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<u>Pollution and Percentage of Deaths caused by NCDs</u>

Data collected from the World Bank Data Bank indicates that in 2010, 80% of deaths in Trinidad and Tobago were caused by Non-Communicable Diseases (NCDs)[1]. This rate is even more alarming when viewed graphically in relation to other island states, as it becomes clear that Trinidad and Tobago faces strikingly high rates of NCDs compared to other countries in the region. Moreover, since 2005, this number has only been increasing; demonstrating that NCDs pose a significant health threat in this country.

Non-Communicable Diseases can be defined as chronic illnesses that are often long-term in nature, and which may result from "a combination of genetic, physiological, environmental, and behavioral factors"[2], such as cardiovascular disease, cancers, respiratory diseases, and diabetes. While NCDs pose a significant threat in many countries across the globe, my research was particularly interested in exploring why there exists such a large gap in the percentage of deaths caused by NCDs in Trinidad and Tobago when compared to other island states, in hopes that changes can be made to target these disparities, and reduce trends in Trinidad and Tobago. This gap is demonstrated by the graph below:
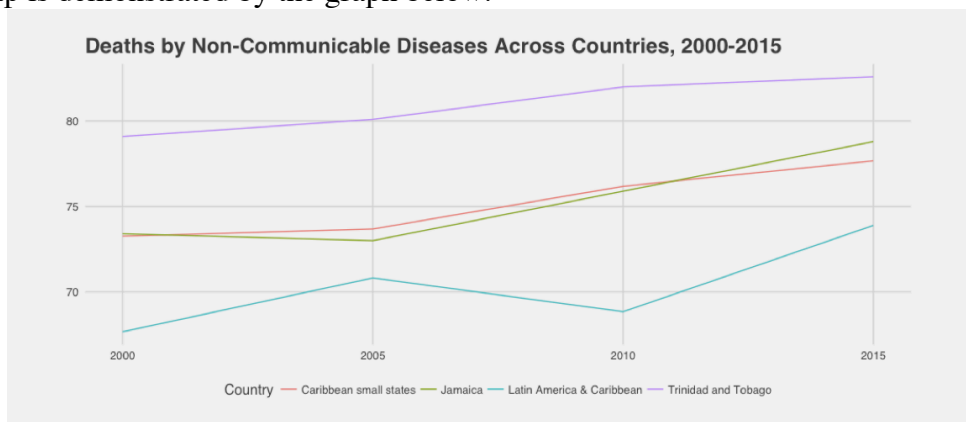
This graph plots years across the x-axis and percentage of deaths casued by NCDs (% of total deaths) within a given country along the y-axis. Overall, it demonstates that a significant gap exists in deaths caused by NCDs in Trinidad and Tobago when compared to other states.

To further explore this trend, I quickly became interested in the relationship between pollution and NCDs within the country. As such, my project sought to explore, understand and demonstrate the relationship between air pollution (as measured by mean exposure to PM2.5 emissions) and deaths caused by NCDs in Trinidad and Tobago. PM2.5 is a type of pollutant that can depreciate air quality. According to the World Health Organization (WHO), PM2.5 may have

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[1] The World Bank, https://data.worldbank.org/indicator/SH.DTH.NCOM.ZS?end=2016&start=2010&view=chart&year_high_desc=false

[2] World Health Organization, http://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases.

far-reaching health impacts, and which can be connected to or defined as NCDs.[3] Moreover, exposure to PM2.5 may lead to significant damages for children and elderly populations, while posing a risk to populations overall. Given this background, my aim throughout the PODs Programme was to answer the following question: How do PM2.5 emissions impact the percentage of deaths caused by NCDs in Trinidad and Tobago?

