social cohesion in neighborhoods



Data: Chicago Region Trees Initiative, The Morton Arboretum https://mortonarb.org/plant-and-protect/chicago-region-trees-initiative/
Data Source: Chicago Health Atlas

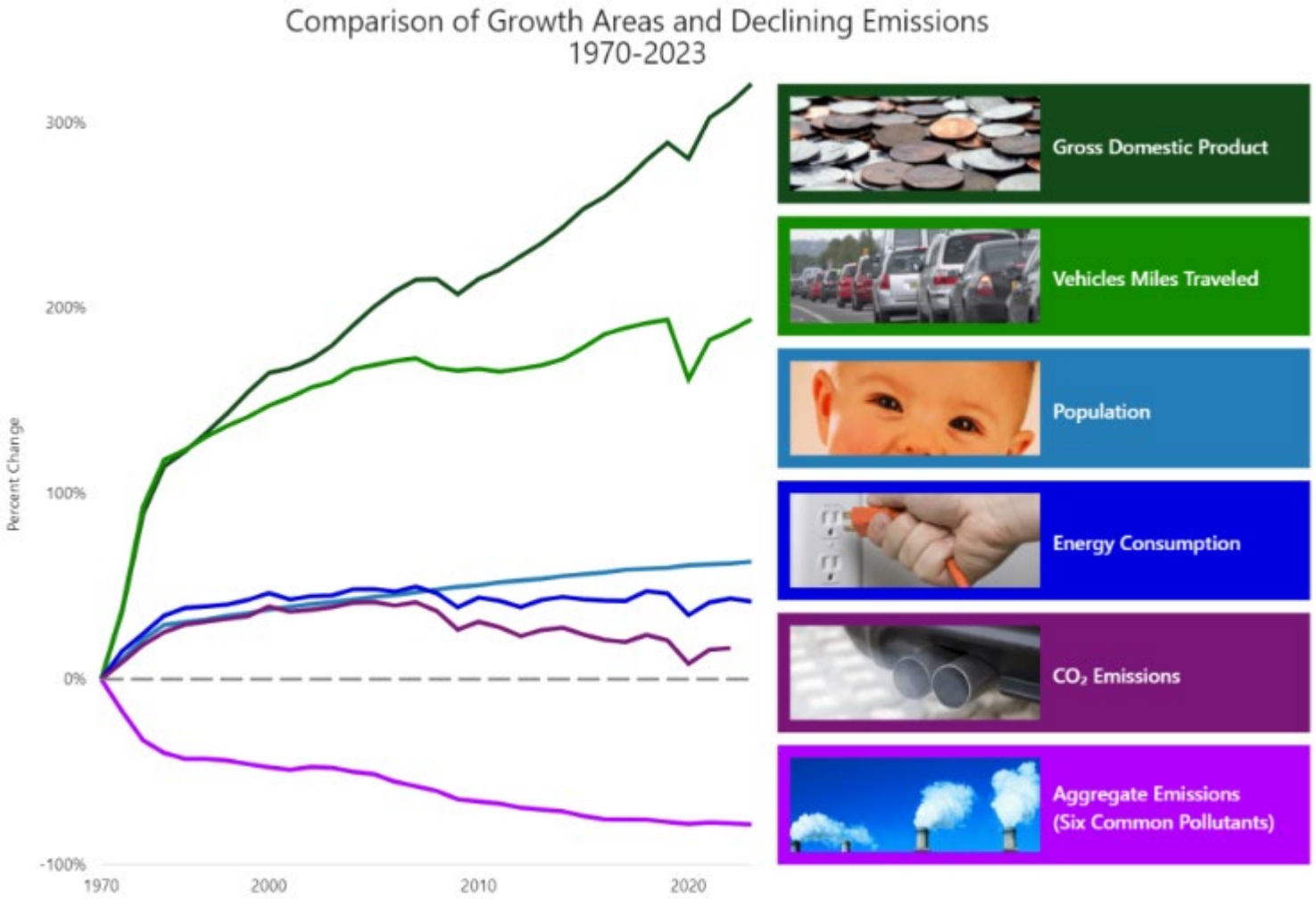
Regulatory Framework

Building on Successes

Since the Clean Air Act in 1970 and the establishment of EPA:

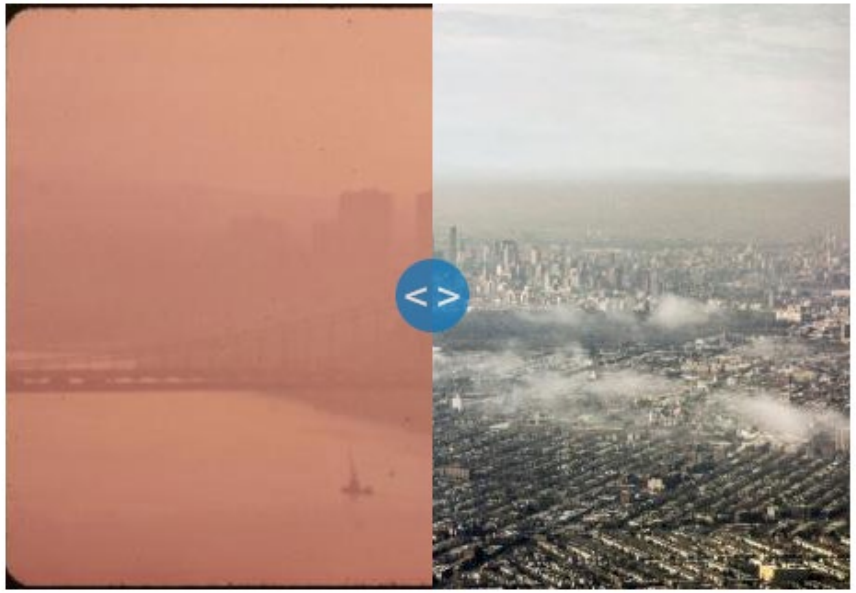
- New passenger vehicles are 98-99% cleaner for most tailpipe pollutants
- Fuels are cleaner
  - Lead has been eliminated
  - Sulfur levels are more than 90% lower

Pollution has Dramatically Reduced while Achieving Economic Growth



New York City: 1973 vs. 2013.

Slide the arrows to compare.



