

---

## How are racial minorities affected by air pollution in New York City?

David Lin, Dara Macareno, Jane Vu

Principal Investigator: Ridwan Islam Sifat, Gopal Barik

Affiliation: International Socioeconomics Laboratory™, Bangladesh University of Professionals, Shaheen College, Sambalpur University, Odisha State Open University, Tata Institute of Social Science

---

### Abstract

Despite trying to move towards a cleaner society, the problem of air pollution remains at large and disproportionately affects racial minorities which can lead to many health problems and premature death. To help solve the disparity in access to clean air, research needs to be done on which groups are primarily affected by air pollution and where in New York City the problem is most prevalent. There have been previous studies done about how air pollution has disproportionately affected minorities and the purpose of this research is to use that information and find places in New York where changes to air quality would be most impactful and who would benefit the most from it. This paper's purpose is to bring more attention to the issue and to eventually help the racial minorities breathe easier.

---

Categories: Air Pollution, New York

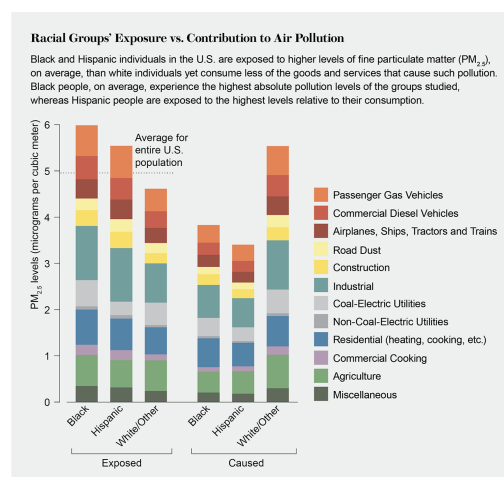
Keywords: Minorities, Health Problems, Disparities

## Background

The luxury of clean air is not evenly distributed among all racial groups as well as those of differing socioeconomic status. Studies have shown that many of the people who are most affected by air pollution are people who: reside in urban settings, have low socioeconomic status, and have a large population of ethnic minorities. (American Lung Association, 2001) Air pollution has a large impact on premature death and studies have shown that Hispanics, Asians, and especially Blacks have a greater rate of premature death from particle pollution. Recent studies have shown that black communities, in particular, have a greater risk of premature death from particle pollution than predominantly white communities. (Kioumourtzoglou, Schwartz, James, Dominici, & Zanobetti, 2016) Socioeconomic status was also a driving factor in harm from air pollution, however, this is not the case for some people where even though they had a higher income than whites, they had still faced a greater risk of premature death which suggests that there are other factors of discrimination that are affecting these groups.

Certain racial groups are disproportionately affected by air pollution compared to how much each group emits. (Thompson, 2019) Studies that were done on the fine particulate matter showed that black and Hispanic people are exposed to 56% and 63%, respectively, more fine particulate than the amount that they generate. (Thompson, 2019) This causes higher asthma rates and damage to immune, neurological, reproductive, and respiratory systems. Some examples of this are in Harlem and South Bronx of New York where 86% and 78%, respectively, were minorities. Also, these minorities consume less from the industries that are causing the pollution. These two neighborhoods have the highest asthma rates in New York City and are a clear example of racial disparities in their exposure to air pollution.

This research extends on previous studies in the past that have analyzed the effect on minorities as a whole and focus on New York City as the largest city in the United States. This would allow legislation to help these minority groups have less air pollution and a lower risk of premature death and a healthier city.



---

## Specific Aims

We aim to explore: *How does varying exposure to industrial and other types of pollutants in different boroughs of NYC potentially influence more health risks for racial/ethnic minorities?* Through our findings, we want to bring awareness about how air pollution risks the health of minority groups that often keep them trapped in polluted areas, especially in largely populated cities. We hope to make stricter policies that hold big corporations accountable for their actions that pollute the air.

