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DATA 3310-01
Professor Mendible
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Chicago Police Department Use of Force Incidents Report

1. Introduction

This report provides a comprehensive overview of the Chicago Police Department's use of force incidents in 2023. Police departments in the U.S. are frequently accused of using force unnecessarily and targeting certain racial demographics, and a 2017 investigation conducted by the U.S. Department of Justice found the Chicago police's use of force in particular to be excessive and in violation of the Fourth Amendment. Motivated by the importance of addressing systemized police violence, the goal of this investigation was to reveal patterns in policing behaviors in the context of use of force incidents. Out of the total 10,469 arrests in Chicago throughout 2023, 33% of them resulted in the use of force– a rate that exceeds that of comparatively sized or larger metropolitan areas. This means that our report covers 3,489 individual use of force incidents, or about ⅓ of all arrests made by the Chicago Police Department in 2023. The figures in this report focus primarily on demographic information but also provide information on incident locations and the frequency of injuries.

2. Methodology

After choosing the broader topic our team was going to investigate, our data preparation process started with selecting our dataset. While we initially explored data from the Seattle Police Department, we decided to use the Chicago Police Department data set based on the variables recorded, the size of the dataset, and the prevalence of use of force incidents. The variables recorded in the Chicago data set covered more environmental factors than most cities (eg: location, lighting, and weather). The Chicago dataset also provided more comprehensive policing information such as patrol type, officer on duty, officer in uniform, and weapon information for both parties. Due to the difficulties of working with and visualizing significantly large data sets, we focused on the entries from 2023 rather than a multiple year period. This

made the data easier to work with and allowed us to generate graphics without high processing times, while still observing trends over time throughout the year. Lastly, we considered the prevalence of use of force incidents when picking a dataset. Chicago has a notably high use of force rate of 33% (as mentioned above), even when compared to cities that are smaller, of equivalent size, or larger. For comparison, the Seattle Police Department has a rate of 0.3%, San Francisco has a rate of 1.9%, and New York City has a rate of 8.9%.

When initially reviewing the data, we found that due to the quantity of attributes collected for each incident– such as the aforementioned environmental factors and policing information– there were many entries with null values. For other categories such as gender and race of the individual against whom use of force was used (referred to in the data as "SUBJECT"), null values were less common but still present. After some background research into how information on use of force incidents is recorded, we renamed null values to be "UNKNOWN/NOT COLLECTED" to more accurately reflect the nature of the missing data. We also wanted to utilize maps in our visualizations, but did not have latitude and longitude in the data set. To create our maps, we linked the available geographic information of zip codes and beat sectors with a geoJSON of the Chicago city area. We also standardized a theme in our code and visualizations document, so that axes, titles, and colors would be consistent.

3. Results and Design

3.1 Racial Demographics

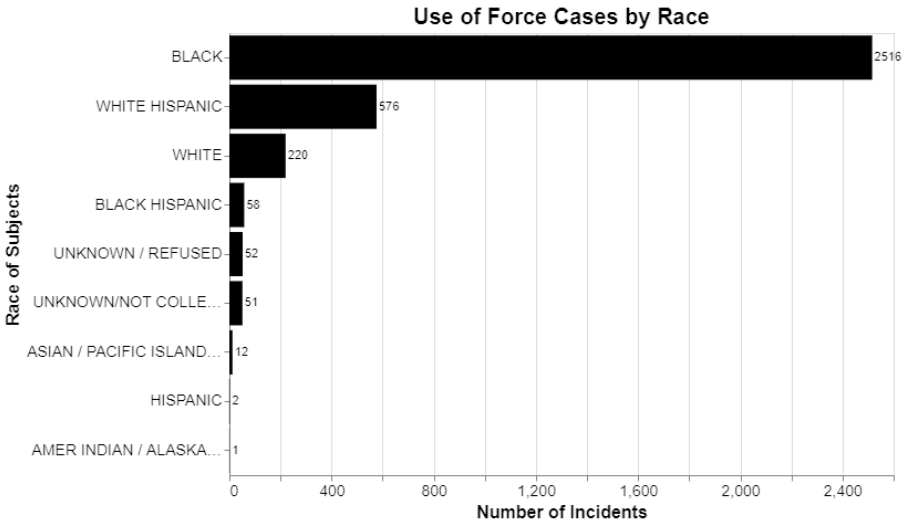


Figure 1: Tracking the number of incidents by subject race, results show a wide majority of Black subjects.

This plot set out to discover what factor race plays into the number of use of force arrests in this dataset. The overwhelming outlier in this chart was the amount of Black subjects (2516), nearly five times as many as the next race of White Hispanic (576). In all, Black subjects made up 76% of the use of force arrests. Considering 28% of Chicago's population in the 2022 U.S. Census was Black, this is a clearly disproportionate amount of use of force arrests. Since there are only two variables (race, number of incidents), both x and y positions are used and color is not used as an encoding. Race of subjects is placed on the y-axis to aid with legibility and ease of reading.

