

Analysis of Philadelphia Crime by Location and Time

Introduction:

The purpose of our project, which aimed at analyzing and visualizing crime patterns in Philadelphia, has provided us with a wealth of valuable knowledge. The two motivating questions we would like our dataset to answer were:

1. How does day of week and time impact what types of crimes are committed?
2. How does location impact what types of crimes are being committed?

By presenting the available dataset, we uncovered key insights into the geospatial distribution of various crime types, shedding light on which areas are more vulnerable to specific crimes and identifying the times and days when crime rates peak. Focusing on the design of our visualization, we made the conscious choice to use size and color in relation to the crime count which helped reinforce the findings that we discovered. The information that we uncovered can be of immense value to law enforcement agencies, communities, and policymakers, as it equips them to allocate resources and craft targeted strategies for crime intervention and prevention.

Dataset:

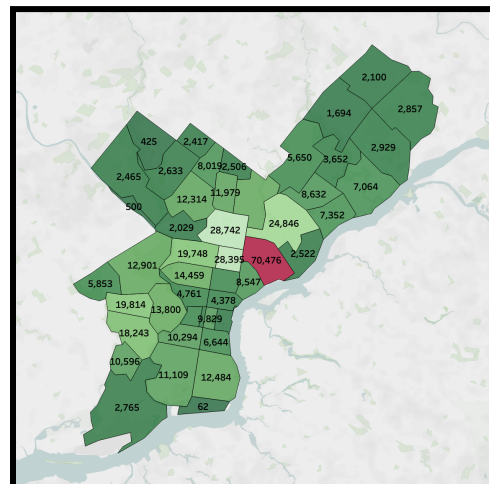
The dataset being utilized is a comprehensive record of various crimes (assault, homicide, theft, ect.) committed in

Philadelphia from 2011- 2023. It is categorized by the hour of the day and the day of the week in which these crimes were committed. This dataset includes more than two million observations of many variables including the zip code where each crime was committed, the category of the crime, and the count of incidents in the zip code.

Crime by Zip Code:

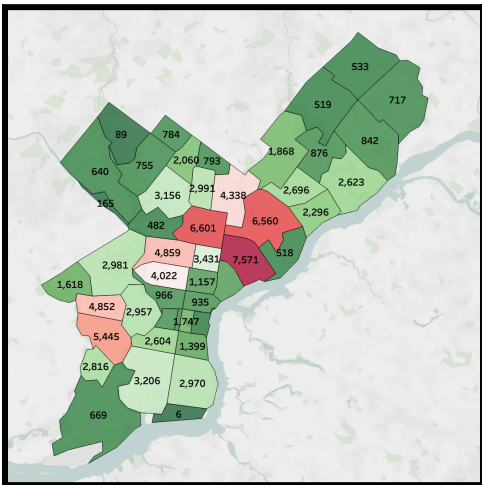
When considering the overall crime statistics in Philadelphia, one zip code stands out prominently. Zip code 19134 contains the Kensington community, which is widely recognized as an area to steer clear of. This zip code shows a staggering 245% increase in crimes committed compared to the runner-up. In fact this area is so riddled with crime that the second, third, and fourth highest-ranking zip codes share a border with Kensington. However, this pattern takes a different turn when examining various types of crimes.

All Philadelphia Crime by Zip Code



For example, the map displaying violent incidents by zip code looks similar to the map depicting overall crime. While there are minor differences, the primary hotspot for violent crimes remains concentrated in Kensington and the surrounding areas. Interestingly, the 19143 and 19139 zip codes also register a notable amount of violent crimes. It is clear that this form of crime is impacting North-Central and West Philadelphia.

