Deliverable 1

Police Overtime

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Introduction:

With the Boston Police Department having a budget of over $400 million dollars, we are focusing on analyzing how this money is spent. Namely, we have looked at Police Overtime and the relationship between total time worked and overtime hours. However, Overtime pay is just one category of BPD spending. Analyzing the earnings, race and demographics, budget, campaign contributions, and field activity datasets we can further analyze how money is used within the Boston Police Department.

Key Questions:

Identifying instances of financial excess in BPD spending

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    - How has the BPD budget changed year-over-year?
    - Where have funds grown or shrunk, overall and intra-departmentally?
    - How has funding shifted between departments?
- How have BPD paychecks changed year-over-year? Both the average amount, as compared with non-BPD Boston city employees, and the breakdown (regular pay v. overtime pay, etc.)?
- How much BPD officer pay came from injury pay? What percentage of officers took injury pay in a given year?

Characterizing wasteful BPD overtime practices

- Identifying instances of financial excess in BPD spending,
- Characterizing wasteful BPD overtime practices
- Using data to fill in narratives around waste & misconduct by individual BPD officers.
- How do overtime hours paid compare to overtime hours worked? What does the discrepancy financially amount to, year after year?
- How has overtime for court appearances changed year-over-year?
- What is the distribution of ratios of overtime worked vs. overtime paid? Are there any outliers? (WRKDHRS vs. OTHOURS in the court OT database).
- Are certain officers (e.g., white, old, male, long tenure, high ranking title) more likely than others to have lower worked-to-paid ratios?

Data Collection and Processing:

Earnings Data:

This data was provided to us and contained information about the Boston City Employees Earnings. The datasets ranged from 2011-2022, but to look at how pay has changed over time we narrowed our focus we looked at 2012-2022. The data contains pay information for each employee, breaking up the pay into injury, overtime, regular, retro, quinn, and detail. Additionally the total pay for each employee is provided as well as their Job Title and Department.

To focus on the pay of the Boston Police Department we had to filter this data to only contain employees which belonged to the Department. Additionally, we had to process the columns relating to pay to be floating point numbers so we could perform computations on the data.

When looking at the earnings of BPD compared to other departments, we had to look at the dataset as a whole. To do this, the same column processing algorithm was used and analysis focused on all of the departments.

Race/Sex of Officers:

This dataset was provided to us recently in the Police Overtime Slack group chat. This contains limited information about the demographics of the BPD, split by rank into the intersections of race and gender. This data is limited, but we are hoping that we can derive a common demographic or rank that is prevalent in cases where anomalous overtime/injury leave is taken, when compared to our other datasets.

While there are entries for several years spanning back, until 2022, the sets provided are only screenshots that we can't make models of, so we are limited to using 2022 and 2023 demographic data. Still, this can hopefully give us insights as we analyze trends in other sets.

Court Overtime:

This dataset ranges from 2012 to 2022. It provides records of officers requesting overtime pay when they appear in court. We have analyzed the number of records for each year to get a better understanding of overtime court appearance for the last decade. This data was in tabular format so merging data was straightforward.

This data has STARTTIME and ENDTIME which could be used to calculate hours worked by officers and surprisingly, there was a huge discrepancy between hours worked and hours paid.

Boston City Budget:

This dataset was not provided to us, and was found on the Boston.gov website. It provides useful information about departmental expenses from 2021-2022. Additionally it provides the 2023 Appropriation as the year has not yet concluded. With that, there is also the 2024 Budget. This dataset can help us analyze how the Budget has changed over time.

To accomplish this, we first had to clean the data. This entailed replacing any missing values with NaN so we could perform computations without encountering any errors. Additionally, the columns in the dataset which related to the expenses had to be formatted to floating point numbers so we could perform computations. Lastly, to look at the budget for the Boston Police Department, we filtered out other departments and only looked at the data relating to the BPD.

Campaign Contributions:

The Campaign Contribution Datasets were provided to us and contained information about which campaigns individuals donated to. These datasets included OCPF data, active campaign contributions, active police campaign contributions, all police campaign contributions, and contributions to Mayor Walsh. Additionally there were datasets about State Campaign Contributions.

The datasets contained information about an individual's occupation, employer, the amount they spent, and the recipient. First to clean this data set we had to remove the rows which had a null value for Employer. This is because we later had to filter the dataset by Employer to narrow our analysis to the BPD. After processing the dataset to only contain individuals employed by BPD we were able to perform analysis on the data.

Field Activity:

This dataset was provided to us and contains detailed information about specific cases of arrests/scenes, both for the suspect in question or the officer who responded. Along with location of arrest and supervising officer. While the Field Activity data is extensive, we don't find it to be too useful for what we are trying to accomplish, at least for now. To preprocess the data set we had to account for the ways that the format of the tables changed. Between the first data from 2012 and now there have been 4 different schemas which had a variety of table names along with data. Using the key provided in the boston.gov dataset we set up a method to combine any of the tables in the case where any of them prove to be useful in the future.

Data Analysis:

Earnings Data:

      Over the decade of 2012-2022 we looked at the earnings for each year. For 2022 the total earnings made by BPD was $405,823,059,81. To analyze how this has changed since 2011, we graphed the total pay for each year since then.
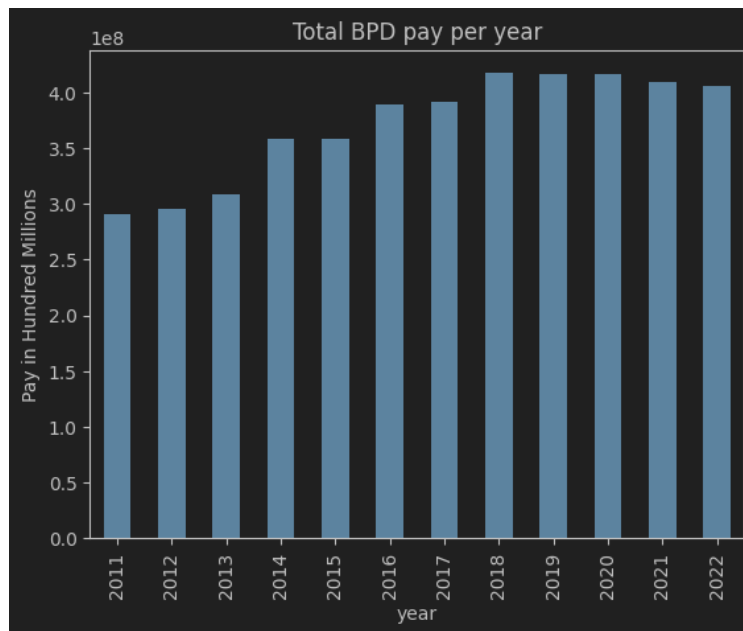

      Since 2011, the total pay has increased from below $300 million to around $405 million in 2022. This total pay could be broken up into 7 categories. Quinn Pay, which is an educational incentive by Boston, made up 6.91% of this. Detail was 5.7%, Injury was 5.8%, Overtime was 19.29%, Retro was 0.169%, Other was 4.45%, and Regular Pay was 57.6%. Looking at 2021, the total earnings was $408,762,469.35. This could be broken down into 6.98% Quinn, 6.01% Detail, 6.60% Injury, 17.67% Overtime, 0.169% Retro, 5.14% Other, and 57.59% Regular. In 2020, the total of all of the combined categories did not equal the total gross earnings. When this happened in the data, we decided it was best to focus on the total sum of the categories to determine the percentage of each. The total was $416,286,097.89 and 82.23% of that was Regular Pay. 9.98% was Quinn, 8.01% Detail, 8.54% Injury, 26.38% Overtime, 0.02% Retro, and 5.53% Other. In 2019, the total pays differed again with the sum of the categories being $415,736,659.02 and the gross total sum at $415,725,606.8. Looking at the sum of the categories, 9.76% was Quinn Pay, 10.56% was Detail Pay, 5.88% was Injury Pay, 82.84% was from Regular pay, 26.28% was from Overtime, 0.008% was Retro, and 5.18% Other. In 2018 the total earnings were $416682999.94. 5.98% of this was from Quinn Pay, 8.15% was Detailed pay, 3.59% was Injury pay, 57.59% was Regular pay, 18.68% was Overtime pay, 0.006% was retro pay, and 3.95% was other. In 2017 there was once again a discrepancy between the total sum of the categories which was $391305537.53 and total gross earnings, $391277619.77. For the categories, 6.86% was Quinn, 13.08% was detail, 4.28% was Injury, 77.83% was Regular, 22.62% was overtime, 2.69% was Retro, and 4.88% was Other. For 2016, the total earnings

were $388,587,231. 4.8% of this was Quinn pay, 10.22% was Detail, 2.79% was Injured, 57.66% was regular, 15.69% was overtime, 5.46% was retro, and 3.35% was Other. 2015 had $358137876.49 total earnings from BPD. In this, 4.82% was from Quinn, 10.16% from detail, 2.26% from Injury, 61.96% from regular, 17.20% from overtime, 0.01% from retro, 3.58% from other. The total amount made by BPD in 2014 was $ 357809909.74. The percentage breakdown is as follows: 4.17% Quinn, 8.29% detail, 2.10% injured, 58.6% regular, 16.18% Overtime, 7.23% retro, and 3.36% Other. For 2013 BPD earned $307796194.76 which 3.52% of this was from Quinn, 10.78% from Detail, 2.03% from Injured, 61.59% from Regular, 18.68% from overtime, 0.06% from retro, and 3.31% from other. Lastly in 2012, the total sum of the categories was $295856635.75 whereas the total gross sum of earnings was $295861606.09. Looking at the percent breakdown of the category total earning sum we have that 3.7% was from quinn, 12.01% was from detail, 1.65% was from injury, 63.82% was from regular, 15.10% was from overtime, 0.05% was from retro, and 3.64% was from other. After gathering this information, we were able to graph how the percentage of each of the categories changed every year.


Percent Quinn Pay Over the Decade

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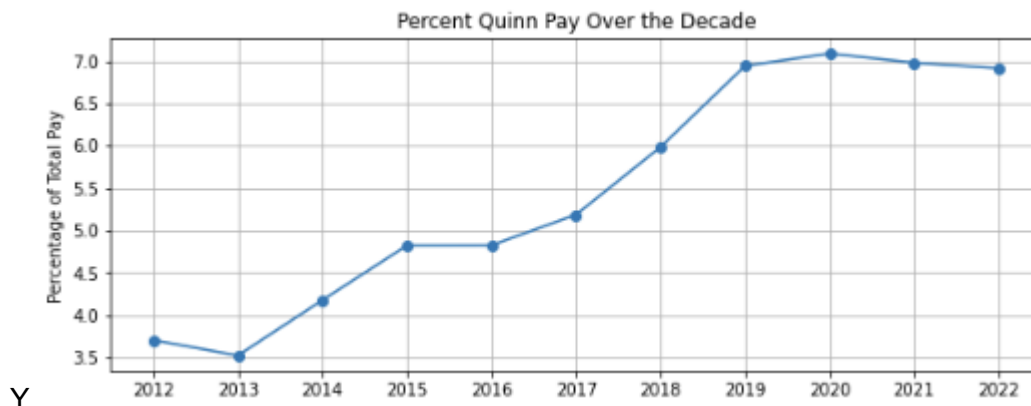
The percentage of Quinn pay has been increasing over the decade and since 2019 it seems to be staying around 7% of the total earnings.