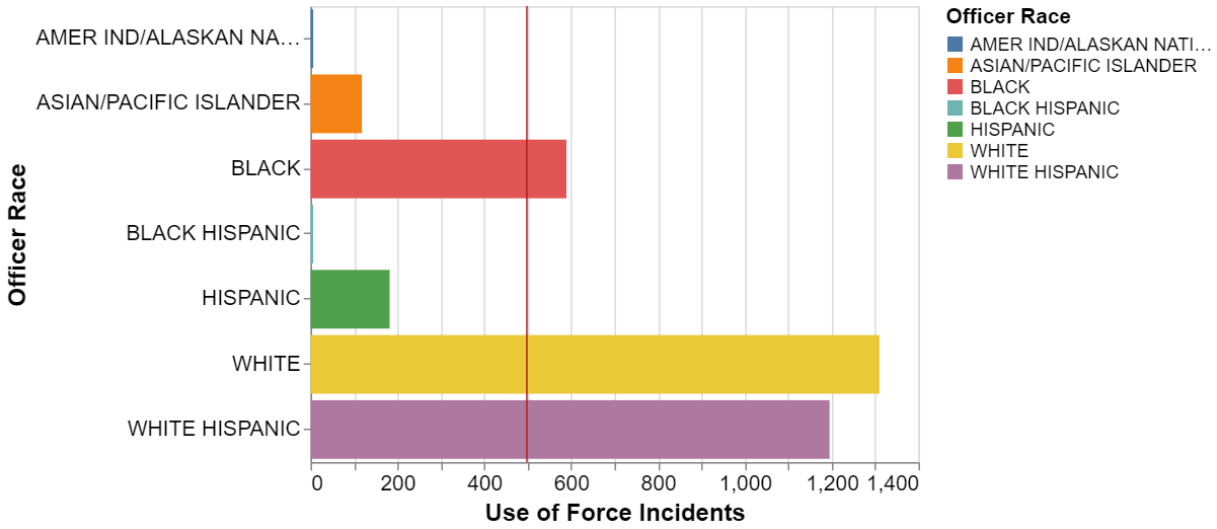
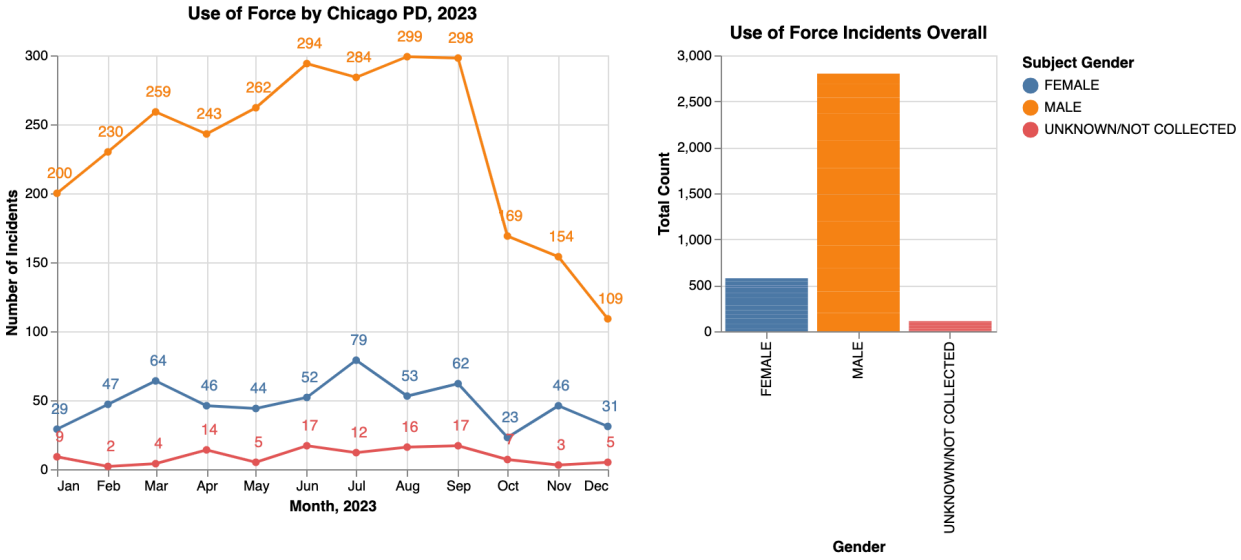


Figure 2: Number of use of force incidents by officer race compared to the overall average.

This chart was created by filtering out unknown values, plotting the chart and color scheme and then adding a line at the average number of incidents. The justification for this design is that a horizontal bar chart rather than a vertical chart makes it easier to read the race of the officer and therefore interpret the graph. I chose to use the color encoding for this chart because there are fewer than eight unique values and it helps differentiate between each race. The chart shows that use of force disproportionately occurs when the officer on the scene is White or White Hispanic. The number of use-of-force incidents for both these categories was