Boroughs in NYC like the Bronx, Queens, and Brooklyn where much of the demographics are minority groups that are but not limited to Hispanics, African Americans, Asians, suffer from bad air quality created from cramped living spaces, the release of CO<sub>2</sub> emissions from the burning of fossil fuels of cars and buildings that make it almost impossible to breathe fresh air. Nearby factories, cramped buildings, traffic caused by cars on nearby highways, lack of vegetation, CO<sub>2</sub> emissions from nearby neighborhoods like Manhattan have created an accumulation of CO<sub>2</sub> emissions and no way to create clean air has created a trap of toxins, gases, and CO<sub>2</sub> emissions that have serious health problems to the people living nearby, usually minorities. Polluted air can lead to chronic health conditions like diabetes, cardiovascular or respiratory diseases and vulnerable groups such as older adults suffer from poor air quality.

We hypothesize that neighborhoods with a diverse demographic of minorities are more exposed to air pollutants, increasing the number of health risks these groups experience.

## Materials and Methods

Originally, an anonymous survey was distributed through Instagram and people we have connections with to measure the health concerns among people of color and minority groups of any age living in New York City. The survey asked participants the following questions:

- *What is your age?*
- *What race/ethnicity do you identify with?*
- *What neighborhood of New York City do you live in?*
- *How long have you or your family lived in that area?*
- *Have you, any family member, or friend have had cardiovascular or respiratory problems/diseases; if so what are they?*
- *How long have you or a family member have had that problem?*
- *Do you live near any construction sites, factories, highways, etc.?*
- *Do you live near any parks/ an area with a lot of trees?*

These questions asked the participant about their ethnic background, comparing health concerns caused by air pollution and living conditions of white people (control group) vs. people of color.

---

However, we ran into a few limitations. These included not having a big enough sample size (88), unequal distribution of age (mostly teens), ethnicity/race, borough/neighborhood and similar responses. For example, when asked “*Have you or any family members/friends have had any serious cardiovascular or respiratory problems, and if so what are they?*” most answered asthma, which is not an enough complex answer to analyze.

We had originally planned to review the responses and divide the data into categories like races, ethnicities, types of health concerns, living region, living conditions, and environment. With this data, we would’ve created graphs that compare the type of health problems and concerns among different races and ethnicities caused by air pollution and also compare the places these races/ethnicities live to see if there’s a direct correlation to health concerns. Because there was not a way for participants to measure how polluted the air is, we planned to use archival data that compare air pollution and air quality in different boroughs of NYC over time and the demographics of those areas.

After careful consideration, we decided it was best to use archival research and make our inferences, conclusions, and analysis. This will be accomplished by analyzing recent research and studies that analyze the amount of air pollution, the demographics of each borough in NYC, and health problems associated with air pollution among racial/ethnic minorities and whites.

## **Results**

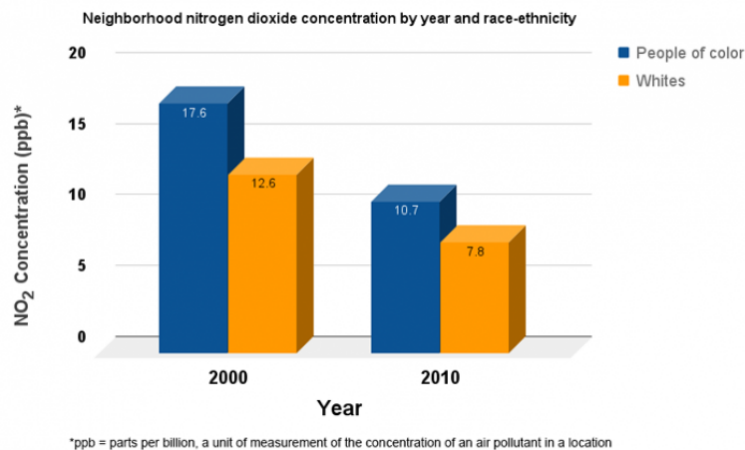
We found that minorities have a disproportionate exposure to air pollution relative to whites from the various sources that we used. There was a difference but not a significant difference in risk of the effects of air pollution. Income also did not affect the exposure to air pollution since there were cases where minorities at a higher income level still had greater exposure to air pollution. We concluded that the disproportionality is race-related after dismissing socioeconomic status as a factor. This is tied to a higher rate of lung cancer, heart diseases, and respiratory diseases which mean a lower life expectancy and more likely to die prematurely.