Percent Regular Pay Over the Decade
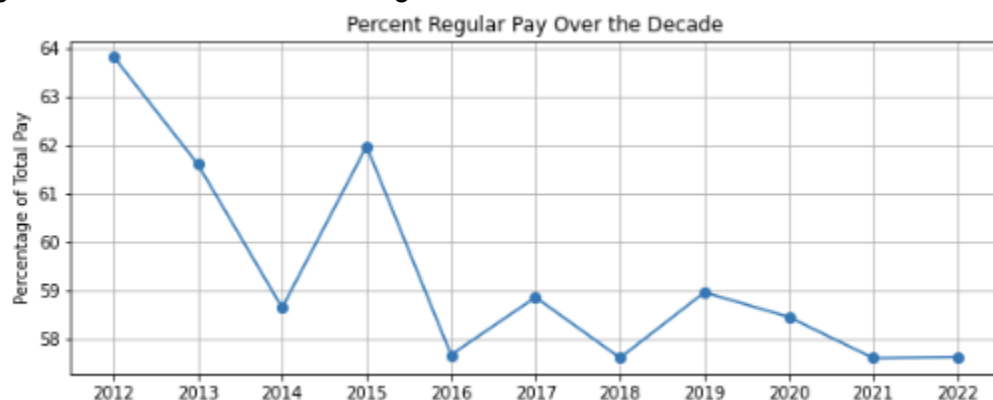
Regular pay has been making up less of the total pay recently with in 2022 it being 57.6% of the total as compared to 2012 which was 63.82%. Regular Pay makes up the most amount of the total pay throughout the decade but this graph shows that in recent years, pay has been increasing in other categories.

Percent Other Pay Over the Decade
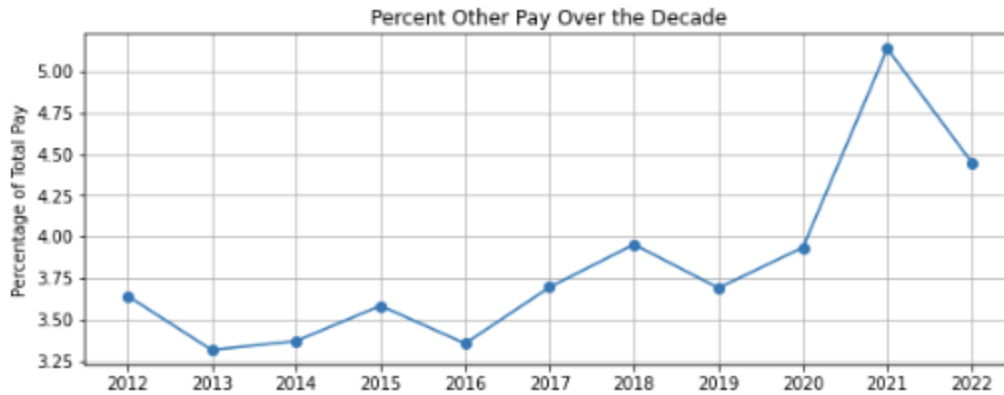
Other pay makes up a small percentage of the total pay. 2021 saw the largest percentage of Other pay.

Percent Injured Pay Over the Decade
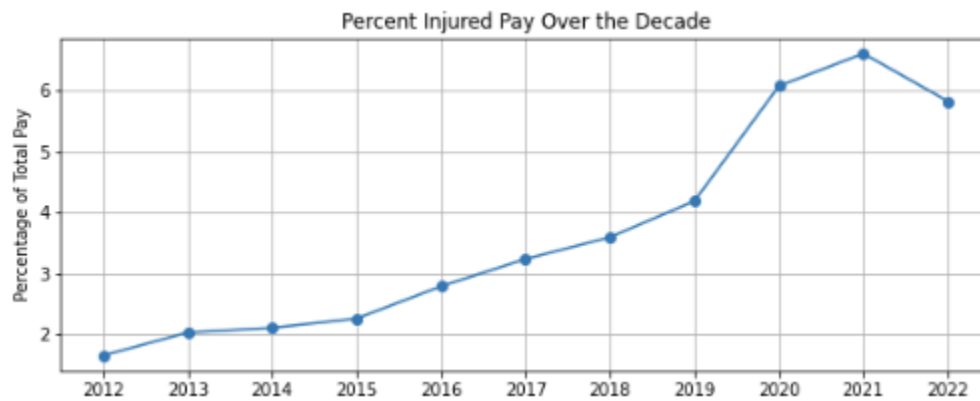

The percentage of Injury pay has been increasing from 2012-2021. In 2022 however it slightly decreased.

Percent Overtime Pay Over the Decade
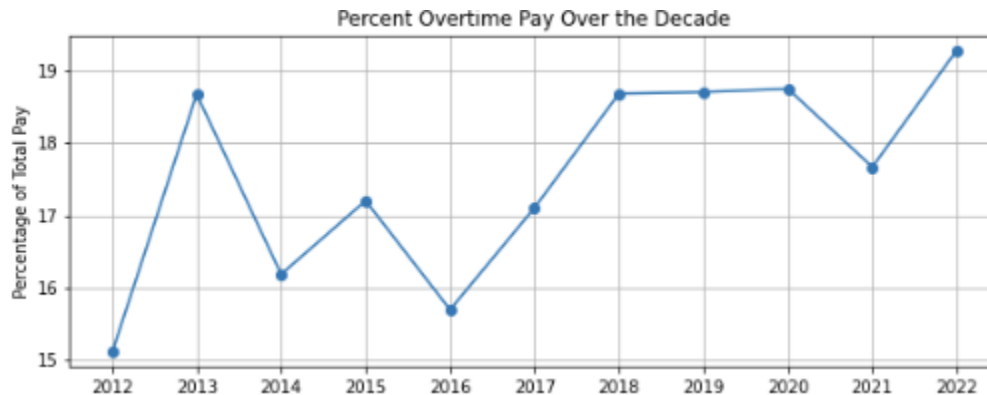
Overtime pay has not been too consistent. From 2012-2013 there was over a 3% increase in the amount that Overtime pay made up. From 2018-2020 this percentage stayed consistent. Then it decreased in 2021 only to increase again in 2022.

Percent Detail Pay Over the Decade
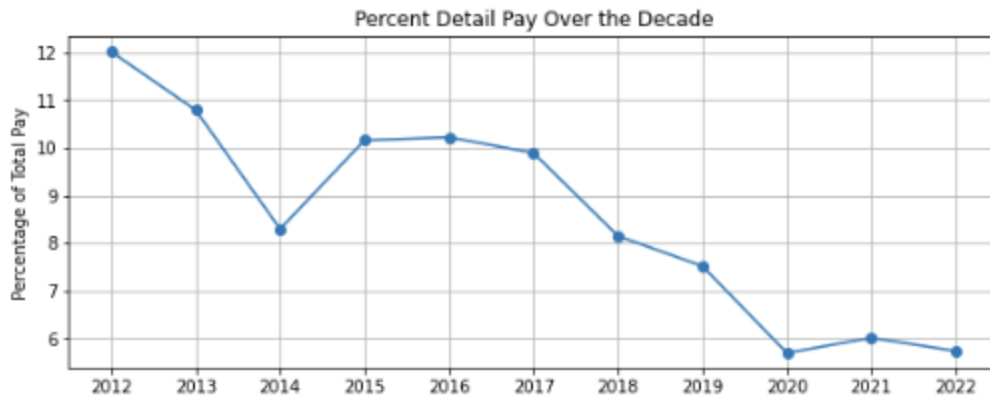
The percentage of the total pay that detail pay makes up has been declining over the decade with in 2012 it being close to 12% and in 2022 close to 6%

**Percent Retro Pay Over the Decade**
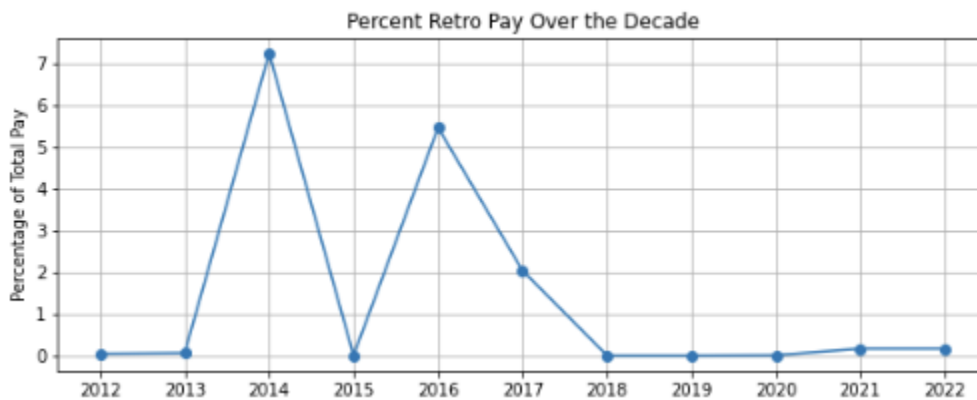
Retro pay makes up only a small percentage of the total pay for each year, in 2014, it made up the most compared to any other year. Since 2018, it looks like Retro pay makes up close to 0% of the total pay.

From this data set we were also able to graph the percentage of each employee who received or claimed each category of pay every year.