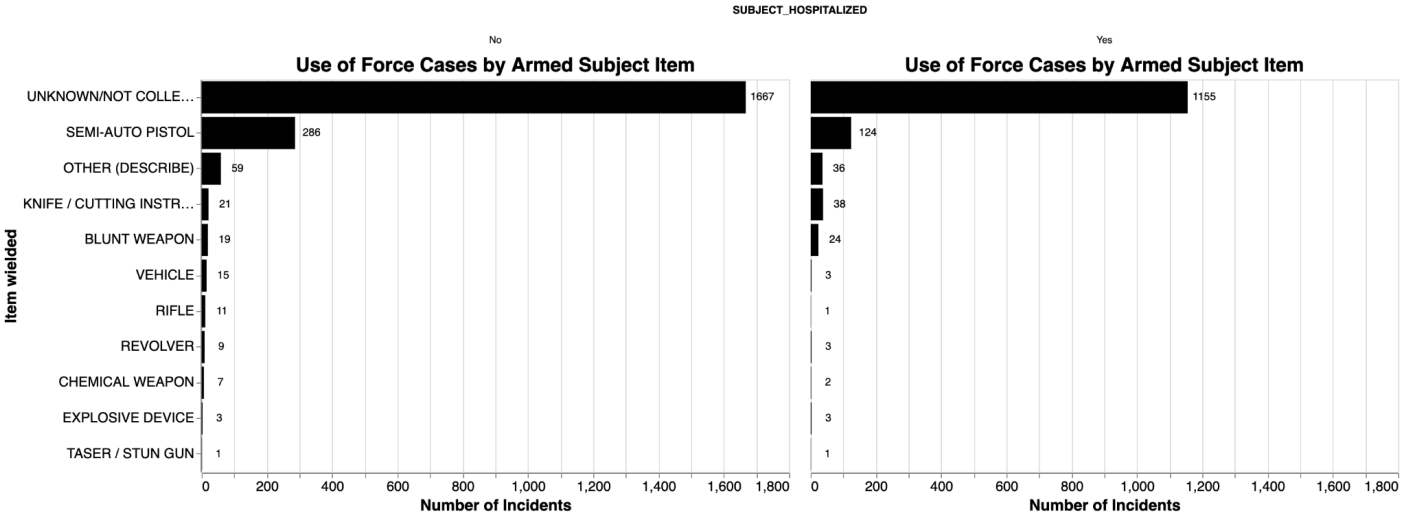
over 1,000 (compared to the average number of 498). This may be because the police force overwhelmingly hires White officers however this would require further investigation.

3.2 Other Subject Demographics



Figures 3 (left) and 4 (right): Use of force incidents by gender over time and overall.

This chart was made to compare two different visualizations of the gender demographics of overall incidents in 2023. In Figure 3, the line point is spread across the year by months, revealing a spike in the summer months and a steep drop between September and October for all three demographic groups. In both graphs it is evident that significantly more Male than Female subjects are involved in use of force incidents. Furthermore, the Chicago Police Department's decision to use a binary gender divide sets it apart from the data shared by other city police departments such as Seattle, which includes information on transgender subjects. While the number of subjects whose gender was listed with a null value was small, it was significant enough to include in the graphs and address in the project. With some research, the common consensus among police departments seems to be that null values represent an instance where gender information was not collected, rather than if someone were identifying outside the Male/Female binary. Because of this, null values were listed as Unknown/Not collected.



Figures 5 (left) and 6 (right): Use of force incidents based on weapon wielded by subject.

This series of histograms displays data about how subjects were armed during incidents, and whether those incidents resulted in hospitalization of the subject. The subjects were found to be overwhelmingly unarmed, and fewer subjects were hospitalized than not overall. However, among those who were hospitalized, there were still a significant majority of unarmed subjects than any other item type. The color encoding is not used in this chart and it is instead faceted to highlight the difference in each column, with count for each bar added for clarity.

3.3 Incident Information and Environmental Factors

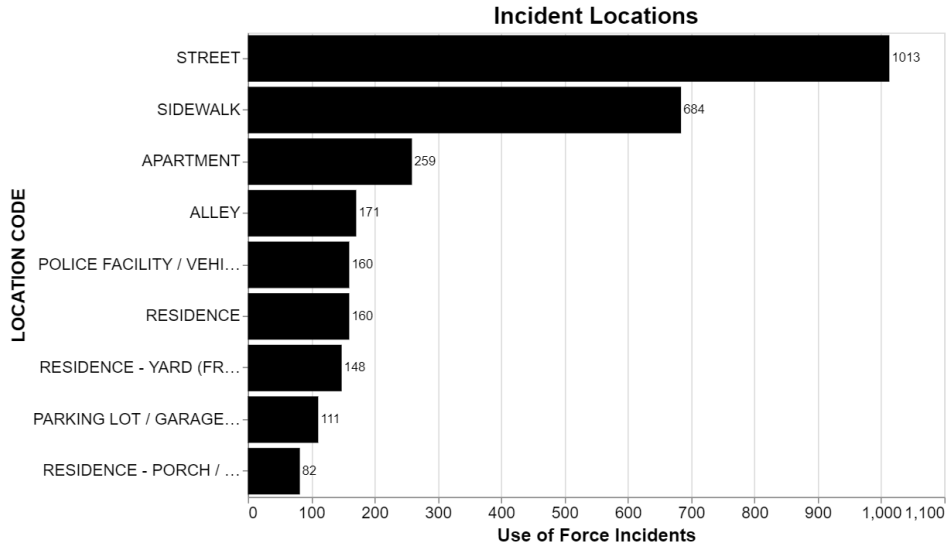


Figure 7: Different incident locations where use of force incidents take place.

