



Making Sense of Police Field Interrogation and Observation (FIO) Data

Citizens for Juvenile Justice (CFJJ)

Farid Karimli, Akshey Nischal, Noah Jean-Baptiste, Christina Xu, Ruiding Feng

Background

- Police departments in MA collect data on 'field interrogations and observations' (FIO), usually interactions with members of the public that do not lead to an arrest.
- Discrepancy between police behavior and data:
 - FIO data can be misleading because the police can simply record sighting of a person
 - A lot of data on arrests, however, sparse data on police interactions

Project Motivation and Goals

- Investigate FIO datasets to draw insights into policing practices
 - Draw conclusions about policing in specific municipalities
 - Analyze the demographics (race, age, and location) of individuals who are stopped
 - Infer how police determine how a particular individual is gang affiliated

Splitting up the Work

- Each team member was assigned a set of cities to perform data extraction on and develop their own analysis of the data
 - Depending on the difficulty, team members were assigned 3-4 cities
- Prior to the city assignment, certain team members were in charge of extracting data
 - Data was initially given to us in the form of .xlsx, .docx., .accdb, .pdf, and .xls
 - We worked on converting this data into csv files since that is easily compatible with pandas dataframe packages that we use



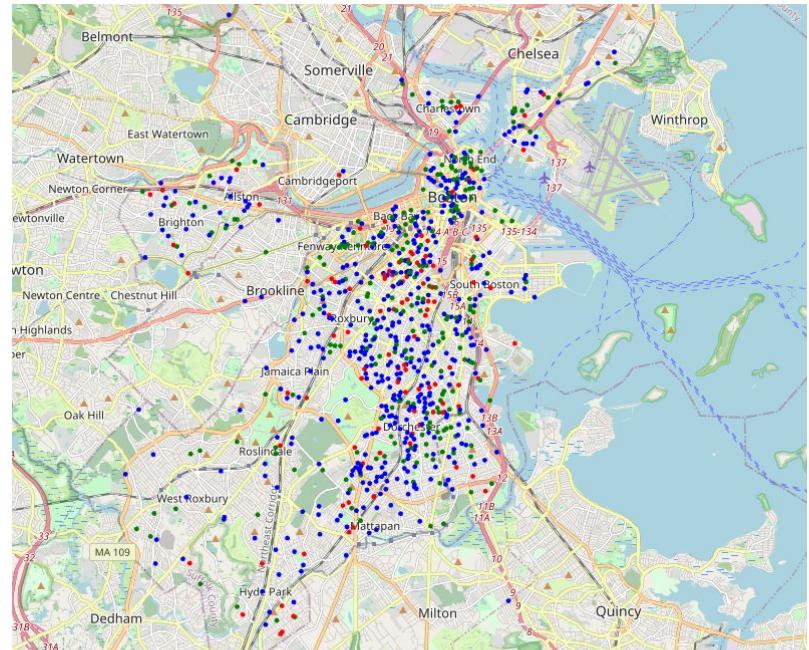
Progress so far

- Auxiliary data/resources:
 - Geocoding APIs for marking streets on map visualisations
 - Census data for demographic information for some municipalities
- Identity based data
 - Extracted data on the premise of race, ethnicity, age and gender to develop inferences on create models for how Fios are conducted and occurred

Boston - locations

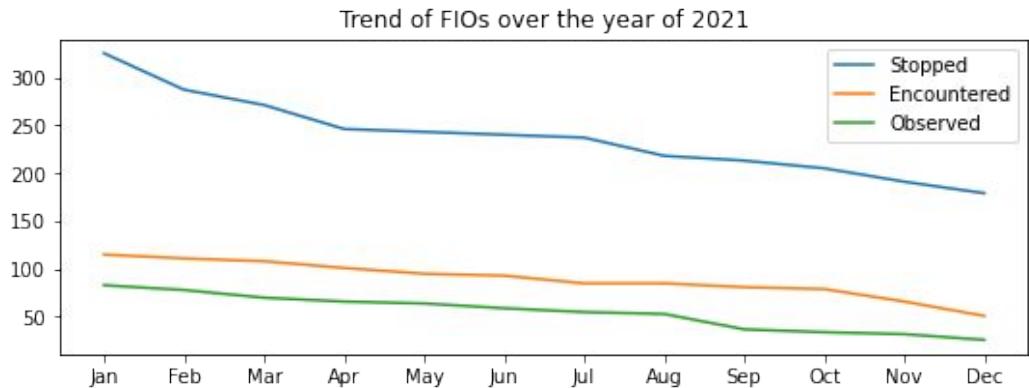
- Plotted the locations of each FIO (for which street data was available)
- Color-coded by circumstance
- Blue for Stopped, red for Encountered and green for Observed
- Towns in Boston with the most FIOs:
 - Downtown Boston, Dorchester, Roxbury, Jamaica Plain and Brighton

Total amount of FIOs (2021): 4582



Boston - Trends

- Displayed the number of FIOs over the year of 2021
- Color-coded by circumstance

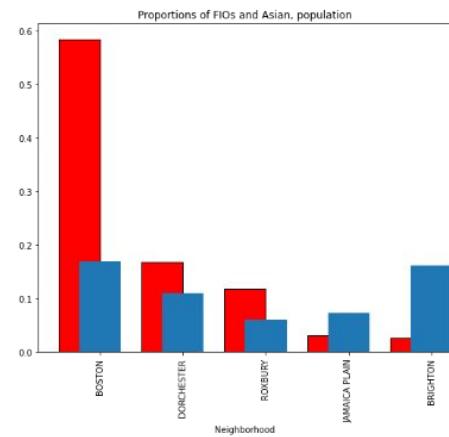
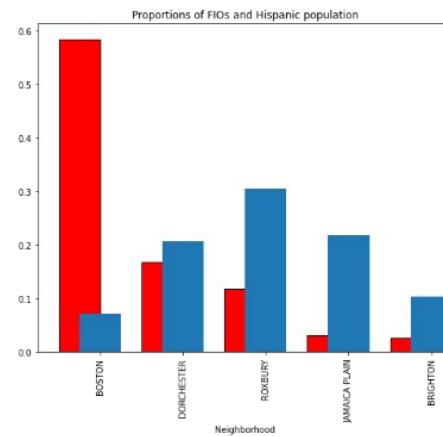


Boston - Race and Ethnicity Insight

- Towns in Boston with the most FIOs:
 - Downtown Boston, Dorchester, Roxbury, Jamaica Plain and Brighton
- Plotted the proportion of FIOs and race population proportion for each
- Downtown Boston has the most white population, with the most FIOs, Brighton has the second most white population but the least of FIOs
- Race data is from
<https://data.boston.gov/dataset/2020-census-for-boston>

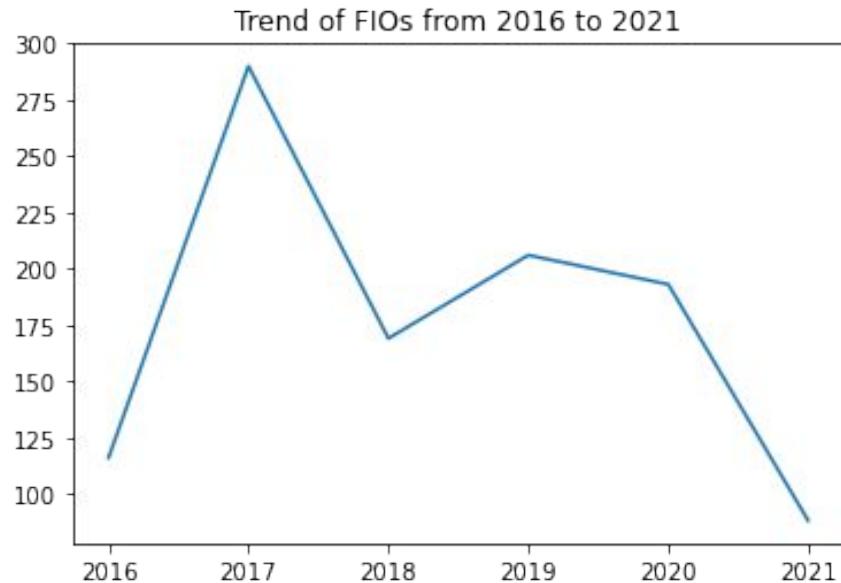
Red - proportion of FIOs for that town

Blue - that town's population proportion of that race



Brockton - trend

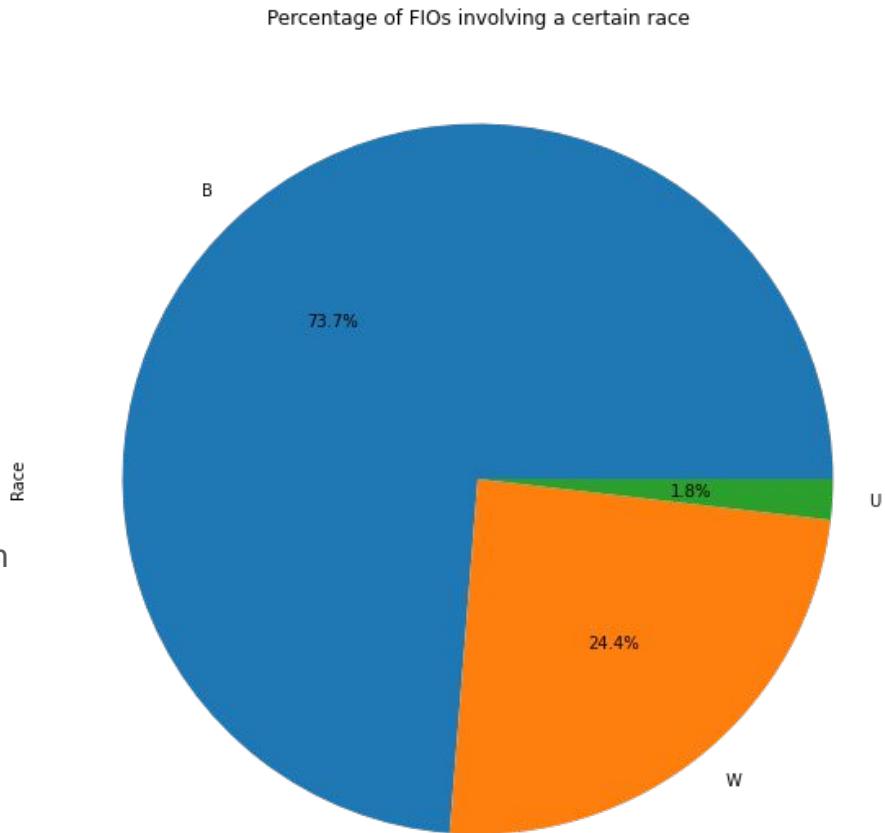
- Number of FIOs from 2016 to 2021
- Peak at 2017, major dip in 2018
- Decrease starting from 2019