Source: EPA Documerica "Then and Now Challenge"

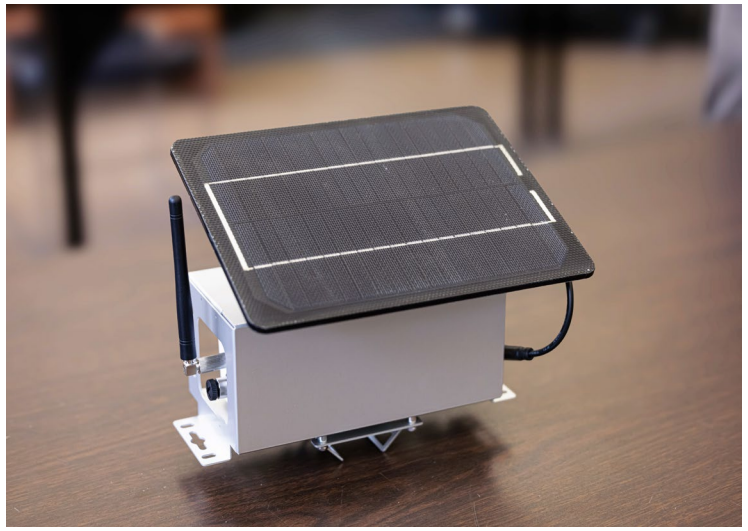
What has worked to reduce $PM_{2.5}$ pollution?

A **multi-sectoral approach** combining policy, technology, and community action

1. **Strengthened Transportation Policies**
   - Electric bus and rail fleets to reduce diesel emissions
   - Low-emission zones restricting older, high-emitting vehicles
   - Improving public transit accessibility to decrease car dependency
2. **Industrial Emission Controls**
   - Regulations on industrial polluters and incentivize cleaner technologies
   - Fenceline air monitoring near industrial zones to detect violations
3. **Cleaner Residential Heating Solutions**
   - Electrification of home heating and subsidizing cleaner heating alternatives
   - Phasing out high emission wood-burning stoves and incentivizing upgrades

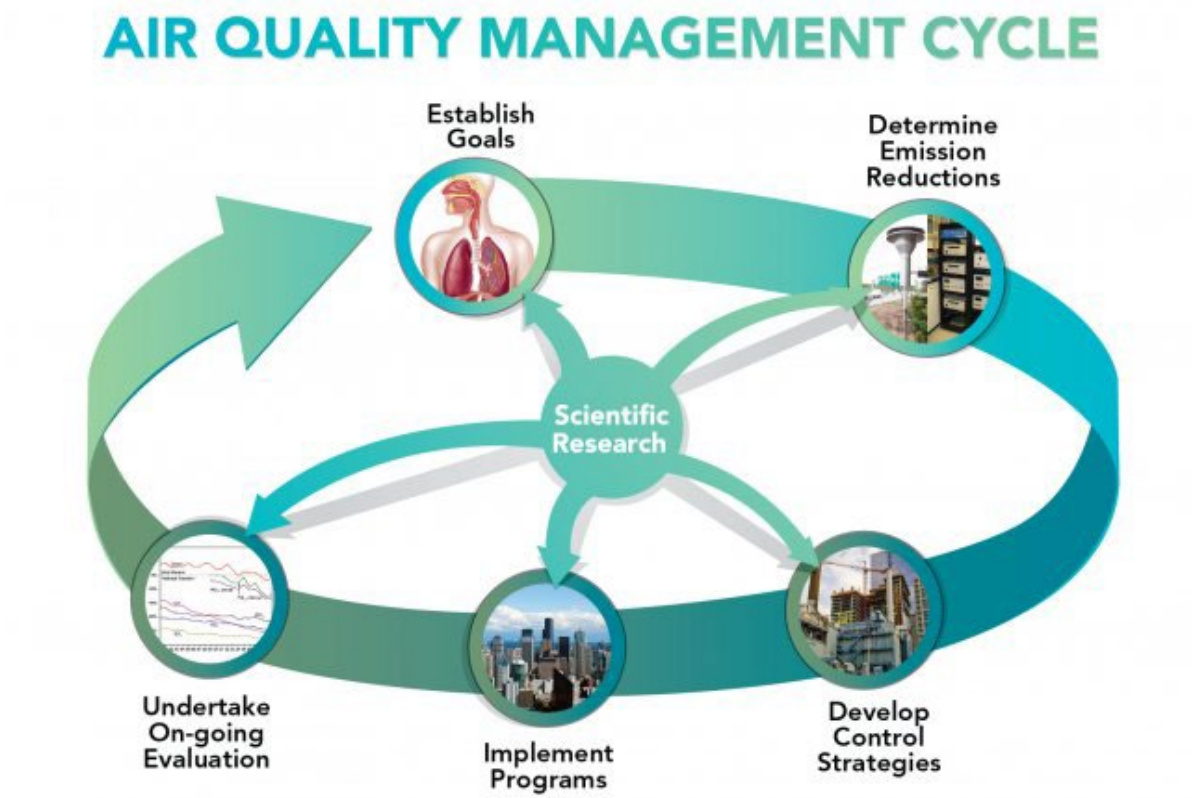
What has worked to reduce $PM_{2.5}$ pollution? (con't)

4. **Construction & Dust Control Measures**
   - Mandate best practices for dust suppression, such as water sprays and wind barriers
   - Require emissions controls on heavy-duty construction equipment
5. **Regional & Federal Coordination**
   - Collaborate with neighboring counties on emissions that contribute to secondary $PM_{2.5}$
   - Implement stricter emission limits for regional sources
6. **Community-Based Monitoring & Public Awareness**
   - Deploy **low-cost air quality sensors** in vulnerable neighborhoods
   - Educate public on indoor and outdoor air pollution risks



Best Practices in Air Quality Management

- Data-driven approach to evaluate and mitigate air pollutant levels
- Involves all levels of government – elected officials, federal, state and local governments
- Regulated industry groups, scientists, environmental groups, and the general public all play important roles too