This chart was created by filtering the locations to the top nine most common incident locations, sorting from highest to lowest and then adding text for easier viewing. The justification for this design is that a bar chart easily compares these locations and using a horizontal bar chart makes the locations values easier to read. There is no color encoding in the chart as the number of locations would make the graph less interpretable if there were nine different colors included. As shown in the chart, use of force incidents largely occur on streets, sidewalks and alleyways (public areas outside). This is followed by residencies such as apartments/houses and the third most common type of location is parking lots.

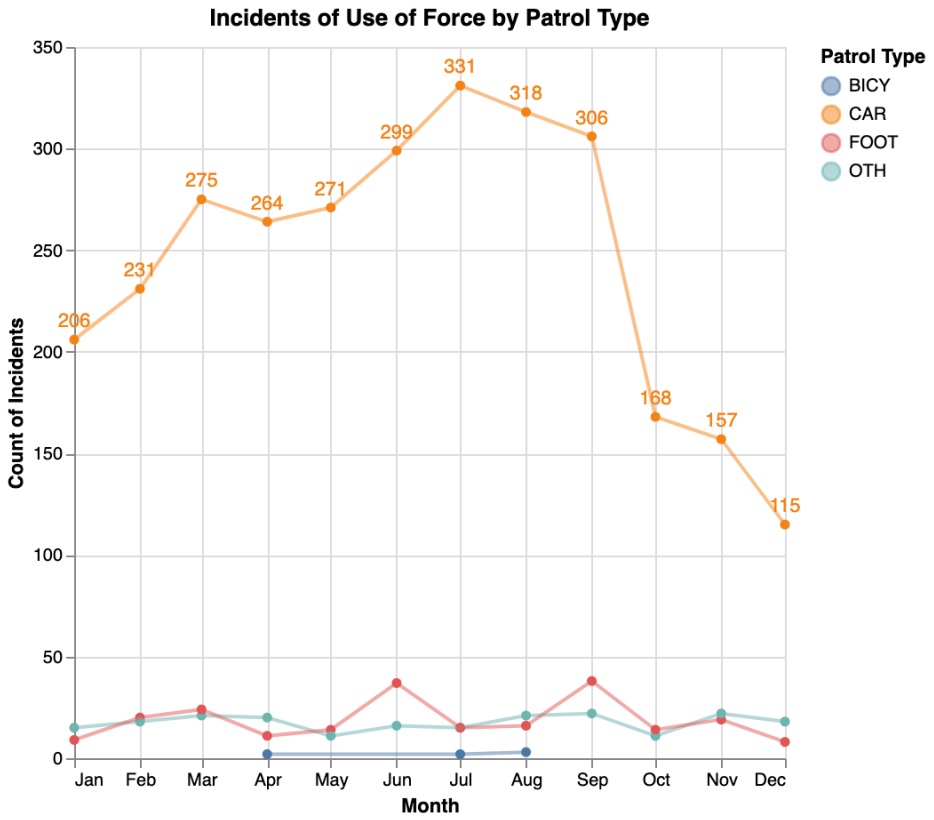


Figure 8: Incidents by the four most represented patrol types: bicycle, car, foot, and other.

This graph views the use of force incidents over the course of 2023 by patrol type. Because there were significantly more car incidents than any other, the number of incidents that occurred while the officer was on car patrol is listed at the top. Other numbers are not listed so as

to not clutter the graph. The pattern of a significant increase in the summer months and a steep decline between September and October can also be seen here.