Percentage of BPD Employees Who Claimed Injury Pay by Year

BPD percent of officers taking injury pay
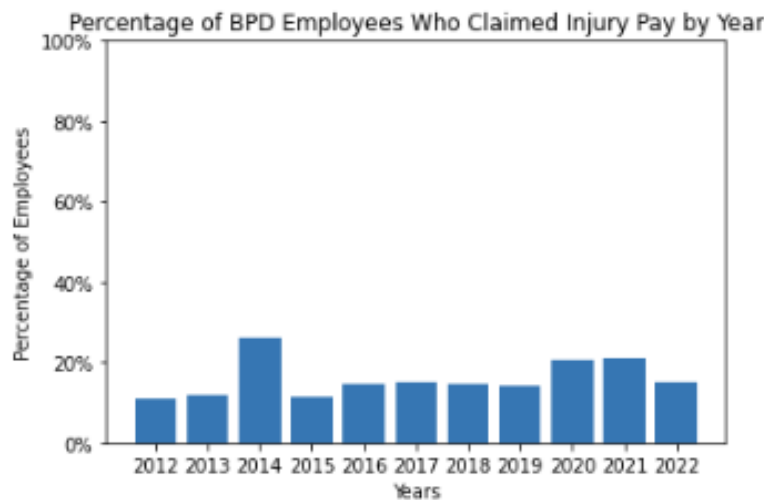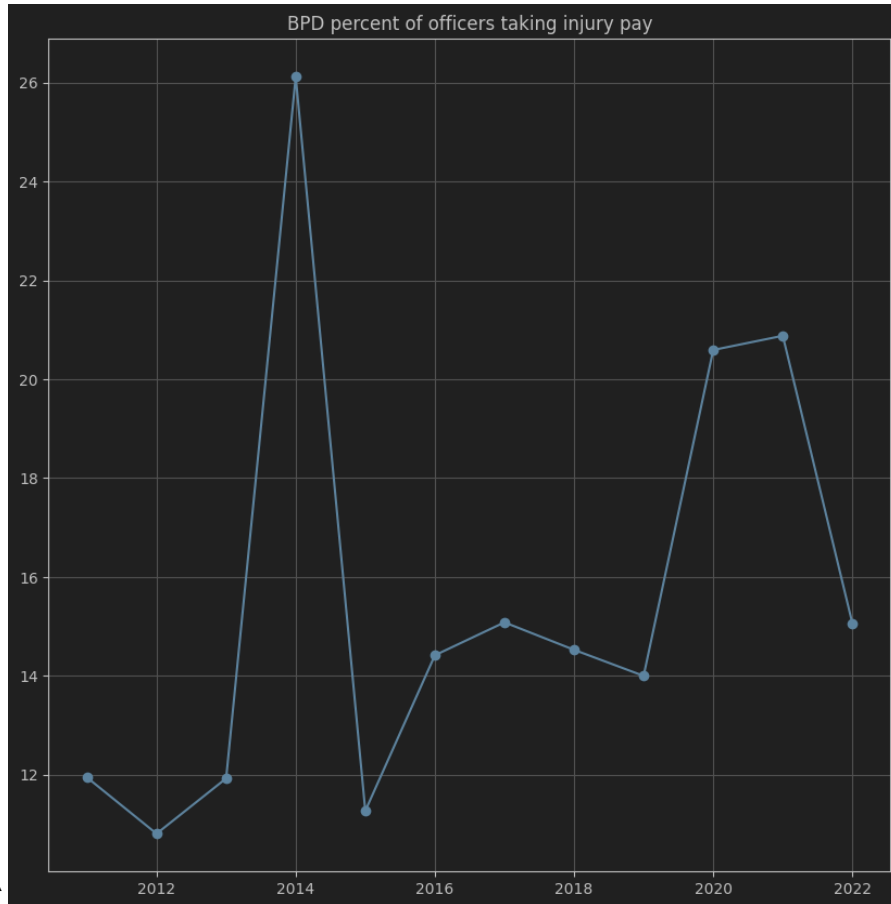
The percentage of employees who claimed injury pay has been inconsistent throughout the decade ranging from 11% to 26%. From 2020-2021 it remained consistent, and increased from 2019. 2022 saw a decrease to about 15% of BPD employees. In 2014, there was a larger number of employees who claimed injury pay, about 26%.
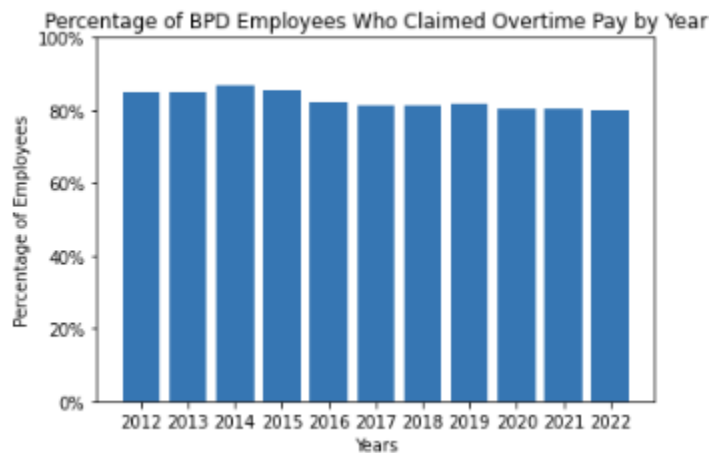

Percentage of BPD Employees Who Claimed Detail Pay by Year
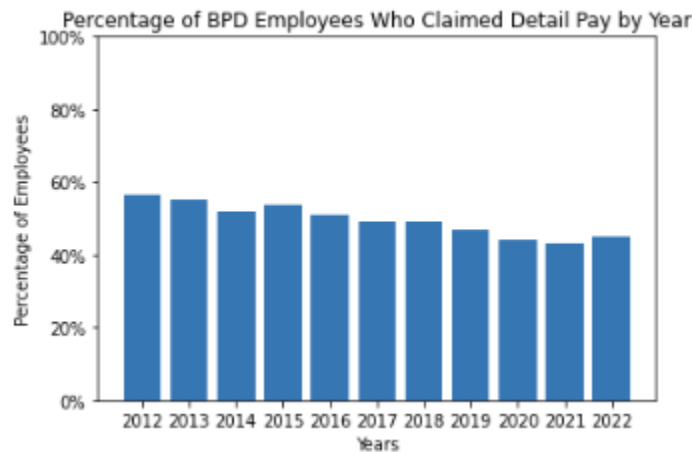
Detailed pay has stayed somewhat consistent throughout the decade with about 50% of employees claiming it each year.

**Percentage of BPD Employees Who Claimed Other Pay by Year**
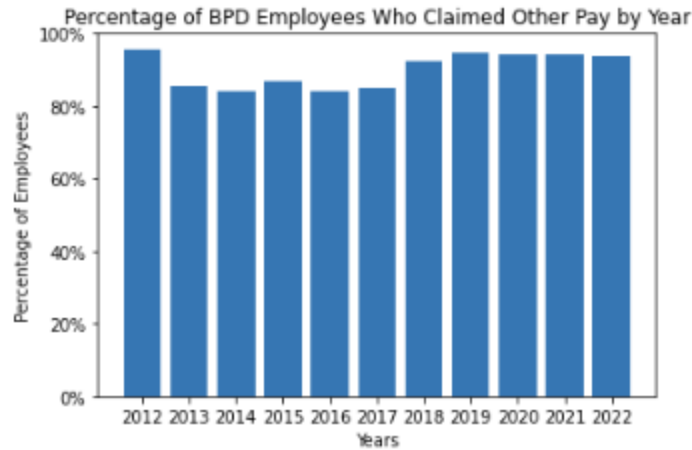
From 2012 - 2022 almost all BPD Employees claimed other pay. This has become more consistent from 2019-2022 with small variations in the percentages.

Percentage of BPD Employees Who Claimed Retro Pay by Year
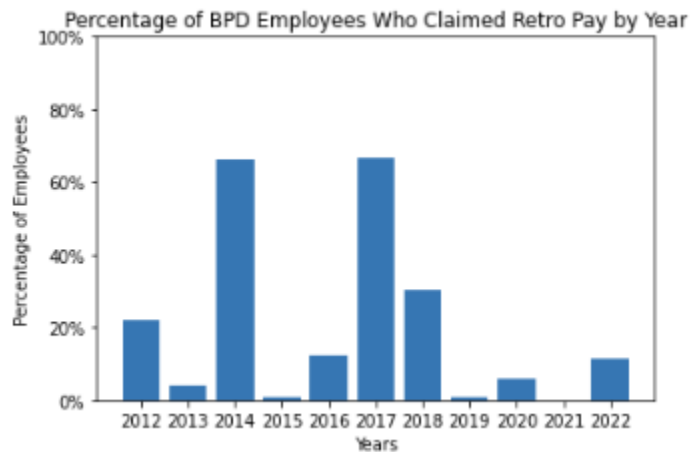
Retro pay has been very inconsistent over the past 10 years. In 2021 no employees claimed Retro pay and in 2013, 2015, and 2019 very little did. 2014 and 2017 had the most employees claim Retro pay.

**Percentage of BPD Employees Who Claimed Overtime Pay by Year**

In 2012 - 2022 a large percentage of BPD Employees claimed overtime pay. This has become more consistent from 2016-2022 with small variations in the percentages. This is very interesting as we are focusing a lot on overtime pay in our analysis.

Percentage of BPD Employees Who Claimed Quinn Pay by Year
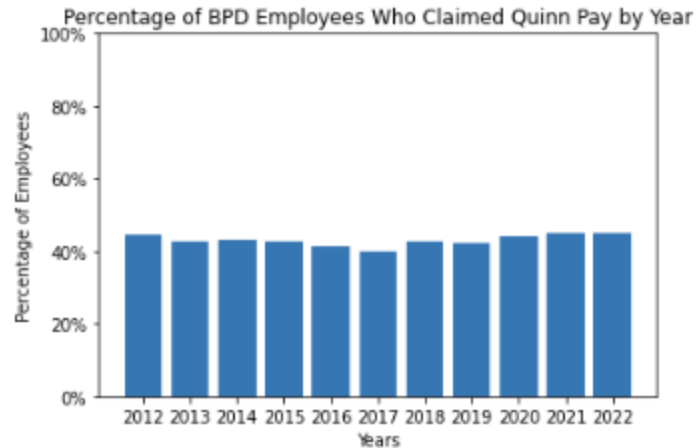
Quinn pay has also been consistent throughout the decade. It seems every year around 40% of employees claim this.

We also graphed the average injury pay from 2011-2012 (pictured below). In analyzing this we found that the average has increased since 2011. From 2011-2015, the average amount of injury pay remained consistent, however, in 2016 it increased to over $2,000. In the most recent year, 2022, the average was around $5000.
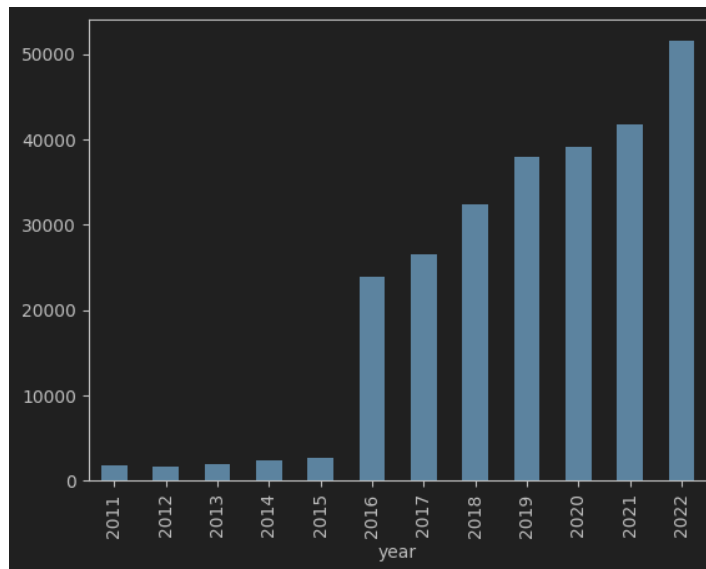

The earnings data set provided the job titles for each individual. As a result, we were able to look at the top earning titles in the BPD. To do this, we graphed the increase in gross pay for each title from 2021-2022.