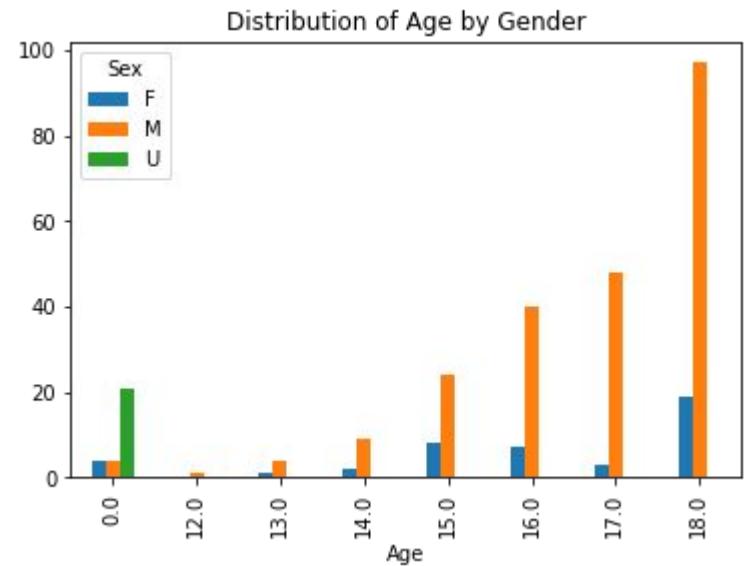
Brockton - race insight

- Vast majority of FIOs involve African-Americans (B)
- A small fraction is unknown (U)
- Can be combined with the previous plot, displaying the proportion of races involved in FIOs for each year



Brockton - juveniles

- Vast majority of FIOs involving juveniles involve 18 year-old males
- Tiny fraction of FIOs involving juveniles less than 14 years old
- Some age values of 0 - only ones where sex is unknown



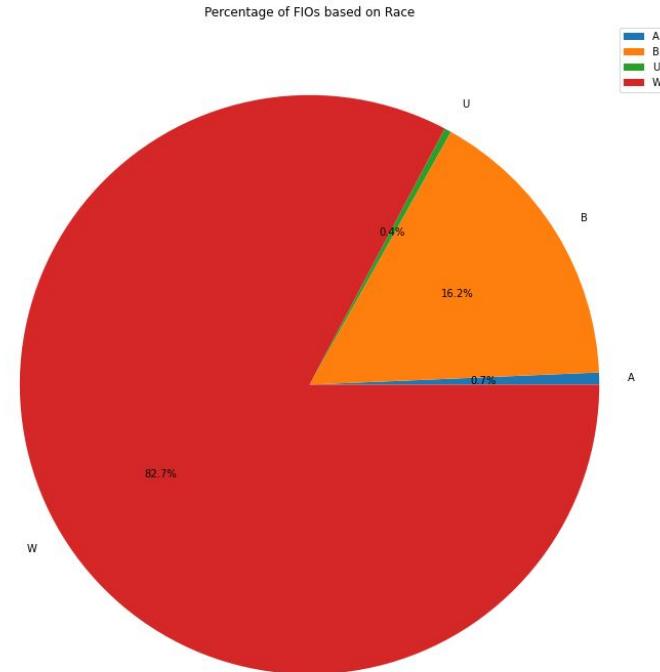
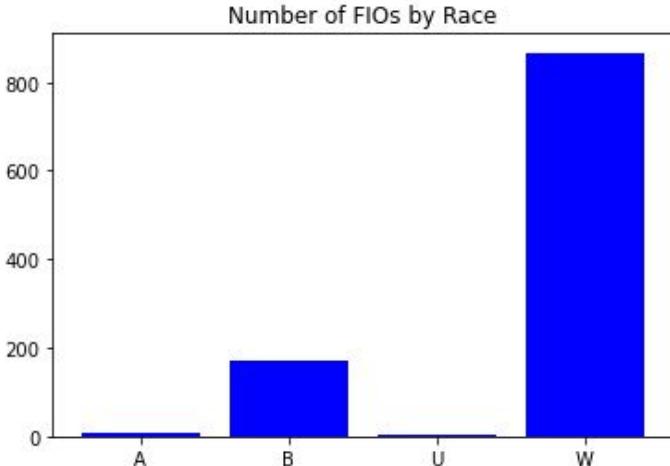
Chelsea - Trend of Fios from 2016

- This graph shows the overall cases of Fios from 2016 up until 2021
- The overall trend we notice is that the total cases is trending down since 2016
- An interesting note is that each of the years follow a similar monthly trend in which the cases peak between March and April, and then again towards the end of the summer.



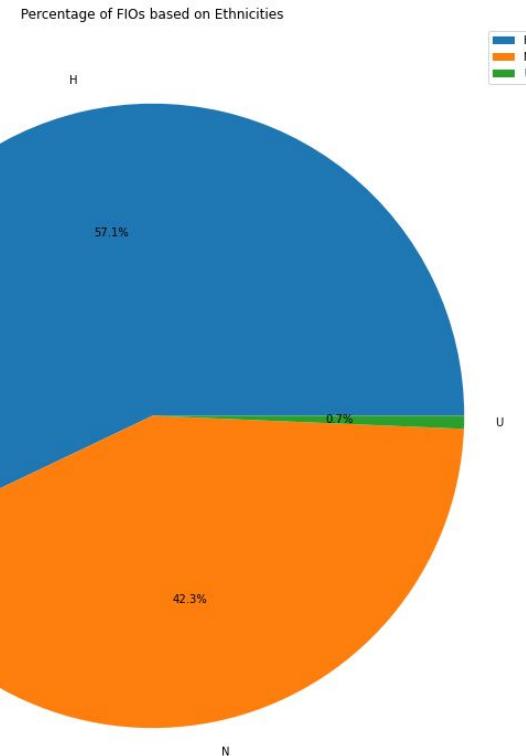
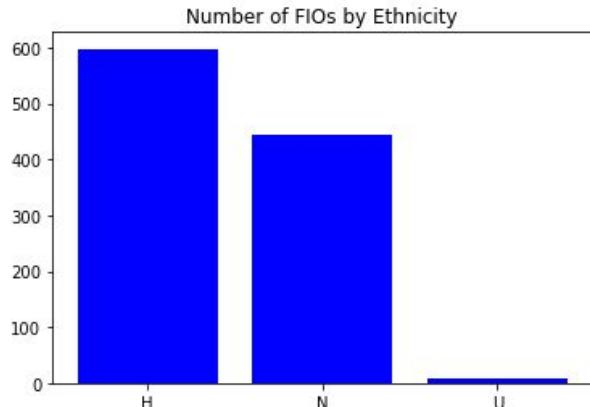
Chelsea - Fios classified by Race

- The bar graph shows the total number of cases by race, while the pie chart shows the percentage out of all the Fios
- Interesting to see that White makes up about 82% of all Fios in Chelsea
- Given census data, we would like to explore the population distributions in Chelsea and determine Fio rate by population data



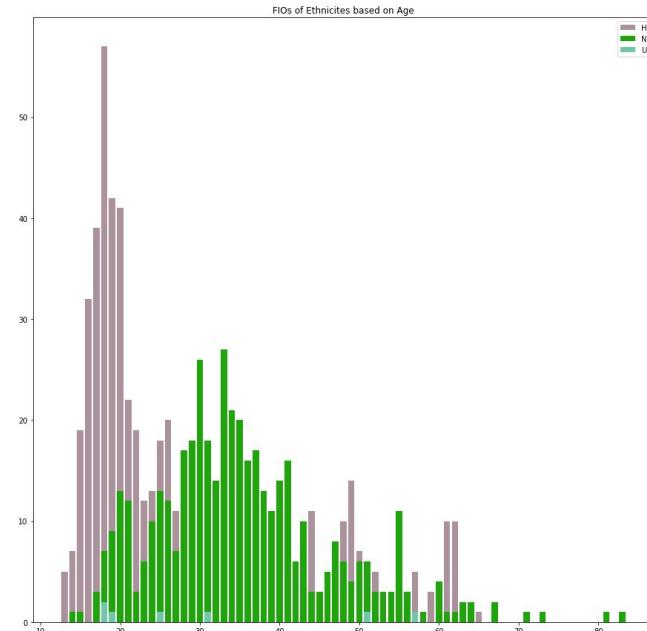
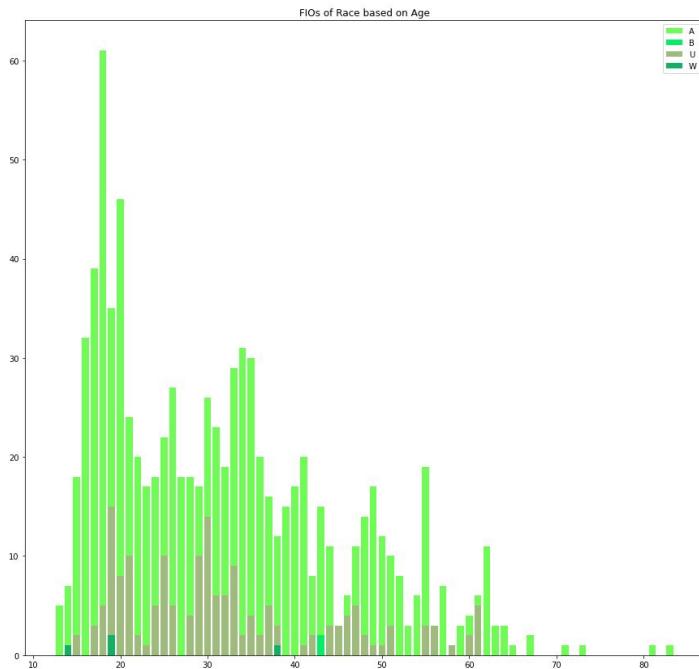
Chelsea - Fios classified by Ethnicity

- The bar graph shows the total number of cases by ethnicity, while the pie chart shows the percentage out of all the Fios
- This figure shows a more balanced proportion of cases than was shown for races
- Given census data, we would like to explore the population distributions in Chelsea and determine Fio rate by population data