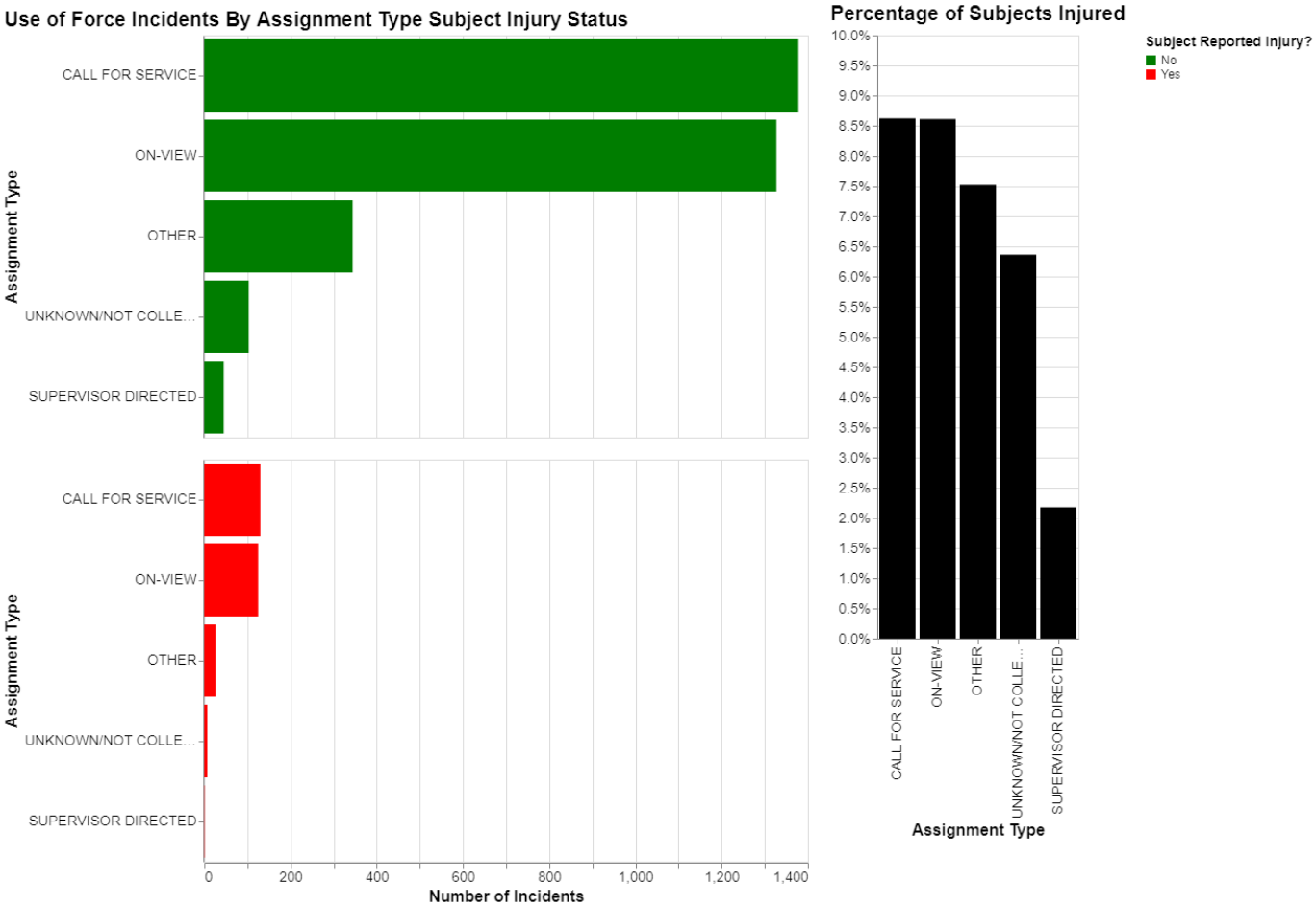


Figure 9: Splitting incidents into police assignments. Assignments are the reason police were brought into contact with the subject. Call for service and on-view make up the majority and have the highest percentage of subject injuries.

When responding to incidents, the most common response types by a considerable margine are calls for service and on-views, with over 1,300 each. Calls for service are when officers are dispatched to the scene by emergency operators or a tip, while on-views are when officers see something and make an arrest based on their judgment. As such, both categories have the most injuries reported, each over 120. Both also had the highest concentration of injuries, as calls for service incidents resulted in subjects being injured 8.6% of the time and on-views resulted in subjects being injured 8.7% of the time. Other assignments resulted in

subjects being injured 7.5% of the time and supervisor directed calls had a rate of just over 2%. Text overlays to double encode the bar graphs were not possible due to the faceted nature of the incident totals graph, so the second percentage graph serves to provide alternative context.

