

# **DELIVERABLE 2 REPORT**

**Organisation :** ACLU

**Client - ACLU Technology Fellow :** Natasha Dhamankar

**Project Manager :** Jasmine Fanchu Zhou

**Technical Engineer :** Yagev

**Team:**

Mohan Sai Krishna Thota (Team Rep)

Ajit Balla

Anran Du

Srinivas Chellaboina

**Description :** The Boston police department (BPD) receives funding every year as part of the city's budget. It's important to examine how the BPD is spending these funds and where they are allocating them. Our task is to analyze the BPD budget and create a report with the requested information. The City Council members will use this report to advocate for future budget allocations during Spring budget negotiations with the Mayor and the Boston Police.

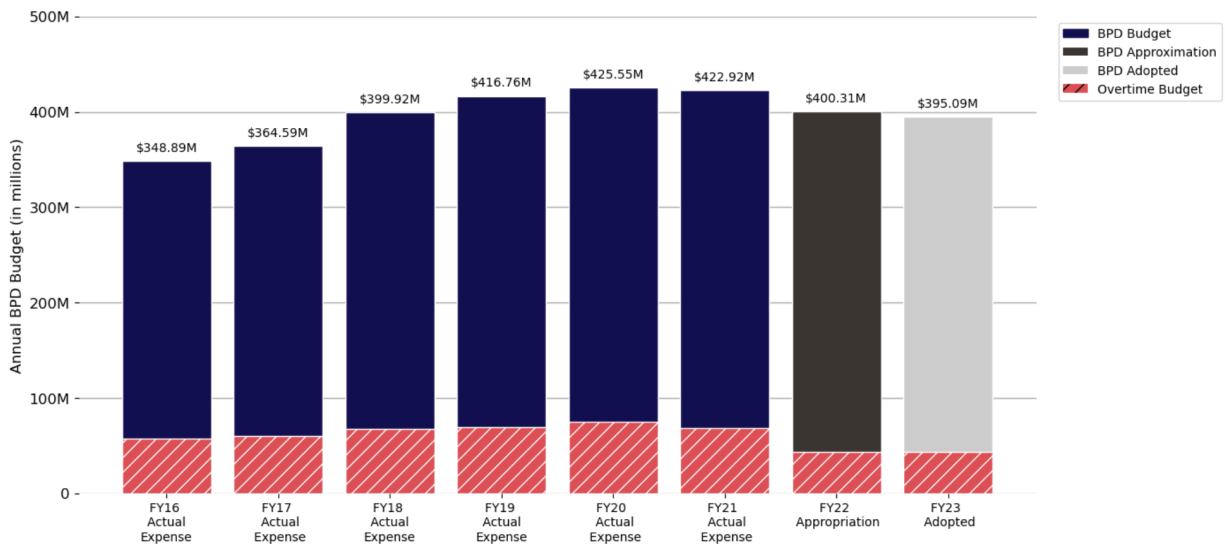
# SECTION I

In this Section we have implemented the changes from the client that have been given to us in the Last Meeting . Changing the colors, Moving the horizontal/vertical lines behind the bars, removing of Red Line, changing the position of Legend.

*The Q1 is the exact implementation of what our client have asked us to change . The Following Graphs will also be changed to the needed requirements(Visulaization) later this week. V2- represents the Version 2 of the Graphs.*

