

Core Module #4: Air Pollution

Exposure Module





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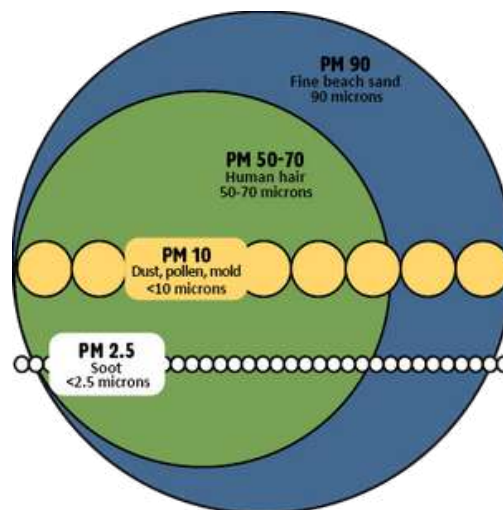
Themes

1. Understanding sources of air pollution.
2. Understanding implications of air pollution on public health.
3. Understanding disproportionate impacts on communities of color.
4. Understanding how the community can get engaged around mitigation and advocacy.
5. Introduction to jobs in the field and providing pathways to learning and employment.

Background/Definition/Introduction

Air pollution refers to the release of pollutants into the air, which are detrimental to our health and planet. Annually, air pollution is responsible for nearly seven million deaths globally. People of color living in low- and middle-income areas suffer the most. In general, most air pollution comes from energy use and production, and much of it is related to transportation – trucks, buses, cars, trains, and boats. Burning fossil fuels releases gasses and chemicals into the air.

Smog and soot are the most prevalent types of air pollution. Smog is air pollution that reduces visibility; a fog or haze that combines with smoke and other atmospheric pollutants. It occurs when emissions from combusting fossil fuels react with sunlight. Soot (aka “particulate matter”) is made up of tiny particles of chemicals, soil, smoke, dust, and other allergens carried in the air. Fine particulate matter, also called PM 2.5, is particulate matter that is 2.5 micrometers in diameter or smaller, which is smaller than dust and mold particles. These fine particles penetrate deep into the lungs and are linked to premature death, heart attacks, strokes, and aggravated asthma.¹