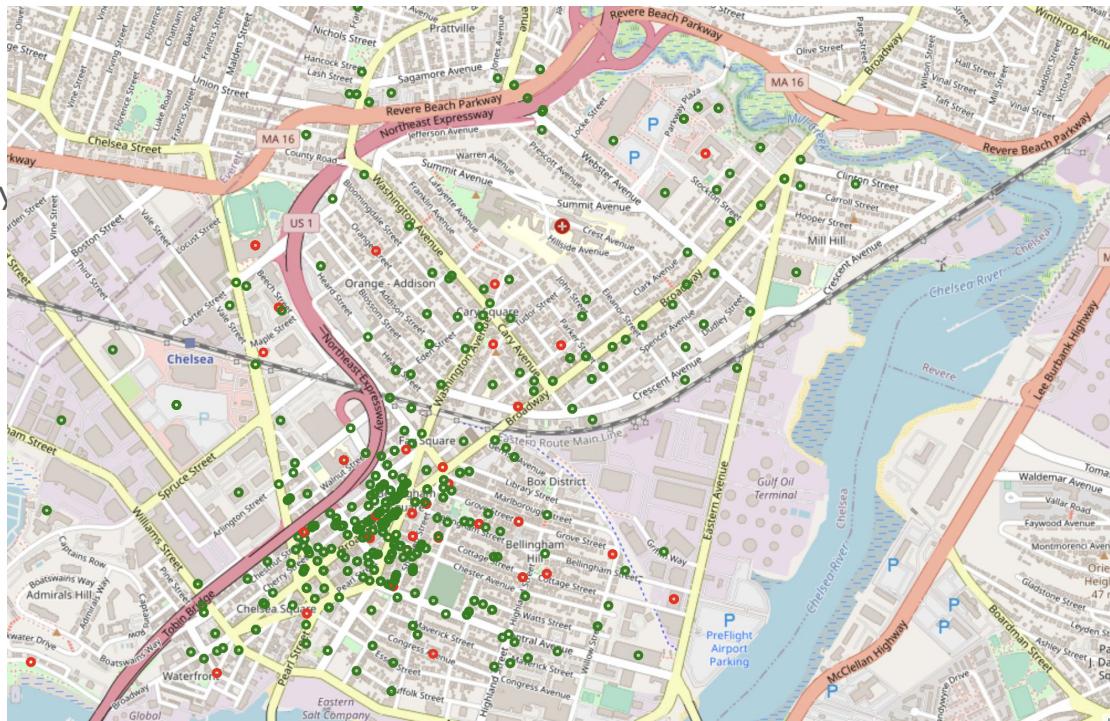
Chelsea - Fios classified by Age

- The graph on the left shows the age range for Fios based on a separation of race
- The graph on the right shows the age range for Fios based on a separation of ethnicities
- Large cluster of Fios amongst juveniles and those in their mid 20s
- Primarily black individuals in this age range



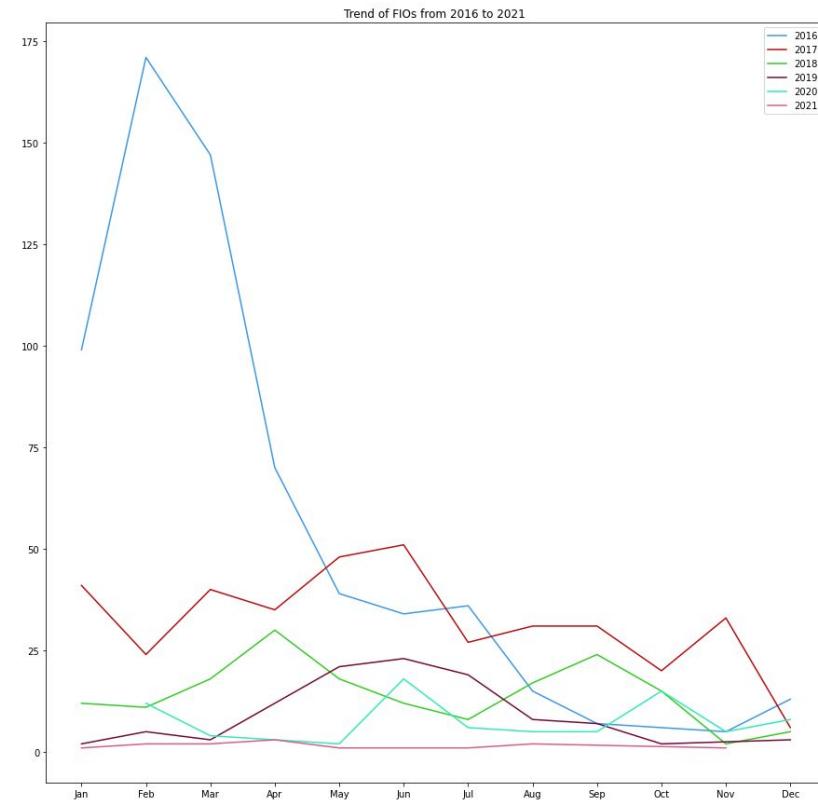
Chelsea - map of gang related cases

- This map shows the location of Fios in Chelsea and whether or not they were marked as gang related or not
- The green circles indicate non gang related cases and red indicates gang related cases
- Gang related database would help us to classify who and where such cases take place



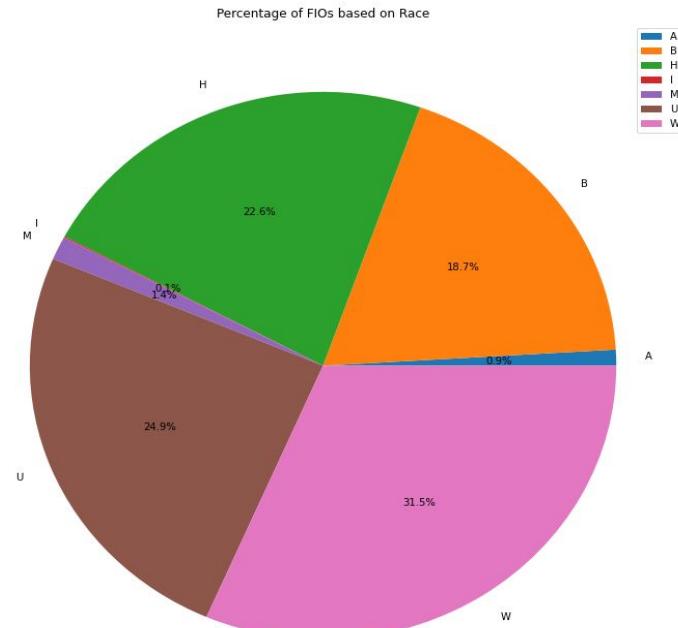
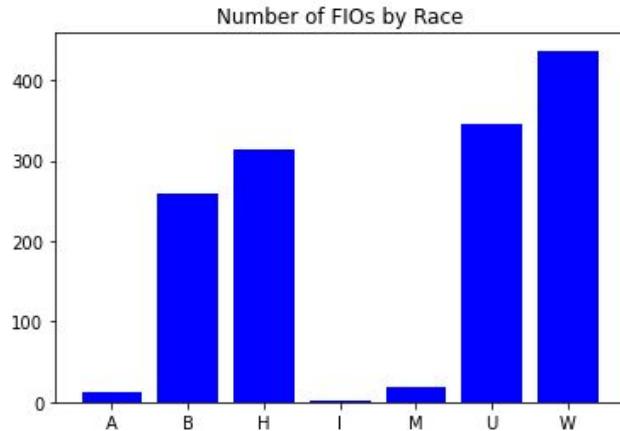
Everett - Trend of Fios from 2016

- Graph shows the trend in total Fio from 2016 until 2021
- Obvious outlier is the beginning of the year for 2016 when cases spiked to 170 before coming back down
- Trend is moving towards lower amounts of Fio cases



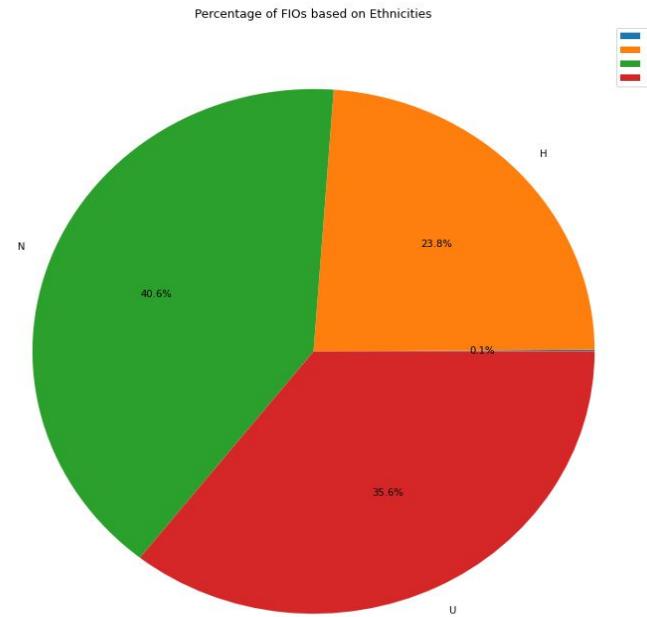
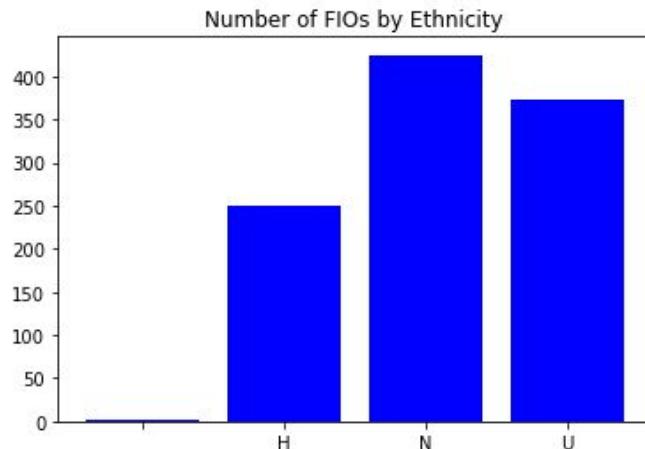
Everett - Fios classified by Race

- The bar graph shows the total number of cases by race, while the pie chart shows the percentage out of all the Fios
- No obvious outlier in terms of percentage of cases
- Would like to look at census data to see percentage of cases given population data