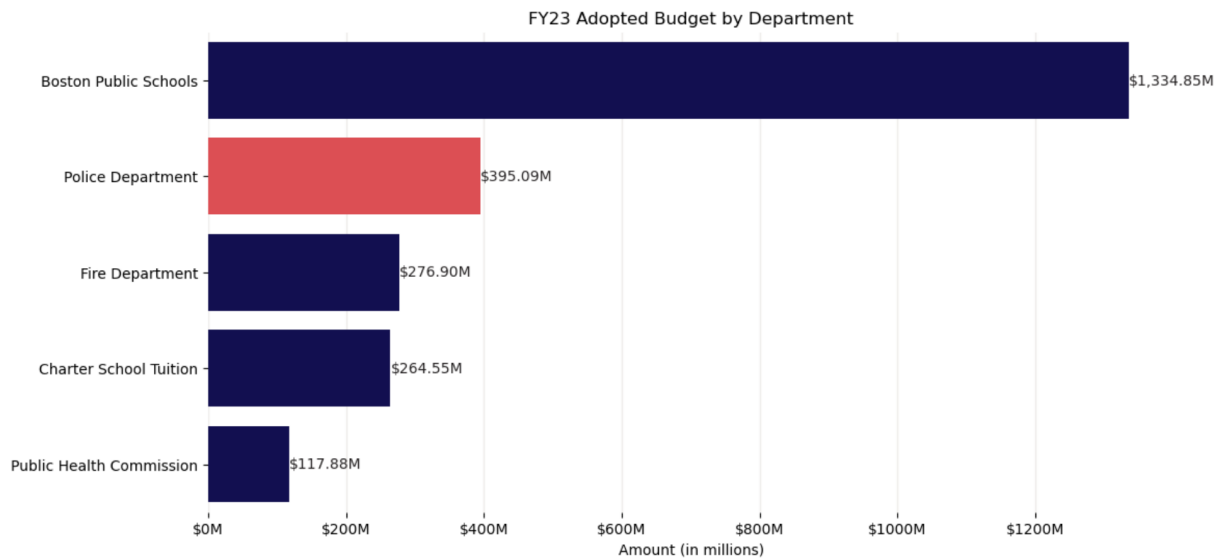
## Q1-V2 Total Budget VS Previous Years

**The overall budget of the BPD from FY 16 to FY 23**



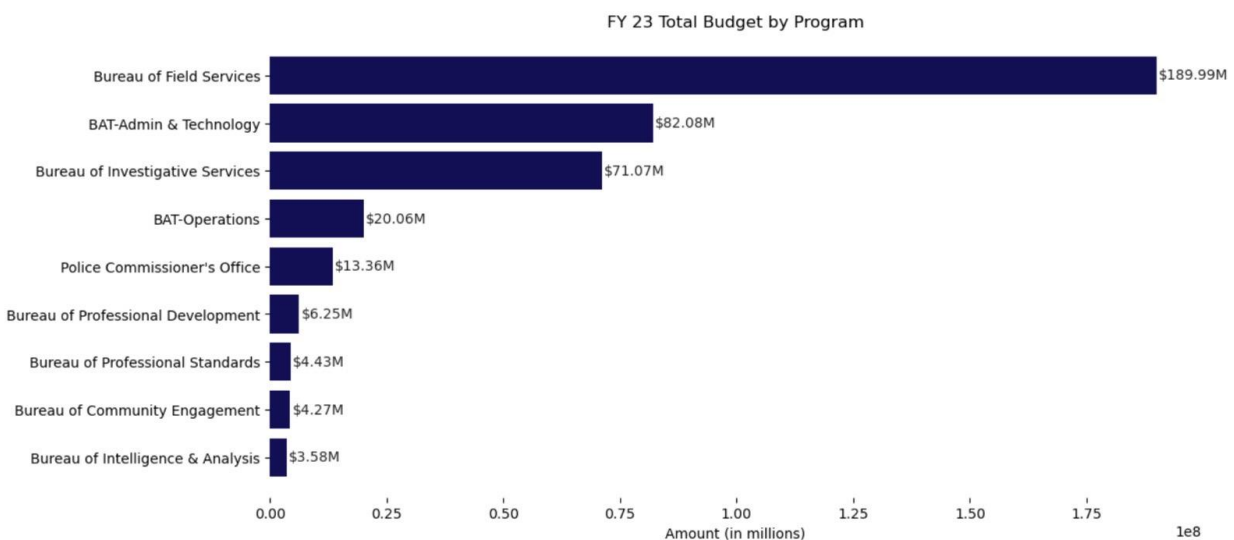
Changes: The red line chart is removed  
the gray axis is moved to the back of the histogram  
the colors of FY23 Adopted and FY22 Appropriation are corrected  
Add overtime budgets

## Q2-V2 BPD Budget VS Other Department Budget + Change Over Time



The graph above shows the adopted budget of the five most ranked departments in FY23, classified by department. The department with the highest budget is Boston Public Schools, with a budget of \$1,334,845,508. The second highest ranking is the Police Department with a budget of \$395,094,796. Although BPD's budget is not high compared with Boston Public Schools' budget, when compared with other departments that guarantee basic people's livelihood, the Police Department's budget is still a lot, exceeding the third-ranked Fire Department's budget by \$117,884,077. Therefore, the BDP's budget may need to continue to shrink.