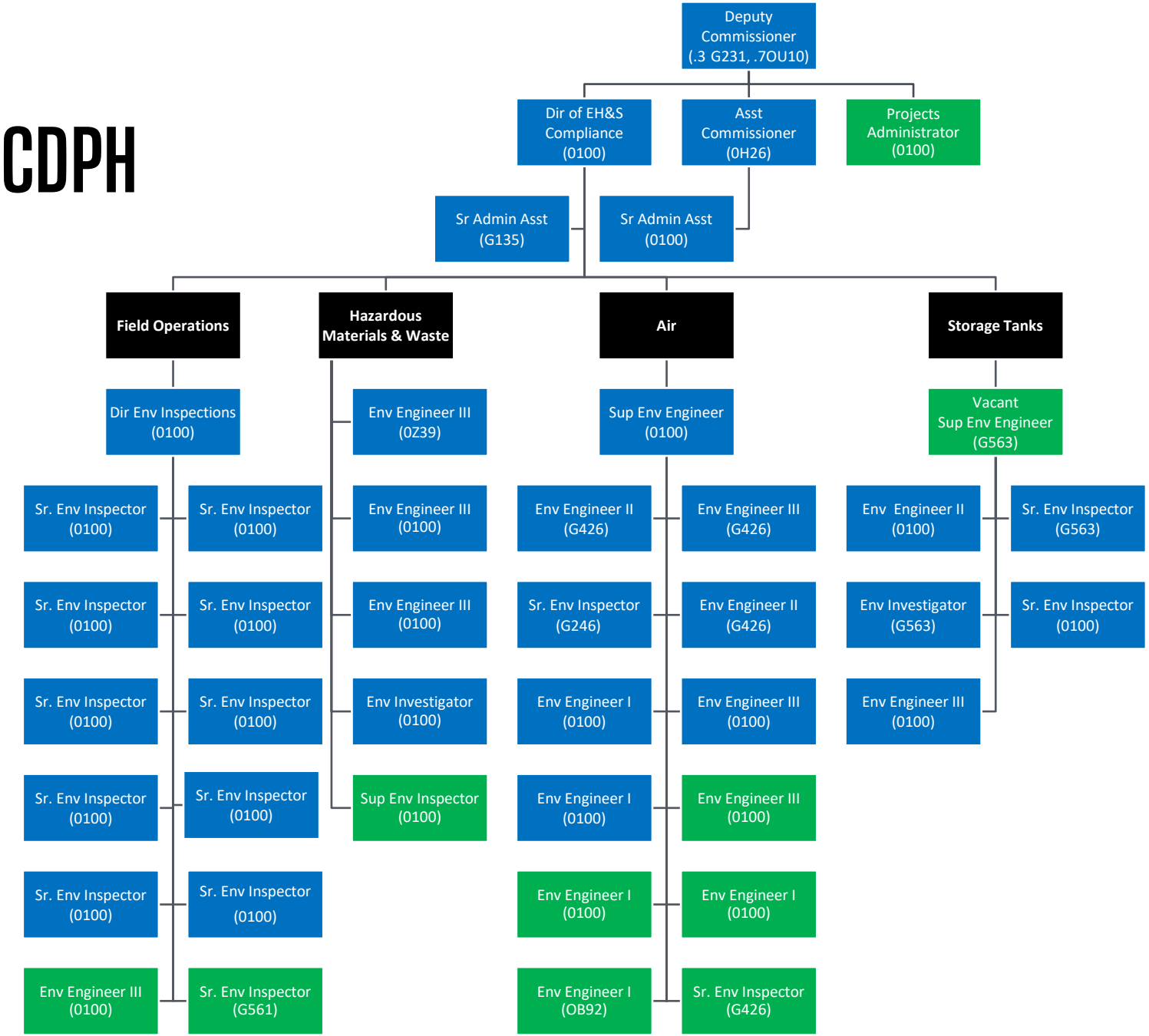


Chicago Air Pollution Standards for Permitted Facilities

- ***[Chapter 11-4 Article II Air Pollution Control Part C: Substantive Standards 11-4-700 et seq]***
  - *11-4-700 Visible emissions limitations.* No person shall cause or allow the emission of smoke or other particulate matter from an emission unit on a stationary emission source within the city with an opacity greater than 30 percent into the atmosphere unless otherwise permitted by **federal or state law**.
  - *11-4-710 Nitrogen oxide emissions.* No person shall cause or allow nitrogen oxide emissions from any source to exceed the limitations set forth by regulations promulgated by the **State of Illinois Pollution Control Board**.
  - *11-4-715 Lead emissions.* No person shall cause or allow the discharge or emission of lead from any facility (unless compliant with **state or federal air permit**).
  - *11-4-720 Emission of particulate matter.* No person shall cause or allow emissions from any source to exceed the limitations set forth by regulations promulgated by the S**tate of Illinois Pollution Control Board**.
  - *11-4-730 Air pollution prohibited.* **Makes air pollution emissions above state or federal law standards unlawful within the City of Chicago.**

CDPH Office of Environmental Permitting & Inspection (OEPI)