Top 20 Job Titles with Largest Percentage Change in Gross Pay from 2021 to 2022
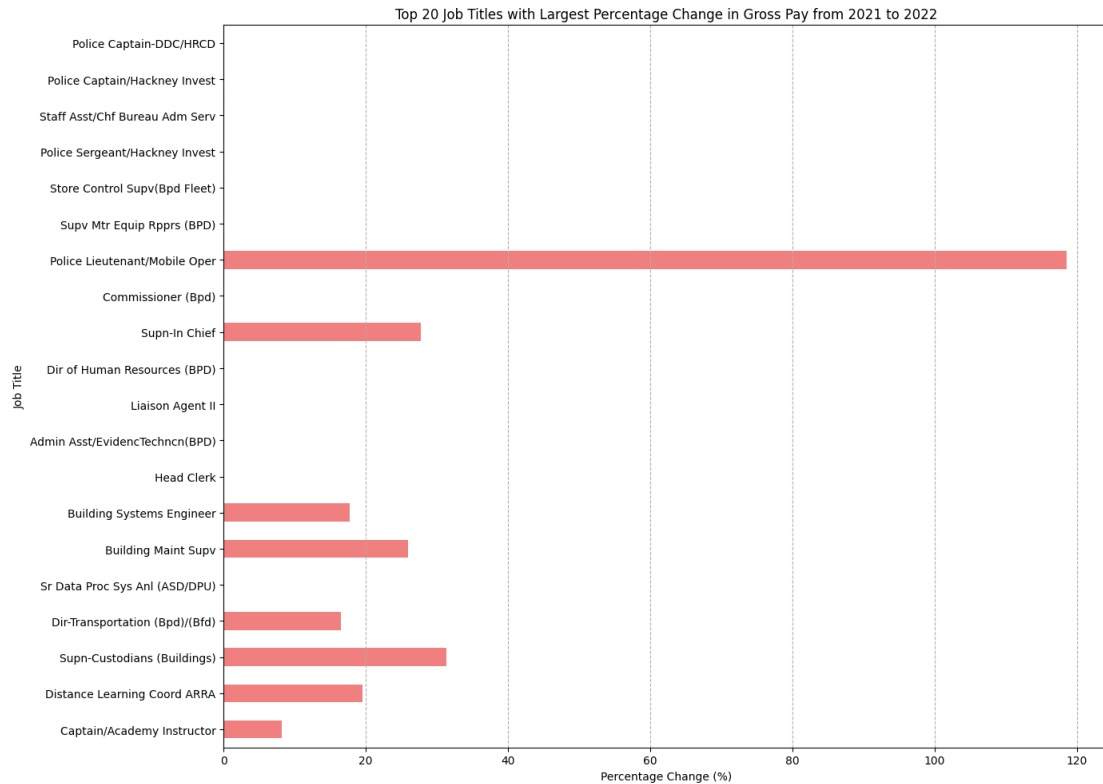
Police lieutenant/Mobile Oper has an outstanding percentage change in gross pay from 2021 to 2022. The value is 118% increase in growth from 2021, meaning that the 2022 gross pay is 118% higher than the 2021 pay for that position within the BPD, so the BPD has invested outstandingly more in police lieutenants and mobile Opers compared to the rest of the roles. On the other hand, some titles such as 'Liason Agent II' and ' Police Captain', have NaN values for 2022, indicating that these positions may not have been present or funded in 2022.

Additionally, the earnings data set helped us analyze how earnings varied between departments over the course of 10 years. Looking at the average earnings of each department, in 2012 the top earning departments were: Boston Fire Department, Boston Police Department, Treasury Division, Women's Commission, Department of Innovation and technology, Administration and Finance, ASD Office of Budget Management, ASD Intergovernmental Relations, Office of Public Works Transport, and the Auditing Department. These average earnings were all below $120,000. We plotted this data for each of the years, however most notably we can compare 2012 and 2022. In 2022 the top 10 earning departments were: The Superintendent, Boston Fire Department, School Support and Transportation, Boston Police Department, Office of People Operations, Advancement & Exit Affairs, Chief Operating Officer, Enrollment Services, Chief Academic Officers, and Finance Commision. The most earning department, the Superintendent, had average earnings of over $160,000. In both years, the Boston Fire Department and BPD were in the top 4 most average earning departments. However, none of the other departments were similar between the two years.

2012 Average Earnings by Department

## 2022 Average Earnings by Department
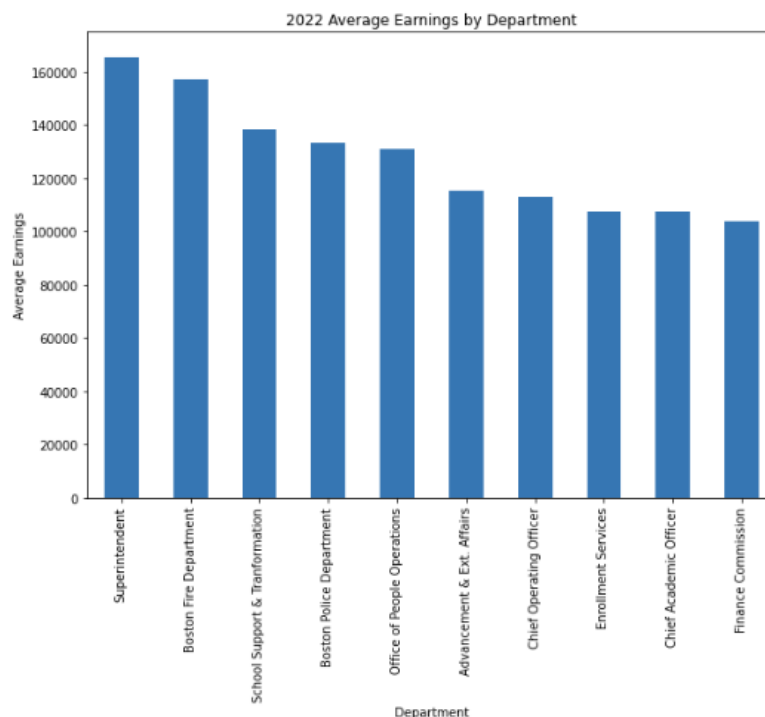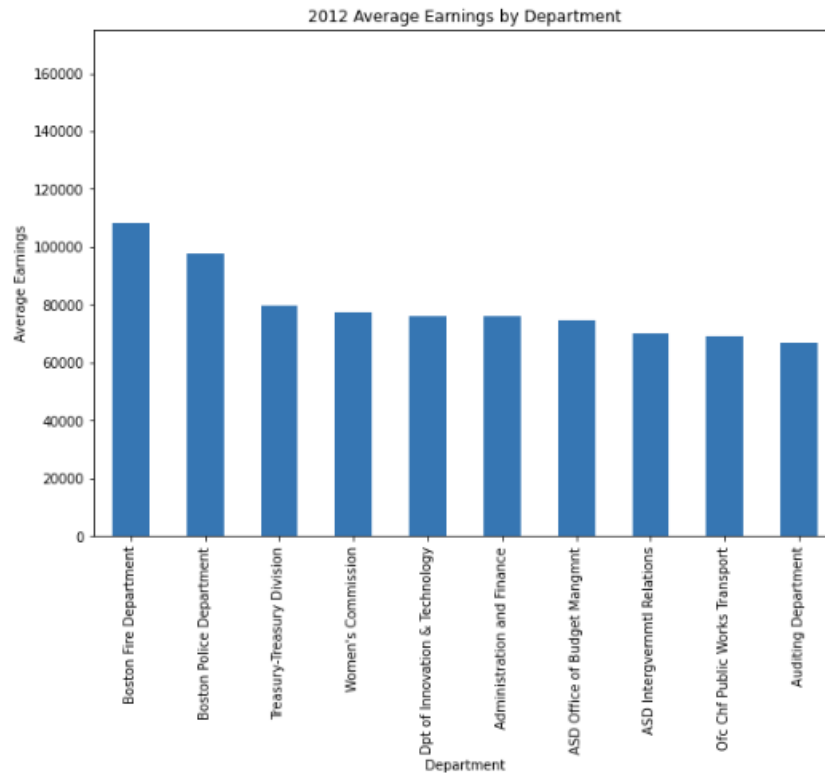
To look at more recent years, we looked at the top 10 departments from 2021-2022. These were: Food & Nutrition, Boston Fire Department, Teaching & Learning, BPD NEW Mission Pilot, Chief Academic Officer, Parks Department, BPS Substitute Teachers, United Student Service, Mayor's Office, and BPS Blackstone Elementary. We calculated the Gross Pay Difference between each of these departments, which is graphed below.

Top 10 Departments by Gross Pay Difference from 2021 to 2022
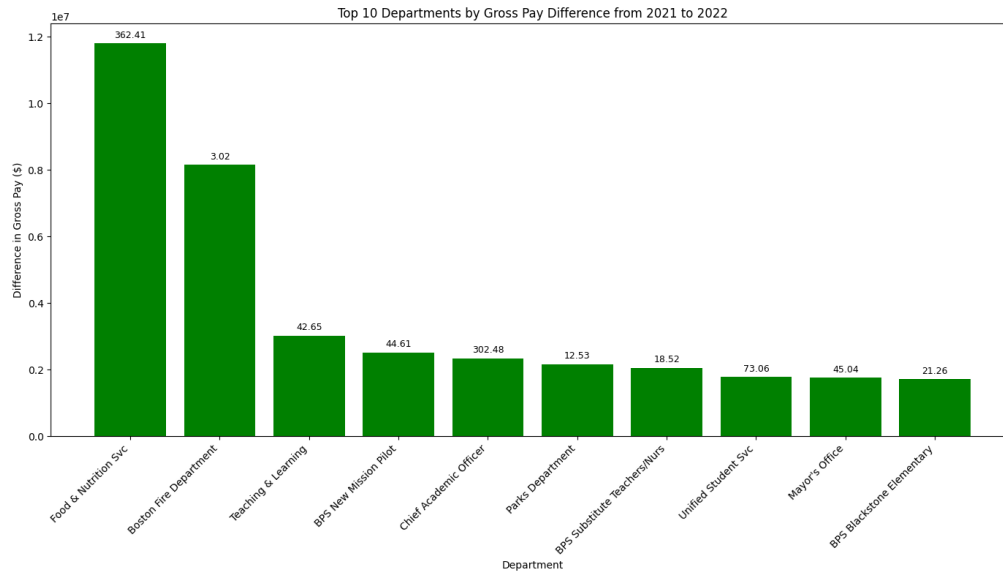
From the bar chart, it is evident that "Food & Nutrition Service" Departments had the highest gross pay increase in absolute terms, in relative terms, it also saw a massive percentage increase of approximately 362.41%. Additionally, Boston's Fire department: saw an increase saw an increase of around $8,153,979.12, marking a 3.02$ increase

The Boston Fire Department appeared as a top earning department throughout the decade. As a result, we looked into its ranking compared to other departments.

Boston Fire Department Average Pay Ranking Compared to Other Departments
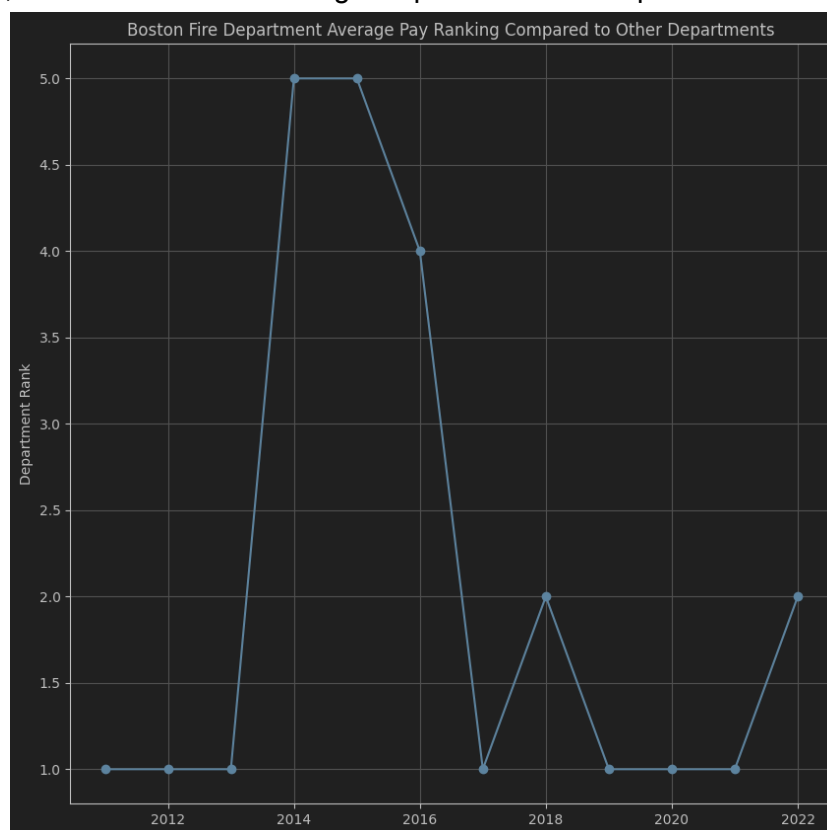
In earlier years, the BFD Ranked as a top earning department, however this ranking dropped for a few years. In 2017, it was back to rank 1 and since then has either taken that rank or rank 2.

