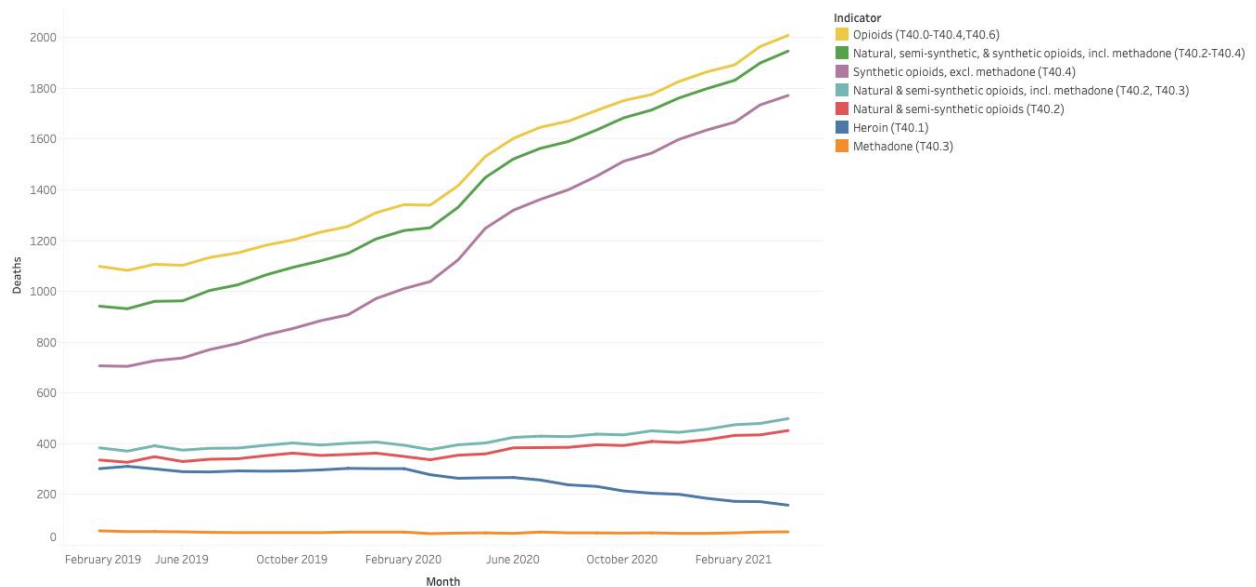**The Effect of Covid - 19 on the Opioid Epidemic**

Pandemic Opioid Deaths in Indiana Split by Class

Team name: Snappy Whippersnappers

Name (full name)	Purdue Email address
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Snappy Whippersnappers

Table of Contents

The Impact of COVID-19 on Opioid Overdoses

Introduction

Over the past two years, modern life was turned upside down as a new disease, named COVID-19 spread throughout the world causing a global pandemic. It influenced almost every single aspect of society, from daily life, such as going to the store on weekends and going to the office on weekdays, to much more subtle topics like people's diet and other lifestyle habits. COVID-19 had influenced almost every aspect of society, including things that aren't as apparent to the casual eye. It is important to think about these not-so-apparent effects that the pandemic may have caused on today's society.

Background

In this section provide background about the data – what dataset did the team choose and why? What additional data was acquired by the team? Why? Explain.

Our team chose the Opioid Abuse dataset because we want to know what kind of impact, if any, the coronavirus may have had on opioid overdoses, especially in the states where the opioid crisis has been the worst. Although we were already provided with the opioid data for Indiana, we didn't have enough information about Indiana, especially during the pandemic. As such, we needed to acquire more opioid data for Indiana, and as well as for Ohio, California, and Illinois, as we found that these were the top three states where opioid deaths had high numbers. Along with this, we needed to gather data on the pandemic - specifically the Covid - 19 infection and death numbers, which we needed to compare to the trends in opioid related deaths.

Questions

What is the question(s) the team has chosen to address? Who is your audience? – What problem are you trying to solve or address? What's been done before?

Did the ongoing COVID-19 pandemic influence the opioid crisis in Indiana?