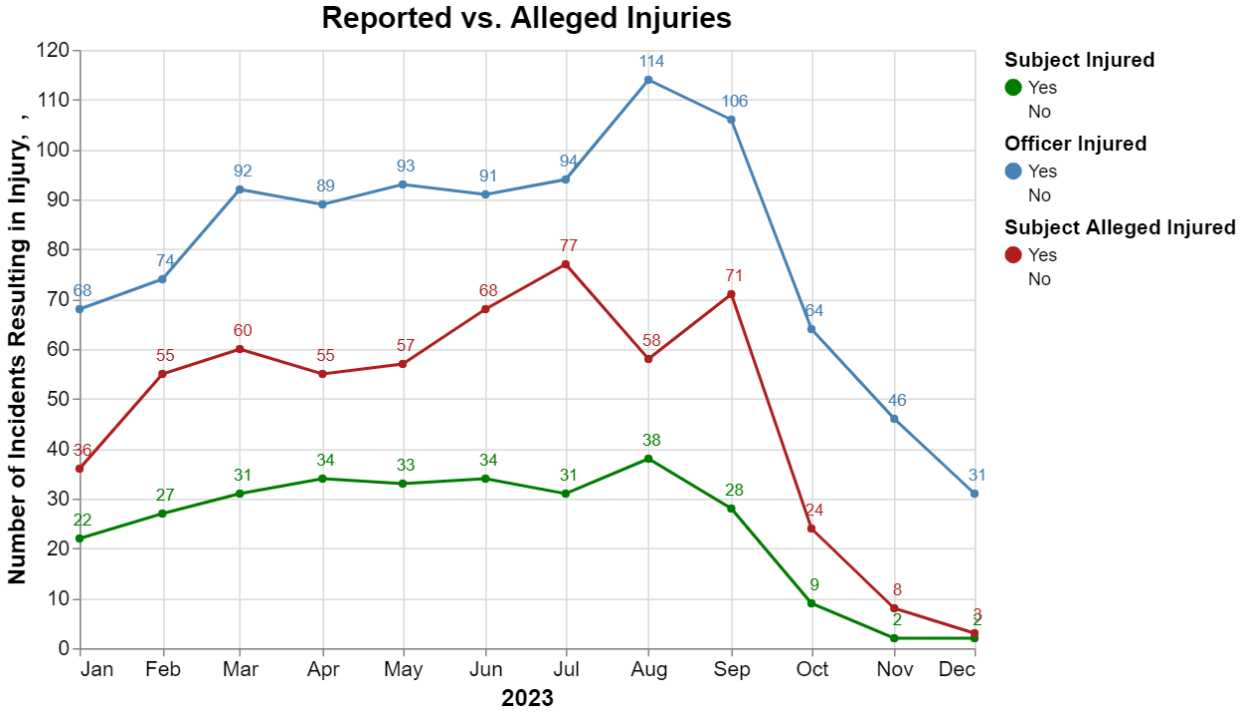


Figure 10: This chart compares the number of officer injuries, subject injuries as reported by the police department, and instances where the subject alleged that they were injured.

This chart was created by making three different graphs for each variable, filtering out unnecessary data and then layering them into one chart for easier comparison. The justification for this design is that layering the charts rather than faceting them requires less effort from the viewer in order to understand the information the chart is trying to convey. Adding text and points allows viewers to easily compare the exact numbers of each month rather than approximating from the y axis. The color encoding is used to distinguish the variables and blue is used for officers as it's a commonly associated color. This graph shows that subjects are likely injured much more often than the police department reports. In some months the subject's alleged injuries are over double the officially reported injuries from the police department. While we can assume that not all of these alleged reports are true based on the data it seems likely that there is a combination of people over-reporting their injuries and police under-reporting subject injuries. Through looking at other data points we can establish a pattern of behavior within the police

department that indicates police officers routinely change reports to better suit their needs which reinforces the possibility that this extreme difference in alleged and reported subject injuries come from officers underreporting subject injuries. It is also worthwhile to point out that officer injuries are always higher than subject injuries and officer injuries are also completely self-reported.

3.4 Zip Code and Demographic Information

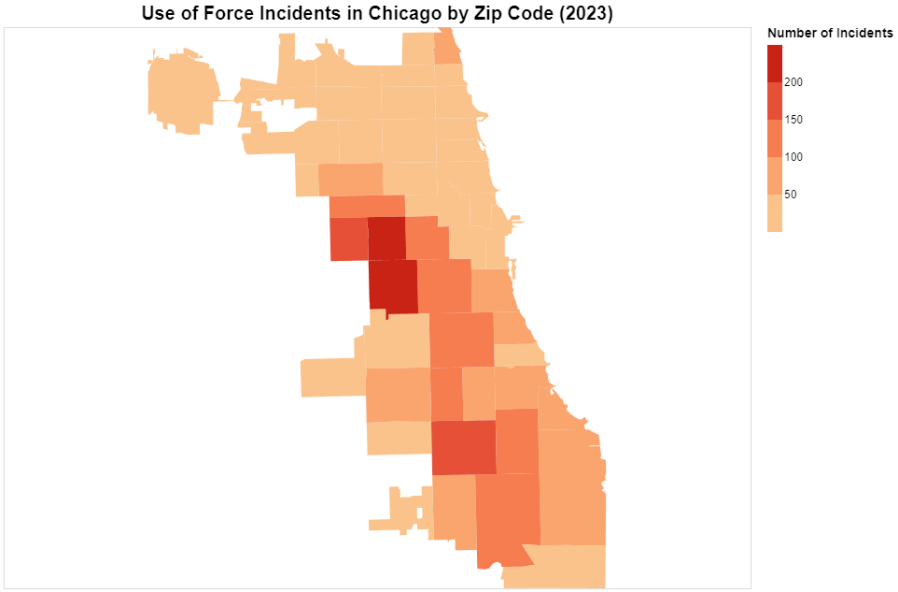


Figure 11: Choropleth of use of force incidents in Chicago by zip code.

This map represents where use of force incidents were most prevalent in Chicago in 2023. There is an interactive tooltip in the plot that displays the exact count and zip code, but this plot is meant to give viewers an idea of where this activity is happening most often. The 60624 and 60623 zip codes of west Chicago, comprising notorious areas like North Lawndale and Garfield Park were the most troublesome, as they were the only areas with over 200 incidents. In north Chicago very few zip codes rose above 50 use of force incidents, but on the south side most zipcodes hovered between 50 and 150 incidents, with the 60620 code nearly reaching 200. In terms of design, to maintain the viewer's ability to discern between zip codes, the values were binned. This led to an issue of some zip codes having no incidents and some having nearly 50, but appearing the same on the map. It was ultimately decided to keep five bins on the plot, as adding more bins would have clouded other parts of the map. As for the color scheme, the

continuous “orangered” scheme was chosen as the colors are discernable with any color deficiency and since the values start at zero, there is no need for a divergent scheme.