We conducted a similar analysis for the BPD in the graph below. The Boston Police Department was frequently ranked 2,3,4 in highest earning pay. However, in 2013 they were ranked 9th and in 2018 they ranked first.

Boston Police Department Average Pay Ranking Compared to Other Departments
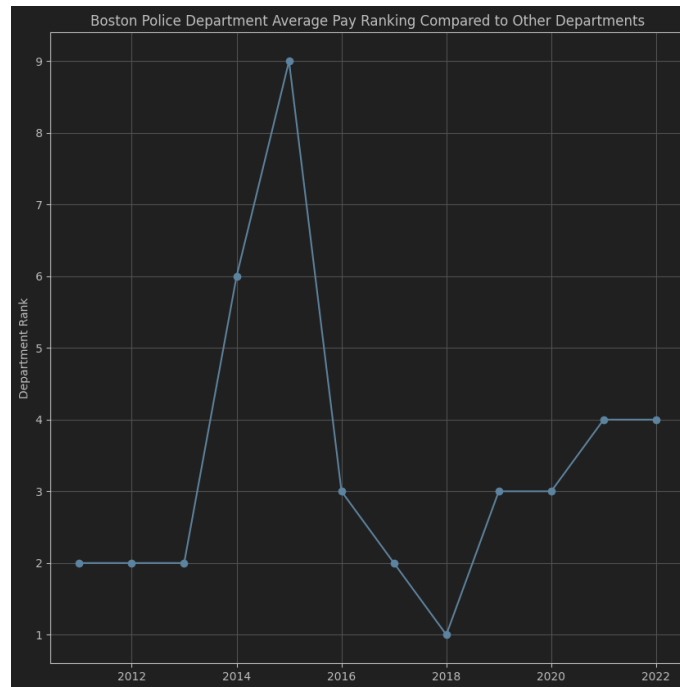
Race/Sex of Officers:

       For the race/sex of officers, there was a small amount of data that was actually ready for analysis (most years' data were just screenshots), but we were still able to piece together trends

Sworn Officers by Sex/Race (2022/2023)
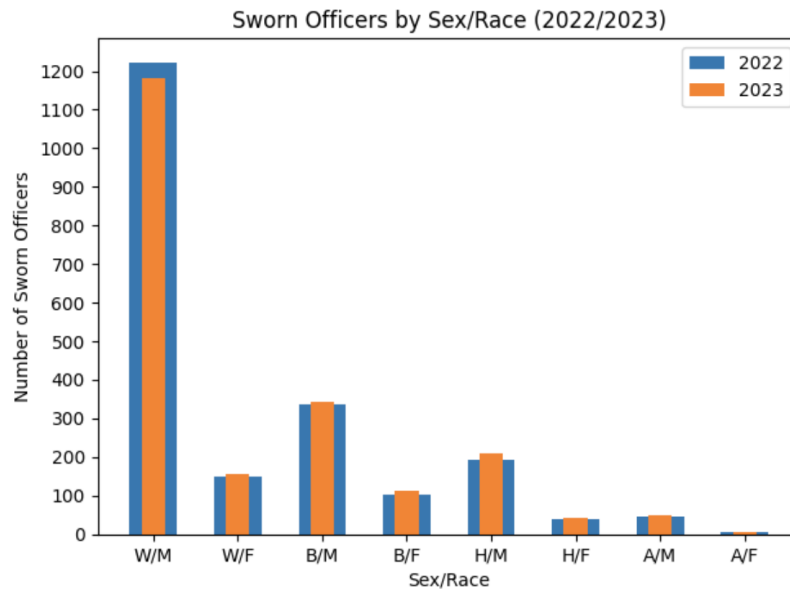
for analysis.

We can see here that across the board, the demographics of the BPD do not change much year-to-year, and that the BPD is comprised largely of white men. This gives us background context into who will fill certain roles as a reflection of the overall composition of the BPD.

Patrol Officers by Sex/Race (2022/2023)
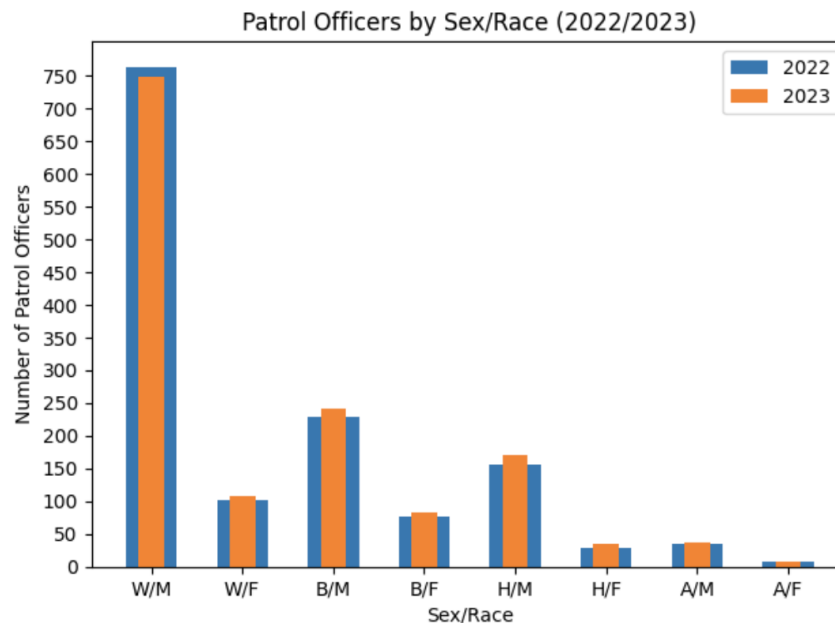
Looking at the patrol officers, we see that they make up over half of the BPD workforce and are almost a 1-to-1 reflection of the demographics in the BPD. Not much can be extrapolated from these groups such due to the sheer quantity of entries in this group.

Superintendents by Sex/Race (2022/2023)
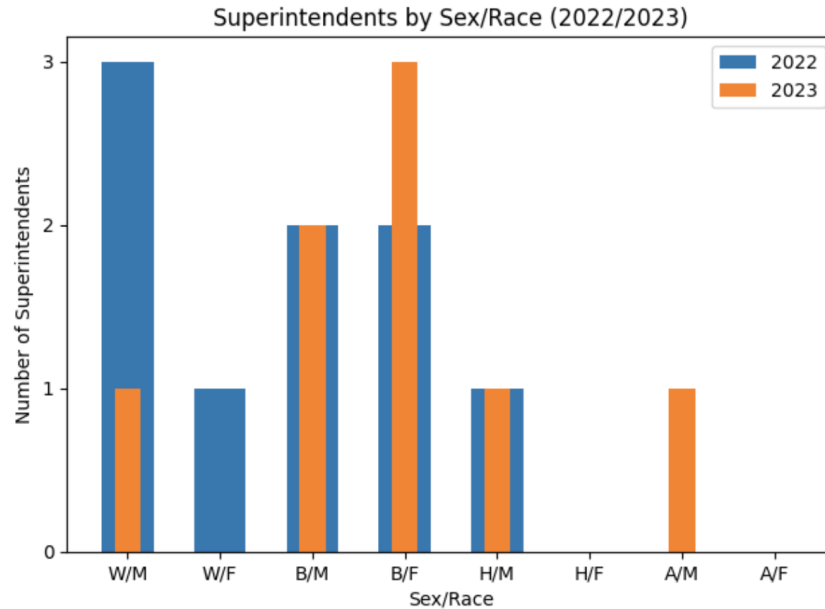
Looking at the top of the chain at superintendents, we see a fair amount of fluctuation in these positions. It could be useful then to cross-reference members of the BPD at the superintendent level to see causes for this as well as further examining members who have remained in these positions for a long time. It is also worth noting that these demographics still resemble the overall demographics of the BPD to some extent.

Lieutenants by Sex/Race (2022/2023)
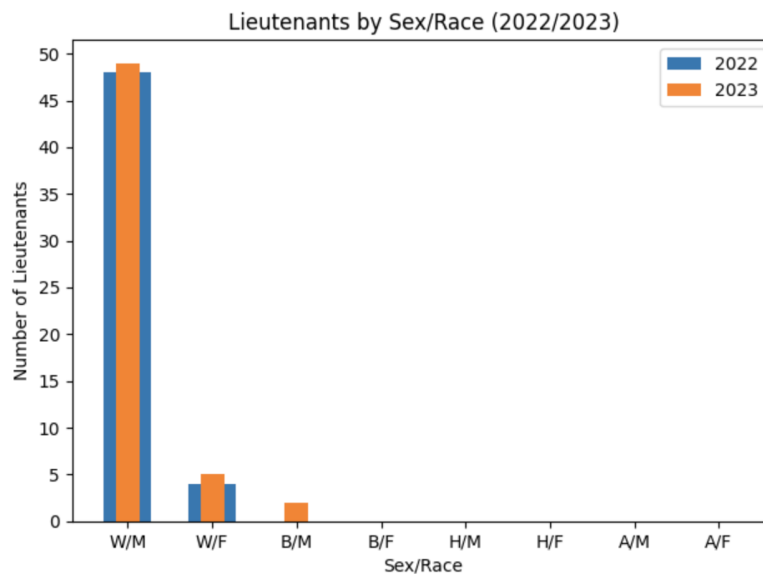
In lieutenants, we see a massive difference between the larger BPD demographic and the distribution of sex/race here. There is also no apparent shrinkage of this profession, which could be of interest in the future as we start to narrow in where anomalous overtime originates.

These are only a few of the groups assessed to highlight the variations in demographic and also to give an idea of the potential use of these data.

Court Overtime:

We analyzed Court Overtime dataset to discover the trend of overtime appearance to court for the last decade and found out that since 2012, appearance to court was in declining trend. However, as you can see on red points, after COVID-19 the appearance to court is on the rise.