Our audience is anyone who is trying to learn how opioids and the coronavirus can affect people's lives. The problem we are addressing is how severe the overdose crisis is and how COVID-19 affected it. Previous reports on the opioid crisis focused just on the crisis, not how COVID-19 could have affected it

Problem Statement

How has the data been visualized before? Significance (why should anyone care)? – why is the team's work important?

Many people are not aware of how deep on a scale the pandemic has impacted our society. Data combining the COVID-19 infection and death rates with the opioid overdose death rates would help people understand the effect the pandemic had on opioid users across the nation, such as whether they had more or less access to opioids during the pandemic compared to pre-pandemic.

Methodology

What did the team do? Show your process, include sketches

We looked at the Opioid overdose death rates across the country and picked a couple of the states with the largest number of overdoses, including Indiana. Then we focused on said states and investigated exactly how common overdoses were and how they aligned with COVID-19 Cases and Deaths.

What did the team do? Show your process, include sketches
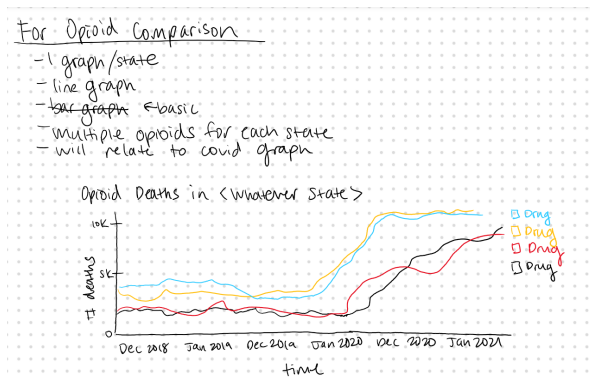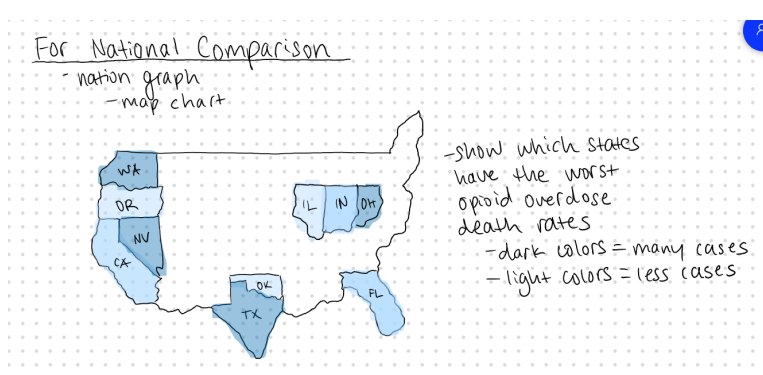

We wanted to visualize the COVID-19 and Opioid death rates for the top three states with the worst Opioid crisis, so we decided to create a map chart that would help us narrow down which states to focus on. From there, we decided to make a COVID-19 death rate chart and an opioid related death chart for each state and compare the two to see if there existed any correlating trends.
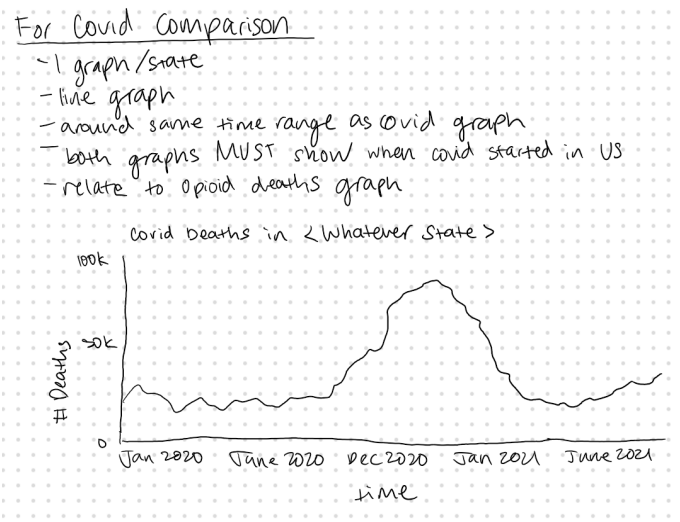
Results

Choose one of your team's "BEST" visualizations and insert it here. This visualization should be the best representation of the team's effort. Provide a figure caption.