## Q3-V2 BPD Budget Spend Categories + Change Over Time



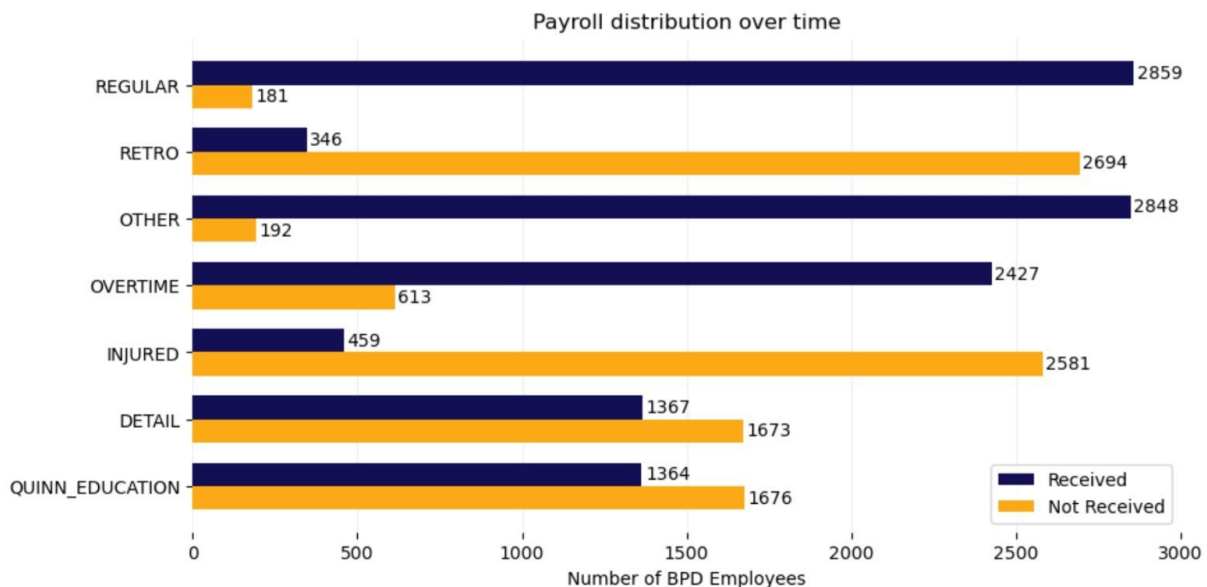
The graph, categorized by program, shows the Boston Police Department's budget allocation for 2023. The top three projects are Bureau of Field Services, BAT-Admin & Technology and Bureau of

Investigative Services, which account for 86.85% of the total budget. The Bureau of Field Services was the highest-budget program, which counts for \$1899.99M, more than double the number of second-place programs. Compared with these three main categories, the remaining 6 categories account for less budget, and the difference is not big.

## SECTION II

This Section Consists of New Graphs that we have worked on since the Deliverable 1. We have covered Questions from Q6,Q9-14. The only left over Questions are Q4,7,8. Which will be covered this by the end of This week.

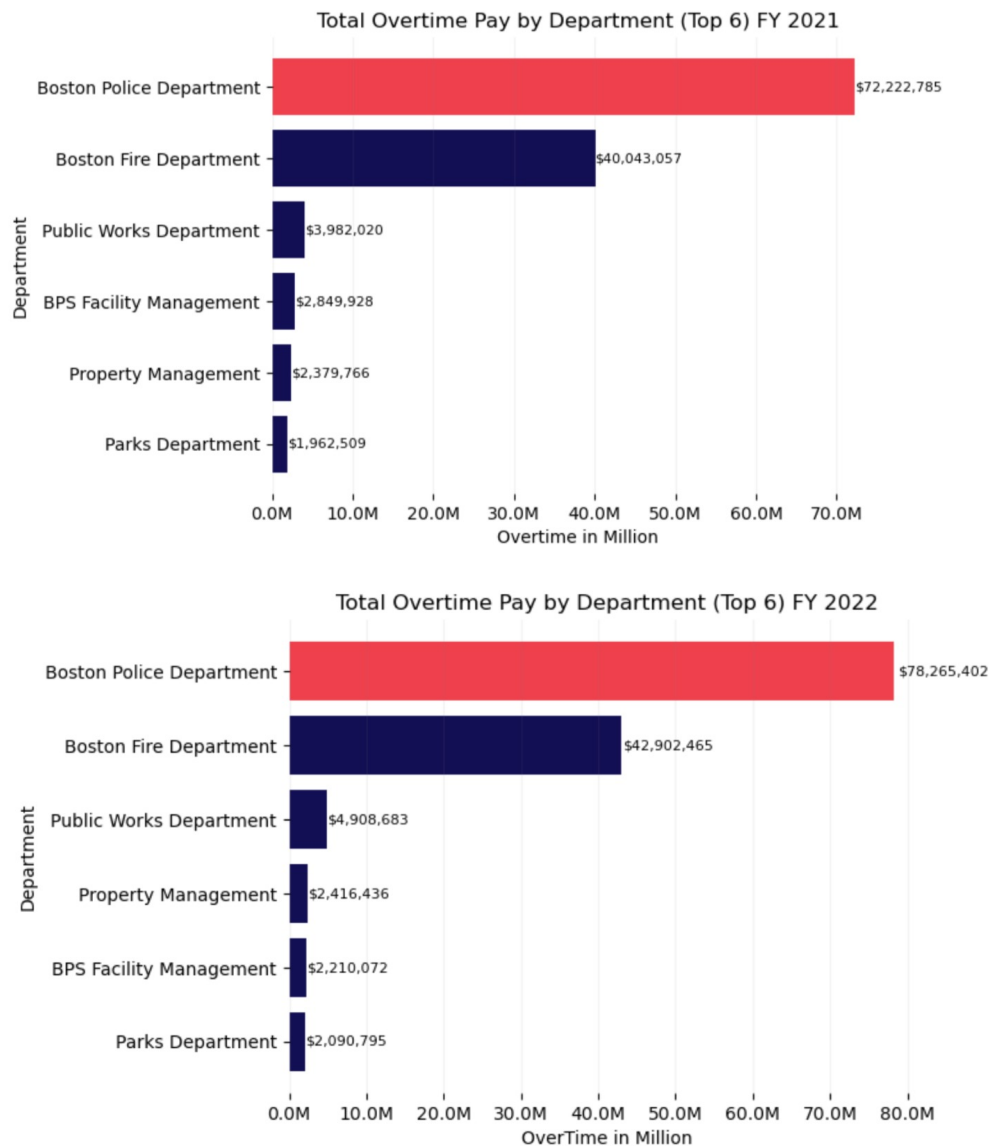
### Q6 Number of Police officers Recieved Vs Not Recieved



