# The Severity of Pollution Across America and How New York Subways Can Help

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**Abstract:**

Carbon emissions across the globe are ever so growing at a dangerous rate. A large leading cause of this in America can be drawn to the use of motor vehicles, and it is imperative to find ways to decrease these emissions. By understanding if New York's use of public transportation is a leading beneficiary of reducing the pollution of the area, it can be possible to reflect that information to other states. This lab goes to New York, California, and Texas and measures their P.M. 2.5 levels using an air quality monitor over the course of 7 days. The lower the levels, the finer the air quality. The lab's results show that all three of the states had similar averages in levels, however New York still was finer than all of them. Through deductive reasoning on the states' different populant levels and the overall results, it is clear to see that New York's public transportation system does benefit the air quality of the state.

**Introduction:**

As the world around us thrusts itself into further industrialization and modernization, it highlights how humans are responsible for the deterioration of the world. Due to increased carbon emissions in our atmosphere, this can lead to more disastrous effects to the earth, such as global warming and overall climate change. However, there are many ways to help counter this issue, such as looking towards effective uses of transportation. On average, it is estimated that there are roughly 276 million registered vehicles in the United States (Borrelli, 2021). This information goes in tandem with the fact that transportation is responsible for the majority of carbon dioxide emissions in America, specifically 29 percent (Lieberman, 2019). Knowing this, it is now imperative to figure out how to fulfill the need for transportation without contributing towards global warming.

A possible solution that can be explored is New York's use of public transportation, their trains and buses that transport millions of civilians everyday. Although these forms of public transportation do omit greenhouse gasses, even more so than a typical car, focusing on managing several hundreds of buses and trains for the masses instead of allowing millions of cars on the road would have a distinct difference in total. By examining the differences in carbon emissions in New York and another state, it is possible to deduce that pollution can be reduced by the focus of public transportation. The states this lab used to compare to New York are those who do not

have a public transportation system. Texas and California both fit that guideline, as well as reportedly having extremely high levels of pollution. Therefore, they would be perfect in determining the pollution levels of New York in its comparison.

**Materials and Methods:**

To properly analyze the pollution levels of a state, proper equipment is required. Air quality monitors do this specific purpose, and it can be used to measure the P.M. 2.5 levels of different cities (Pitiranggon et al, 2021). Now to properly measure the pollution levels, this lab measured New York's average pollution level of Time Square over a week long period. This same method was then repeated onto two other cities, which was Houtson, Texas and Los Angeles, California.

**Results:**

**Figure 1**

| Days | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| P.M. 2.5 Levels | 63 | 67 | 60 | 71 | 69 | 72 | 64 |

Figure 1- New York's P.M 2.5 levels across 7 days

**Figure 2**

| Days | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| P.M. 2.5 Levels | 74 | 78 | 75 | 80 | 82 | 72 | 76 |

Figure 2- Texas' P.M 2.5 levels across 7 days

**Figure 3**

| Days | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| P.M. 2.5 Levels | 69 | 66 | 75 | 77 | 73 | 70 | 71 |

Figure 3- California's P.M 2.5 levels across 7 days

**Discussion:**

It is apparent that the results widely varied across multiple states. The best way to indicate healthier levels of P.M. 2.5 levels is by the lower levels emitted by the vicinity. New York has seemingly the lowest P.M. 2.5 values of the three selected states (Figure 1), with an average of about 68. Looking at Figure 2 next, it is apparent that Texas on average had the highest P.M. 2.5 levels of the three of about 77. Finally, California had an average P.M. 2.5 levels of 72, beating out New York as well. Through this, it is apparent that New York on average had the lowest levels of these three states by a somewhat miniscule value. It is important to take into account the population sizes of these states, as California and Texas have a comparatively larger population size than New York. Them being closer in values is prevalent here, as it presents a clear distinct problem on California and Texas' behalf.

**Conclusion:**

By this information, it is possible to deduce that New York is doing something better in terms of managing their pollution levels. Knowing that the latter two states have no statewide public transportation, this can prove that New York's 24 hour M.T.A. is beneficial in the states' pollution levels. Therefore, proving that public transportation can help reduce these carbon dioxide emissions.

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