

Opioid Abuse in Indiana

Total Average Amount Spent on Oxycodone and Oxymorphone From 2006-2016

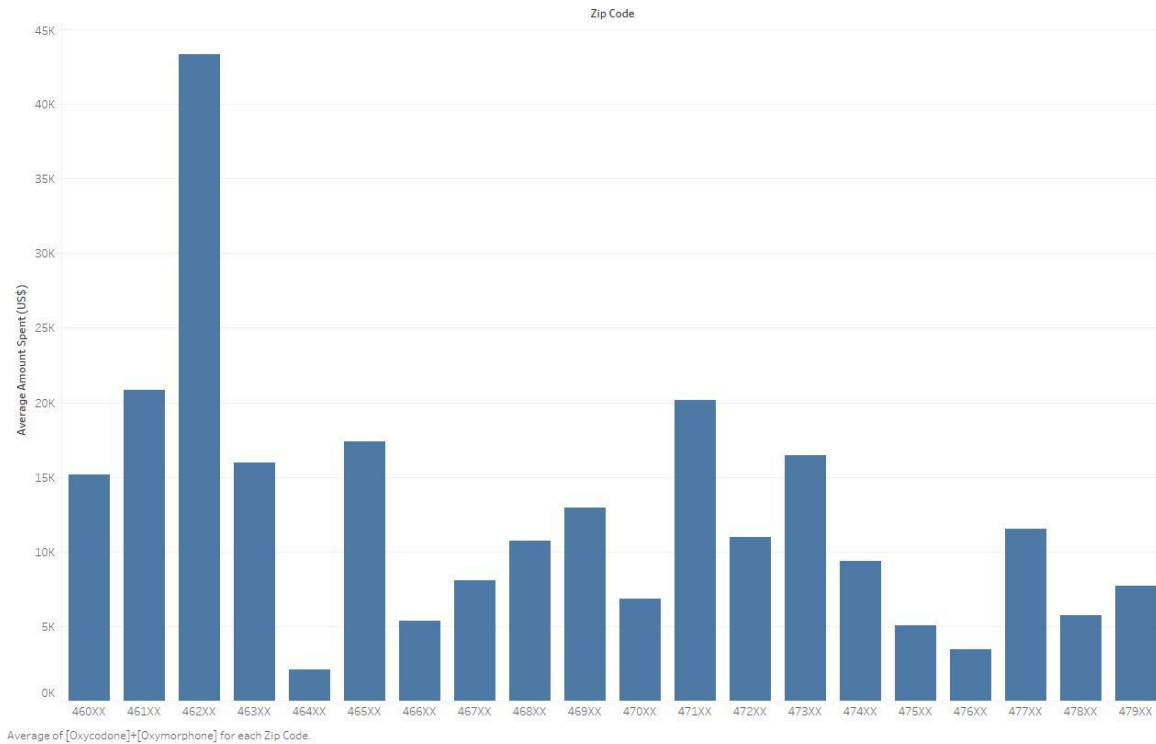


Figure Caption: Average of Oxycodone and Oxymorphone separated by Zip Code.

Team Calico

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Opioid Abuse in Indiana

Introduction

In this section, Introduce your topic.

In the recent rise of substance usage, the Indiana community has been met with a deadly predicament: opioid abuse. While it can be apparent of the effects of opioid abuse, citizens hold minimal information on the issue. Team Calico has chosen to investigate the difficult subject of Indiana's opioid abuse.

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.

Team Calico decided to investigate and analyze this dataset (Opioid Abuse in Indiana) because the subject was an expansive topic that we narrowed down and asked a specific question. The topic also provided more interest than the alternative datasets.

Team Calico acquired additional datasets that recorded the drug overdose deaths in the United States and the average amount spent on Oxycodone and Oxymorphone in Indiana. These datasets allow us to begin to discover questions that could be answered. Specifically, it provided an analysis of what region and what demographic was being greatly affected in Indiana. These datasets assist in the progression of our analysis and investigation.

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?

Indiana residents are greatly impacted by opioid abuse. The team aimed to ask questions that were relevant to the current and prospective residents of Indiana. Team Calico wanted to address what is opioid abuse and what are the effects that users in Indiana are currently facing. The team also desired to discover what demographic of Indiana residents were being greatly affected. Team Calico aimed to direct our analysis to individuals over 18, pharmaceuticals, and health-care partioniers. The end goal of the analysis is to equip our audience with insights in regard to opioid abuse and it's severity in Indiana.

Problem Statement

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

In regards to the visualization of data concerning opioid abuse, temporal visualizations are most commonly used. Temporal maps are often in combination with legend, using color spectrum to represent the severity of a variable. Such data visualizations allow the common user or researcher to compare the severity of spending amounts of opioids, demographics such as age and gender, and opioid overdose deaths.

The severity of opioid abuse in Indiana is not commonly discussed and recognized. The opioid abuse has continued to claim many lives however the approach to solve such calamity has not been approved on. This crisis needs to be presentable and accessible so that Indiana communities can view the impact of opioid abuse.