This graph shows how Boston police officers are paid in seven major income categories by comparing those who are paid with those who are not.

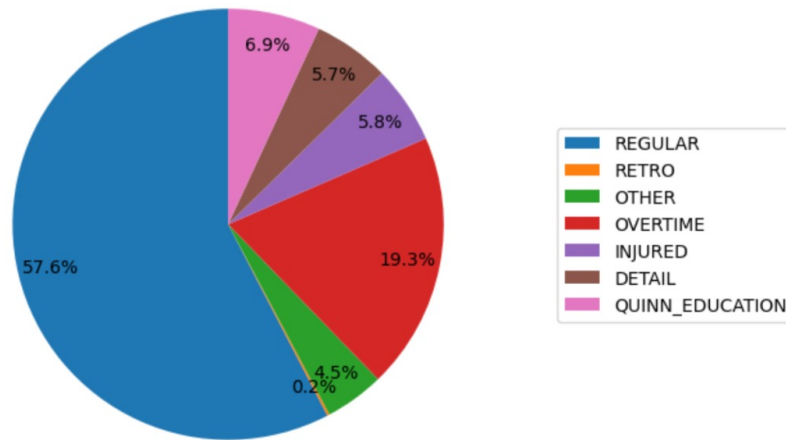
By comparing the receive status of each category, it can be seen that the three major categories of earnings, which are OTHER earnings, REGULAR earnings and OVERTIME earnings, can be received by more than 80% of police officers. Besides, half of the police officers can receive the PAID DETAIL earnings and EDUCATION INCENTIVE Earnings. As for injured earnings and retro earnings, only 15.1% and 11.4% of employees can receive them. Therefore, we can conclude that the main income of the vast majority of Boston police is obtained from OVERTIME payments, REGULAR payments and OTHER payments such as bonus incentive earnings, grievances and ect. Therefore, getting wages through overtime working is an important way for them to get wages.

## Q9 Total overtime of top departments + over time



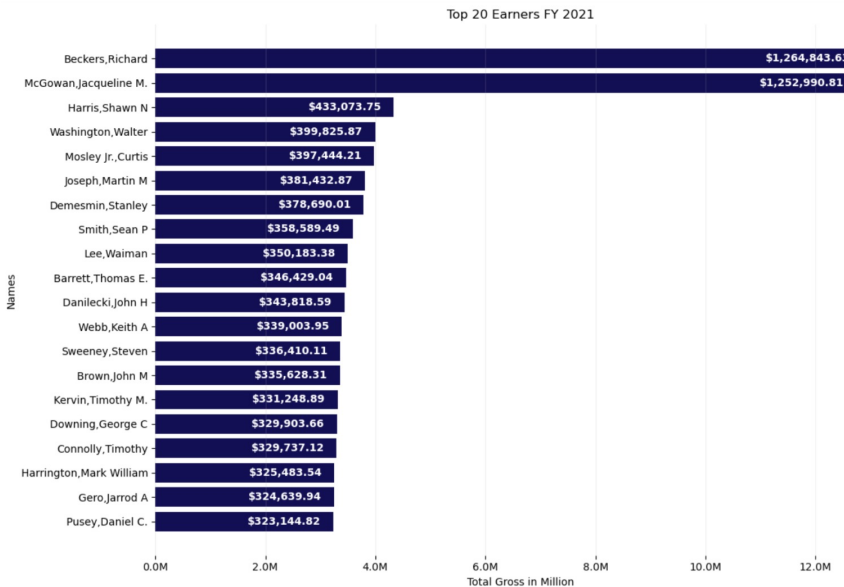
These two graphs are classified by department, showing the top 6 departments in Boston in the category of overtime pay in 2021 and 2022. In these two years, the overtime pay of the Boston Police Department has been ranked first and far exceeded the second place Boston Fire Department for at least 30 Million dollars. In addition, although the total overtime pay rankings of other departments have changed in the past two years, they are generally similar, concentrated between 0.4Million and 0.2Million dollars. The average overtime pay of these sectors in 2022 is about 3.7% of the BPD OH pay.