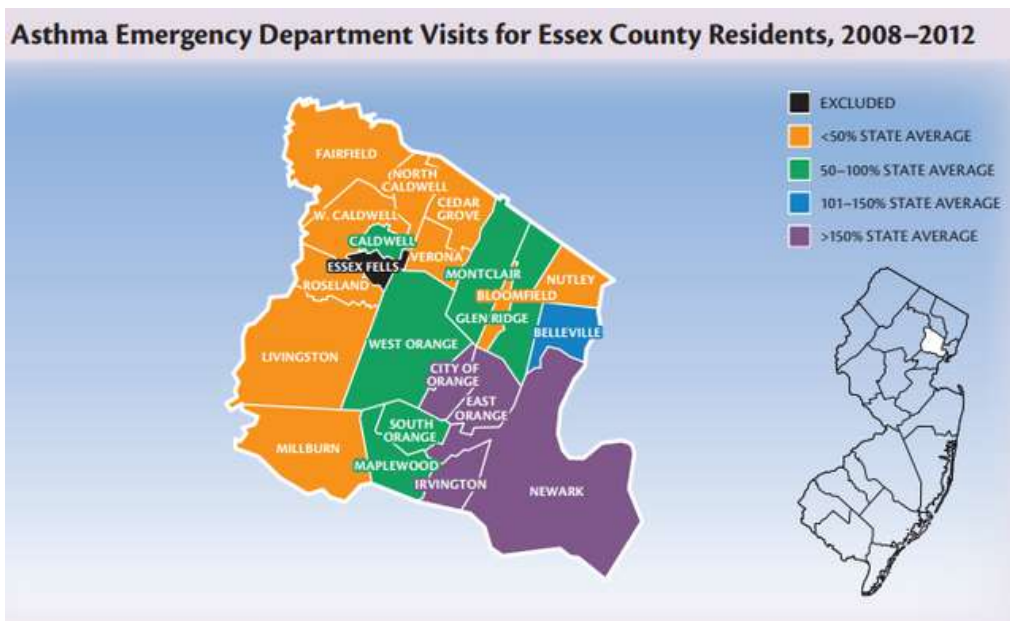


Source: Washington State Department of Ecology

1. Brian Palmer, “Particulate Matters,” NRDC, June 15, 2018, <https://www.nrdc.org/onearth/particulate-matters#:~:text=They%20found%20that%20an%20increase,heart%20disease%20by%2010%20percent>. Add a little bit of body text

Both smog and soot come from cars, trucks, buses, trains, factories, power plants, incinerators, and anything that burns coal, gas, or natural gas. In New Jersey, the transportation sector is the largest source of air pollution and accounts for 79% of nitrogen oxides from manmade sources, 23% of fine particulate pollution, and 41% of net greenhouse gasses. These pollutants impact our most sensitive residents, which include the elderly, children, and those with heart and lung conditions, such as asthma.

Research shows that air pollution can worsen asthma symptoms.² The graphic below illustrates how residents of Essex County, NJ visit the emergency room (ER) for asthma more often than residents in the rest of the state. Newark, East Orange, Irvington, and the City of Orange had the highest rates, together accounting for 86% of Essex County’s ER visits for asthma. In Newark, about 25% of the children have asthma — a rate three times higher than the national average. This data suggests the pollution from Newark International Airport and nearby highways, truck routes, and industrial businesses is having a profound effect on the health of local residents.



Source: New Jersey Department of Health

In addition to health concerns, air pollution contributes to climate change. While the ozone in the atmosphere is warming the climate, the particulate matter can have either warming or cooling effects on the climate depending on its different components.³ This translates to at-risk communities seeing an increase in flooding, heat waves, droughts, and wildfires due to climate change. The US Environmental Protection Agency released a report that examines how climate change may impact environmental justice communities.⁴

2. “Air Pollution,” Asthma and Allergy Foundation of America, October 2015, https://www.aafa.org/air-pollution-smog-asthma/?fbclid=IwAR0Eo2ailgG5OVz2n0PjCjWEXUM8xu8hT0hmPihZkWYCLX_6wAGuYubREE.

3. “Air Quality and Climate Change Research,” EPA (Environmental Protection Agency, March 30, 2022), <https://www.epa.gov/air-research/air-quality-and-climate-change-research#:~:text=Ozone%20in%20the%20atmosphere%20warms,sulfates%20cool%20the%20earth's%20atmosphere.>

4. “Social Vulnerability Report,” EPA (Environmental Protection Agency, July 21, 2022), <https://www.epa.gov/cira/social-vulnerability-report>.

Key findings from the report:

- Black and African American individuals are projected to face higher impacts of climate change for all six impacts analyzed in this report compared to all other demographic groups. For example, with 2°C (3.6°F) of global warming, Black and African American individuals are:
 - 34% more likely to currently live in areas with the highest projected increases in childhood asthma diagnoses. This rises to 41% under 4°C (7.2°F) of global warming.
 - 40% more likely to currently live in areas with the highest projected increases in extreme temperature related deaths. This rises to 59% under 4°C of global warming.
- Hispanic and Latinx individuals have high participation in weather-exposed industries, such as construction and agriculture, which are especially vulnerable to the effects of extreme temperatures. With 2°C (3.6°F) of global warming, Hispanic and Latino individuals are 43% more likely to currently live in areas with the highest projected reductions in labor hours due to extreme temperatures. With regards to transportation, Hispanic and Latino individuals are about 50% more likely to currently live in areas with the highest estimated increases in traffic delays due to increases in coastal flooding.