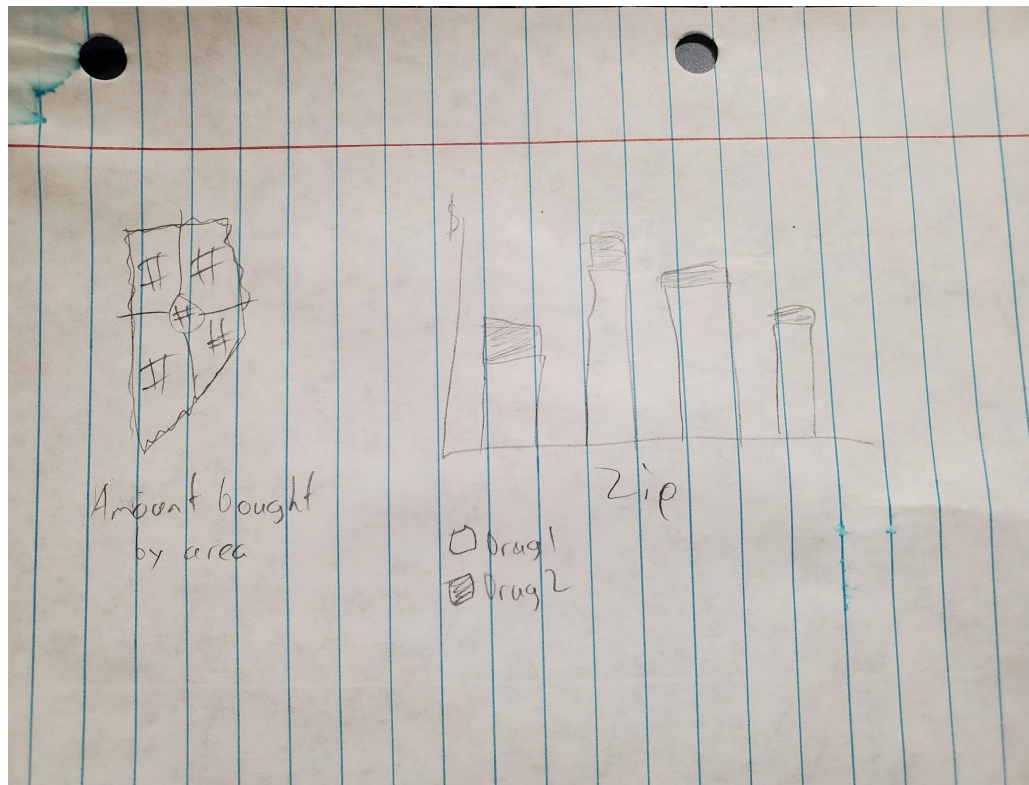
Team Calico's project aims to provide information about the severity of opioid abuse and the affected demographics. Our objective is to display the consequences and the gravity of opioid abuse. While we aim to provide accessible information to Indiana communities, Team Calico seeks to direct our audiences to solutions that can be practical and effective to reversal of opioid symptoms and overdoses.

Methodology

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

In the progression of this project, we familiarize ourselves with the data visualization process and lecture material taught in CGT270. With the given material and resources, we were able to move in the appropriate direction to seek additional dataset and filter & mine accordingly. Team Calico used Microsoft Excel to originally view the datasets and clean them if necessary. The team proceeded to filter and mine data that was aimed and of interest to our questions. In the progression of the investigation, Tableau software was used to visualize and design the data accordingly. With Tableau's feature, Show Me, Team Calico was allowed to view and design visualizations that were appropriate to answering the project's questions. Show your process, include sketches

Representation concepts:



Original Data (Acquire and Parse):

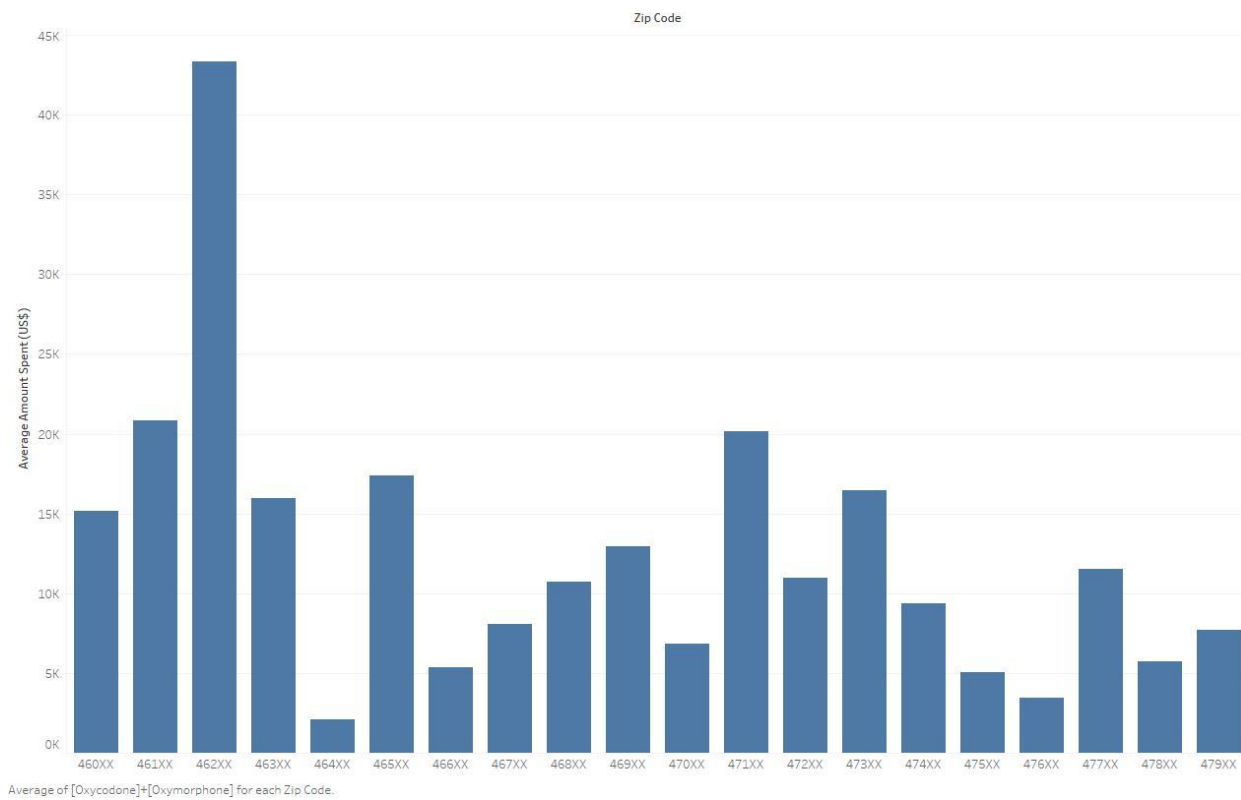
StateFIPS	zip3	year	quarter	drug_9143	drug_9652
18	460	2006	1	7045.47	0
18	460	2006	2	9187.12	0
18	460	2006	3	9794.46	26.66
18	460	2006	4	9561.06	50.63
18	460	2007	1	9933.75	92.05
18	460	2007	2	10581.67	239.37
18	460	2007	3	10814.76	178.43
18	460	2007	4	10680.59	197.55
18	460	2008	1	11085.99	205.63
18	460	2008	2	11136.95	301.31
18	460	2008	3	12363.43	302.87
18	460	2008	4	12994.72	365.56