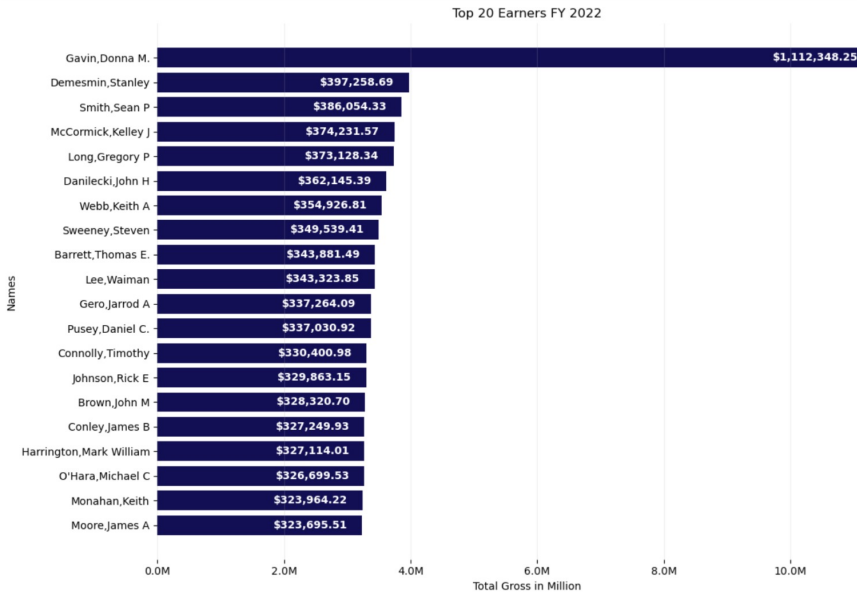
## 10. Payroll distribution over time (base, overtime, retro, detail, etc.)



This pie chart shows the payroll distribution of Boston Police Officers in 2022. The income distributions that account for the most officers' income are regular pay and overtime pay, accounting for 57.6% and 19.3% respectively. These two income categories accounted for 76.9% of the overall income, and the rest of the payroll distribution accounted for 4.5%-6.9% respectively, which had little impact on the overall income. Therefore, when studying how much the personnel classification contributes to the BPD budget overrun, it is necessary to focus more on the rationality of setting the amount of regular pay and overtime pay.