Values/Benefits

Knowing about sources of air pollution and impacts on human health can help one better understand and limit the exposure of these harmful pollutants. To help with this, the NJ Department of Environmental Protection (NJDEP) has developed several resources and tools:

- NJDEP | Environmental Justice | [Where Are NJ Environmental Justice Communities?](#)
- NJDEP | Environmental Justice | [What are Overburdened Communities \(OBC\)?](#)
- [What's In My Community? \(arcgis.com\)](#): A mapping tool that will find every facility with an air permit registered with the Division of Air Quality.
- [Site Remediation Waste Management Program's \(SRWMP\) Community Corner](#): A mapping tool that keeps New Jersey residents informed on SRWMP activities in their community.

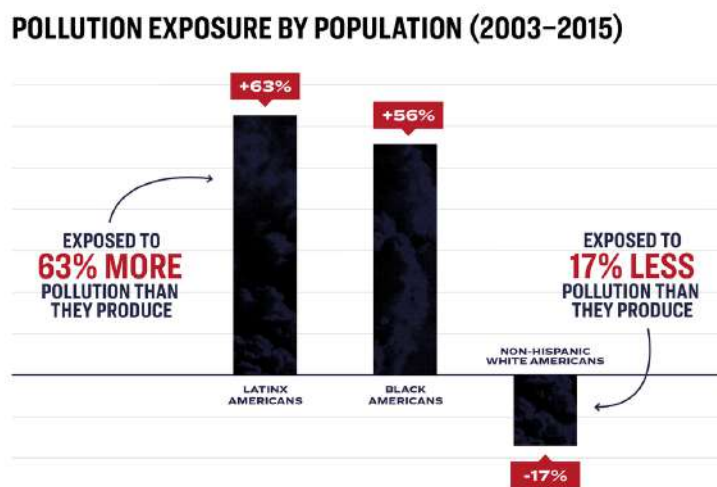
Challenges/Liabilities

The air we breathe affects human health and global climate conditions. Unfortunately, communities of color are disproportionately impacted by polluting facilities, industry, and transportation. Soot levels are highest in urban areas, disproportionately exposing urban residents to potential health problems from soot. Children, residents of urban areas, and the elderly are particularly vulnerable to the effects of soot. Children have immune and respiratory systems that are still developing, and they breathe up to 50% more air per pound of body weight than adults do. Breathing in soot from diesel exhaust can cause both acute and chronic respiratory problems, such as asthma. Asthma is the leading chronic illness among children and is one of the leading causes of school absenteeism.⁵ The risk of premature death is 26% greater in areas with high soot levels than in areas with less fine-particle pollution.

5. "Asthma Trends Brief," American Lung Association, accessed September 6, 2022, <https://www.lung.org/lung-health-diseases>.

There are six criteria air pollutants: ozone, particulate matter, carbon monoxide, lead, sulfur dioxide, and nitrogen dioxide. Criteria air pollutants are air contaminants that, at certain levels, can cause harm to human health and the environment. The NJDEP monitors for all six criteria air pollutants, however, the two pollutants of most interest are ozone (O₃) and fine particulate matter (PM_{2.5}). At unhealthy levels, they can cause harm to everyone, especially our vulnerable populations, including people with asthma, heart or lung problems, children, teens, and the elderly. By reducing soot by 2%, nearly 400 premature deaths could be avoided each year in New Jersey.

The graphic below depicts racial inequities of how much air pollution Black, Hispanic/Latinx, and White communities emit versus inhale. A 2019 study published in the Proceedings of the National Academy of Sciences⁶ found a racial gap between who causes air pollution and who breathes it. White people enjoy a “pollution advantage” when it comes to air pollution. They inhale 17% less air pollution than they generate. Black and Hispanic/Latinx people, on the other hand, experience a “pollution burden.” They face 56% and 63% more pollution exposure, respectively, than they cause. As indicated by the study, Black and Hispanic/Latinx communities in the United States are much more likely than White communities to have negative health impacts from their exposure to air pollution.



Source: Christopher W. Tessum et al., “Inequity in consumption of goods and services adds to racial–ethnic disparities in air pollution exposure,” *Proceedings of the National Academy of Sciences* (March 2019).