Refined Data (Mine and Filter):

# Data State FIPS	# Data Zip Code	# Data Year	# Data Quarter	# Data Oxycodone	# Data Oxymorphone	# Calculation [Oxycodone]+[Ox...
18	460XX	2006	1	7,045.47	0.00	7,045.47
18	460XX	2006	2	9,187.12	0.00	9,187.12
18	460XX	2006	3	9,794.46	26.66	9,821.12
18	460XX	2006	4	9,561.06	50.63	9,611.69
18	460XX	2007	1	9,933.75	92.05	10,025.80
18	460XX	2007	2	10,581.67	239.37	10,821.04
18	460XX	2007	3	10,814.76	178.43	10,993.19
18	460XX	2007	4	10,680.59	197.55	10,878.14
18	460XX	2008	1	11,085.99	205.63	11,291.62

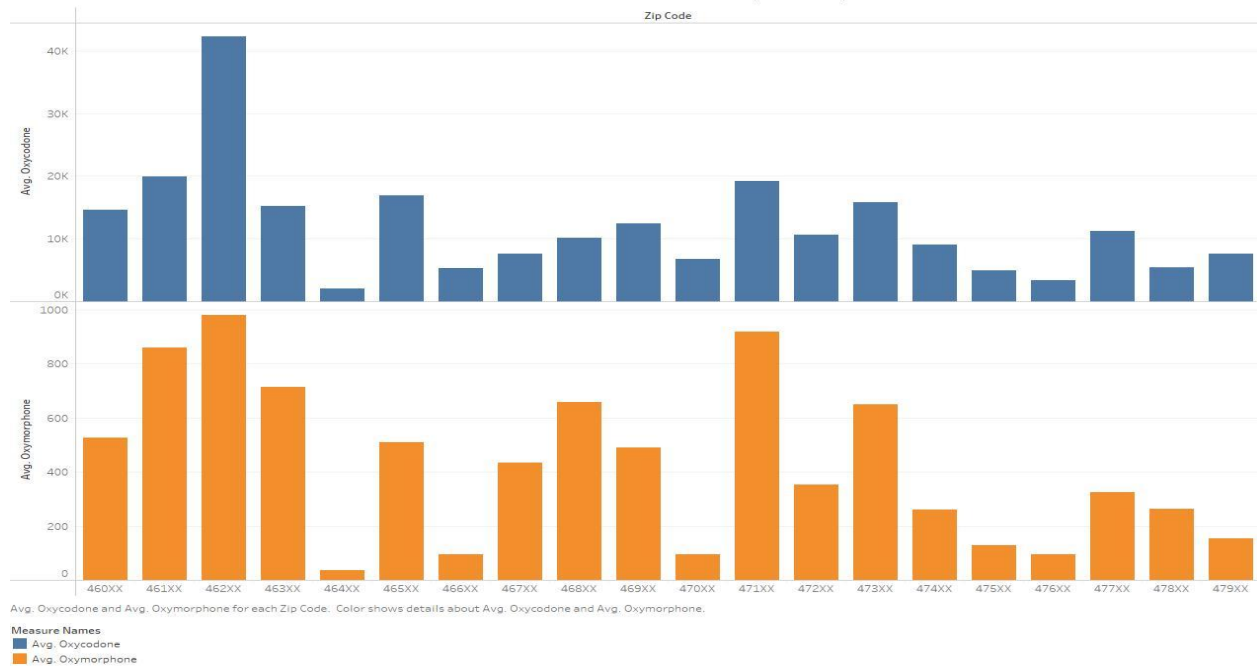
Original Visual (Represent):

Total Average Amount Spent on Oxycodone and Oxymorphone From 2006-2016



Refined Visual (Critique and Refine):

Total Average Amount Spent on Oxycodone and Oxymorphone From 2006-2016 (Separate)



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.