### Q11 Top 20 Earners (change from previous year)



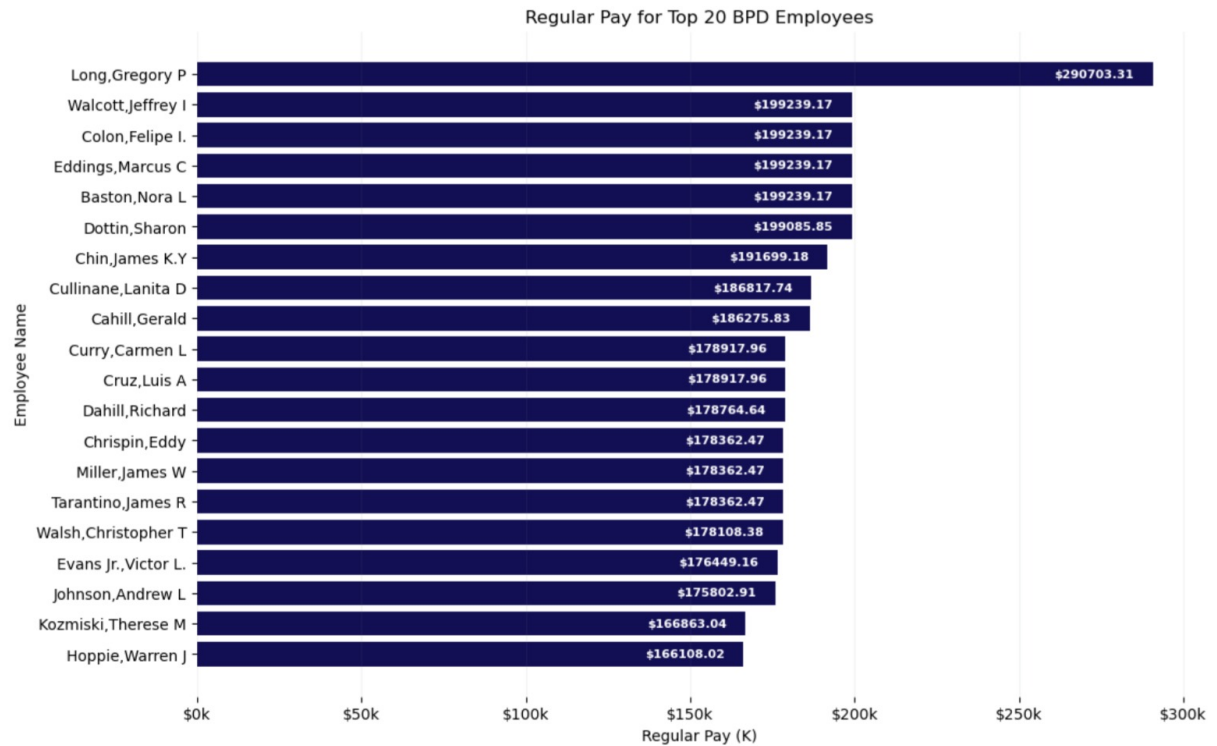
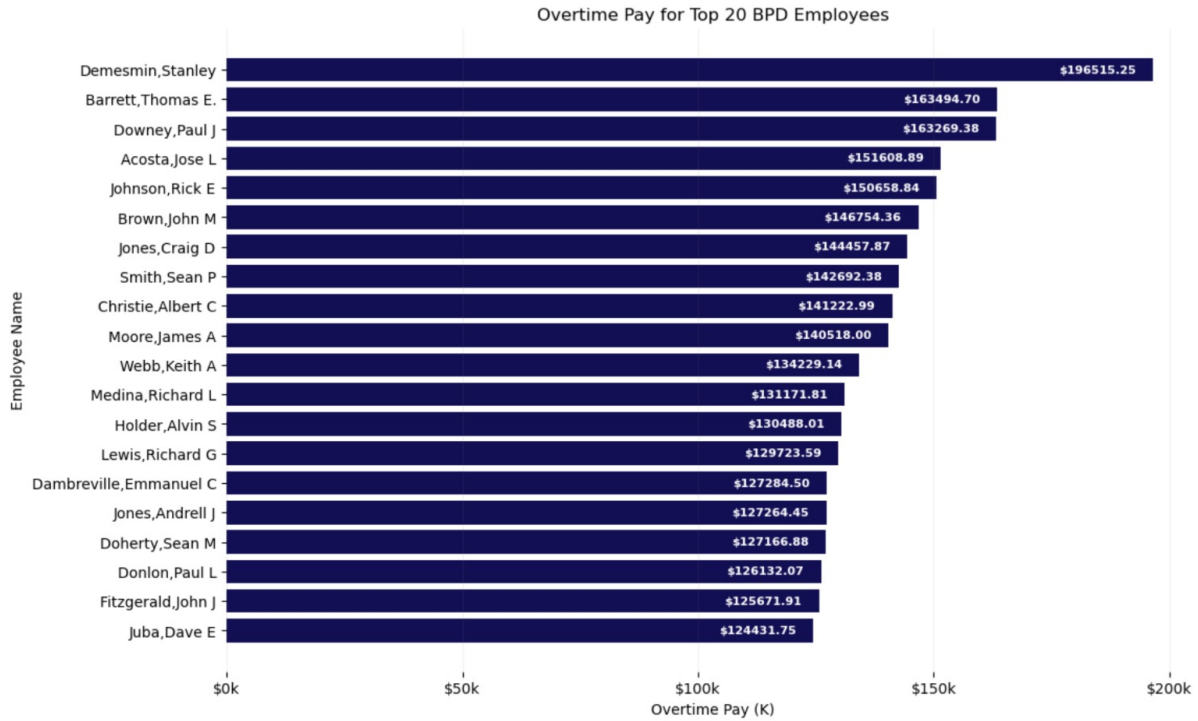


These two graphs show the top twenty officers with the highest total gross salary for 2021 and 2022. The highest ranking in 2021 is Beckers Richard, and the second is McGowan Jacqueline M. Their salaries are \$1,264,843 and \$1,252,990, 6 times that of the third-ranked officer. Interestingly, the titles of both are police officer, and there is only Other pay in the salary category. Therefore, the salaries of these two people are not of reference significance. Apart from these two officers, the salaries of other officers are about the same, with a difference of about \$100,000 between the last ranking and the third ranking.