Overtime Court Appearance from 2012 to 2023
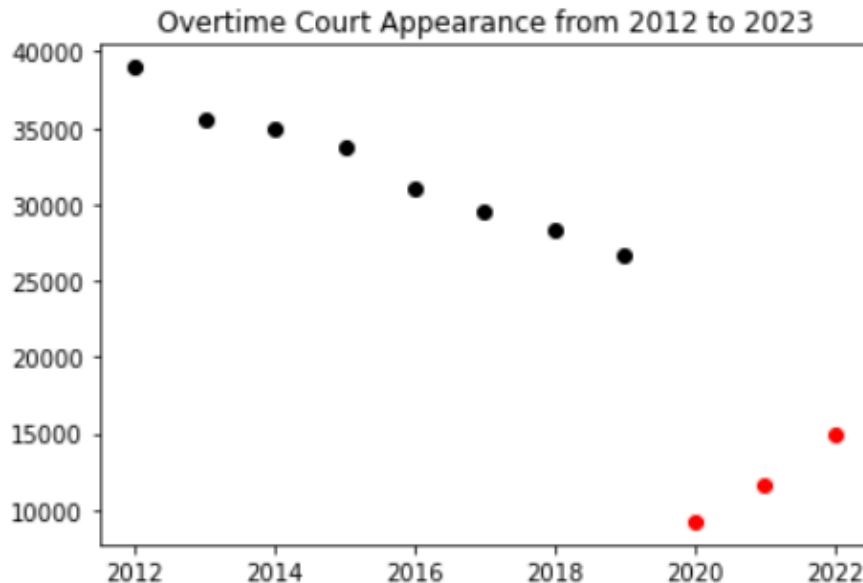
Moreover, to analyze the relationship between worked hours and paid hours, I graphed scatter plots for each year from 2012 to 2022 and they showed identical patterns. The pattern showed that for most overtime records which had less than 4 hours of worked hours, officers were paid for 4 hours. If hours worked and hours paid were the same, this scatter plot should have a strong linear relationship between two axes. However, for points where worked hours are less than 4 (X-axis), most of points were paid for 4 hours (Y-axis)

Overtime of Court Appearance in 2022
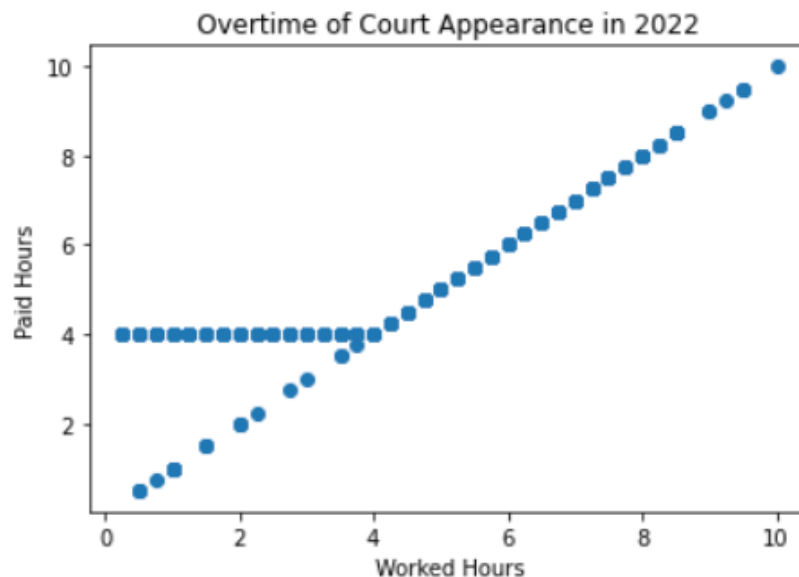
Following is a distribution of paid hours to worked hours ratio. Since 2012, more points move towards the right meaning the number of cases where paid hours are far greater than the worked hours are increasing each year.

Ratio of Paid Hours to Worked Hours(per case)-Court Overtime 2012
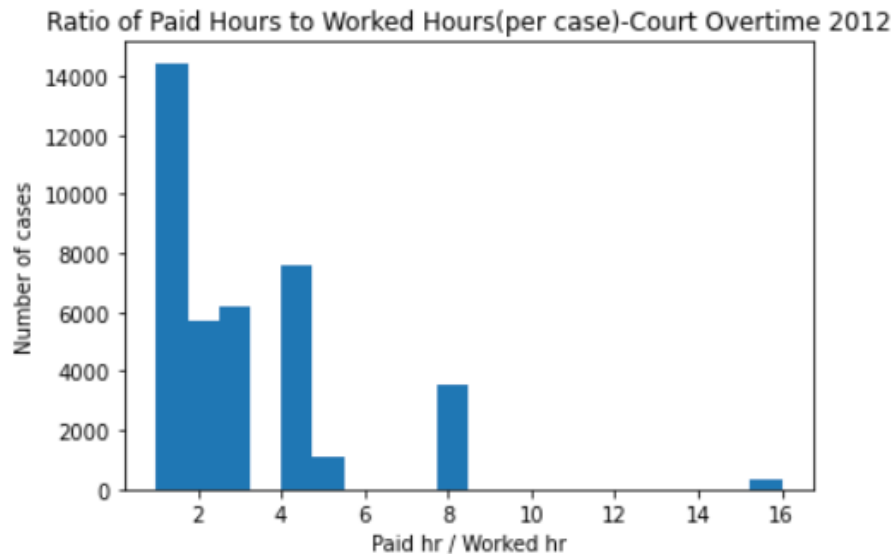
While the ratio of paid-to-worked hours shifts right, the total number of overtime cases are decreasing.

Ratio of Paid Hours to Worked Hours(per case)-Court Overtime 2022
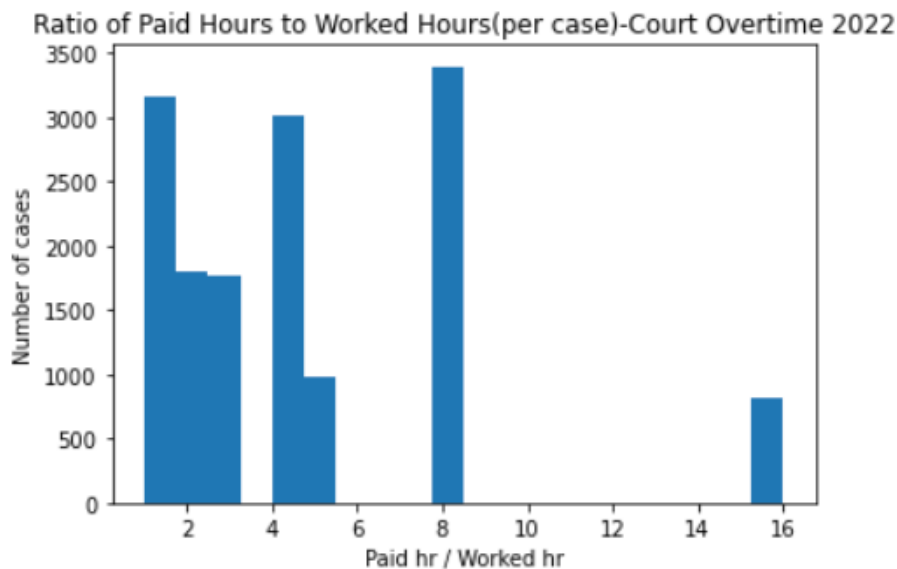
Boston City Budget:

We analyzed the Boston City Budget Dataset to examine how the budget has changed in the past few years. By summing the expense column for each year, we were able to get the total expense/budget for that year. In 2021 the budget was $422,917,516.90, in 2022

$420,411,576.37, in 2023 $395,907,803.60, and in 2024 the budget is $404,973,192.56. This was then able to be plotted to compare how the budget has changed from 2021-2024. From 2021-2022 the budget had a $2,000,000 difference. However from 2022 to 2023 there was a difference of about $25,000,000. The proposed 2024 budget was $9,065,389 more than the budget in 2023.

Budget Over the Years
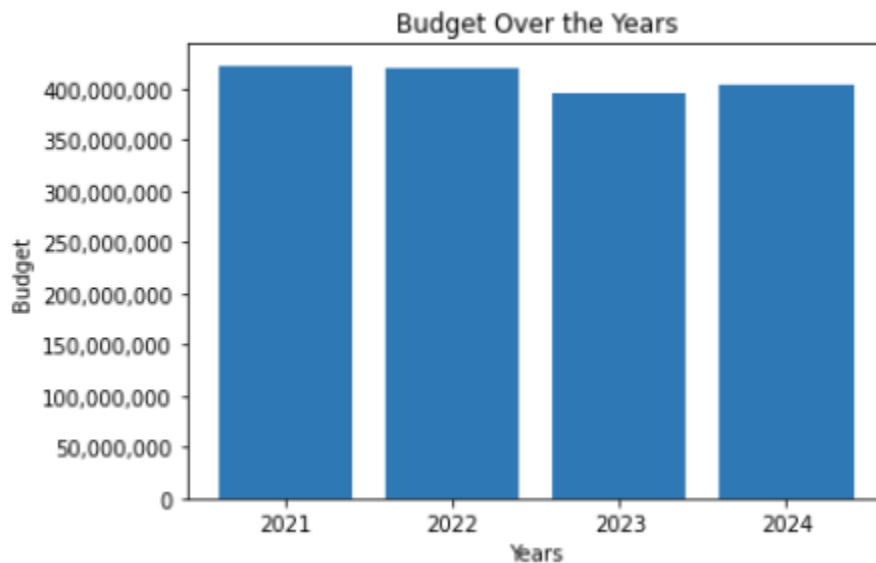
Additionally, there were 5 categories in the budget: Contractual Services, Current Charges and Obligations, Equipment, Personnel Services, and Supplies and Materials. For each of the 4 years personnel services was the category with the majority of the budget. In order to see any changes between the years of how the budget for the categories had changed, we graphed the amount of budget the category received for each year.
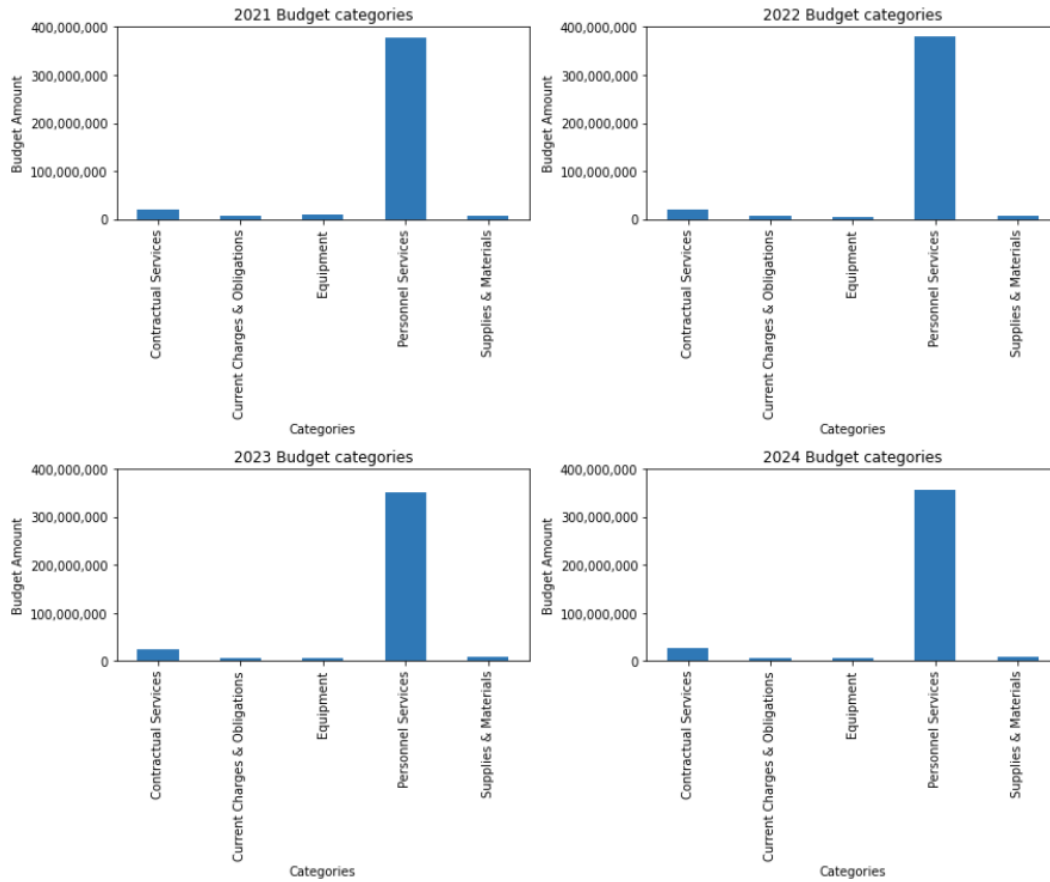
We then took the amount of budget each category received and calculated what percent of the budget each got from 2021-2024. This way we are able to analyze if the budget is changing each year.
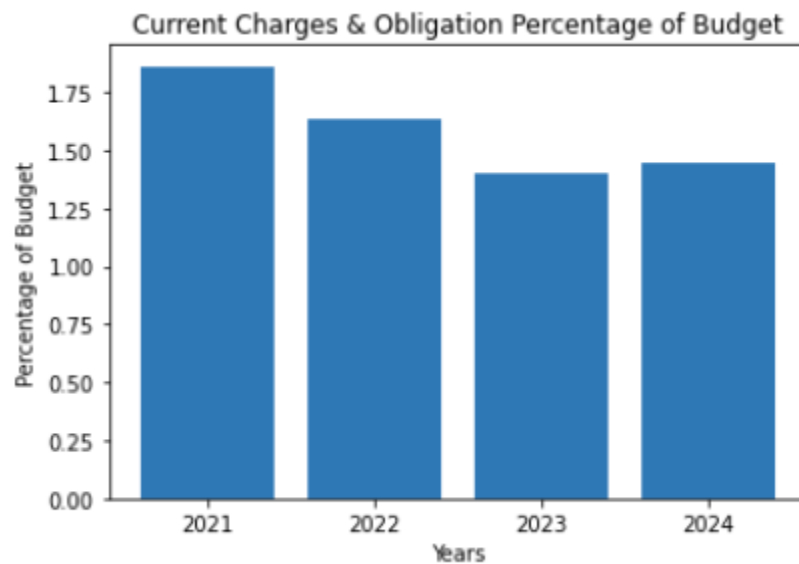
Current Charges & Obligations made up between 1.25-2% in the years above. It looks like in recent years the budget has decreased.