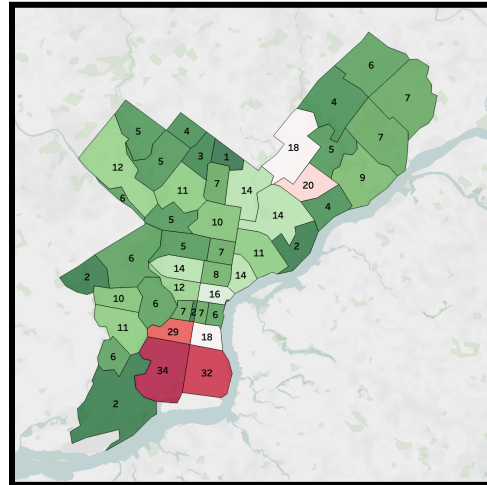
Violent Crime by Zip Code



Conversely, incidents of theft from auto are primarily concentrated in South Philadelphia, with the epicenter being the 19145 and 19148 zip codes. It's worth noting that these areas are also home to all the major sporting arenas in the city. One hypothesis worth considering is that these sporting events, with their extensive parking lots, may contribute to the higher incidence of theft from automobiles. This observation diverges from the overall crime map, where

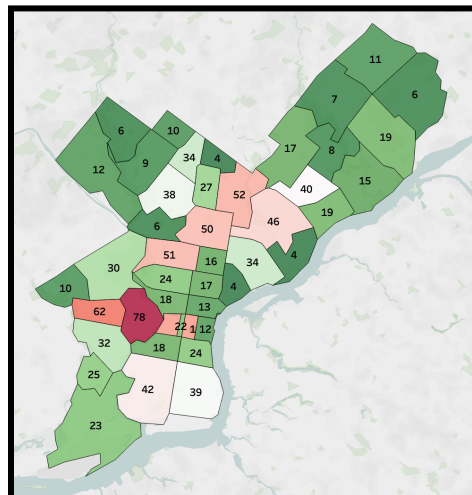
South Philadelphia falls below the citywide average for crimes committed.

Theft from Auto by Zip Code



A surprising twist emerges with the next category of fraud. The most cases of fraud occur in the zip code containing University City. This area reports a staggering 313% more instances of fraud than the citywide average. This pattern deviates from the trends observed in the previous analyses and appears to be concentrated in University City and North Philadelphia.

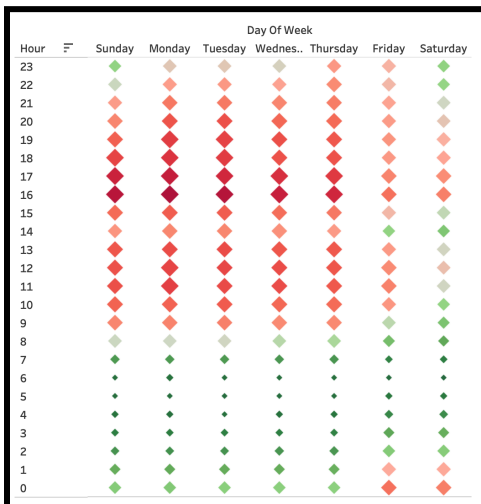
Fraud by Zip Code



Crime by Day and Time:

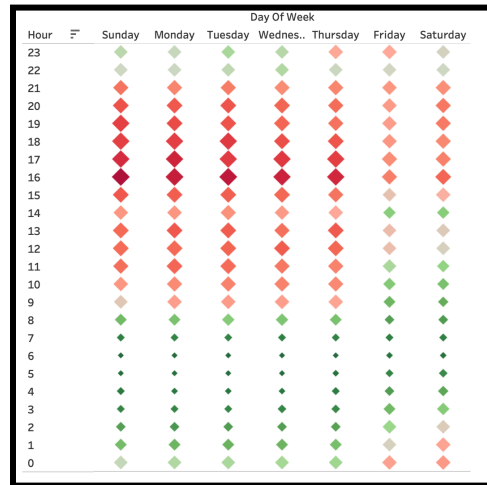
The distribution of the day of the week and time when crimes occur varies significantly depending on the type of crime committed. Across all types of crime, the most frequent occurrences are on weekdays around 6 p.m., while the least frequent are on weekdays between 5 a.m. and 6 a.m. To illustrate this variance, three specific crimes have been selected for examination.