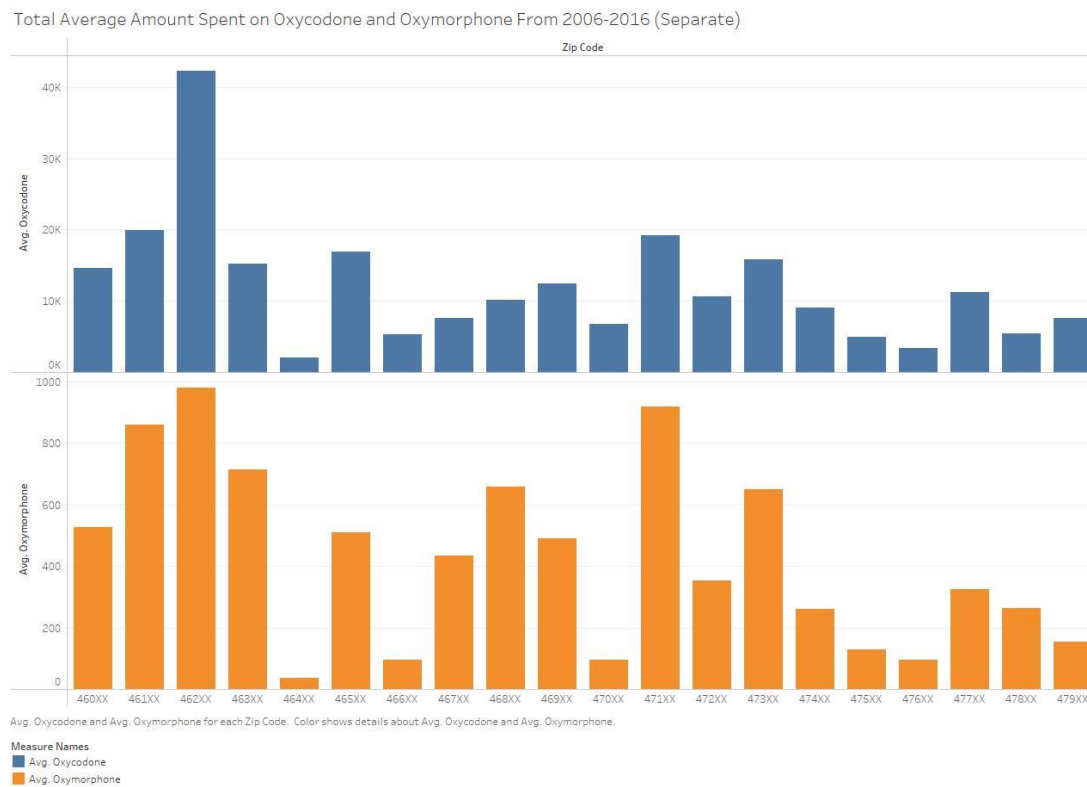


Figure Caption: Avg. Oxycodone and Avg. Oxymorphone for each Zip Code. Color shows details about Avg. Oxycodone and Avg. Oxymorphone. Created By: Tiernan Hubbard

Discussion and Conclusion

Discuss your results (the figures in the Results section). Do your visualizations address the problem stated in the Problem Statement Section? Explain.

With the final visualizations, Team Calico was able to understand the severity of opioid abuse in Indiana, and the demographic that was severely being affected by the symptoms and overdose deaths of opioids. While spending on opioids was immense in high populated areas such as Marion County, smaller regions such as Lake County, Indiana did minimum spending on opioids. It's apparent that high spending would occur in densely populated regions, however the individuals in Indiana between the ages of 45-54 were greatly affected by overdose deaths and these regions such as Marion County had 20% or less of individuals in this age range. Smaller counties, such as Lake County held over 50% of individuals that were in this specific age range. With further examination, smaller counties did the least amount of spending, however the age range 45-54 were being greatly affected by opioid abuse and largely occupied smaller counties. It provided the insight that individuals in these regions are not given the resources and information to combat substance abuse. While using incarceration seems to be a common approach to combating opioid abuse, it does not allow citizens to confront opioid symptoms and overdose. Addiction treatment and overdose reversal tools allow individuals to manage their symptoms and substance usage. Medications such as Naloxone and Lofexidine aids in the reversal of the effects of opioid overdose and treat physical symptoms, respectively. In addition, to aid medication, community-based treatments such as substance-usage facilities provide individuals to be monitored, observed, and consume substances safely.

References

If references are listed, make sure they are cited in the body of the document.

Appendix A – Resources Used

Datasets

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

[2019 Drug Overdose Death Rates](#)

This dataset presents a temporal map overview of drug overdose deaths in the United States. This dataset is compiled and visualized on the CDC website.

[Drug Submissions to Indiana State Police Laboratories - Datasets - the Indiana Data Hub](#)

This dataset contains information on drugs that were submitted to the Indiana State Police for analysis. It includes information such as the offense county, the name of the substance, and logging periods of the substance

Tools used

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

Tool/Application	Description
Microsoft Excel	Data Cleaning
Tableau Desktop	Data Visualization
Wix	Team Website

Appendix B – Percent Contribution

Group Contributions

In this section list the tasks that were completed by all team members for example: 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, reading the final deliverable before submission,

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
Zoe Katz	<i>Kept everyone on track and attended class, labs, and meetings. Helped provide outside datasets and sources. Created slideshow for the group and helped fill out the Hackathon Report. Recorded audio for 5 minute video. Parsed, mined, and filtered data to create a visualization for the Individual Contributions appendix. Worked on the Individual Contributions. Helped fill out team worksheets.</i>	20%
Russhell Campbell	<i>Responsible for gathering written contributions from the team and combining them into a cohesive story, data wrangling (parsing, filtering). Developed project webpage and prototype. Helped fill out Hackathon Report and uploaded report and video to project webpage. Helped fill out team worksheets.</i>	20%
Zoe Wetzel	<i>Helped provide outside datasets and sources. Updated the Hackathon Report Template as new versions became accessible. Wrote initial responses for Introduction, Background, Questions, and Problem Statement sections of Hackathon Report. Helped revise, edit, and check the final version of the report. Helped work on slides for the 5 minute video and provided audio. Parsed, minded, and filtered data to create a visualization for the Individual Contributions appendix. Worked on the Individual Contributions and helped provide insight to the rest of the group. Helped fill out team worksheets.</i>	20%