Opioid Related Deaths Across the U.S.
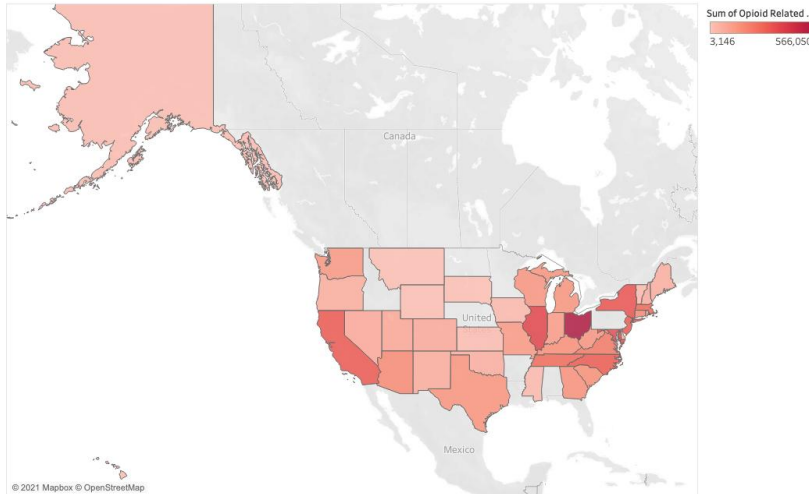
-Aditya Anand

This map visualizes the number of opioid deaths across the country. The darker the red, the higher the number of opioid deaths. From this visualization, Ohio, Illinois, California, and New York have the most opioid deaths by numbers.
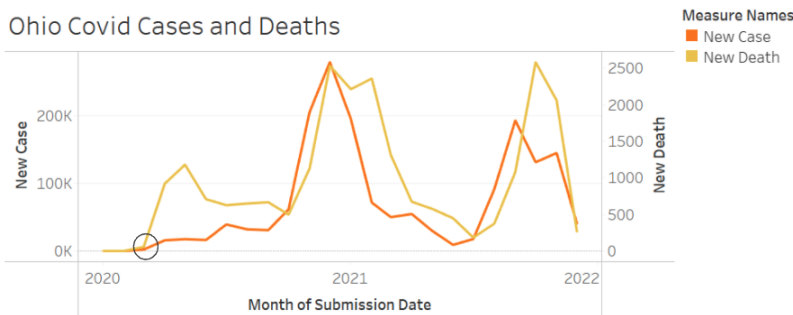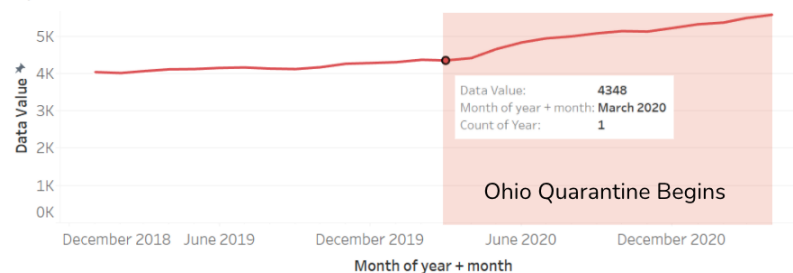
This visualization helps show the relationship between the pandemic and the opioid crisis over the course of the pandemic. The circle on the top visualization represents the date that the initial quarantine started, and the highlighted section on the bottom visualization represents the same thing. There was a drastic rise in opioid deaths in Ohio when the quarantine started compared to the rather steady trend of the line before the pandemic.

-   Samruddhi Tawade

Discussion and Conclusions

Discuss your results (the figures in the Results section). Do your visualizations address the problem stated in the Problem Statement Section? Explain. What insights did the team uncover? What recommendations can be made based on these insights?

The first visualization is what showed us the states to focus on. It shows which states have an opioid problem and how severe they are. The second visualization represents the process that we took to come to our conclusion. In the second visualization, we had a side-by-side comparison between the coronavirus pandemic in that state along with the opioid death trend. In almost every state that we compared, we found a distinct rise in the number of opioid deaths as the pandemic increased in severity. This led us to conclude that as the pandemic wore on, there was a higher death rate associated with it.