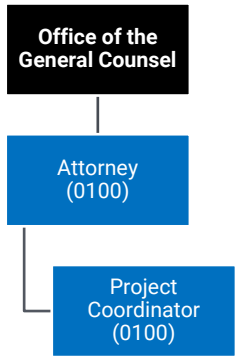
OEPI at CDPH



44 FTEs

10 Vacancies

CDPH Shared Services



CDPH Air Pollution Control (APC) Efforts

Permitting → Inspections → Enforcement

Learn more about the Consequential Facility permitting process

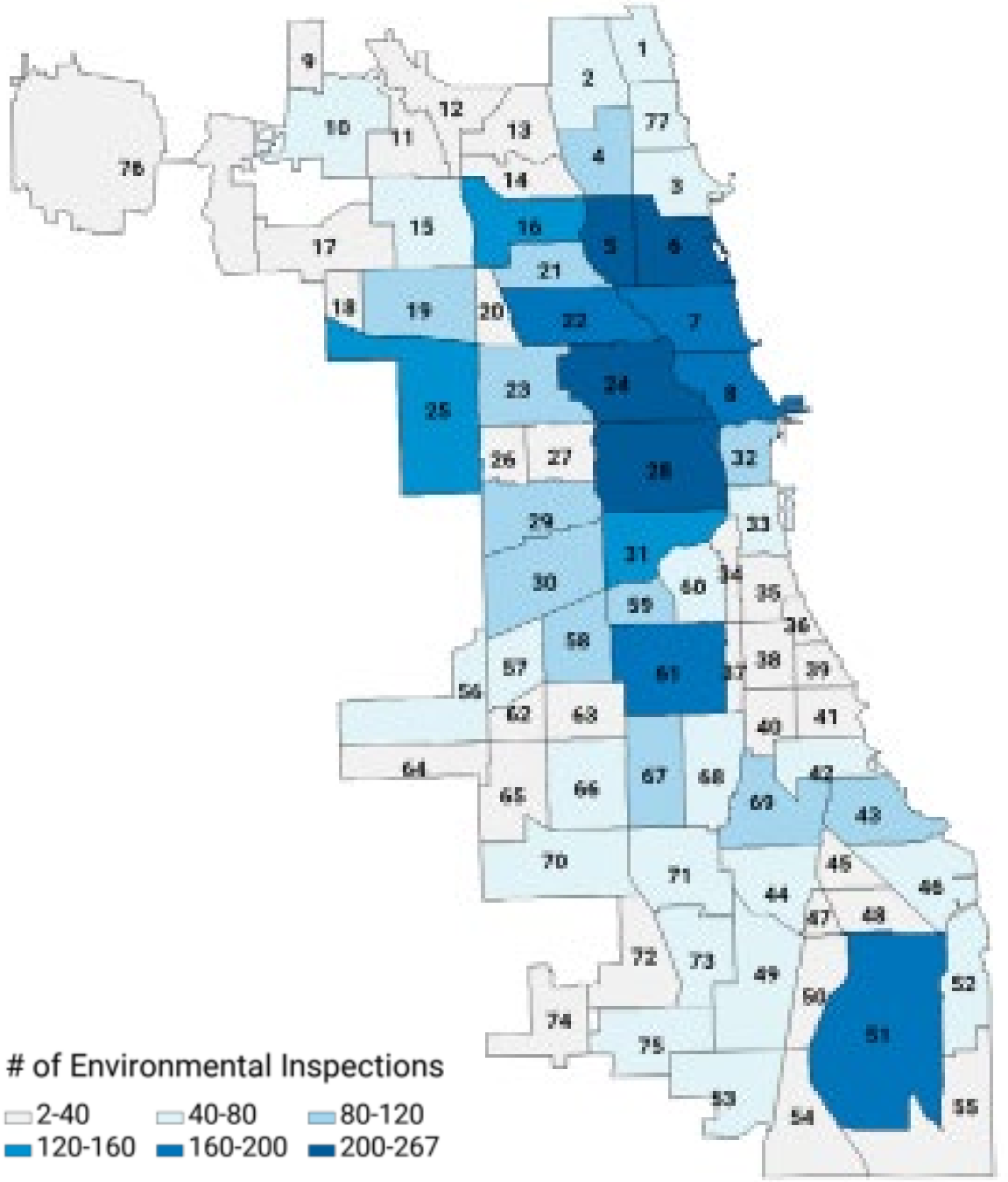
2024 OEPI Impact

2024 Impact

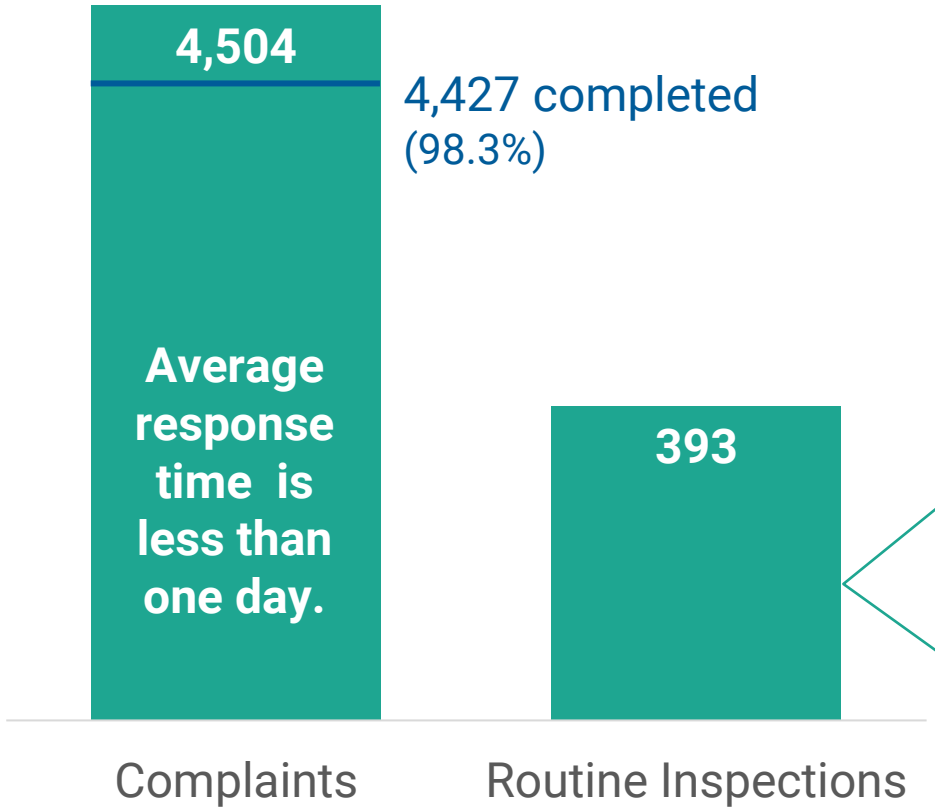
650,000+
Pounds of E-waste & Hazardous Waste Collected

6,000+
Inspections Conducted

1,000+
Permits Reviewed



2024 APC Inspections



Category	Emissions	Permitted Facilities	Percent Facilities Inspected
A1	Facility whose potential and actual emissions are 100 tons or more per year	29	34%
A2	Facility with potential to emit more than 100 tons per year, but whose actual emissions are less than 100 tons per year	53	21%
B	Facility whose potential and actual emissions are more than 5 tons per year but less than 100 tons per year	253	14%
C	Facility whose potential and actual emissions are 5 tons or less per year	1637	12%
	All Permitted Facilities	1972	13%

Only **half** of air inspector positions are filled.

Increasing Routine Air Pollution Control Inspections

CDPH currently has 3 air inspectors who perform routine facility inspections and investigate complaints

Currently, air inspections are prioritized by complaints, historical violations and IEPA requirements (motor vehicle repair shop, dry cleaners, metal plating facilities, etc.)