<i>Tiernan Hubbard</i>	<i>Attended class, lab, and meetings. Created multiple visualizations for the data and revised and refined them. Helped work on slides for the 5 minute video. Worked on Individual Contributions appendix. Helped fill out team worksheets.</i>	<i>20%</i>
<i>Chloe Garces</i>	<i>Showed up for group meetings, class, and labs. Created 2 visuals for slide show and compiled final video. Worked on Individual Contributions appendix. Helped fill out team worksheets.</i>	<i>20%</i>
	<i>Total</i>	<i>100%</i>

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: Zoe Katz

My Hometown/City/Country: Marion County/Indianapolis/Indiana/United States Hackathon Topic (dataset): Opioid abuse in Indiana

Include your story and visualization below.

Indiana has had a problem with drugs and overdosing. It is a common problem that needs to be stopped or at least decreased so that people can stop misusing drugs. The visual below that was made by me in Tableau, presents a closer look at Marion county's drug submissions from 2018 to 2019. Cannabis appears to be the most common drug that is being misused as well as Opioids. I have lived in Indiana my whole life and I knew people who have overdosed, misused or had access to these drugs. It is very unfortunate and tragic that this happens because people will have to live with such dire consequences.

My team's finding is that opioids are a big issue in the United States as well in Indiana, especially in Marion County since it is the biggest county in Indiana. It is slightly difficult to compare my team's findings and my findings in my hometown because as a group we focused on just opioids but in the data set I am referring to, it mentions a lot more drugs than opioids. Therefore it is not entirely accurate, but it could have some insight. One could say that the commonality between my findings with the team and my individual thought is that opioids are misused and are a prevalent issue. Drugs, especially opioids, need to be handled in a better way. For this to be effective, there are help groups and companies willing to help with drug addiction and/or people with suicidal thoughts. Also, another potential solution is that people should continue to spread the word about drug and opioid abuse so that it can be stopped.

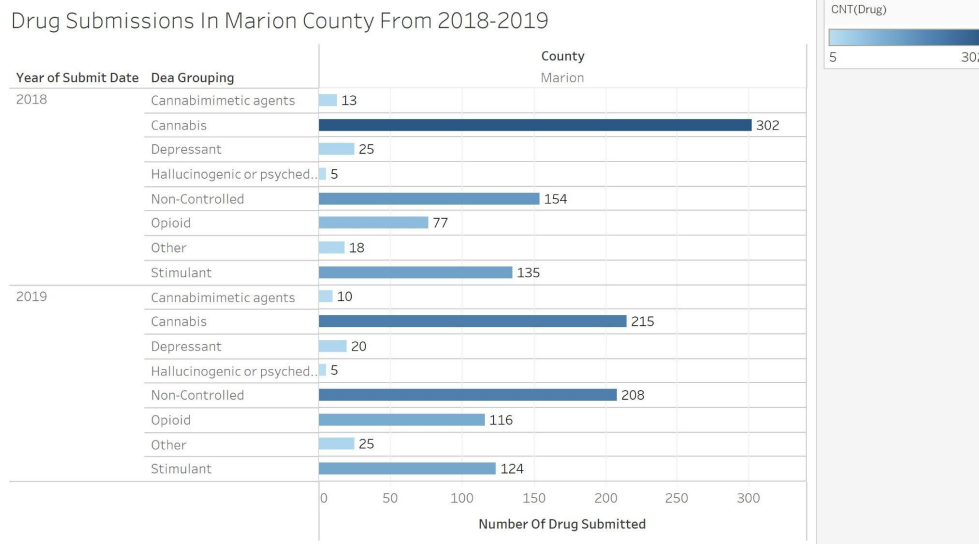


Figure caption: The graph shows the number of drugs submitted in 2018 and 2019 in Marion county. The darker the blue the more the drug has been submitted and the lighter the blue the less the drug has been submitted.

Team Member #2: Chloe Garces

My Hometown/City/Country: Crown Point, Indiana, United States
Opioid Abuse in Indiana

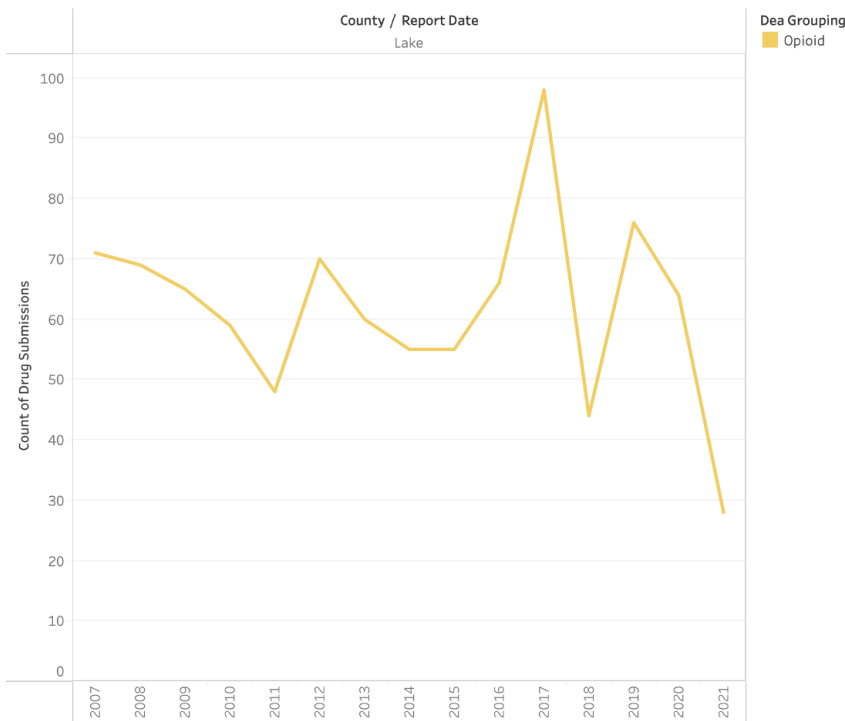
Hackathon Topic (dataset):