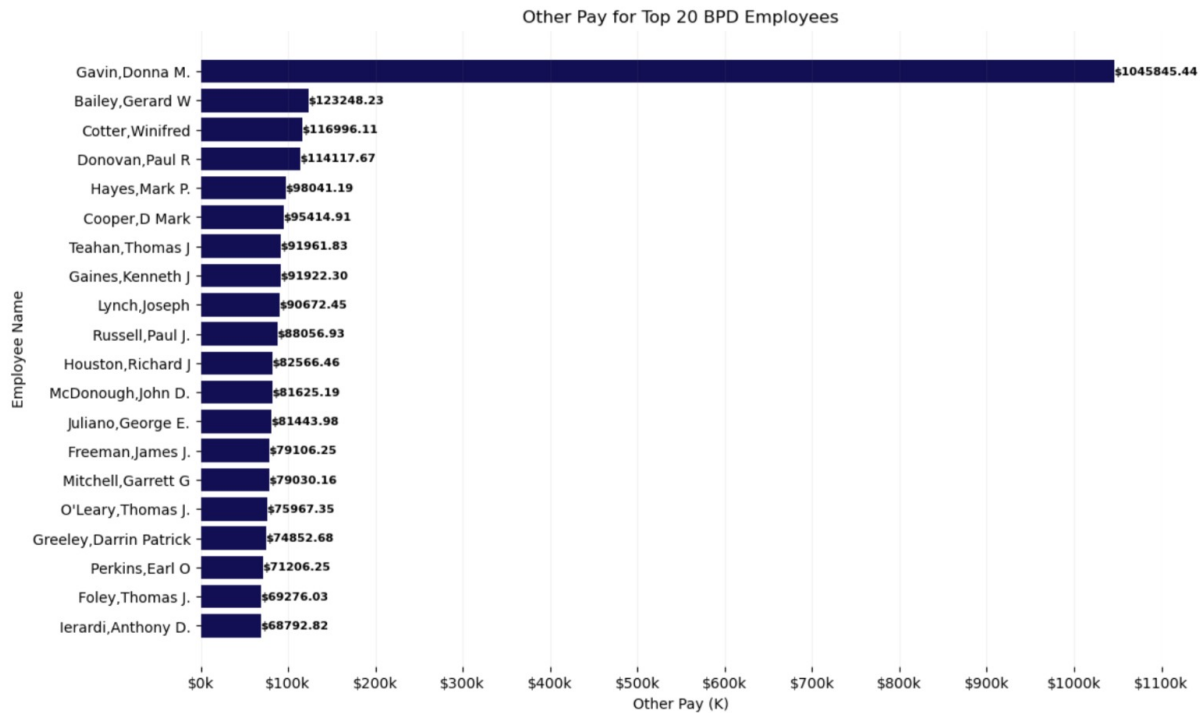
The highest salary in 2022 is Gavin, Donna M., whose salary is \$1,112,348.25, three times more than the second officers. The titles of both officers are Police Lieutenant (Det), but most of the salary in the first person comes from other pay, which shows that Gavin's salary should not be regarded as part of normal salary income condition. For the officers ranking from 2nd-19th, their salaries are similar, and the range of change is roughly the same as that in 2021, which is around \$100,000.

To sum up, although the names of the top 20 officers in 2021 and 2022 have changed, except for the top two employees, the salary levels of the rest of the employees are not much different.