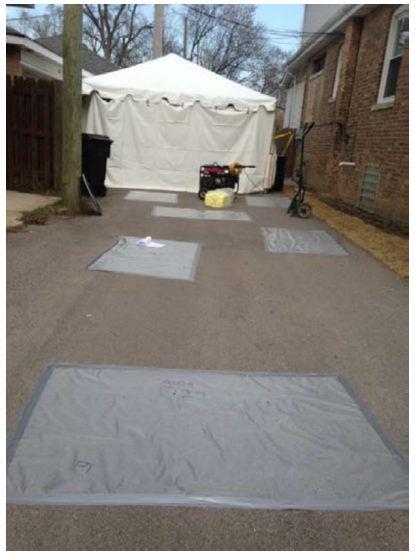
We do more complaints inspections than routine inspections due to limited staff

We are currently hiring 3 additional air inspectors to increase routine inspections

Asbestos Complaint Inspection and Abatement

Rock Crushing/Material Handling

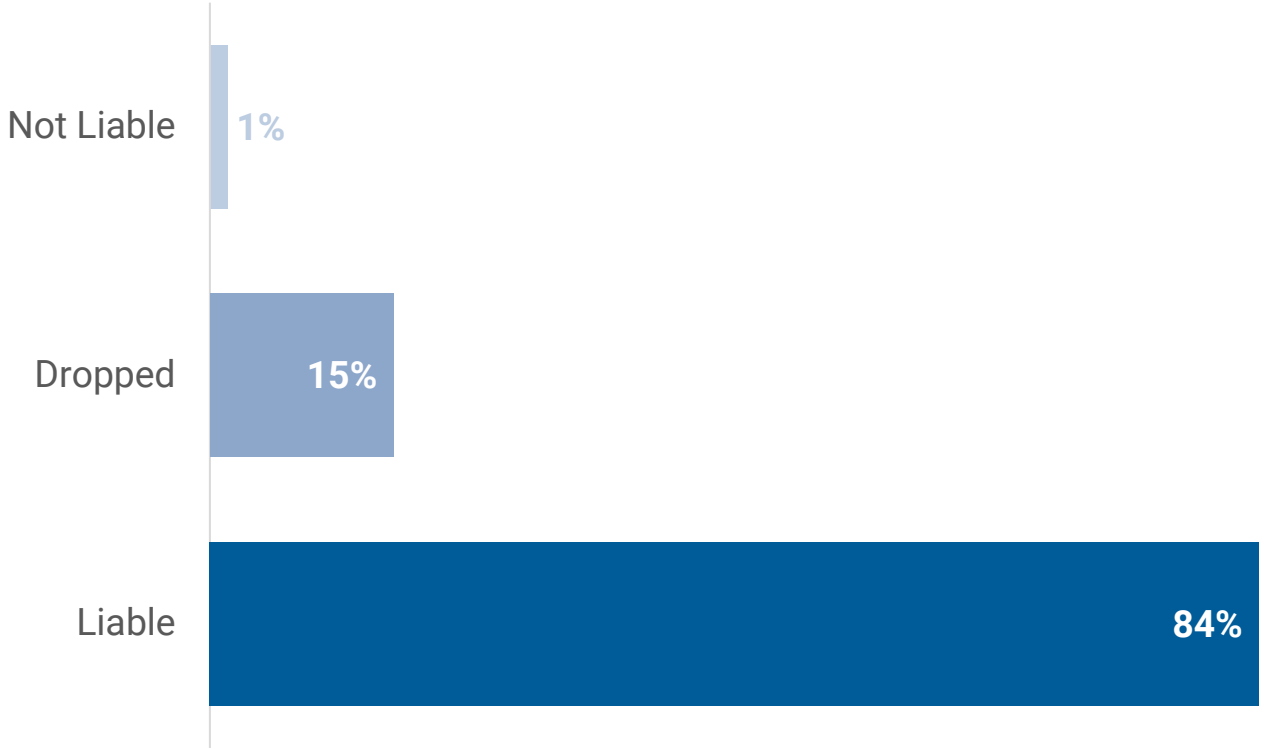
Mercury Spill



Pollution Controls in Place

2024 APC Enforcement

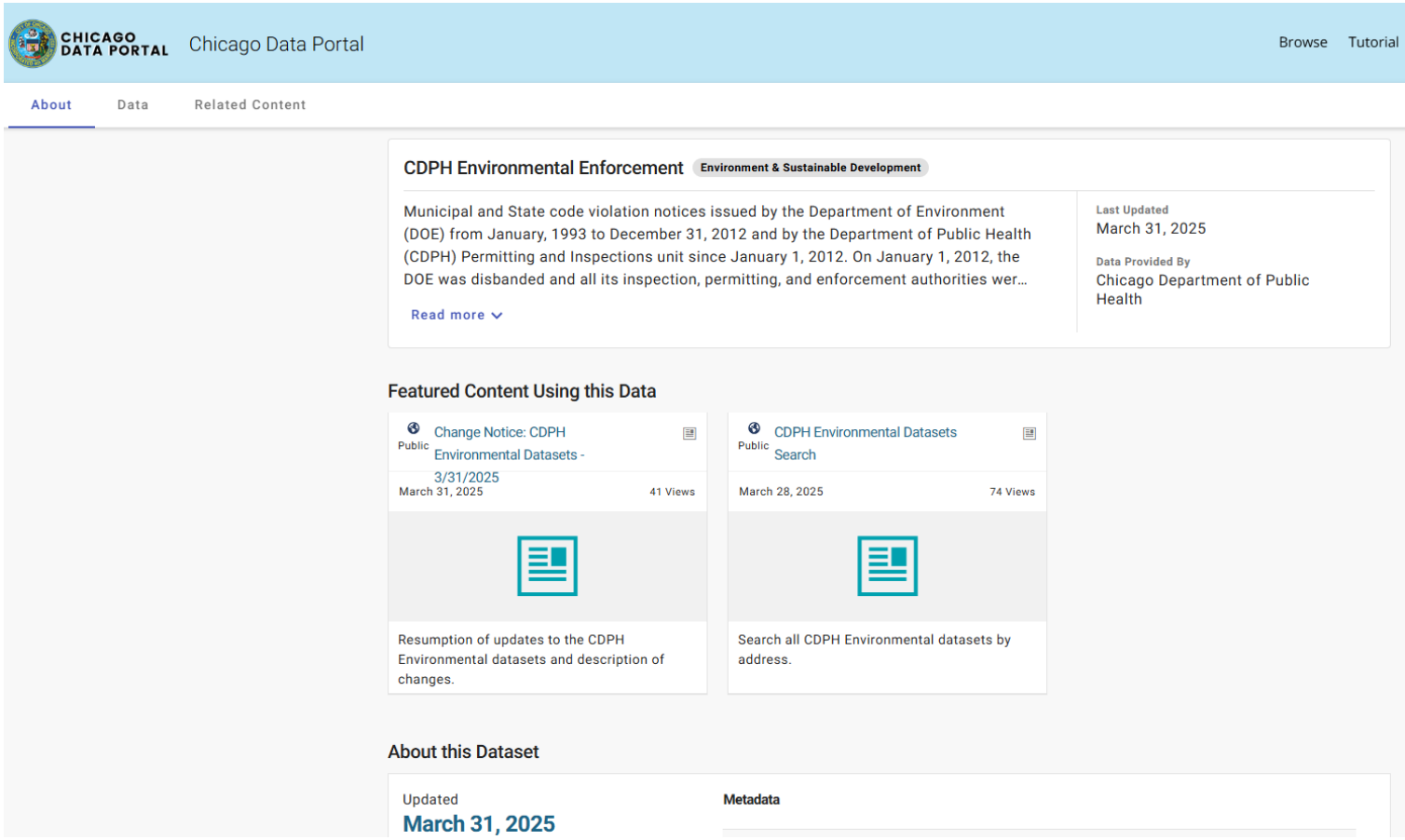
- Tickets can be appealed
- The **majority** of APC tickets were successfully prosecuted at City of Chicago Administrative Hearings