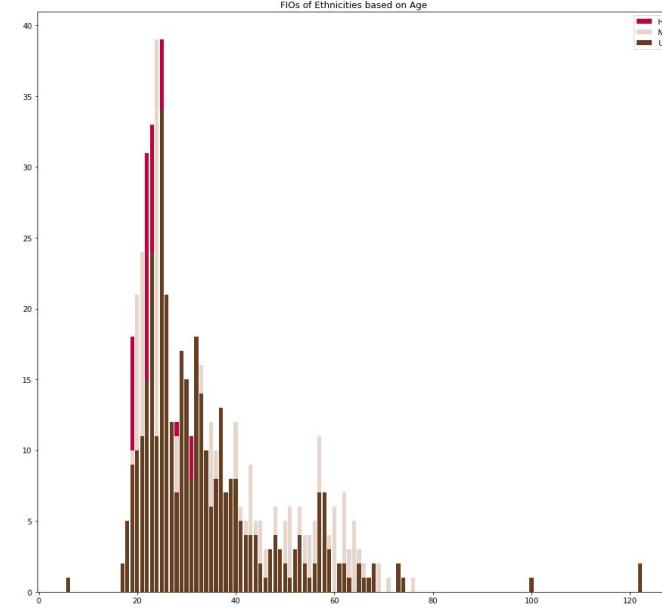
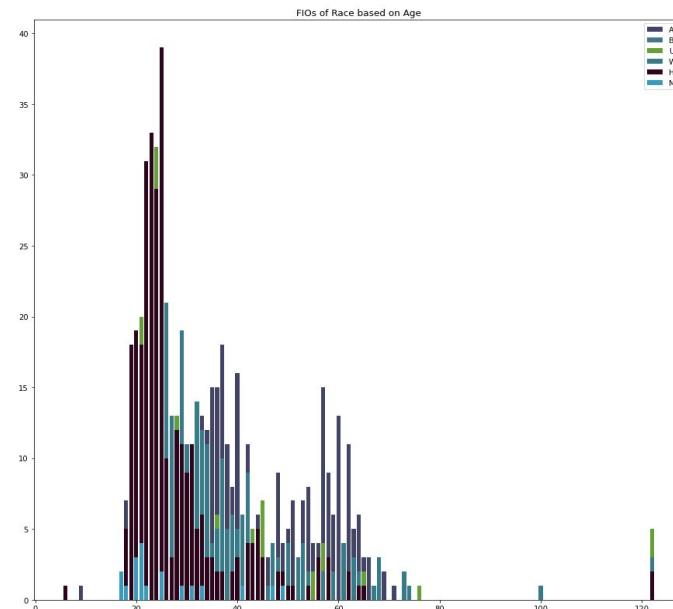
Everett - Fios classified by Ethnicity

- The bar graph shows the number of cases by ethnicity, while the pie chart shows the percentage of cases by ethnicity
- Very evenly spread amongst H, N, U
- Would like to look at census data to see if trend is consistent with overall population



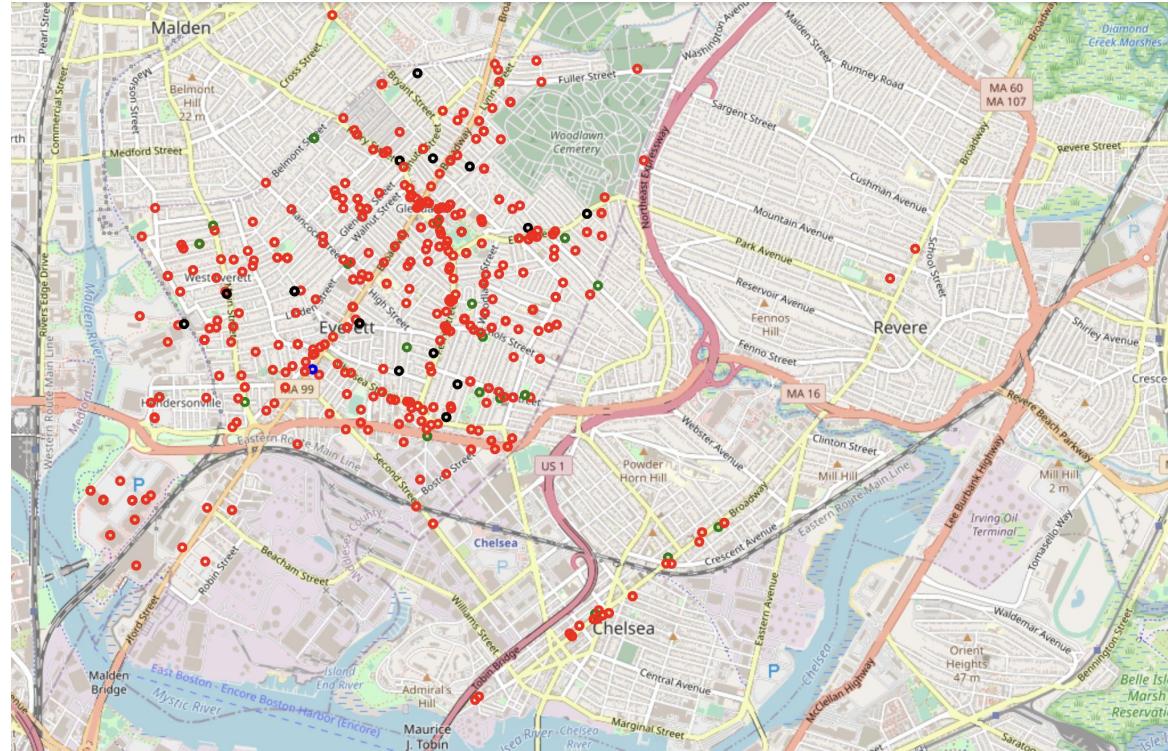
Everett - Fios classified by age

- Left graph shows ages distinguished by race while right side is shows ages distinguished by ethnicity
- Clear trend towards juvenile in these cities
- High amounts of Hispanic cases between the ages of 18 and 25
- Even mix of races and ethnicities as the age increases



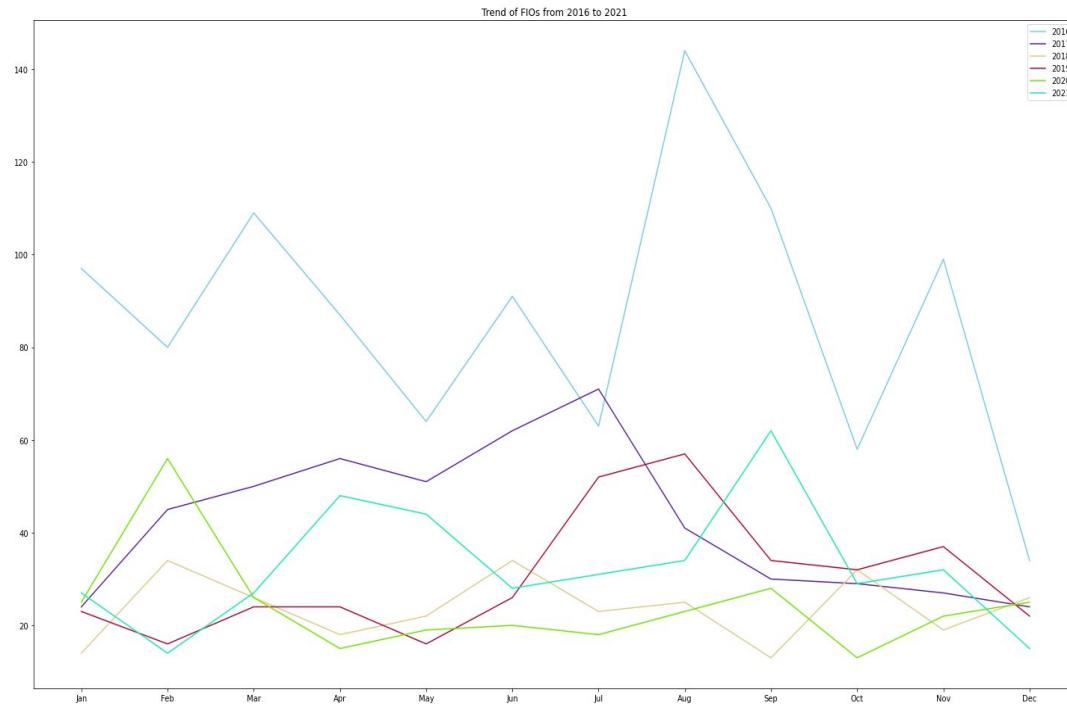
Everett - Fio type locations

- This map shows the location of Fios in Everett. The red dots represent type I, the blue dots represent type A, the green dots are type O, and the black dots are type S
- Primarily Fio cases of type O I in the municipality of Everett



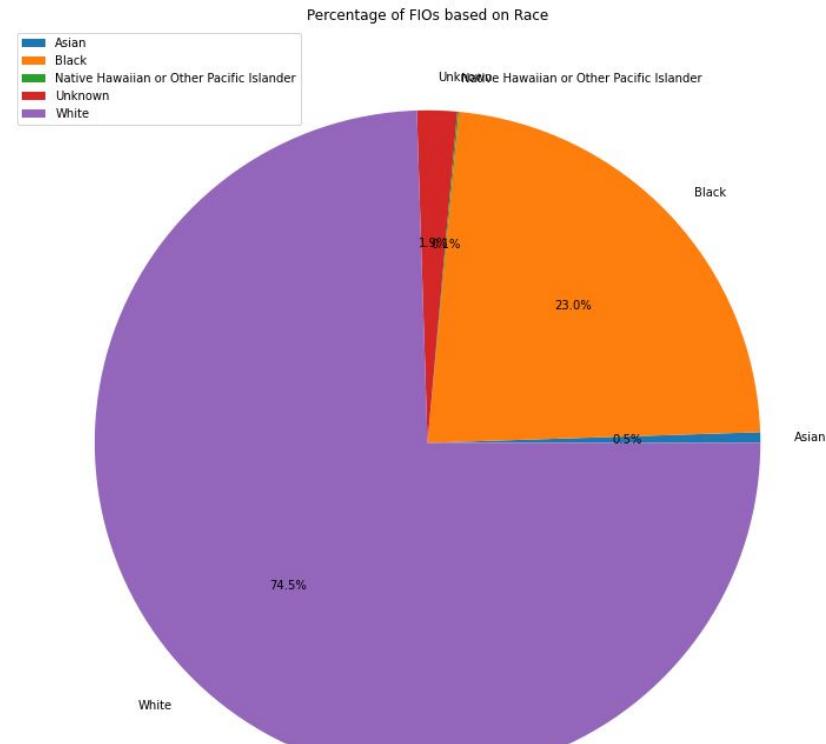
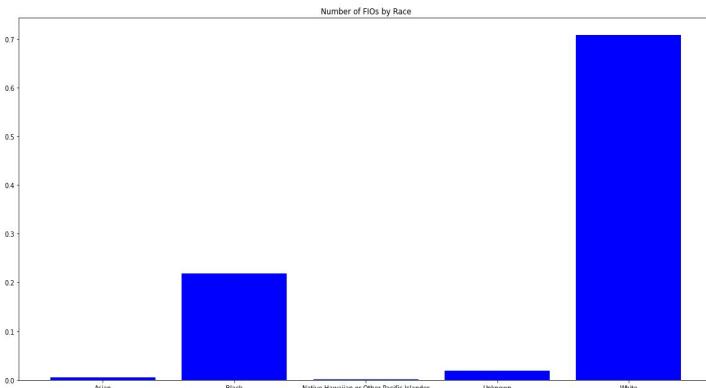
Framingham - trend of Fios since 2016

- Unlike the other municipalities, Framingham sees it spike in cases towards the end of the year in months from October to December
- Overall trend of cases going down since 2016