Contractual Services Percentage of Budget
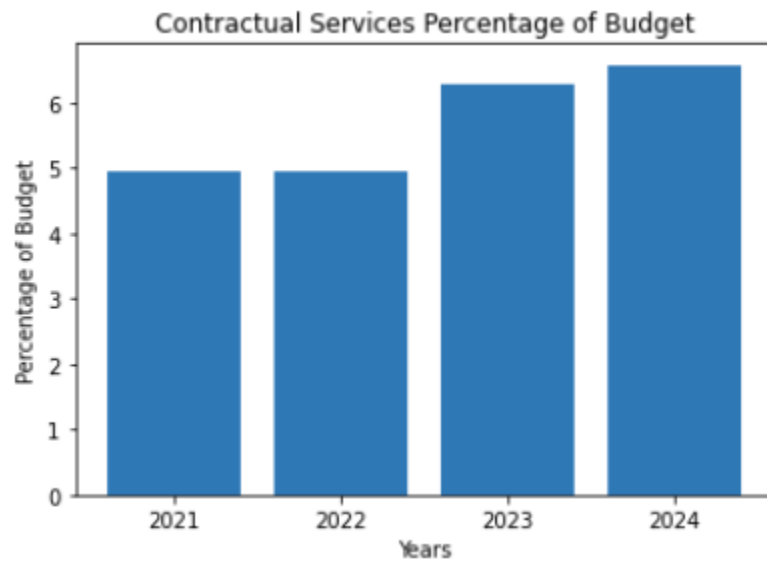
Contractual services have increased in the budget in 2023 and 2024. It has gone up from 5% to around 6%

Equipment Percentage of Budget
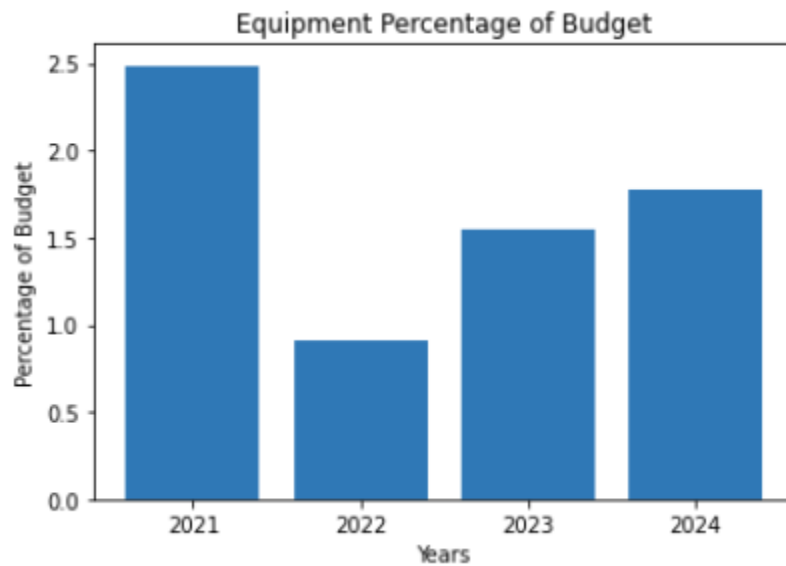
The Equipment budget was 2.5% of the total budget in 2021. However in 2022 this dropped to about 1% and since then has increased every year.

Personnel Services Percentage of Budget
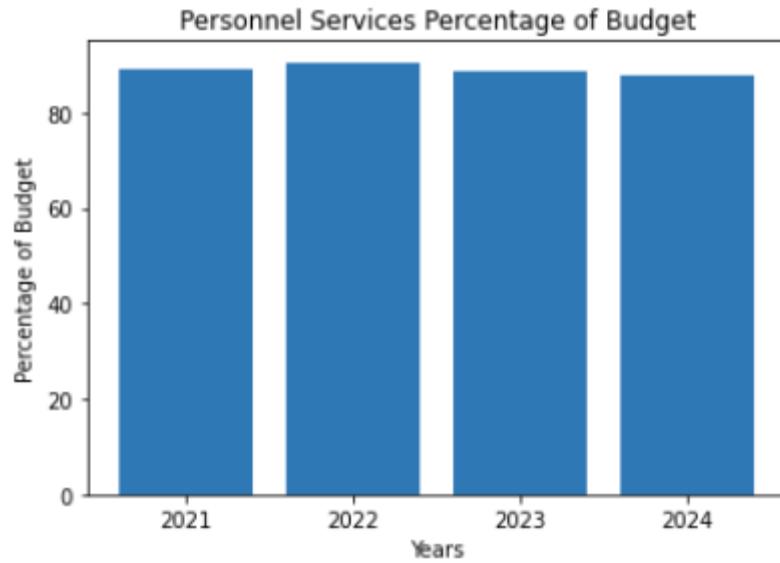
Personnel Services has stayed consistent from 2021-2024, making up a majority of the budget.

Supplies & Materials Percentage of Budget
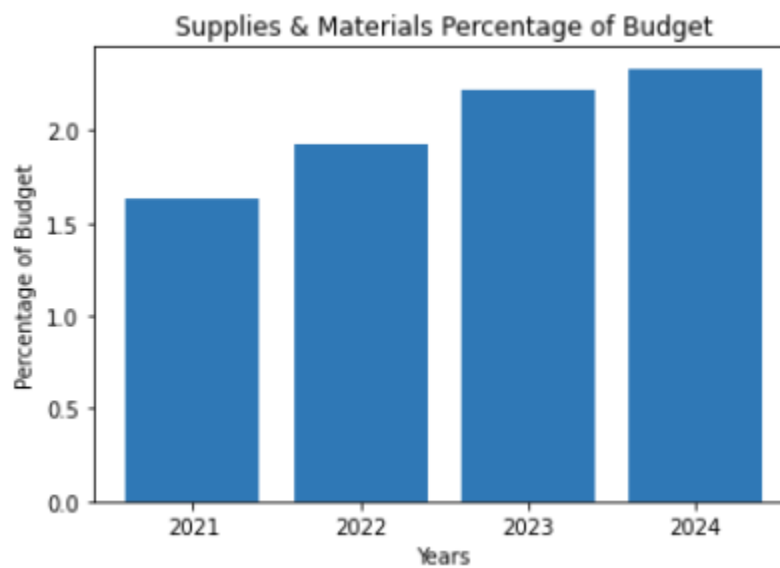
The budget for supplies and materials has increased each year since 2021
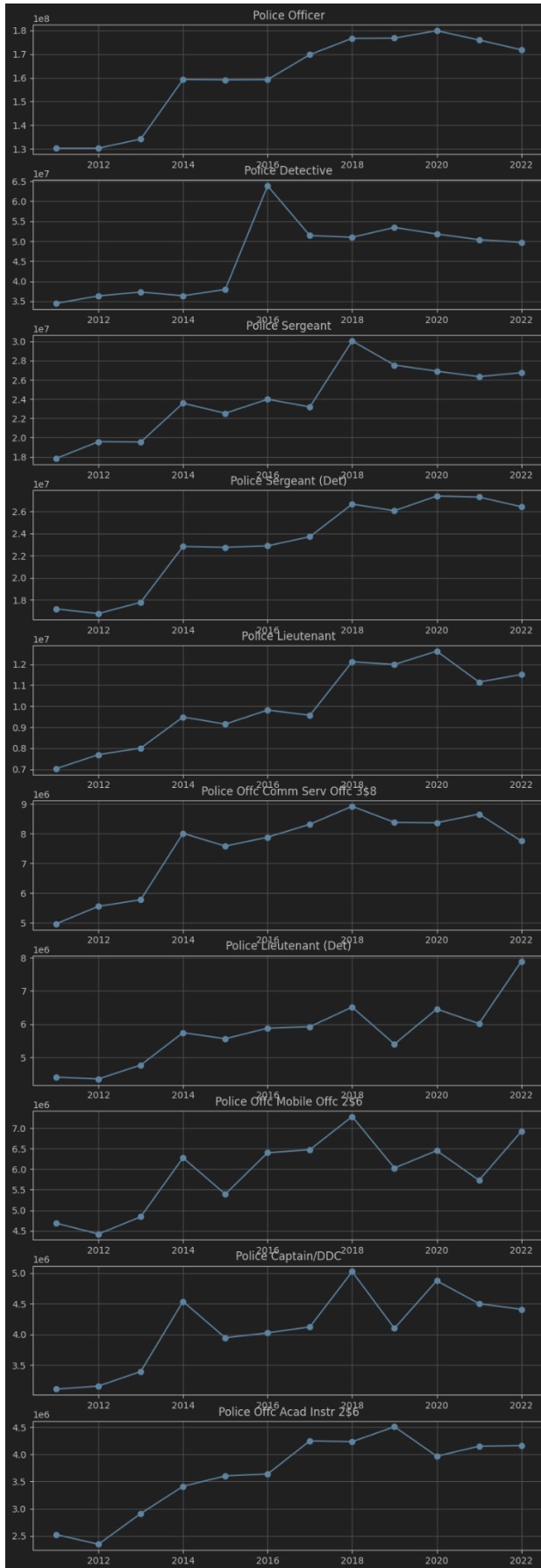
Changes in total sum of pay per title in the

BPD. While there has been a net increase in total pay for all of these roles, police officer and other lower level roles have seen a less decline comparatively to 2018. Roles such as captain seem to have reached a peak in 2018, and have since declined comparatively.

Campaign Contributions:

In the OCPF Data set there was $810,501.75 spent by BPD Employees towards Campaigns. The top contributor was James Martin who noted 49 times. However, he did not spend the most. Joseph Young spent $11,500 towards campaign contributions. The top recipient was Martin Walsh who was donated to 1387 times and received $413,328.19.