695

TICKETS ISSUED

Where to Find Data on Environmental Enforcement



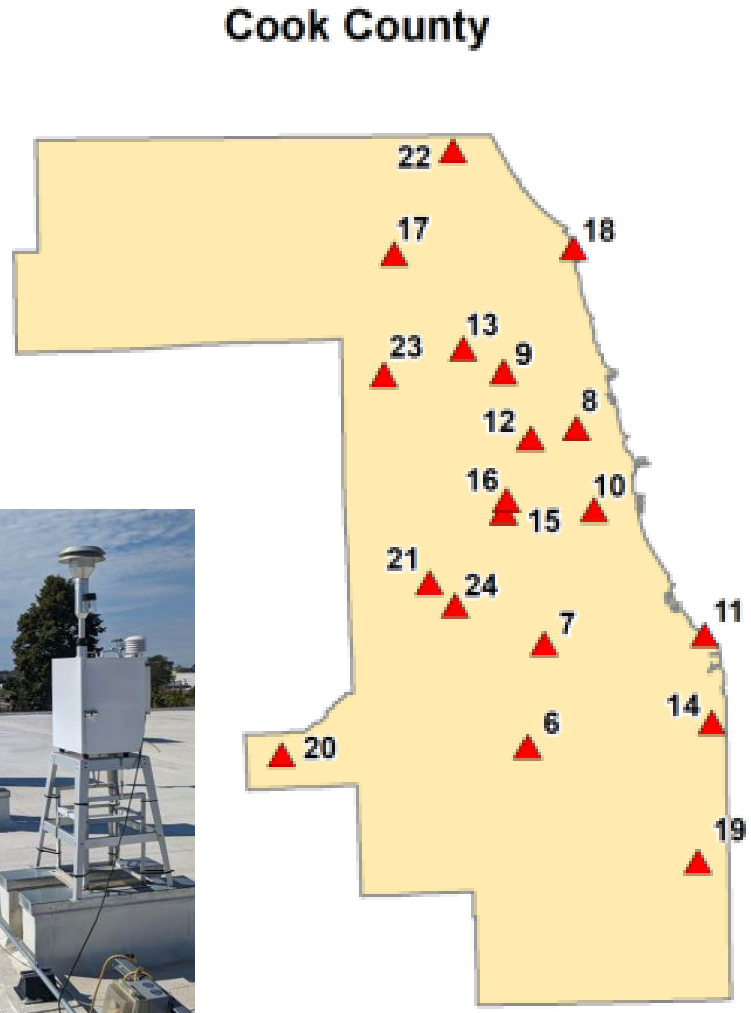
https://data.cityofchicago.org/Environment-Sustainable-Development/CDPH-Environmental-Enforcement/yqn4-3th2/about_data

Improving Air Monitoring

Current Air Monitoring Efforts

- IEPA operates an ambient air monitoring network statewide, including 8 in the City of Chicago in partnership with Cook County
- Air quality data can be accessed by the public at:
  - www.AirNow.gov
  - https://epa.illinois.gov/topics/air-quality/outdoor-air.html