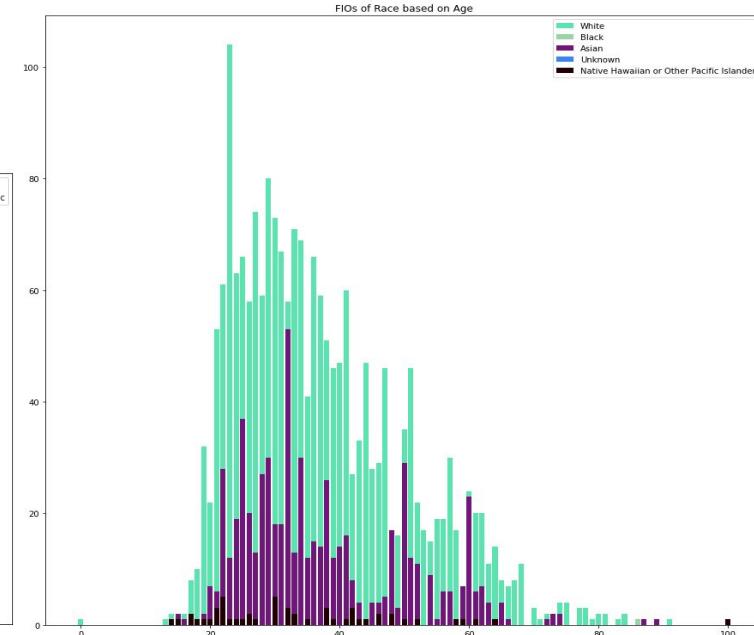
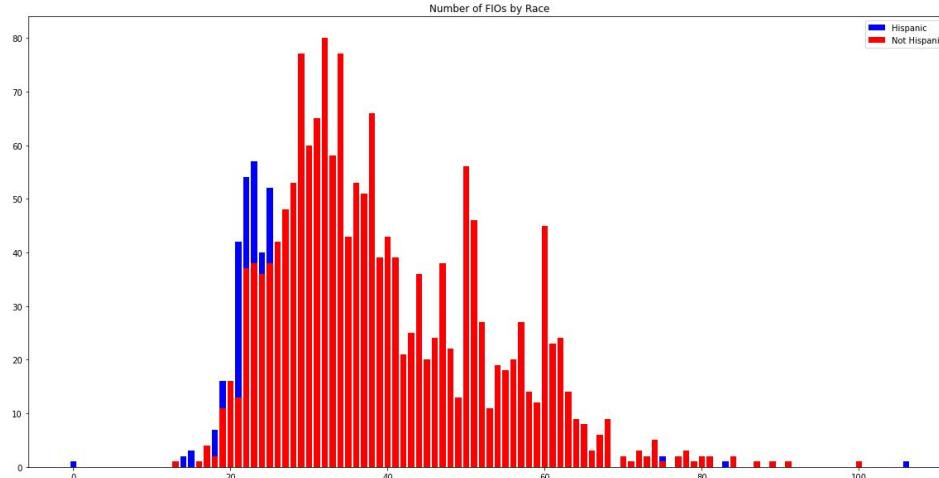
Framingham - Fios classified by race

- The bar graph shows the overall number of fios by race while the pie chart shows the Fios by percentage
- Again we see an unusually large amount of white Fio cases
- Would like to see census data to confirm trend



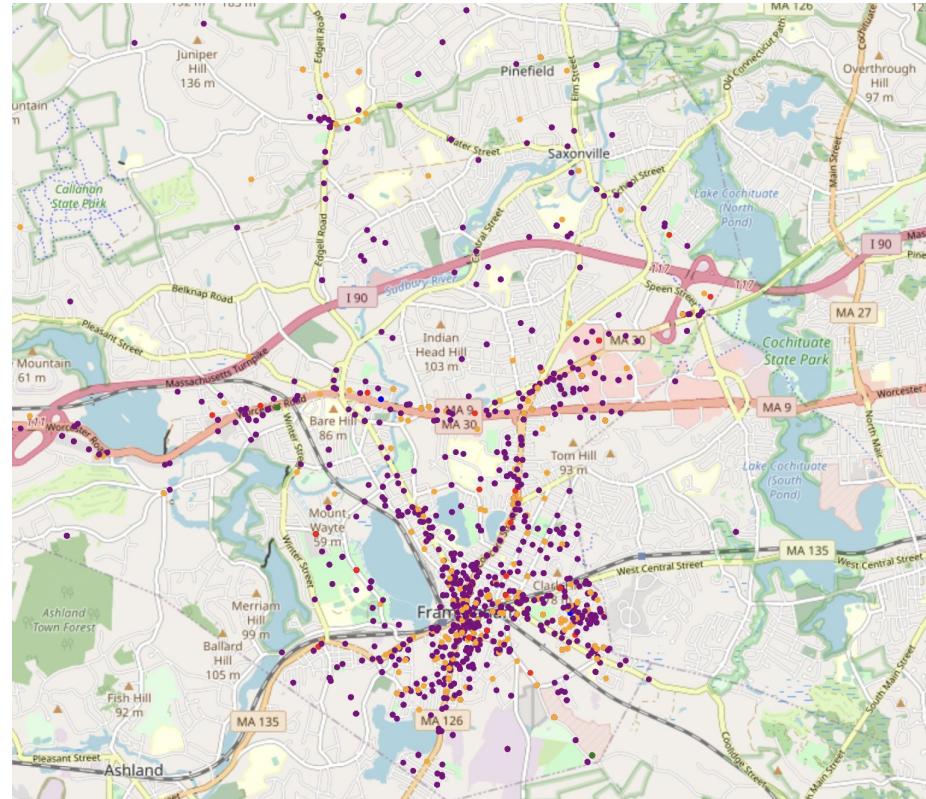
Framingham - Fios by age

- The graph on the right shows Fios by age and distinguishes based on race, while the graph on the left focuses on whether or not the person was identified as Hispanic or not
- Most Hispanic cases occur in the age range of about 18-25
- Potential for gang affiliations in that data, would need gang database to confirm



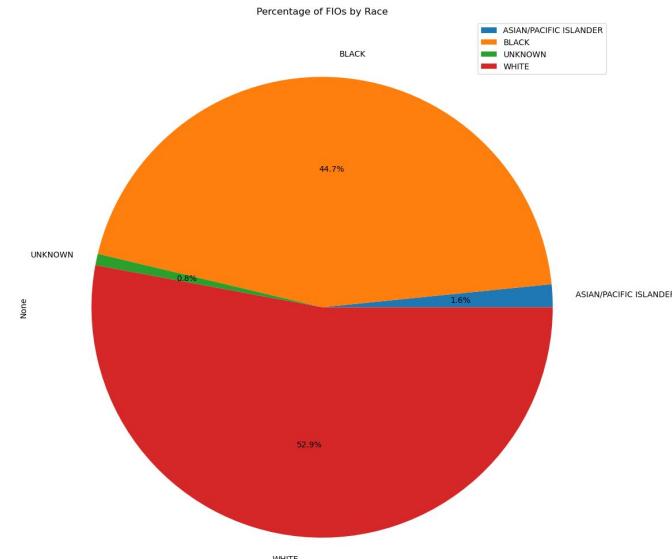
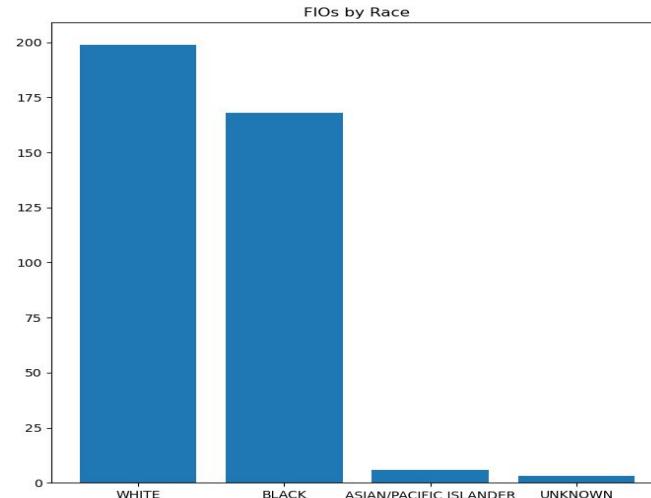
Framingham - map of Fio locations

- The map shows the location of Fios based on race, blue dots represent Asian, orange dots represent Black, red dots are unknown, purple dots represent White, and green dots represent Pacific Islanders
- Most of the surrounding areas consist of purple dots
- Large cluster of red dots towards the middle of Framingham



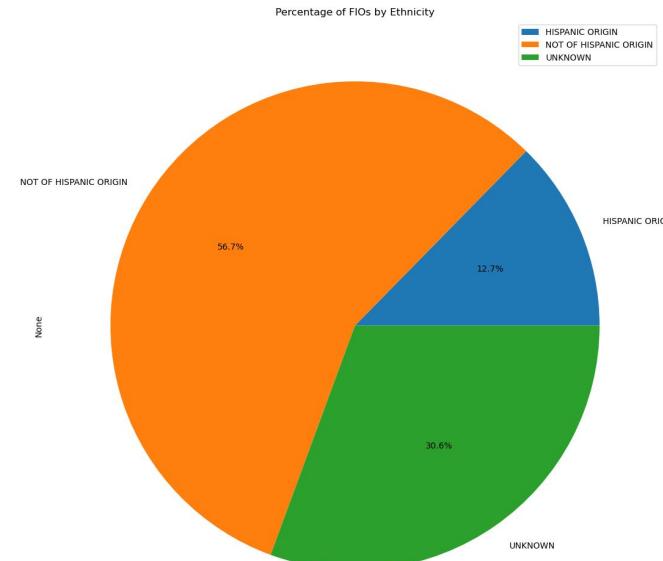
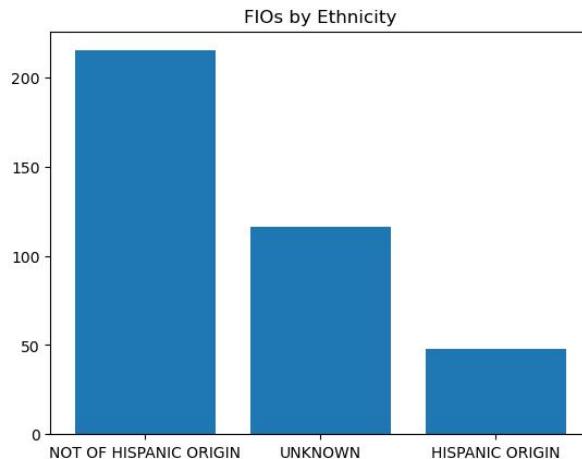
Quincy - Fios classified by Race

- The bar graph shows the total number of cases by race, while the pie chart shows the percentage out of all the Fios
- Census data would provide more context
- Vast Majority White and Black