Include your story and visualization below.

The opioid crisis has been a problem throughout America for years. While opioids are a stimulant needed to help with pain and other medical issues, people will still abuse the drug and find means to take it without being prescribed. This is the exact reason why there is such a big stigma against opioids, which is why we need to help educate people on the opioid crisis and how it affects us and our community.

If we look at this graph about Lake county's use on opioids, there are a few spikes but an overall decrease from 2007- 2021. When looking at this graph, the biggest spikes I can find are in 2011-2012 and 2015-2017. I wondered why specifically in these years there was a spike, and I found on the Centers for Disease Control and Prevention's website (<https://www.cdc.gov/opioids/basics/epidemic.html>) there was a wave of overdose deaths on heroin happening in 2010 throughout America. I also found that there was another wave of synthetic opioids going around that may have spiked the data and created an increase of opioid usage. While comparing my other teammate's data, it was somewhat difficult to see if it was similar because I was the only one to create a visualization that showed the data periodically rather than on an average.

Opioid Drug Submissions in Lake County from 2007- 2021



The trend of count of drug_submissions_to_indiana_state_police_laboratories.csv for Report Date Year broken down by County. Color shows details about Dea Grouping. The view is filtered on County and Dea Grouping. The County filter keeps Lake. The Dea Grouping filter keeps Opioid.

Team Member #3: Russhell Campbell

My Hometown/City/Country: Pontiac, Michigan, United States
Opioids Abuse in Indiana

Hackathon Topic(dataset):

Include your story and visualization below.

Similar to Indiana's opioid crisis, Michigan's population is faced with the challenges of opioid abuse. Oakland County, Michigan is one of many counties that have a high population consuming and overusing opioids. One of Oakland County's cities, Pontiac, has very little legislative involvement in combating the opioid predicament that resides in Pontiac. While there is minimal government involvement, local organizations are heavily involved in providing treatment and resources to Pontiac's affected citizens. Recovery centers is a measure that is used to allow citizens to process and challenge their addiction to their drug of choice. The dataset OC Recovery Meetings Locations provide data that specify the locations and additional characteristics such as the type of recovery center.

In the chosen dataset, Pontiac Michigan has access to both Alcoholics and Narcotics Anonymous locations. As Team Calico looked for solutions for the insights revealed from the datasets, recovery locations can be a prominent resource from local organizations that can be used to combat the opioid crisis in Indiana.

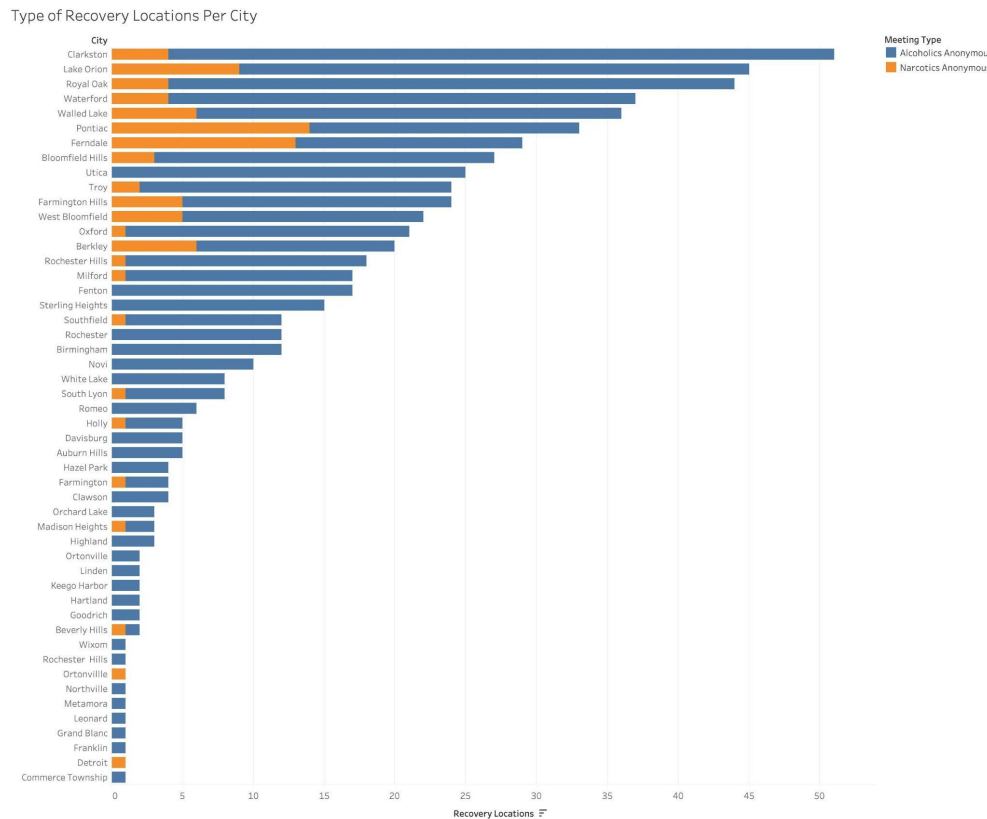


Figure 1: Type of Recovery Locations Per City

Team Member #4: Zoe Wetzel

My Hometown/City/Country: West Lafayette/Indiana/United States
Opioid Abuse in Indiana