We had two theories to explain this correlation. The first theory was that due to the rapid influx of COVID-19 patients left the hospitals packed and unable to treat others. As such, those that came to the hospital overdosed on opioids were unable to be saved due to the hospital's overpopulation. The second theory we came up with to explain the correlation was that many people would turn to opioids as a coping mechanism to help deal with the new stresses that were brought on by the pandemic. Both these theories are possibilities for us to continue our research of this topic in the future.

References

[Health: Overdose Prevention:](#)
[2019 Drug Overdose Death Rates | Drug Overdose](#)
[Products - Vital Statistics Rapid Release - Provisional Drug Overdose Data](#)
[Quarterly Provisional Death Rates for COVID-19](#)
[Drug Overdose Mortality by State](#)
[NVSS - Public Use Data File Documentation](#)
[Ohio: Opioid-Involved Deaths and Related Harms](#)
[Injury Surveillance and Data | Ohio Department of Health](#)
[Drug Overdose Deaths | Drug Overdose](#)

Appendix A – Resources Used

Datasets

Datasets Provided

[Northend Data 2018 and 2019_DeIdentified-Fall2021](#)

[dp_age](#)

[dp_hispdetail](#)

[dp_housing](#)

[Datasets](#)

Datasets Acquired

[Provisional Drug Overdose Death Counts](#)

[COVID-19 Cases and Deaths by State](#)

[Information Technology Solutions - 2019 Ohio Drug Overdose Data](#)

List the name of the data set provided and a description of the additional data set acquired.

Tools used

List all tools used in the project and a brief description (see the examples below); add more if applicable.

Tool/Application	Description
Excel	Data cleaning
Tableau	Data visualization
Wix	Web development
Zoom	Communication/meeting
Quickime Player	Video recording/editing
Google Slides	Powerpoint Presentation
Google Docs	Collecting resource links

Appendix B – Percent Contribution

Group Contributions

In this section list the tasks that were completed by all team members: contributed to the data visualization process, brain stormed topic ideas, served as rotating team leader, contributed content to the short story (summary), contributed content to the 5-minute video, worked on hackathon report, reading the final deliverable before submission, worked on Google Slides.

Individual Contributions

In the table below list each team member's full name, their contribution (body of work) and their % of the work completed. The total must add up to 100%

Team Member	Description	Contribution
Aditya Anand	*Developed the project web page prototype, acquired additional data for the project, recorded 5-minute video.*	*34%*
Tyler Hinkes	*Made the Indiana and California visualizations.*	*33%*
Samruddhi Tawade	*Made Ohio visualizations, acquired data specific to the Ohio visualizations, worked on Appendix A*	*33%*
	Total	100%

Appendix C – Individual Contributions

In this appendix each team member must contribute a one-page document relating the team's topic/data to their hometown or home country. The one-page document must contain: (1) a description of the problem, (2) a comparison of the team's findings with insights about your hometown/country related to the hackathon data (3) a visualization to support items (1) and (2).

Each person should create their individual page **(1-page only)** and make it available to the designated team member who will upload the final document.

This will be viewed and assessed as part of each person's individual contribution.

Leave this page as is.

Start adding individual page content on the next page.

REMOVE any blank pages before submitting.

Team Member #1:   Tyler Hinkes
My Hometown/City/Country: Palos Park, Illinois

Hackathon Topic (dataset): COVID-19 Effect on Opioid Overdose

Include your story and visualization below.