## **Discussion**

Many epidemiologic studies have proven that encompassing air contamination levels of O<sub>3</sub>, PM<sub>10</sub>, (SO<sub>2</sub>)<sub>4</sub>, and H<sup>+</sup> have a direct correlation with increases in medical clinic admissions and mortality in the United States and abroad. These examinations yielded measurably critical generally speaking relationships between air contamination and expanded emergency hospital admissions. Furthermore, they emphasized that the overall risk estimates because of increases in ambient pollution levels for the Hispanic nonwhite population of New York City, for the most part, are bigger than, albeit not measurably essentially unique in relation to, those of the non-Hispanic white populace (Charon and Thurtson, 2001). It is known that minorities of color are at higher risk of being impacted by air pollution due to the fact that they have higher rates of lung and heart conditions (MPCA, 2019).

Other studies have shown that Hispanics and Asians, however particularly Blacks, had a higher risk of premature death from air pollution than whites did. This study discovered that income did not drive the distinctions. Higher-pay blacks who had a higher income than numerous whites actually faced more serious danger than those whites, proposing that the effect of different factors, for example, persistent pressure because of discrimination might be assuming a part. Due to years of residential segregation, many Blacks have no choice but to live in areas where there is more exposure to air pollution (ALA, 2020). To have an understanding of the complete impact on the population subgroups, imputable risks were studied instead of relative risks. As a result of this, the results became more exaggerated. The nonwhite subgroup shows to be more antagonistically impacted by the result of air solution as far as the quantity of individuals each day being admitted to the medical clinic. This is due to the fact that the nonwhite subgroup has a bigger pattern pace of being admitted to the medical clinic for respiratory causes than the white subgroup. This might be because nonwhite subgroups have less access to healthcare.

Though, expecting that the choice to concede a patient to the medical clinic isn't identified with their insurance status this non-differential misclassification would bring about underestimation of the impact. An extra constraint was the lack of pollution submission approximates for each group. It can not be prohibited that the contrasts between these groups could be partially to higher submissions among the impoverished. Yet, in the event of a territorial pollutant like  $O_3$ , this appears to be moderately impossible as an illustrative factor. Regardless of the limitations, it is proven that racial minorities are more impacted by air pollution for the reason that they are socioeconomically disadvantaged (Charon and Thurtson, 2001). From the graph below it shows that people of color are known to be more impacted by levels of  $NO_2$  concentration.



---

## References

American Lung Association. (2001, June). Urban air pollution and health inequities: A workshop report. Retrieved February 21, 2021, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240553/>

ALA. "Disparities in the Impact of Air Pollution." *American Lung Association*, 20 Apr. 2020, [www.lung.org/clean-air/outdoors/who-is-at-risk/disparities](http://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities)

Gwynn, R. Charon, and George D. Thurston. "The Burden of Air Pollution: Impacts among Racial Minorities." *109S4*, Environmental Health Perspectives, Aug. 2001, [www.ncbi.nlm.nih.gov/pmc/articles/PMC1240572/pdf/ehp109s-000501.pdf](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1240572/pdf/ehp109s-000501.pdf)

*Inequitable Exposure to Air Pollution from Vehicles in the Northeast and Mid-Atlantic*. Union of Concerned Scientists. (n.d.). <https://www.ucsusa.org/resources/inequitable-exposure-air-pollution-vehicles>

Kioumourtzoglou, M., Schwartz, J., James, P., Dominici, F., & Zanobetti, A. (2016, March). PM2.5 and mortality in 207 US cities: Modification by temperature and City Characteristics. Retrieved February 21, 2021, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4748718/>  
Thompson, A. (2019, June 01).

Minorities breathe more than their share of polluted air. Retrieved February 21, 2021, from <https://www.scientificamerican.com/article/minorities-breathe-more-than-their-share-of-polluted-air/>

MPCA. "Who Is at Risk from Air Pollution?" *Minnesota Pollution Control Agency*, 28 Feb. 2019, [www.pca.state.mn.us/air/who-risk-air-pollution](http://www.pca.state.mn.us/air/who-risk-air-pollution)