Initially, I thought that exploring the relationship between PM2.5 exposure and NCDs in Trinidad and Tobago would provide answers to the questions I had throughout the course of the program. Upon my initial research, I found that while the percentage of deaths caused by NCDs have increased since 2005; PM2.5 emissions have also experienced an upward trend since 2011. This is demonstrated by Figure 2.
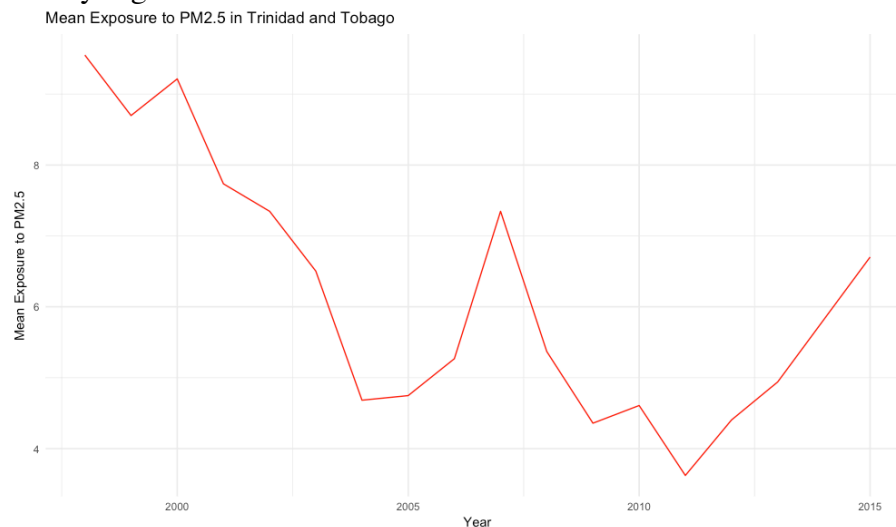

Figure 2: Rates of PM2.5 exposure in Trinidad and Tobago.

In recognizing this, the best way to move forward seemed to be to explore whether or not there exists a correlation between these two measures by utilizing the *cor()* function. After using *cor()* to analyze the relationship between PM2.5 exposure and deaths by NCDs in Trinidad and Tobago, I received a result of -0.4. While this is a relatively weak relationship, it nonetheless seems to say that as PM2.5 exposure increases, deaths caused by NCDs seemingly decreased. This finding was peculiar at least, as it seemed to go against everything I had researched and looked into regarding PM2.5 and its potential connection to NCDs. However, this finding taught me a lot of lessons.

Firstly, it taught me that there are few results not worth sharing. At first, I thought the solution to this finding would be to throw my data away. After all, if such an odd relationship seemed to exist, how could it be helpful? However, something I learned through PODS is that your results are helpful, even if they do not initially seem to be fruitful. In reproducing these findings, perhaps myself or others could help me gain insight on why I found the results I did. Secondly, it taught me that the more I know about data science, the more is left to be learned. In my ability to recognize that my results seem to be peculiar, I have also recognized that I know so

[3] World Health Organization, http://www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-effects-of-particulate-matter-final-Eng.pdf

much more about data science than I did at the start of the summer (and that I definitely have a long way to go!). Finally, it taught me that we need more data. The datasets I was working with only contained data for the years 2000, 2005, 2010, 2015. Thus, while I was able to use the *cor()* function to explore the relationship between these two variables, the lack of available data may be blurring some lines, and could be leading to a lack of clarity on what exactly the relationship is between these two variables. As such, as we move forward, it is integral that we collect more data on the trends in health and pollution going on both globally and domestically, as understanding these trends could have a valuable impact on the ways in which policies are implemented and enacted. In the future, this is something that I would love to look into further.

Policy changes pertaining to air pollution and NCDs in Caribbean nations could have far-reaching implications; contributing to the Sustainable Development Goals (SDGs), and potentially leading to the creation of more healthy populations. Although my findings did not seem to produce helpful results at first, I am hoping that they are something that could influence others to take air pollution, climate change, and NCDs more seriously. Through my continued research, I hope to influence actors (state, non-governmental, private, and individuals) to implement changes such that the percentage of deaths caused by NCDs in Trinidad and Tobago may be reduced.

Works Cited

The World Bank. "Cause of Death, by Non-Communicable Diseases (% of Total)." *Cause of*

Death, by Non-Communicable Diseases (% of Total, 2011, data.worldbank.org/indicator/

SH.DTH.NCOM.ZS?end=2016&start=2010&view=chart&year_high_desc=false.

The World Health Organization Europe. "Health Effects of Particulate Matter." *The World Health*

Organization, 2013, www.euro.who.int/__data/assets/pdf_file/0006/189051/Health-

effects-of-particulate-matter-final-Eng.pdf.

World Health Organization. "Non Communicable Diseases." *World Health Organization*, World

Health Organization, June 2018, www.who.int/news-room/fact-sheets/detail/

noncommunicable-diseases.