      Back home, opioids were passed around at my high school. I have had friends who have taken some at one point. I was even offered some as well, but I refused because I wouldn't want to see the effects it would have on my body and my future life. I really wanted to investigate opioid problems because of these said experiences. Looking into the data I found out that opioids are a huge problem not only in Illinois, but the country. We didn't investigate the way Opioids affected Illinois as much compared to states like Indiana, California, and Ohio. California and Ohio have some of the biggest opioid issues in the United States. Illinois was up there but was not as prevalent. The state we focused on the most however was Indiana. I relate to Indiana because I do have a lake house within the state which means I spend a good amount of my year either in Illinois or Indiana. Going into this project, I didn't expect much of a correlation between opioid deaths and covid cases. While going through the date and visualizing it however, I soon came to realize that there is a big connection. I put the covid cases and opioid death graphs side by side and saw they both spiked at around the same time. Opioid deaths dropped a little bit after covid cases, but I do have a theory as to why. Covid-19 didn't last a day. It usually lasted about two weeks, including quarantine; it could be even longer. People are still stuck in their homes and if they are already addicted, there is nothing stopping them from keeping on taking them. Unfortunately, I could not find much evidence to back this theory up.
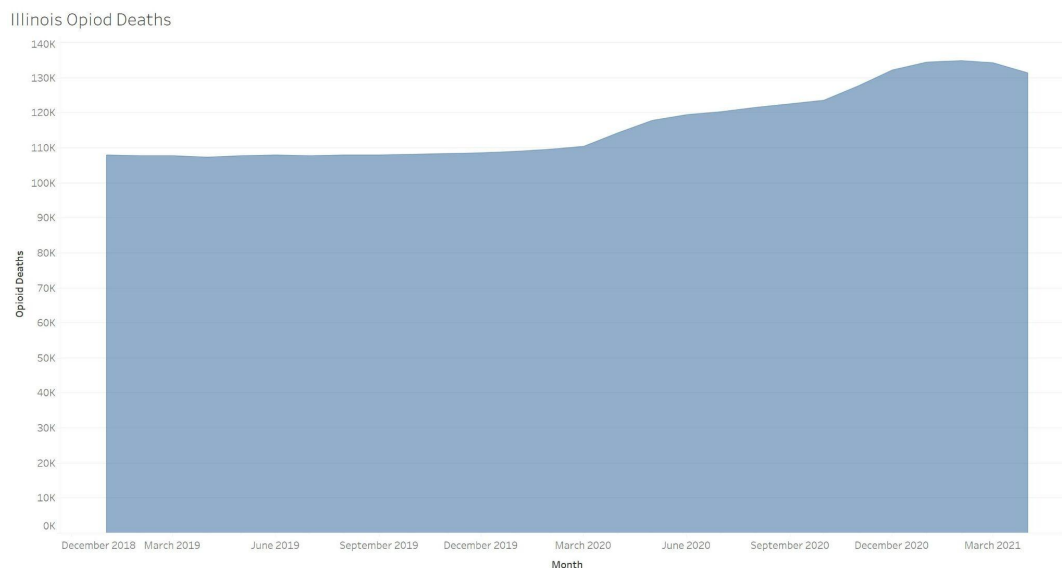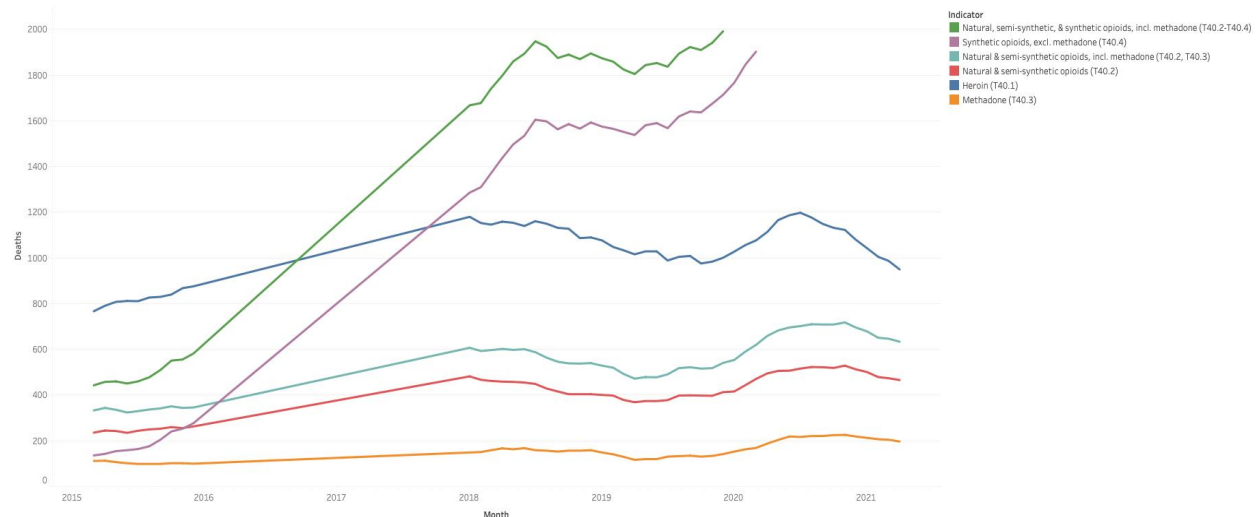
Team Member #2:   Aditya Anand