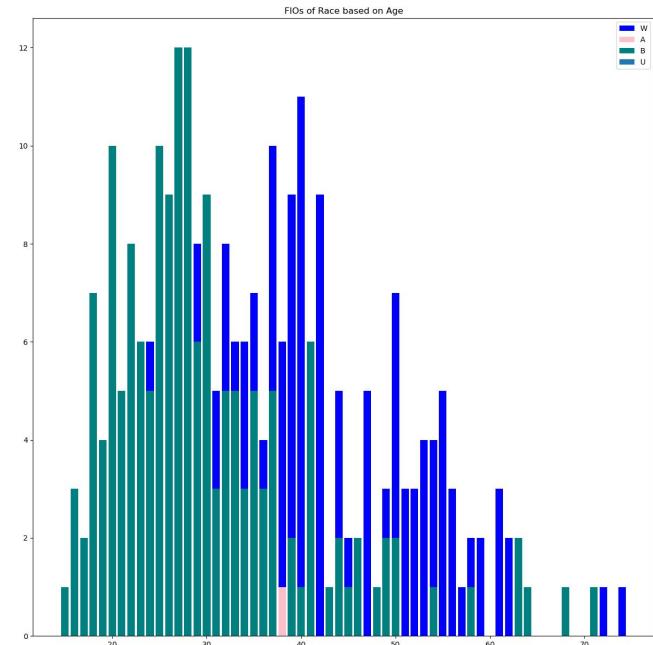
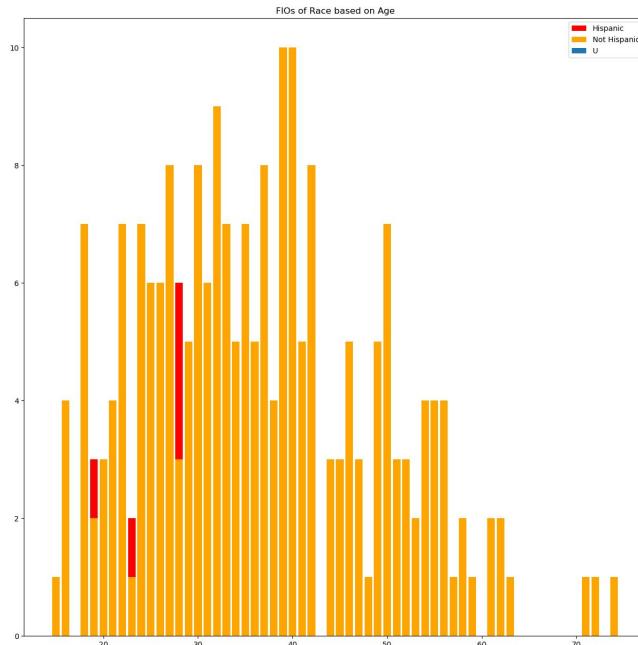
Quincy - Fios classified by Ethnicity

- The bar graph shows the total number of cases by Ethnicity, while the pie chart shows the percentage out of all the Fios
- Census data would provide more context
- Many unknown



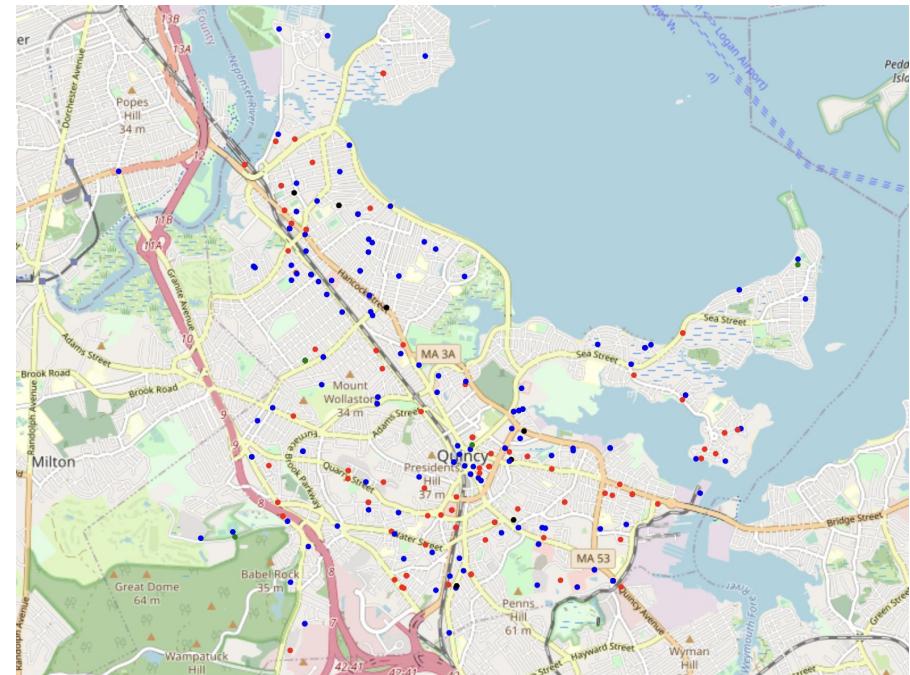
Quincy - Fios classified by Age

- Left Graph Shows age and Ethnicity
- Left Graph Shows age and Race
- Trend around 20's, 30's and 40's
- Many juvenile cases



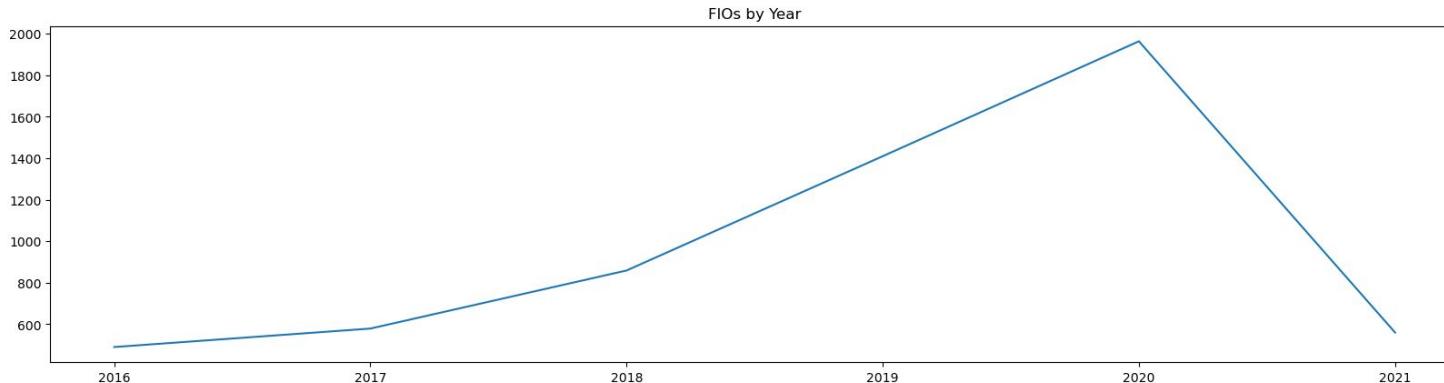
Quincy - Fios by Location

- The map shows the location of Fios based on race, blue dots represent White, Red dots represent Black, Black dots are unknown, Green dots represent Asian / Pacific Islanders
- Majorly Black and White cases
- Black classes primarily in south Quincy



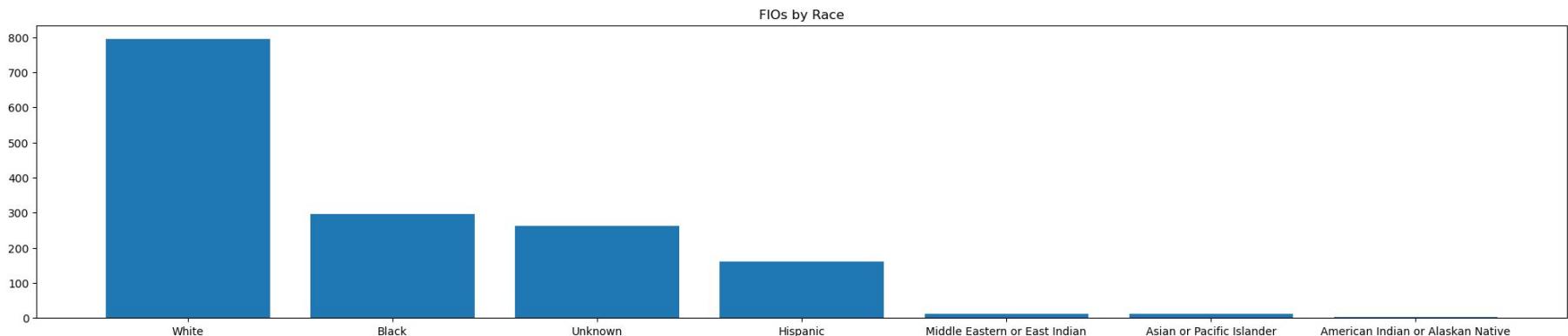
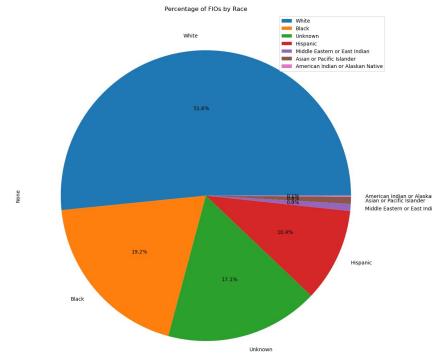
State Police - Fios by Year

- Trending Significantly Upward
- Large decrease in FIO's during the COVID-19 Pandemic



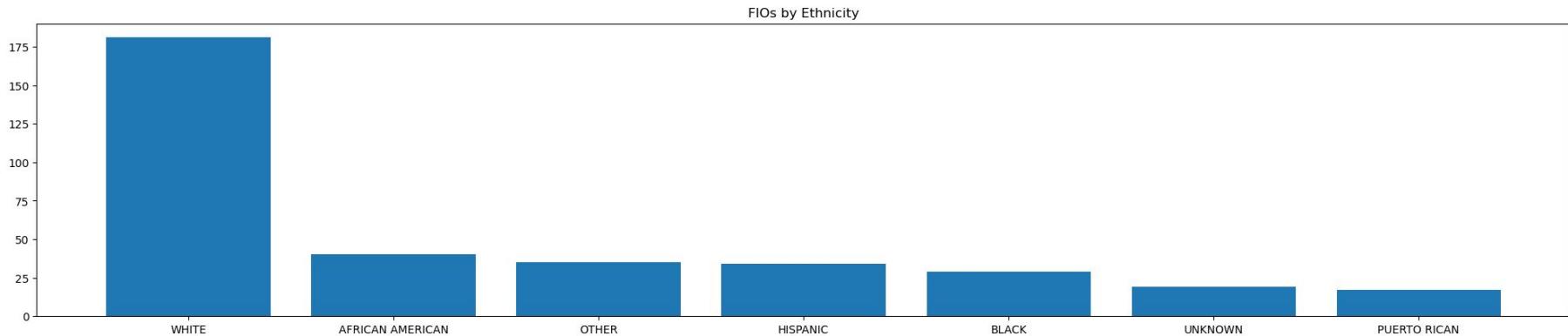
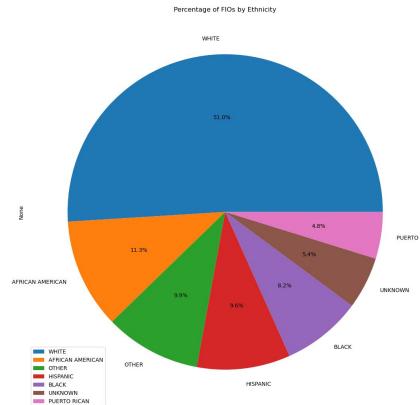
State Police - Fios classified by Race