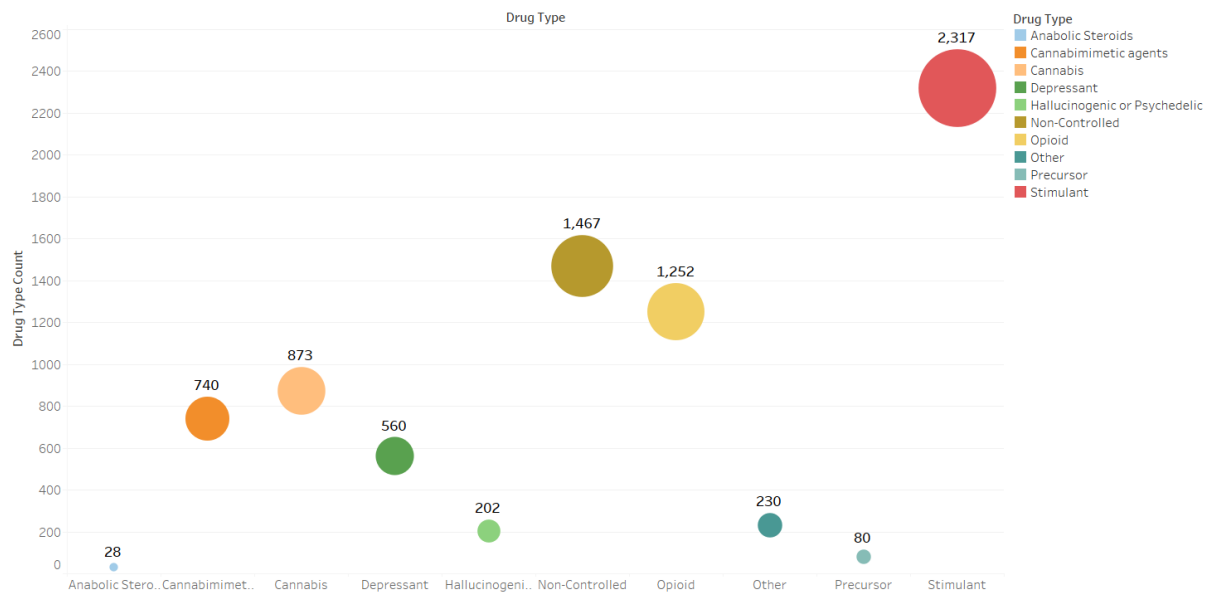
Hackathon Topic (dataset):

Include your story and visualization below.

Like with many other drugs, opioid abuse is responsible for many deaths. The opioid abuse crisis not only impacts individuals and their families, but also compromises the safety of Indiana's communities. So we wanted to see what opioid spending and the opioid abuse crisis is like in Indiana.

We found that densely populated areas accounted for higher spending of opioids in Indiana. Curious to see how this finding compared to my home county, Tippecanoe, I found a dataset that showed a breakdown of the information on specific drug samples found in Indiana that were submitted to officials and sent to be analyzed. I figured that since Tippecanoe is a densely populated county, that the data would indicate a high number of submissions that were opioids, which could lead to the assumption that there is high spending on opioids in Tippecanoe. I found that opioids accounted for 1252 submissions, making it the third most common type of all the categories in the data. Opioids were only beaten out by non-controlled substances and cannabimimetic agents (which had 1467 and 2317 submissions respectively). Tippecanoe's high total opioid submissions indicates that similar to other densely populated areas, there is likely a relatively high supply and amount of money being spent on opioids in this area.

Total Number of Drug Submissions in Tippecanoe County by Drug Type (2007-2021)



Sum of Drug Type Count for each Drug Type. Color shows details about Drug Type. Size shows sum of Drug Type Count. The marks are labeled by sum of Drug Type Count. The view is filtered on Drug Type, which excludes null.

Figure Caption: The chart above shows the number of drug submissions from 2007 to 2021 in Tippecanoe county by drug type. The categories are indicated in the legend on the upper right. The visual was created in Tableau and the original data is from the first reference link.

Team Member #5: Tiernan Hubbard

My Hometown/City/Country: Whiteland/Indiana/United States
Abuse in Indiana

Hackathon Topic (dataset): Opioid

Include your story and visualization below.

Indiana has a long history of opioid abuse, dating back to before I was even alive. There are numerous deaths and hospitalizations every single year because of this long lasting opioid epidemic. With a bit of research and scrutiny, we wanted to take a deeper dive into this crisis.

The fun part of this data source was being able to pinpoint areas where there were high or low sales in opioids. Unfortunately, zip codes without all the numbers are a little more difficult to work with rather than full zip codes. The obvious outliers, being 462XX and 464XX zip codes, are Indianapolis and Gary respectively. Something worth noting however, is the second highest bar, being 461XX zip codes. This includes my home town, Whiteland, having the code 46184. Despite being nearly half the size of 462XX, this is still marginally higher than where other bars average at. This came as a bit of a surprise, since I have never heard of my town having opioid issues. Something to note is that 461XX zip codes are all quite close to Indianapolis, which could be a reason for why it is the second highest bar.