Solutions/Mitigation

In understanding the sources of air pollution and health implications, we can develop community activists to support environmental justice issues. The activists’ role could include opposing the siting of new pollution-emitting facilities in already overburdened areas, or advocating for mitigation projects like smokestack “scrubbers” as well as other upgrades and retrofits to existing polluting facilities. We can also gain support for green infrastructure projects, like shade tree plantings, that help clean and cool our communities.

6. Susan Hanson, ed., “Inequity in Consumption of Goods and Services Adds to Racial ... - PNAS,” *Proceedings of the National Academy of Sciences of the United States of America* (PNAS, March 11, 2019), <https://www.pnas.org/doi/pdf/10.1073/pnas.1818859116>.

You can get air quality alerts sent directly to your phone or computer. Like the weather, air quality can change from day to day, or even hour to hour. Up-to-date information allows you to make decisions based on current air quality forecasts. Sign up now: [EnviroFlash – Home](#). The Air Quality Index (AQI) daily forecasts are based on a color-coded system for reporting outdoor air quality conditions. The AQI was established as an easy way for the public to gauge air pollution levels compared to the health-based national air quality standards. It is a yardstick that runs from 0-500. On the left are the AQI values, and on the right are the level of health concerns associated with the corresponding AQI values. The higher the AQI value, the greater the level of air pollution and the greater the health concern.

AIR QUALITY INDEX

0-50	GOOD Air pollution poses little or no risk.
51-100	MODERATE Health concern for people who are unusually sensitive to air pollution.
101-150	UNHEALTHY FOR SENSITIVE GROUPS Sensitive groups, young children and the elderly, may experience health effects.
151-200	UNHEALTHY Everyone may experience health effects; sensitive groups may experience more serious health effects.
201-300	VERY UNHEALTHY Health alert: everyone may experience more serious health effects.
301-500	HAZARDOUS Health warnings of emergency conditions. The entire population is more likely to be affected.

Source: Greater Mercer TMA

New Jersey's groundbreaking Environmental Justice Law, N.J.S.A. 13:1D-157, requires the NJDEP to evaluate the contributions of certain facilities to existing environmental and public health stressors (including but not limited to air pollution) in overburdened communities when reviewing certain permit applications. Check out this link to learn more on how to get involved and be a part of solutions: [NJDEP | Environmental Justice | Take Action](#)

Teaching/Training

Things we can do to help reduce air pollution:

- Work remotely.
- Consider ways to green your transportation, whether by taking public transit, biking, ridesharing/carpooling, or driving electric. There are many incentives available to make the transition to driving green easier.
- Do not idle your cars for more than 3 minutes. It is the law.
- Use cleaner wood-burning practices.
- Consider high energy efficient models when it is time to update your HVAC system or water heaters.
- Consider solar energy.
- Learn what you can do to help reduce air toxics in New Jersey.
- Sign up for the NJ Air Quality Flag Program. Eligible organizations will receive a set of flags and an educational toolkit at no cost. NJDEP staff will contact you to assist you in implementing the program.
- Participate in the public engagement sessions, hearings, and meetings hosted by state and local/county governments.

Facilitation Questions

1. What is PM 2.5?
2. Why is it harmful?
3. How can it affect your health?
4. Where does it come from?
5. What are some things you might do to reduce air pollution in your community?
6. How can air pollution contribute to climate change?

Additional Resources

Videos:

- [What is Environmental Justice](#)
- [Learn more about Air Quality and Climate change affecting NJ](#)
- [Environmental Justice from the perspective of the Ironbound Maria López-Nuñez](#)
- [South Ward Newark, Truck Count Event, April 2022](#)
- [South Ward Environmental Alliance in Newark, NJ](#)
- [NJ Matters: Larry Mendte sits with Doug O'Malley, State Director of NJDEP to discuss how clean is the air we are breathing](#)

Links:

- [Environmental Justice | US EPA](#)
- [NJDEP | Environmental Justice | Environmental Justice Resources](#)
- [Furthering the Promise: A Guidance Document for Advancing Environmental Justice Across State Government](#)
- [New Jersey's Environmental Justice Law](#)
- [Environmental Justice Rulemaking Briefing Presentation](#)
- [Environmental Justice Rule Proposal](#)