- The bar graph shows the total number of cases by race, while the pie chart shows the percentage out of all the Fios
- Census data would provide more context
- Data seems to be mixed with Ethnicity



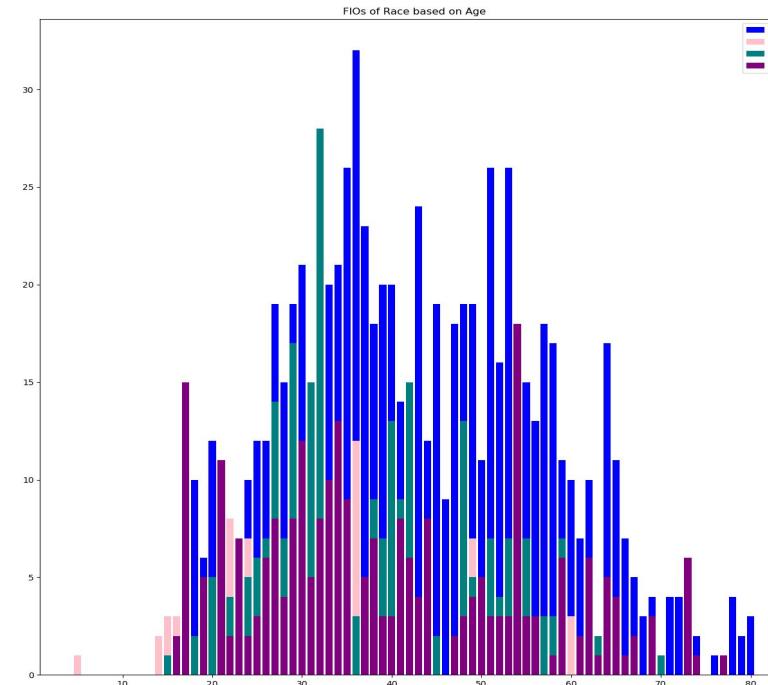
State Police - Fios classified by Ethnicity

- The bar graph shows the total number of cases by Ethnicity, while the pie chart shows the percentage out of all the Fios
- Census data would provide more context
- Data seemingly mixed with nationality
- Under 2% grouped into “Other” category



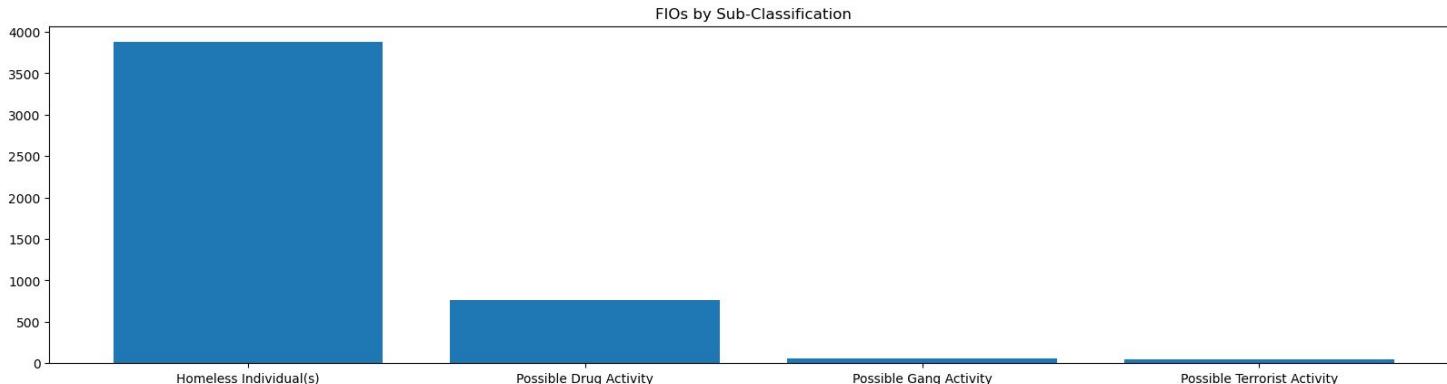
State Police - Fios classified by Age

- Fairly Evenly distributed
- Trend around 20's, 30's and 40's
- Many unknown cases
- Younger cases more likely to be Black and Hispanic



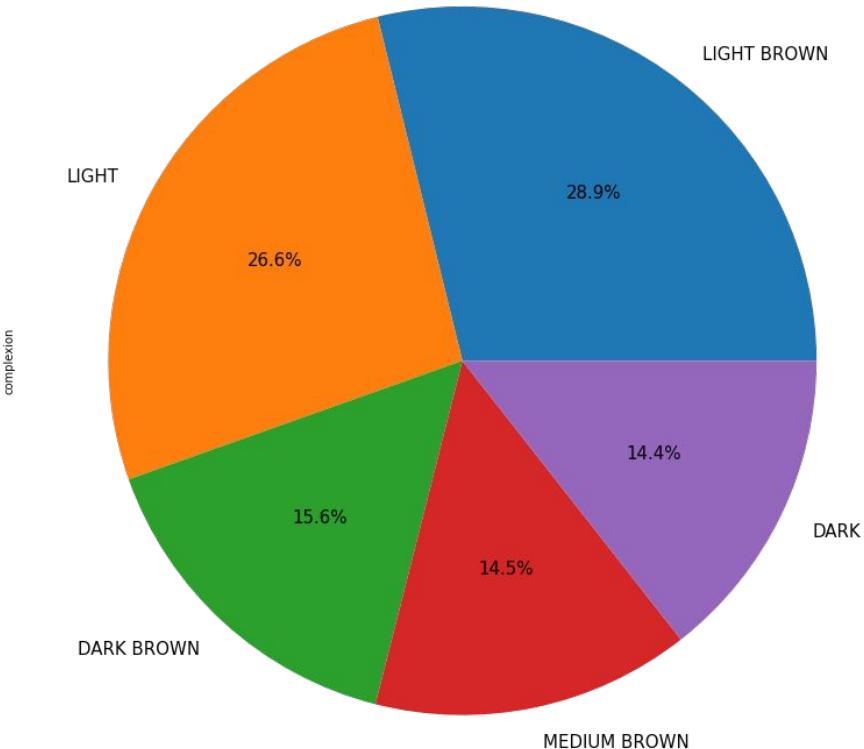
State Police - Fios By Subclass

- Large majority of Homeless individuals
- Not a lot of gang related or terrorist activity
- Many reported drug activity



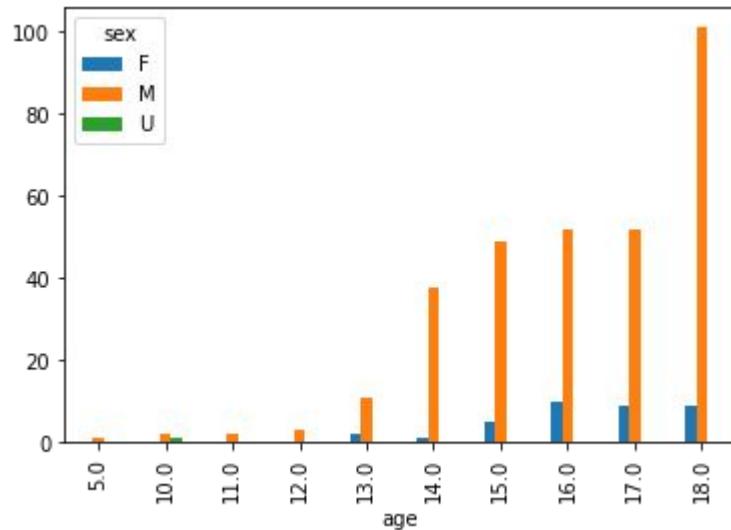
Springfield - race and ethnicity

- Race values unclear - either Hispanic or Not Hispanic, other values are weird
- Complexions could give us better insight
- Most FIOs report Light or Light Brown complexion, but it looks like the data is fairly distributed



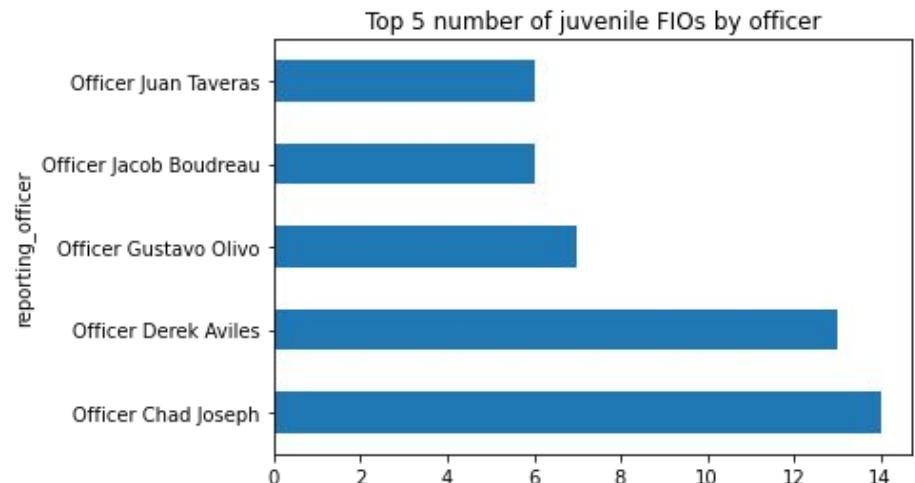
Springfield - juveniles

- Same plot as Brockton
- The distribution of ages is very similar to Brockton's
- 18 year-old males are most frequent
- Ages 15-17 are fairly distributed