Scan code to see locations of air monitors



Chicago Monitors Health Indicators on Health Atlas

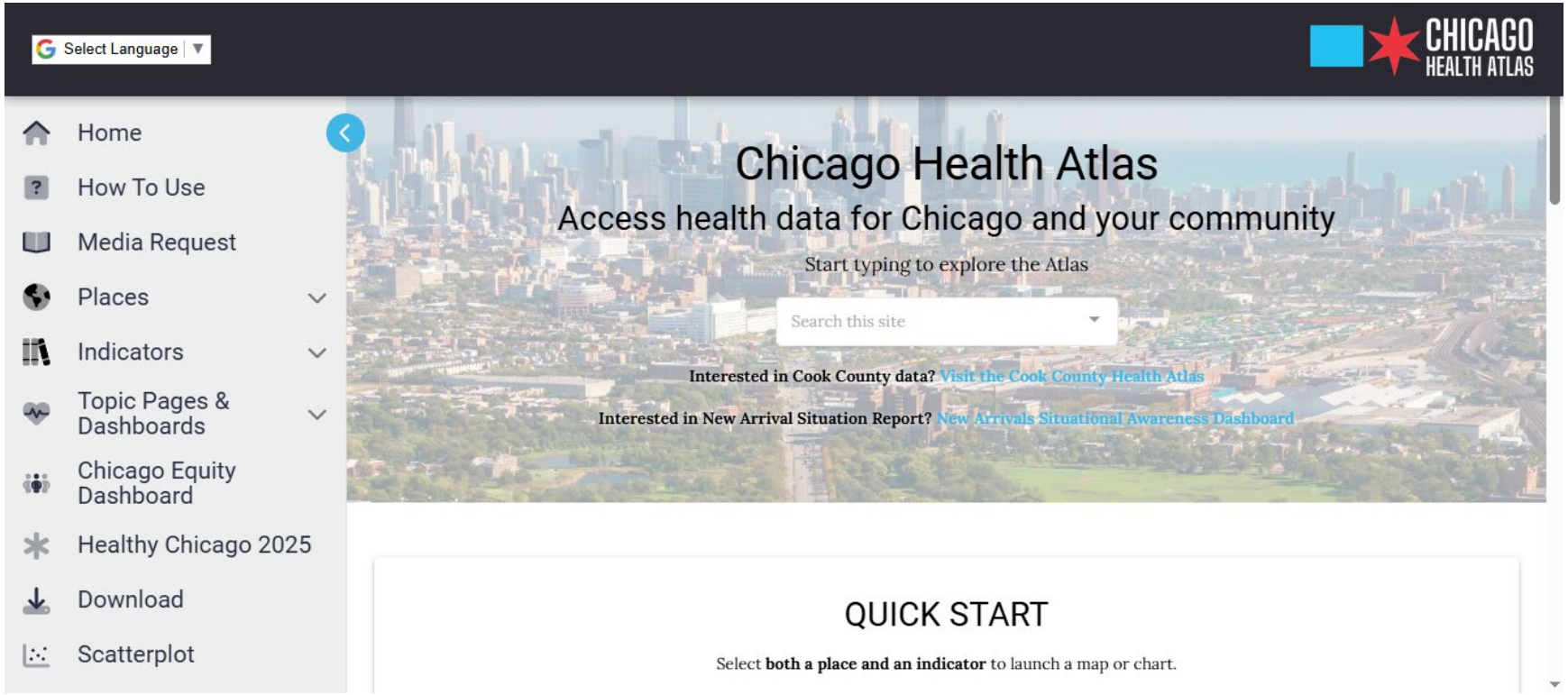
400+ indicators

35+ data sources

Multiple geographic layers
- Citywide
- Community area
- Zip code
- Healthy Chicago Zones

https://chicagohealthatlas.org/

Chicago Health Atlas www.chicagohealthatlas.org

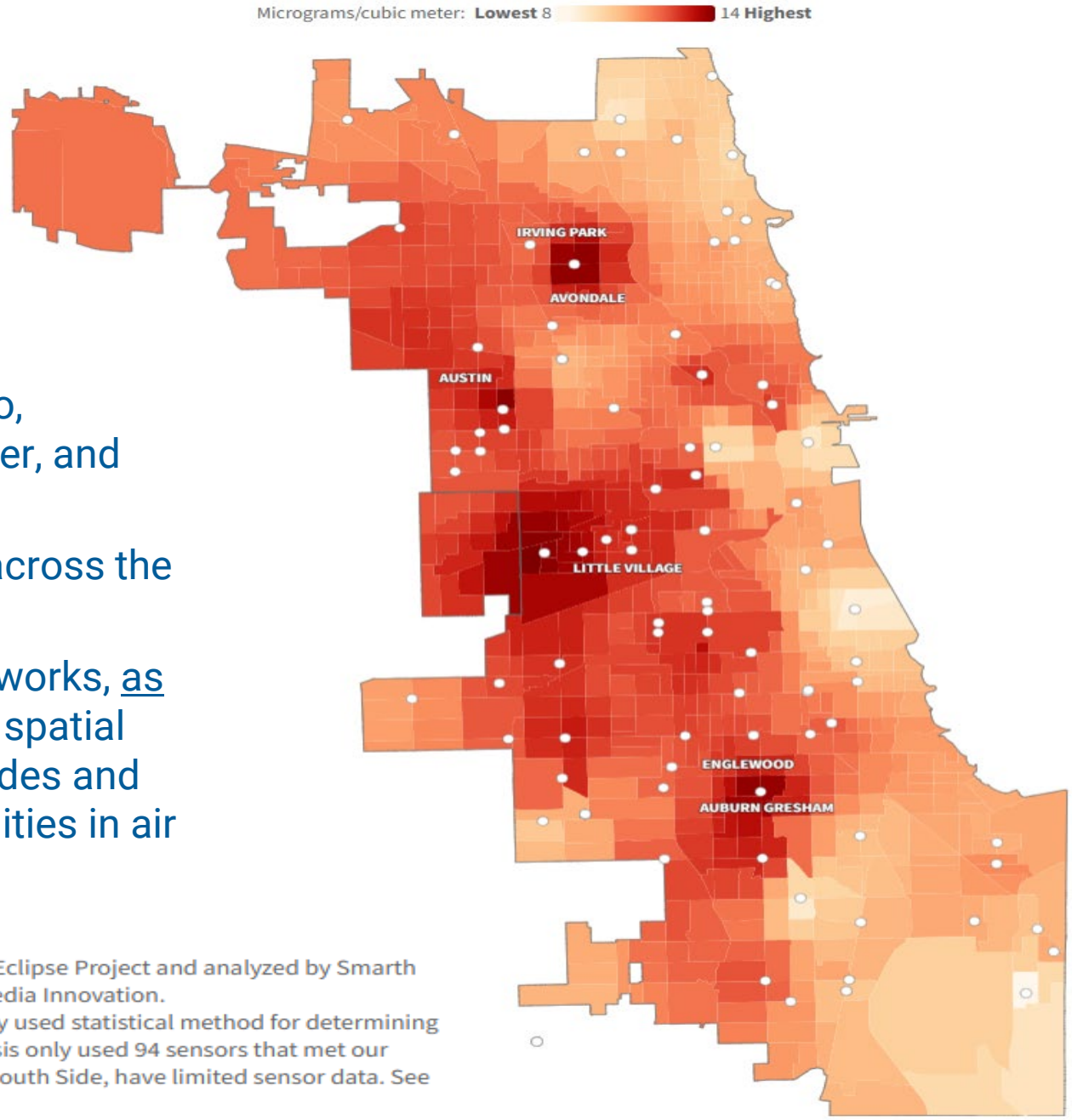


DATA AVAILABLE ON:

- Sensitive populations
  - Young and older adults
  - Underlying health conditions
- Environmental Conditions
  - Traffic density, Tree Canopy
- Environmental Exposures
  - PM2.5, Elevated blood lead levels

CDPH's Office of Epidemiology & Research is currently working on adding an Environmental Health module and additional environmental health indicators to the Chicago Health Atlas.