For All Campaign Contributions there was a total of $150,063 spent by BPD Employees. Dana Barrett had the most contributions as she donated 13 times. Barrett also had spent the most with $7,000 towards contributions. Michael F. Flaherty was the top recipient receiving $27,050 across 178 donations.

In the All Walsh Contributions data set there was a total of $419,078.19 contributions from BPD Employees. Martin Walsh received 1400 donations with the top contributor being Brain Leahy with $4000. However Leahy was not the most frequent contributor, as this was Michael McDougall who donated 24 times.

We did not do any further analysis on this dataset as it did not help answer any of the current questions we focused on. However, we think that this could be very useful for an extension question which considers where individuals donated and the political parties of the recipient.

Field Activity:

Due to the disconnected nature of field activity with it having no direct monetary value, there was little analysis that could be done with this dataset. However there were a few things that were potentially interesting in the dataset. For the years between 2011 and 2015 they record the district which the FIO took place in. Shockingly the vast majority of cases in these years occurred in district B2 or Roxbury. Along with this one supervising officer was responsible for roughly 14000 FIO in that 5 year period, a total which was 7 standard deviations away from the mean.

Total FIOs per supervisor
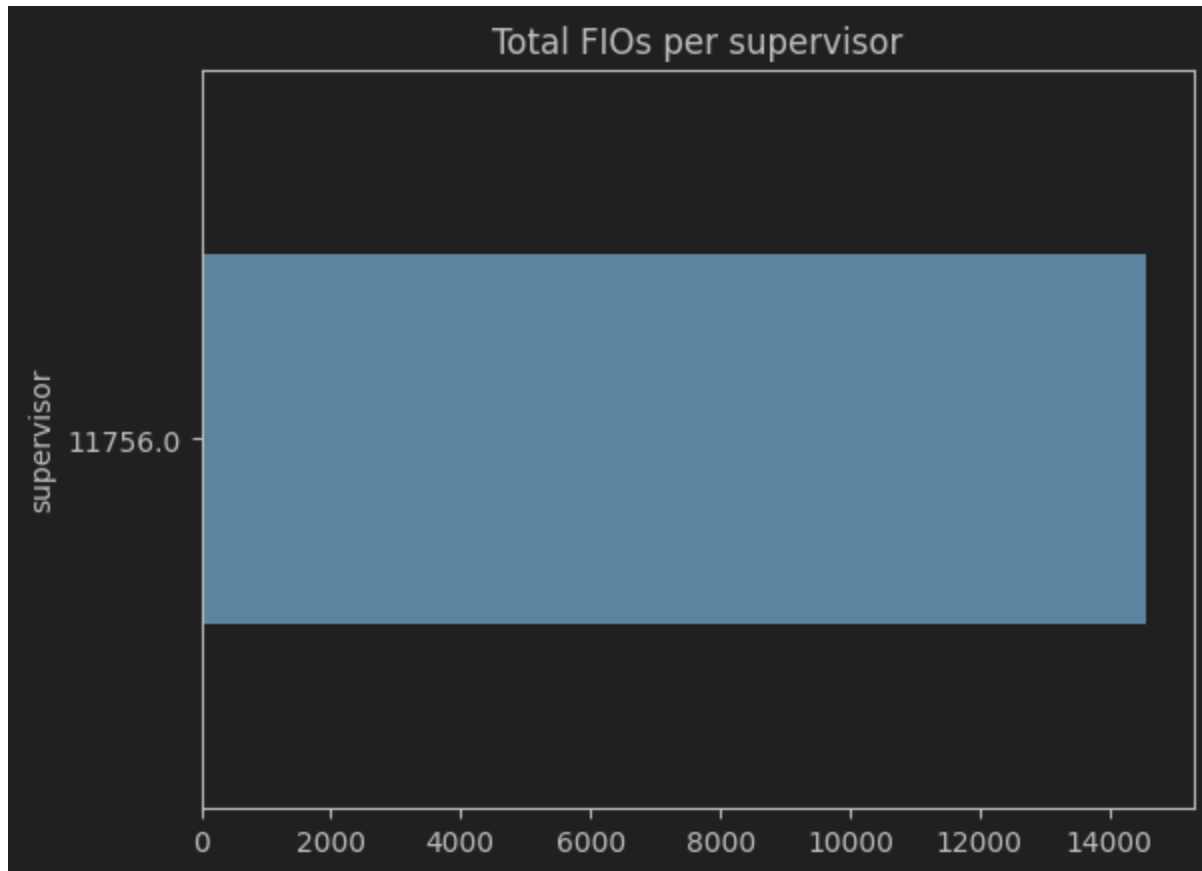
John J Ford, ID number 11756, we do not presently understand why he has such an overwhelming majority of supervisory roles in this time period, or the significance it could hold, but hopefully some concrete answers can be found.

Answers to Questions:

1. Identifying instances of financial excess in BPD spending

      To identify where there was financial excess in BPD spending we first looked at how the BPD budget had changed year over year. We looked at data from 2021-2024 as this was available to us from the City Of Boston. In the analysis of this data we found that the budget for 2024 is almost $18 million dollars less than the budget from 2021. This is a 4.24% decrease in budget. The overall budget was broken up into five categories: Contractual Services, Current Charges & Obligation, Equipment, Personnel Services, and Supplies and Materials. To determine how the budget has changed between these categories, we looked at the percent each category made up of the total budget. We found that the budget for Contractual Services has increased in recent years, as in 2024 it is about 6% of the total budget whereas in 2021 it was 5%. The budget for current charges and obligations has decreased slightly since 2021 with 2024 having Current Charges and Obligations at around 1.5% of the overall budget. Equipment has increased in budget since 2022. Personnel Services has been the majority of the budget for

all 4 years and has not changed much. In 2023 and 2024 the budget for supplies and materials has increased slightly from 1.6% in 2021 to about 2.3%.

Next, we looked at where funds have grown and shrunk intra-departmentally. Looking at the gross pay per title we found that Police officers are consistently the highest percentage of the combined pay for BPD employees, this makes sense given that there are more police officers than other roles. Surprisingly of the top 10 highest combined pay roles almost all had an uptick in combined pay in 2018 while many had a downtick in 2021. Police Detective is somewhat of an exception among the top 10 highest combined pay roles as it reached a peak in 2016 and after falling in 2017 has remained consistent.

Lastly we looked at the changes in funding between departments. To do this we looked at earnings data from 2012-2022. From this we were able to see which departments received the most funding for the personnel service category in the budget, focusing on the top 10 departments. In 2012 the average earnings for all departments were less than, on average, $120,000. However in 2022 the top department was the Superintendent which earned on average over $160,000. Additionally using this data we were able to look at the average pay for each apartment and rank these. From that we could determine how frequent departments appeared. The BFD was frequently ranked one, meaning they had the highest average pay for many years. BPD on the other hand, frequently ranked 2,3,4 and in 2018 ranked first. Lastly we looked at the changes in gross pay. In the past two years (2021-2022) we found that the "Food & Nutrition Service" Departments had the highest gross pay increase of approximately 362.41%.

Next, in order to identify financial excess we analyzed the earnings to determine how BPD paychecks changed from 2011- 2022. We found that BPD paychecks have on average decreased compared to other departments in the past 10 years. Originally the BPD was ranked 49th among city of boston departments by average pay. Over the past 10 years this has gone down to 232th. The average pay however has gone up from a little over 60,000 in 2011 to upwards of 80,000 in the past 3 years. Regular pay has gone up slightly in the past 10 years, while overtime pay has gone up significantly – it doubled from 15k in 2011 to 30k last year.

Additionally, we looked for financial excess in Injury Pay. We found that over the past decade the percentage of injury pay has consistently increased, outside of in this most recent year (2022). In 2012 Injury Pay made up about 2% of the total pay, whereas in recent years it has exceeded 6%. The percentage of officers taking injury pay has also overall increased, especially in 2020 and 2021 and peaked in 2014.

2. Characterizing wasteful BPD overtime practices

To find the discrepancy between overtime hours paid compared to overtime hours worked, we analyzed overtime data from 2012 to 2022. The annual difference ranges from 180k hours to 260k hours but no pattern was found. The year of 2017 displayed maximum value and year of 2020 had minimum value. However, overtime data did not have hourly pay for each officer and having the same rank can't guarantee equal pay, we have not yet calculated the discrepancy financially. Yearly overtime court appearances (2012-2022) were declining from 2012 (40k) to 2019(27k). After hitting the all-time low of 10k in 2019 due to COVID-19, it is

increasing by 3k each year. Distribution of ratios of overtime worked vs. overtime paid is skewing to the right as time goes by. As the data gets skewed, the number of outliers is increasing. Outliers have a ratio of 16.

Individual Contributions:

David White:

I Initially focused mainly on the field data. I combined a few datasets and did some preliminary analysis of a few of the years. But while there were some oddities in the dataset it seemed unlikely that this dataset would prove useful towards answering the two main questions we chose to answer for this deliverable. Last week I worked on our first question which was about identifying trends in the BPD budget. Here I combined the data between 2011 and 2022 to look for trends in spending and the way that the budget and pay of officers changed year by year.

Ashton Fox:

I spent a lot of time trying to figure out what a possible use of the field activity, but ultimately couldn't see any immediate use we could have for it, so when we started to piece together trends among overtime/injury pay and anomalous instances of those classes and the race/sex data among officers came out, I thought that it would be useful to graph the data among different job titles. Because there were only a small number of actual datasets for the years (most were screenshots), I had a small sample to work with, but comparing the differences - or lack of - between years can hopefully give insight into where in the BPD these anomalous instances can lie.

Seunghwan Hyun:

I started with analyzing overtime data and earnings data and moved on to answering Question 2 (Characterizing Wasteful BPD overtime practices) for this deliverable. I visualized the relationship between worked hours and paid hours for overtime data and overtime court data from 2012 to 2022. For overtime data, timestamp had different formats for older data so I had to use timestamp to calculate worked hours. Also, I was interested in the trend of time differences (between worked and paid hours) for each record and per officers. I used the pandas groupby() method to sum overtime worked hours and paid hours for each year. Moreover, yearly discrepancy between worked hours and paid hours showed no particular pattern.

I attempted to analyze the overtime trend with respect to the 'Rank' in overtime data but distributions were similar for all ranks.

Ahmad Sadiq:

For our group's deliverable 1, I concentrated on analyzing the earning reports and overtime data for the years 2021 and 2022. My primary goal was to identify instances of financial excess in BPD spending (so question 1). I meticulously compared the year-over-year changes in the BPD budget, pinpointing areas where funds had increased or decreased, both overall and within specific departments. By breaking down the data, I was able to discern how funding allocations shifted between departments over the two years. Furthermore, I delved into the intricacies of BPD paychecks, comparing the average amounts with non-BPD boston city employees and providing a detailed breakdown of regular pay versus overtime pay. A significant portion of my analysis was dedicated to understanding the extent of BPD officer pay that originated from injury pay and determining the percentage of officers who availed injury pay annually. I visualized the results using graphs to communicate my findings with the group, and during our group meetings I collaborated with the team members to integrate our individual insights into a cohesive analysis.

Emily Opresnick:

Initially I focused on processing and analyzing the Campaign Contribution data. After conducting a bit of analysis on the datasets I found that the information would not really help too much with answering the main questions. After discussing this with the group, we decided that the data could be used for a potential extension question. I began working on answering the first question: Identifying instances of financial excess in BPD spending. To do this, I looked at the data in the earnings datasets from 2012-2022. Additionally, I looked at the Boston City Budget Data set to further understand how the budget has changed over the past few years.