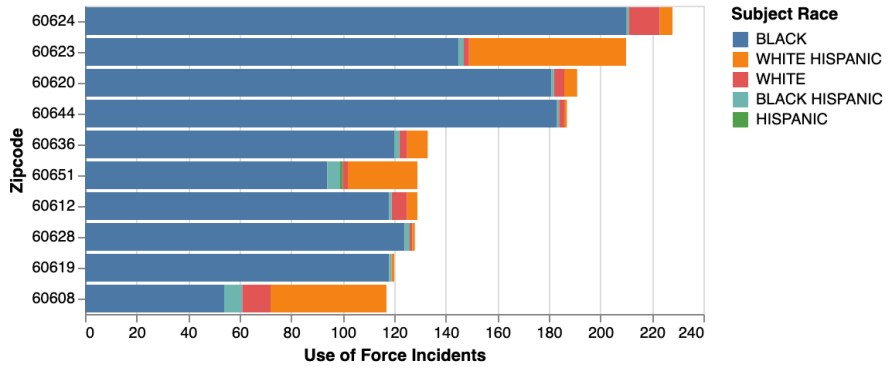


Figure 12: Zip codes with highest number of use of force incidents with subject race breakdown.

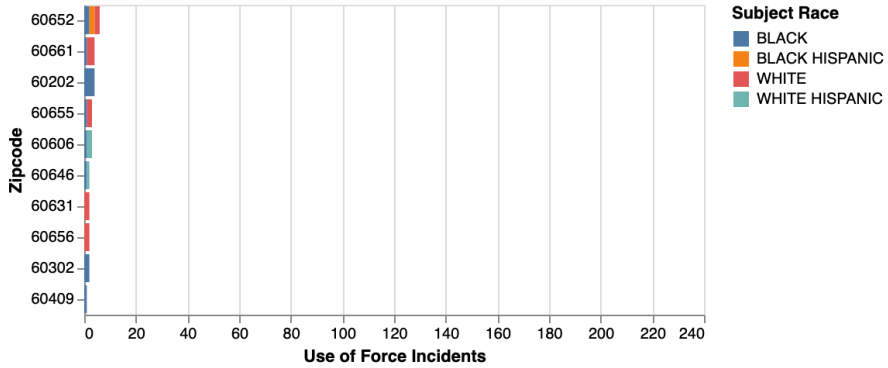


Figure 13: Zip codes with lowest number of use of force incidents with subject race breakdown.

These three charts were made by combining the zip codes provided in the original data set with an open source data frame of zip code and corresponding latitude/longitude markers in a geoJSON file. Tooltips displaying zip code number and count are added to the charts but not visible in the report. Color encodings were used to display information about the racial demographics of these incidents, and data with unknown values were filtered out. Of all of the Chicago zip codes, 60624 and 60623 were significantly higher, being the only two with over 200 incidents in 2023. Of these incidents in the top ten zip codes, the number of subjects who are Black are significantly higher than any other racial group. However, in the zip codes with the ten fewest number of incidents, there is no such pattern.

Of the zip codes with the ten highest number of incidents, eight had a majority Black population and two had a majority Hispanic population, with average population rates of 82.1%

and 57.8% respectively. Of the zip codes with the ten lowest number of incidents, eight had a majority White population, one had a majority Hispanic population, and one had a majority Black population, with average population rates of 65.5%, 47.2%, and 71.3% respectively. These rates were calculated using Illinois census data.

4. Analysis

4.1 Findings on Race

Our visualizations of the data resulted in a few significant findings. Firstly, because of the history of racial discrepancies in subjects of police use of force incidents, we prioritized racial demographic information about the subjects. Our graphs on this data demonstrated firstly and overall, Black Chicago residents are significantly and disproportionately overrepresented as subjects of police use of force, composing over 76% of all incidents (Figure 1). The size of the demographic group of Black subjects is over 4.3 times larger than the following group of White Hispanic subjects. When looking at the racial makeup of the zip codes with the highest and lowest numbers of incidents in the city, a racial discrepancy could also be seen (Figures 12 and 13). Overall, zip codes that see the highest number of police use of force incidents tend to have a majority Black population, while zip codes that see the lowest number of police use of force incidents tend to have a majority White population. In both of the groups of zip codes with the ten highest and lowest number of incidents, 80% (or 8 out of 10) followed this pattern of being either majority Black or majority White respectively. Of the zip codes with the highest number of incidents, Black subjects were also consistently overrepresented.

We also analyzed demographic information about the police officers who committed the use of force incident, referred to in the data set as ‘Member.’ The officers were overwhelmingly White or White Hispanic, with both demographic groups composing over 1000 of the use of force incidents each (Figure 2). This is over double both the median (498) and mean (436) number of incidents for a racial group. While no significant outliers were detected, the group of White officers who were members in use of force incidents was the furthest from the mean, with a z-score of 1.63 calculated at a 0.05 significance level.