Total Average Amount Spent on Oxycodone and Oxymorphone From 2006-2016

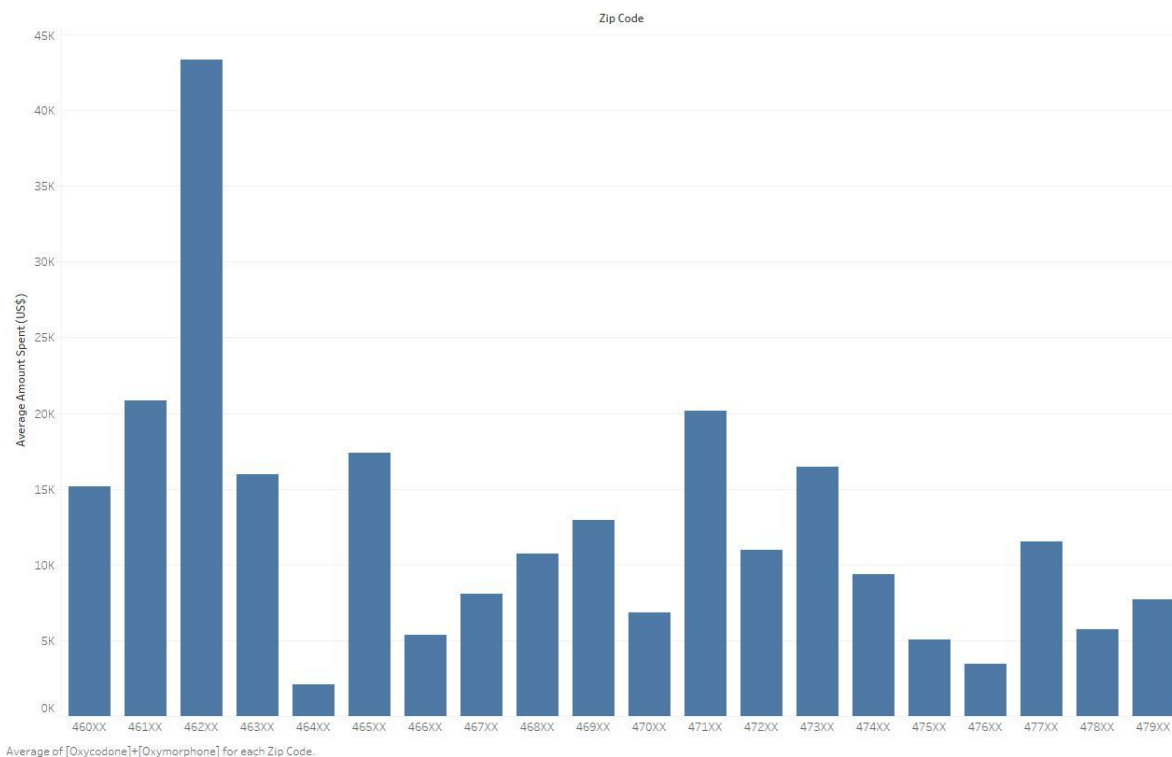


Figure Caption: Average of Oxycodone + Oxymorphone for each Zip Code

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”).

Team Calico has a diverse group with unique backgrounds, skills, and professional interests. There is a large range of majors in the team: Animation (Chloe Garces), Game Design & Development (Zoe Katz), Web Programming (Russell Campbell and Tiernan Hubbard), and User Experience Design (Zoe Wetzel). As of academic status, the team is equally split between seniors and freshmen. Team Calico has a diverse background and ethnicity.

Chloe Garces is a Filipino-American and is the first-generation immigrant child of her family. Chloe’s family professions being in the medical field have helped us gain research about opioid abuse and patients experiences on how to recover from these trials. Russell Campbell is from Pontiac, Michigan. She told us her experience growing up around the Detroit area and how the ethnicity diversity is different from Purdue’s population. Zoe Wetzel is from West Lafayette, Indiana. She discussed with us her memories about watching crime documentaries with her father. Growing up she knew about the opioid issue but never noticed any evidence in the community. Tiernan Hubbard is from Whiteland, Indiana and did heavy research on Indiana’s opioid abuse problems. Zoe Katz is also Asian American and is from Indianapolis, Indiana. Zoe shared with the group about the diverse population in Indianapolis and her findings about opioid abuse from her city. There is a higher data set from her city in comparison to the rest of the group since she is from the largest city out of the other 3 members.

With this diverse group Team Calico was able to brainstorm different ideas and problem solving solutions to help with the opioid abuse problem. Team Calico were able to compare the data from both small and large cities based on where each member was from and created unique solutions. Because 3 out of the 5 members are POC, the team discussed the prejudice of POCs using opioids due to the stigmas against it. Some members opened up about their experiences of discrimination and how these events create a larger problem, especially for POC, who seek treatment for opioid abuse. After these discussions, we found there is a lack of treatment and resources for opioid abuse. The team worked extremely well together and with different perspectives they were able to come up with various solutions.

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
Zoe Katz	<i>Zoe Katz</i>	12/03/2021
Russhell Campbell	<i>Russhell Campbell</i>	12/02/2021
Zoe Wetzel	<i>Zoe Wetzel</i>	12/06/2021
Tiernan Hubbard	<i>Tiernan Hubbard</i>	12/04/2021
Chloe Garces	<i>Chloe Garces</i>	12/04/2021