## Q12. Top 20 Earners (OT, Base, Other)

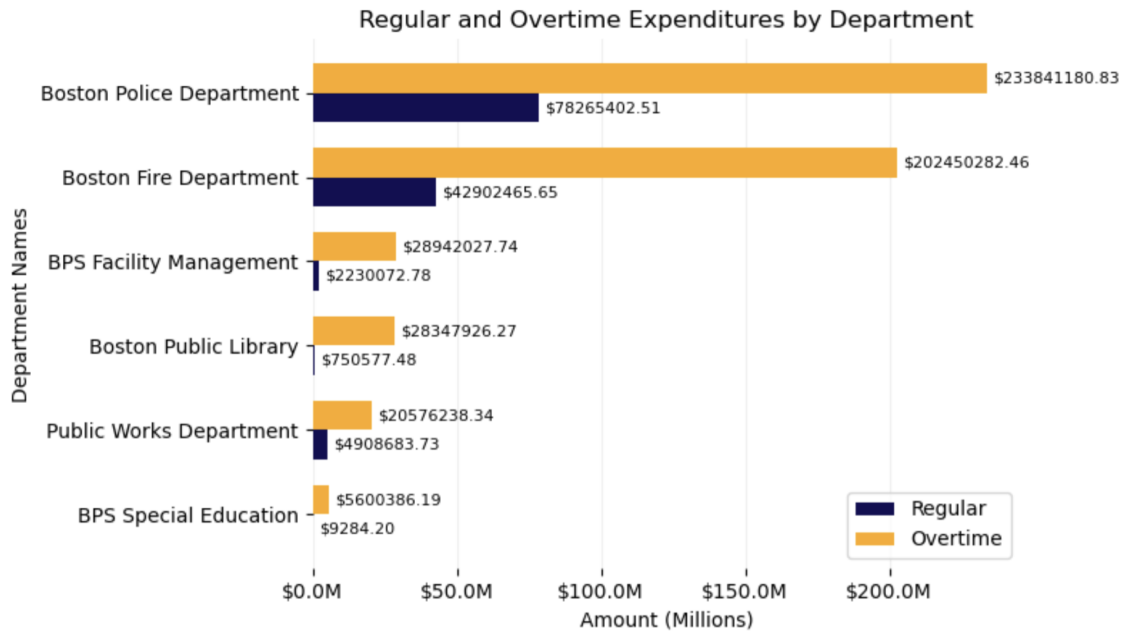






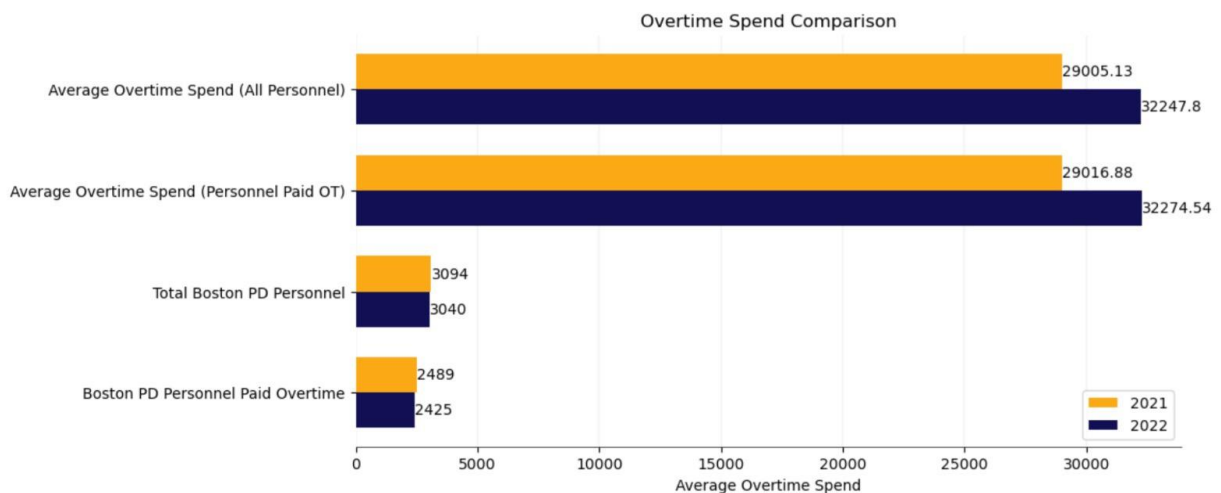
The above three graphs show the Top 20 Earners in the three categories of OT, Base and Other pay. From the perspective of the overall trend, the median of regular pay is the largest, reaching \$178,918, followed by overtime pay, whose median is \$140,519, and the median of other pay is only \$88,056. According to this finding, the high basic salary and overtime pay is the main reason for the high income of high-income groups. In addition, except for those who rank the highest in each category, there is not much difference in the income of the other officers in the two categories of regular and other pay. While the overtime category shows a clear decline, with a difference of \$40,000 between the second and 20th ranks.

### Q13. High level overtime analysis (base salary vs. overtime vs. other departments)



This graph is classified by sectors and analyzes the expenditures of each sector on regular salary and overtime salary in 2022. It can be clearly seen from the figure that the money spent by BPD on Regular and Overtime salary ranks the highest among the six departments. Compared with BPD, BFD's regular spending and overtime spending are about \$30,000,000 less. What's more, the spending of other departments is 1/10 times of BPD, or even less. Therefore, it can be concluded that BPD spends too much on Regular and Overtime spending, which needs to be adjusted.

### 14. # of employees vs. OT spend



This graph illustrates the overtime spending comparison in 2021 and 2022. The number of both Total Boston PD Personnel and Boston PD Personnel Paid overtime are decreased. However,

the average overtime spend of All Personnel and Personnel Paid OT increased. This difference implies that the Overtime Spending on both categories did not decrease in 2022.

## EXTENSION OF THE PROJECT

For the Extension of this Project we are planning for the Following:

- We will update our visualization section and analysis with new data from April 2023. Based on the above, we will analyze the changes in the budget and salary distribution of BPD in the latest year, and propose possible measures to improve this situation through past policies.
- We will categorize police officers by their characteristics and find out the impact of different characteristics on their salary level, such as gender, race, title, and other factors. Subsequently, we will conduct a more detailed analysis of the groups classified by characteristics, and find out whether there is wage opacity in these groups by studying the composition of police officers' payrolls. For example, an employee applies for medical leave and receives an overtime pay in their payroll. Through the above analysis, we try to explore the reasons for the high budget of BPD from the perspectives of employee characteristics differentiation and wage transparency.

GitHub Link : <https://github.com/BU-Spark/ds-aclu-police-budget-analysis/tree/working-1>

Presentation Link :

[https://bostonu.zoom.us/rec/share/uYFdSNnVviYzznJ-bmzoS7yh5Sui\\_ZPY6jMwQRL08oagzBahmKz597HKfyb4I6jf.MY--3Fvr6fH2ar6O?startTime=1679598289000](https://bostonu.zoom.us/rec/share/uYFdSNnVviYzznJ-bmzoS7yh5Sui_ZPY6jMwQRL08oagzBahmKz597HKfyb4I6jf.MY--3Fvr6fH2ar6O?startTime=1679598289000)

**Password: A68?F?eU**