4.2 Findings on Other Subject Demographic Information

Other subject demographic information we examined included subject gender, whether the subject was armed, and whether the subject was injured. The Chicago Police Department restricts its gender categories to male, female, and unknown/not collected. Among these three categories, there was a significant majority of male subjects, composing 80.3% of all incidents (Figures 3 and 4). All three gender categories saw a spike in the summer months and a steep decline between the months of September and October, and these changes were most prevalent within the male category. The subjects were also overwhelmingly unarmed in use of force incidents, even when focusing on the subjects who had to be hospitalized due to the use of force incident (Figures 12 and 13). About 50% more subjects were not hospitalized than those who were, at an overall ratio of 1.51. Finally, the most incidents occurred in central Chicago zip codes, though these are not the most populous (Figure 11).

4.3 Findings on Environmental and Incident Information

Finally, we looked at data related to the incident itself or environmental factors, the first of which being incident location. The majority of incidents occurred on the street or in a residence, though within the top nine most common locations, there was a more even distribution of incidents among residence locations (building interior, porches, and yards), police vehicle or facility, alleys, and parking lots/garages (Figure 7). When looking at patrol type over time, most incidents occurred while the office was on car patrol. The spike in the summer months and steep decline from September to October can also be observed in member statistics (Figure 8). When exploring the data based on police response type, the vast majority of members were either responding to a call for service or initiated the incident upon view (Figure 9). Finally, when examining the injuries reported after use of force incidents, members allege injuries consistently higher than subjects (Figure 10). The data for subject injuries is further divided between alleged injury and injury, though when calculated cumulatively, subjects report injuries (both observed and alleged) at a similar rate to officers.

5. Conclusion and Further Research

Overall, our findings with this data set tragically reaffirm the findings of the Department of Justice investigation mentioned earlier. Not only does the Chicago Police Department have a significantly higher rate of use of force incidents than other United States metropolitan police

departments, but these incidents overwhelmingly include, and injure, unarmed Black men in central Chicago. The overrepresentation of Black subjects and White or White Hispanic members indicate the need for further research and work to be done on the systemic racial disparity in these use of force incidents.

There were also aspects of the data we observed that led to questions beyond the realm of our data set and exploration. First, the Chicago Police Department collects data using a strict binary gender option. Because of this, rates of use of force incidents against subjects with minoritized gender identities cannot be tracked. It would be helpful if in the future, further information and identification options were utilized. Secondly, we consistently observed a spike in the summer months in use of force incidents. Based on external publications, this could possibly coincide with an overall spike in crime rates and violent crime rates during summer months. With these data and visualizations alone, we do not have enough information to determine whether there is a cause-and-effect relationship between crime and use of force incidents, if use of force incidents are an accurate predictor/metric of crime rates, or if use of force incidents are a helpful response to higher crime rates. While further research must be conducted, we can nonetheless observe the correlation.

References

Carter, M. (2024, March 7). *Seattle police use of force nears all-time lows, but racial disparities still plague the numbers*. The Seattle Times. https://www.seattletimes.com/seattle-news/law-justice/seattle-police-use-of-force-nears-all-time-lows-but-racial-disparities-still-plague-the-numbers/

California Department of Justice. California Justice Information Services Division, Justice Data & Investigative Services Bureau, Criminal Justice Statistics Center. (2021). *Use of Force Incident Report.* Office of the Attorney General. https://data-openjustice.doj.ca.gov/sites/default/files/2022-08/USE%20OF%20FORCE%202021.pdf

Chicago Police Department. (2024, February 2). *Use of Force Dashboard*. Chicago Police Department. https://home.chicagopolice.org/statistics-data/data-dashboards/use-of-force-dashboard/

Illinois Demographics by Cubit. Illinois Demographics by Cubit . (n.d.). https://www.illinois-demographics.com/

Johnson, A. (2023, July 10). *Here's why warm weather causes more violent crimes-from mass shootings to aggravated assault*. Forbes. https://www.forbes.com/sites/ariannajohnson/2023/07/06/heres-why-warm-weather-causes-more-violent-crimes-from-mass-shootings-to-aggravated-assault/?sh=3d18982e5ab3

New York City Police Department. Statistics - Reports & Dashboards. (2022). *Use of Force Dashboard.* https://www.nyc.gov/site/nypd/stats/reports-analysis/use-of-force.page

Seattle Police Department. Information and Data. (2024). *Use of Force Data.* Seattle Government. https://www.seattle.gov/police/information-and-data/data/use-of-force-data#:~:text=Our%20officers%20answer%20hundreds%20of,use%20of%20force%20(0.3%25).

U.S. Department of Commerce. (2022). *U.S. Census Bureau quickfacts: Chicago City, Illinois*. United States Census Bureau. https://www.census.gov/quickfacts/fact/table/chicagocityillinois/PST045223

U.S. Department of Justice. Office of Public Affairs. (2017, January 13). *Justice Department Announces Findings of Investigation into Chicago Police Department*. (Press Release No. 17-057). United States. Department of Justice.

https://www.justice.gov/opa/pr/justice-department-announces-findings-investigation-chicago-police-department