Average $PM_{2.5}$ Readings July–October 2021



PROJECT ECLIPSE

- Partnership between Microsoft, City of Chicago, JCDecaux, Environmental Law and Policy Center, and Array of Things
- Deployed >100 low-cost air pollution sensors across the city with oversampling in EJ neighborhoods
- Demonstrated that dense, low-cost sensor networks, as a complement to regulatory networks, capture spatial variations during short-term air pollution episodes and enable monitoring of neighborhood-level inequities in air pollution exposures in real time

Source: Microsoft Research Eclipse Project. Data courtesy of the Microsoft Research Eclipse Project and analyzed by Smarth Gupta and Dillon Bergin, MuckRock and Columbia University's Brown Institute for Media Innovation.
Note: The values displayed between sensors are estimates calculated by a commonly used statistical method for determining air pollution. Although Microsoft located 115 sensors throughout Chicago, our analysis only used 94 sensors that met our completeness criteria. Some areas of the city, including the Southeast Side and Far South Side, have limited sensor data. See our methodology for more information on how we analyzed the data.
Visualization: Charmaine Runes/WBEZ

CDPH Efforts to Improve Air Quality

Improve Data Collection: Air Sensor Network Update

2024
- Air sensors selected and procured

Winter 2025
- CDOT MOU finalized

Spring 2025
- Advisory Board selected
- Sensors co-located with IEPA Air Monitoring Stations for calibration

Summer 2025
- Sensors installed
- Community input on public dashboard

Fall-Winter 2025
- Community Leads train residents
- Public dashboard published

Opportunities for Community Involvement

- ✓ Apply to join the Advisory Board *(Note: Selection coordinated by HCZ Regional Leads)*
- ✓ Submit suggestions to the ChicagoAQI portal developed by Anthony Moser (N4EJ)
- ✓ Participate in community engagement sessions on sensor placement and the public dashboard
- ✓ Conduct air quality trainings with community members to better equip them with knowledge

Community Education

What can people do to safeguard their health?

- Check daily air pollution forecasts
- Take precautions on poor air quality days
  - Wear a face mask, limit time outdoors
- Reduce exposure to indoor air pollution
  - Replace gas stoves, don't burn wood in fireplaces, grow plants, use air purifiers
- Notify 311 if you see something concerning

What does the Air Quality Index mean for me and my family?



Name	Index Value	Advisory
Good	0 to 50	None
Moderate	51 to 100	Usually sensitive individuals should consider limiting prolonged outdoor exertion.
Unhealthy for Sensitive Groups	101 to 150	Children, active adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
Unhealthy	151 to 200	Children, active adults, and people with respiratory disease, such as asthma, should avoid outdoor exertion; everyone else should limit prolonged outdoor exertion.
Very Unhealthy	201 to 300	Children, active adults, and people with respiratory disease, such as asthma, should avoid outdoor exertion; everyone else should limit outdoor exertion.
Hazardous	301 to 500	Everyone should avoid all physical activity outdoors.

How Can People Get Updates?

RESOURCES

Sign up for environmental news and learn about opportunities for public engagement at:

CHICAGO.GOV/ENVCOMMUNITYINFO

Submit an environmental complaint: CALL 3-1-1
or visit 311.CHICAGO.GOV

CDPH
Chicago Department of Public Health

Chicago.gov/Health

HealthyChicago@cityofchicago.org

@ChicagoPublicHealth

@ChiPublicHealth

Appendix

What is the City doing to enforce environmental laws?

Our goal is to protect public health and the environment. We do this by preventing pollution, addressing environmental hazards, mitigating risks from environmental pollutants and ensuring compliance with environmental laws and regulations. During inspections and during the permit process, CDPH educates regulated businesses to ensure they understand expectations and make corrections in a timely manner, as appropriate.

How do citations for small and large infractions work?

Penalties have a variety of range, depending on the scale of the violation. Settlement agreements may also be used to ensure a regulated business complies with City ordinances including specific expectations (such as new equipment), timeframe for implementation, and often with an agreed outcome (such as voluntary facility closure) if expectations are not met.

Air Violation Fine Range Examples

Prohibited Activities		First Offense + Subsequent, Chicago
Permit required to operate a waste facility	11-4-030(a)	$1000 to $10,000 for each offense
Operation of a facility must not be in violation of its permit or an applicable ordinance or regulation: 1) Exceeds or does not comply with the Facility plans and specifications; 2) Violates any permit condition; 3) Violates any provision of chapter.	11-4-030(b)	$300 to $1000 for first violation, $500 to $1,500 for second violation $750 to $5,000 for third and each subsequent violation for same offense within one year for each offense
City regulations for cleaning of, sound and air quality control at, and discharge of particulate matter and wastes from shooting ranges must be adhered to	11-4-260(b)	$300 to $1,000
Air Pollution Control Permit must be obtained for any regulated equipment or area.	11-4-620(a)(1)	$250 cat C; $1,000 cat B; $4,500 cat A2; $7,500 cat A1
Replacement or relocation of regulated equipment or area requires new Air Pollution Control Permit.	11-4-620(a)(2)	$250 cat C; $1,000 cat B; $4,500 cat A2; $7,500 cat A1
Repairing or modifying regulated equipment or area (changing quantity or nature of air emissions) requires new Air Pollution Control Permit.	11-4-620(a)(3)	$250 cat C; $1,000 cat B; $4,500 cat A2; $7,500 cat A1
Permit shall be posted in a conspicuous place near regulated equipment or area.	11-4-620(b)	$350 to $500 for each offense
Conditions of Air Quality Control Permit must be adhered to	11-4-630(b)	$3,500 to $5,000
Written notification required within 30 days when regulated equipment is dismantled or discontinued.	11-4-640	$1,000 to $5,000; with stipulations (see code)
A Certificate of Operation must be obtained for regulated equipment or area	11-4-660(a)	$250 cat C; $1,000 cat B; $4,500 cat A2; $7,500 cat A1
Certificate of Operation must be posted	11-4-660(c)	$350 to $500 for each offense
Conditions of Certificate of Operation must be adhered to	11-4-670(b)	$3,500 to $5,000
Each facility with a Certificate of Operation must yearly certify that they continue to meet the standards for the issuance of said certificate.	11-4-690	$3,500 to $5,000
Opacity of emissions of smoke/ particulate matter from stationary emission source must be lower than 30% when not otherwise permitted	11-4-700(a)	$1,000 to $5,000; with stipulations (see code)

Which methods of enforcement, permissible under the municipal code, does CDPH regularly use in enforcement?

There are times that CDPH uses measures beyond fines to protect public health and the environment, such as requiring air monitoring, payment for consultants to be on site, and site clean up and removal of material, such as asbestos abatement or illegally dumped chemicals.

Example 01: A total of six violations related to permit violations and fugitive dust leaving the facility. The operators were required to make improvements at a significant cost including driveway pavement repair, increase dust control using water misting machines near material handling areas and truck wheel wash equipment to prevent mud from leaving the site.

Example 02: A total of three violations related to poorly controlled emissions and handling of material that could become windborne. These were resolved through a settlement agreement. Beyond the fines paid, the owners were required to install odor control condensers and top-of-silo blue smoke controls, install bottom-of-silo blue smoke controls, and complete third-party inspection and maintenance of equipment used to capture dust and emissions. The cost of the emissions control equipment is between $500K-$700K.