All Philadelphia Crime by Day and Time



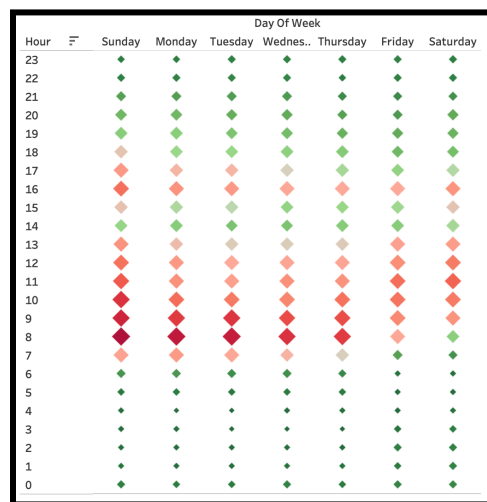
The first variable analyzed is Violent Crimes, which occurs most frequently between 10 p.m. and 1 a.m., irrespective of the day of the week. The frequency of this crime is lowest around 6 a.m. This visualization does reveal anything that is not already ingrained in the public psyche, but highlights just how severe the decrease in frequency is during the day.

Violent Crime by Day and Time



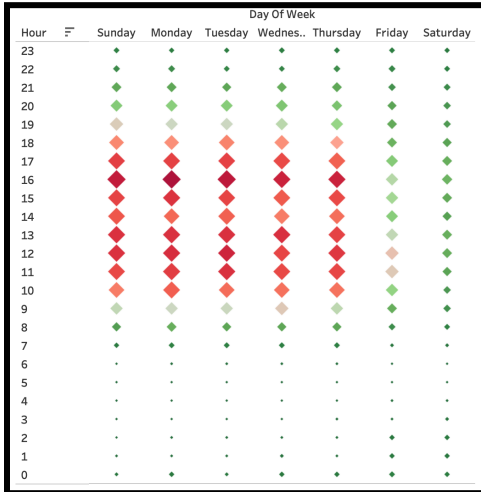
Next, we consider Theft from Vehicle crimes which peaks at 8 a.m., coinciding with the time workers park their cars to enter the office. Another surge occurs at 4 p.m. Notably, this crime is rare during nighttime hours. This diverges from the hypotheses that event parking acts as a magnet to this crime, as events generally happen during mid-day, evening and nighttime hours.

Theft from Auto by Day and Time



Lastly, Fraud, which predominantly occurs during standard working hours (9 a.m. - 5 p.m.). Given that Fraud is classified as a white-collar crime, this pattern aligns with the typical office hours of white-collar workers.

Fraud by Day and Time



Overall Effectiveness:

What truly sets this project apart is its comprehensive perspective on the state of crime in Philadelphia. We meticulously considered multiple factors, including location, time, and the type of crime. When we examined the intricate relationship between crime, location, time, and day of week we revealed patterns that might have remained hidden with a casual observation of the dataset. Our journey through this project showcased that every decision, from defining the project's scope to setting objectives and strategies, was firmly anchored in the data, ensuring our alignment with the project's overarching goals.

Furthermore, this project vividly demonstrated the sheer effectiveness of data-driven insights. While we applied this approach to the realm of crime analytics, its principles extend far beyond this domain. The methodology we employed here can be seamlessly adapted to business, healthcare, government, or countless other fields, underlining its versatility and power as a problem-solving tool. In essence, this project has not only enriched our understanding of crime patterns in Philadelphia but also imparted skills and insights that transcend its specific context, making it a valuable lesson in the broader application of data-driven decision-making.

References:

City of Philadelphia. (n.d.-a). Arrests. OpenDataPhilly.

<https://opendataphilly.org/datasets/arrests/>

City of Philadelphia. (n.d.-b). Crime Incidents. OpenDataPhilly.

<https://opendataphilly.org/datasets/crime-incidents/>