My Hometown/City/Country: Chicago Illinois   Hackathon Topic (dataset): COVID-19's impact on the Opioid Crisis

Include your story and visualization below.

Personally, I have seen how the effects of COVID-19 have had far deeper reaching effects on society, seeing how both society and culture have taken a dramatic change from the times where my family and I would go outside. Looking back at my experiences before the pandemic, the things I did seemed alien - going to large gatherings without worrying about protecting myself - in fact not even worrying about diseases at all. I learned that COVID-19 changed me - in more ways than I can think of. This led me to want to know how deeply society could have changed, and some of the unforeseen consequences of the pandemic. Along with the pandemic, I had met many people in high school who would regularly use Marijuana and would also vape. Seeing how prevalent these drugs were in my school led me to want to learn about the prevalence of worse drugs, like opioids - the drugs that have serious immediate health consequences and are much worse than Nicotine and Marijuana. This led me to explore the connection between the pandemic and the opioid crisis that has been plaguing the country for decades. To compare Illinois with my hackathon data, I created a visualization with the same format as another visualization from our presentation, which looked at the trends of specific opioid deaths over time from 2015 to 2020. Overall, the results were similar, with the more natural opioids falling during the pandemic, with a drastic and concerning rise in synthetic opioids like Fentanyl - just like my observations with Indiana. One major difference between Illinois and Indiana, however, is that there is a drastic decline in opioid usage just before the beginning of the pandemic, beginning around 2018. This is likely due to a clampdown on drugs that was then hurt by the pandemic bringing almost the entire world to a halt.

Opioid Deaths in Illinois Split by Class

The trend of Opioid related deaths in Illinois from a period of 2015 to 2021. The line color represents the type of opioid that resulted in the deaths, with a code ranging from T40.0 to T40.6.

Team Member #3:   Samruddhi Tawade

My Hometown/City/Country: Morgan Hill, California

Hackathon Topic (dataset): Covid-19's impact on the Opioid Crisis

Include your story and visualization below.

      Opioid abuse has been a long-time problem in California, making it one of the states with the worst drug abuse death rates. However, I was never exposed to, offered, or had experience with drugs growing up for the first 16 years of my life. I grew up in one of the more decent, wealthier neighborhoods, thus having a sheltered and safe life for a long time. When we moved to a more rural area, I was exposed to drugs and could identify one by the way it smelled within my first month of school, even though I never did them. It seemed as if every other person was a drug user in some way or another but, I would later find out that none of the drugs they did were opioids. As a result, I grew up thinking that I had been exposed to all the different types of drugs already, and that some of them had to have been opioids since opioids were also drugs. It was not until this project that I understood what opioids actually were, how they were used, and how much of a problem its abuse was in California. I was shocked when I learned that despite being exposed to many drugs, I had never been exposed to opioids, when I was doing research for this project, and found it surprising that California had one of the worst opioid crises in the nation, especially since I had never encountered one before. With this new information at hand, I began to wonder if the crisis had gotten worse in recent years due to COVID-19 and people seeking them as a source of distraction or comfort while being stuck at home, which would explain why I had not heard of this issue before, or if this had always been a prevalent issue and I was just growing up living in a bubble. I came up with the idea to research COVID-19's impact on the Opioid Crisis in different states where the crisis was the worst, to see if other states were facing similar problems regarding a recent spike in opioid abuse around the same time that COVID-19 became a serious issue in the United States. To visualize this and compare my hackathon data to my home state, I created a visualization depicting opioid related deaths in California, pre-COVID-19 and during COVID-19. My visualization shows me that there was a large spike in opioid related deaths around the same time that the mandatory lockdown was imposed, but there was also already a considerable amount of opioid related deaths happening prior to that. Because there is a correlation between an increase in opioid related deaths and the start of quarantine, I believe COVID-19 played a big role in making the crisis more severe.

Opioid Related Deaths in California 2015-2021
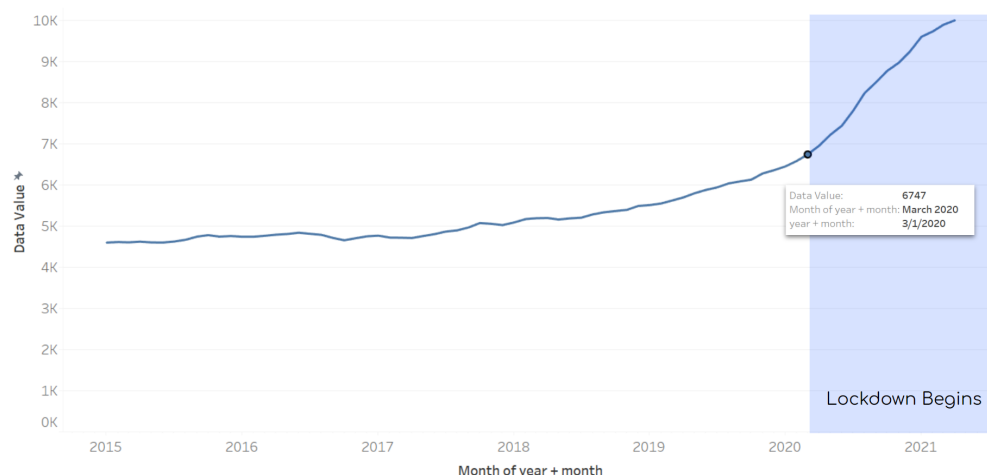
Appendix D - Diversity Statement

Some of the most enlightening outcomes are generated by diverse teams working together to solve complex problems. What does diversity mean and why is it important? Merriam-Webster defines diversity as: 1) the quality or state of having many different forms, types, ideas, etc., 2) the state of having people who are different races or who have different cultures in a group or organization. When solving complex problems having adequate representation is important. In the context of the hackathon, diversity could mean (but is not limited to): varied perspectives, varied points of view, different academic majors represented, different academic levels (Freshmen, Sophomore, Junior, Seniors) on the team, different ethnicities (state this professionally). Having a diverse team from different backgrounds can boost engagement and productivity and make us smarter (read short article: "How diversity actually makes us smarter").

Our Diversity Statement:

Team Snappy Whippersnappers is made up of individuals with a wide variety of different experiences. For example, Samruddhi Tawade is a Data Visualization major, TJ Hinkes is a Cybersecurity major, and Aditya Anand is a Computer Science major. While they may share some similarities, they also share many differences in both content and experiences. Along with this, the team is also diverse in both ethnicity and gender, with one second generation US Citizen who comes from California (Samruddhi Tawade). While both Aditya Anand and TJ Hinkes come from Chicago, Aditya is a first-generation US Citizen, whose parents were directly from India. Unlike Samruddhi and Aditya, TJ Hinkes was exposed to Opioids from a young age growing up in a city where they were more common and was even offered opioids during his time in high school. He was able to share his experiences with Opioids with the group, which helped us form theories to help explain the conclusions of our research and to open new avenues of research for the group. Along with this, while Aditya was never exposed to opioids themselves, he was exposed and was near marijuana when he was younger, giving him a different perspective on drugs in general, since marijuana is known to be a much less deadly drug compared to opioids. Finally, Samruddhi brings the fresh perspective of never being exposed to opioids of any kind, giving her a fresh perspective and a mind with less bias compared to TJ and Aditya. These different perspectives all came together to create a project that was better than what any of the three could individually produce.

Appendix E – Team Consensus

Team Consensus

I have read and approved of the content as a representation of the team's work and my contribution.

Team Member (full name)	Signature	Date
Tyler Hinkes	Tyler Hinkes	12/9
Samruddhi Tawade	Samruddhi Tawade	12/9
Aditya Anand	Aditya Anand	12/9