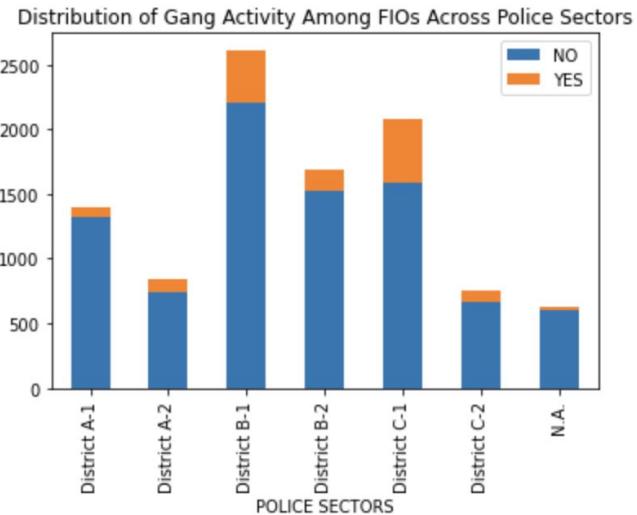
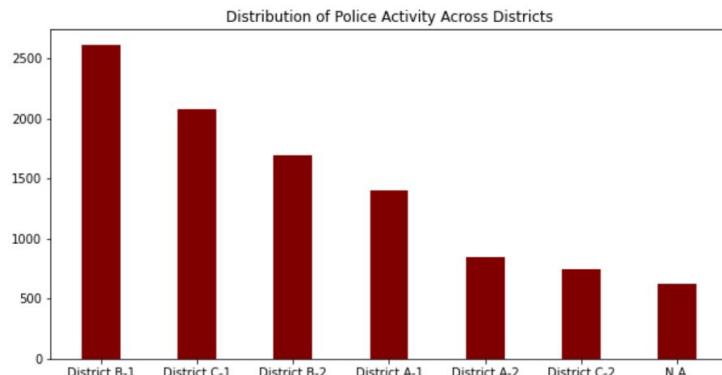


Springfield - juveniles, police officers

- Access to officer names
- Interesting to see which officers are associated with the most juvenile FIOs
-

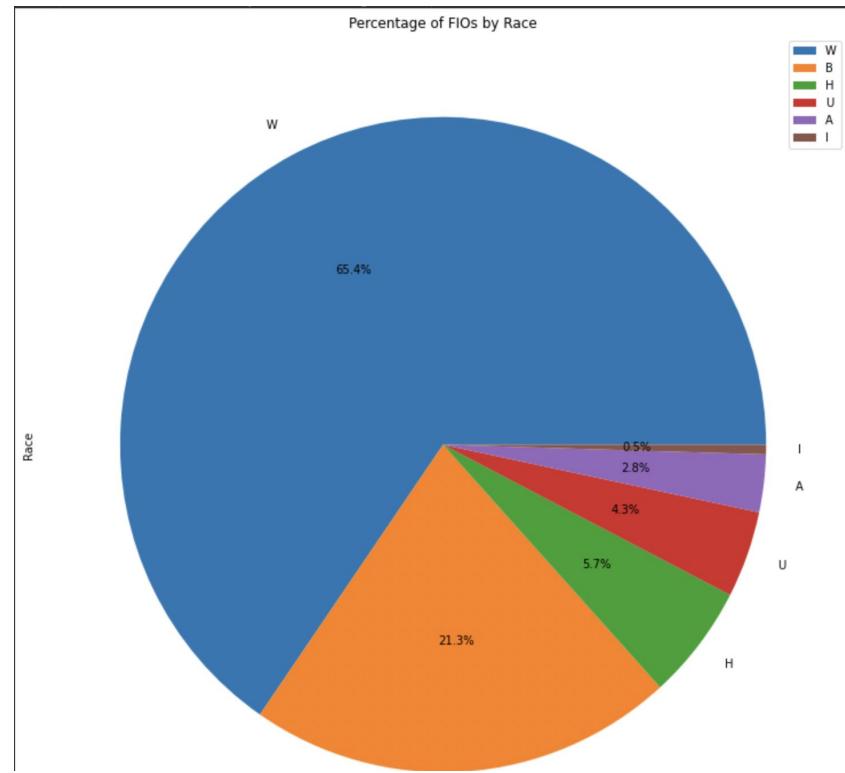
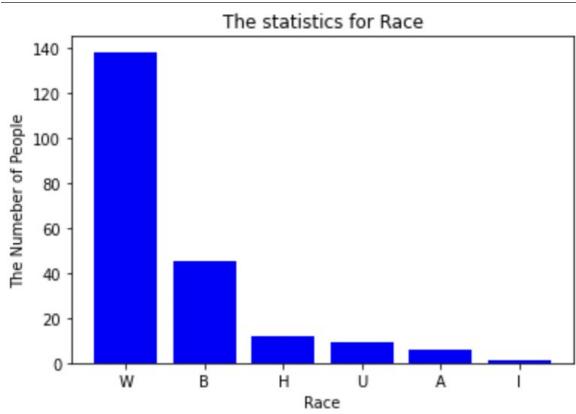


Distribution of Police and Gang Activity Across Lowell



Newton – FIO Race Distribution

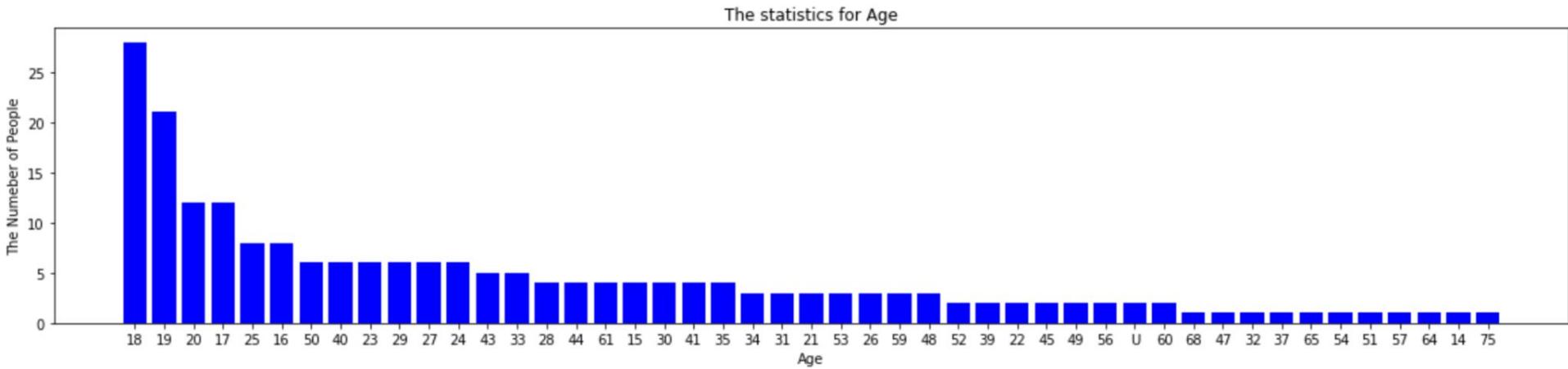
In Newton, the percentage of whites on the caseload is much greater than the sum of the other races.





FIO Distribution by age

The age range for juveniles in the United States is under 18, and the 18-year-old has the highest number of cases in Newton.

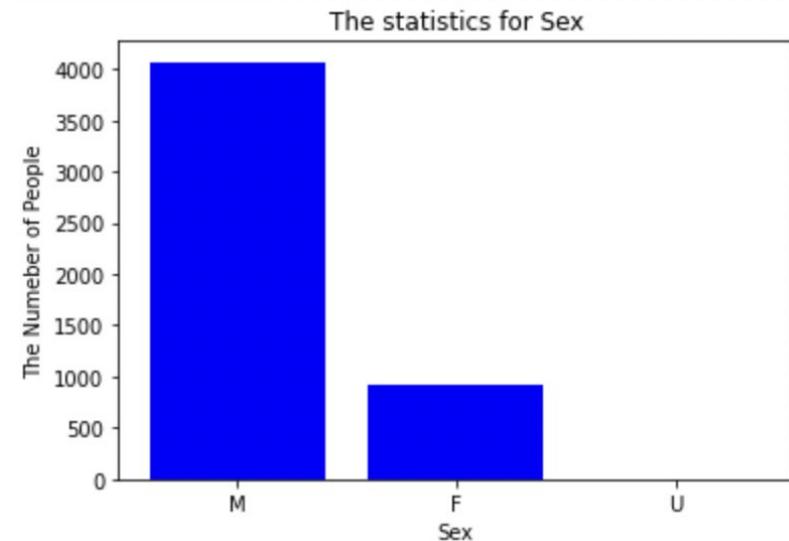


New Bedford – FIR Race And Sex Distribution



From the report, we can see that whites outnumber blacks in the incidents.

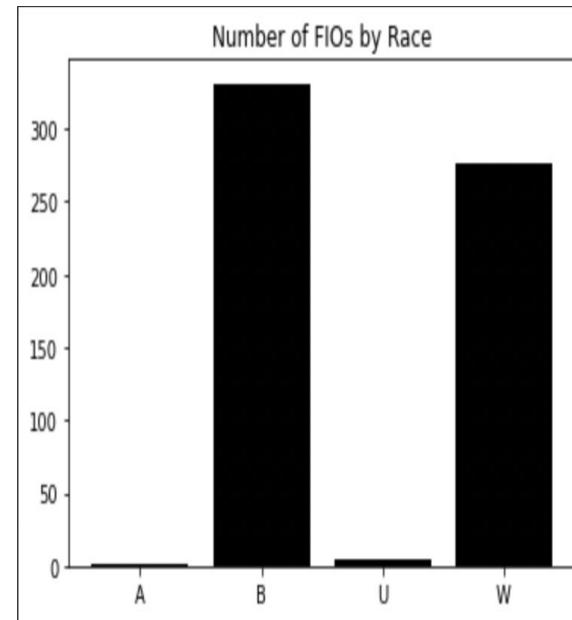
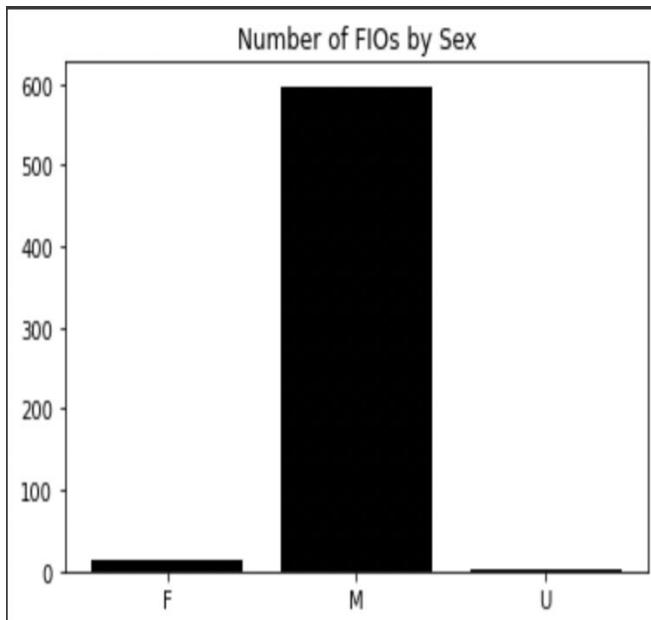
Males dominate the incidents, but females also make up a small percentage.



Gang-Related

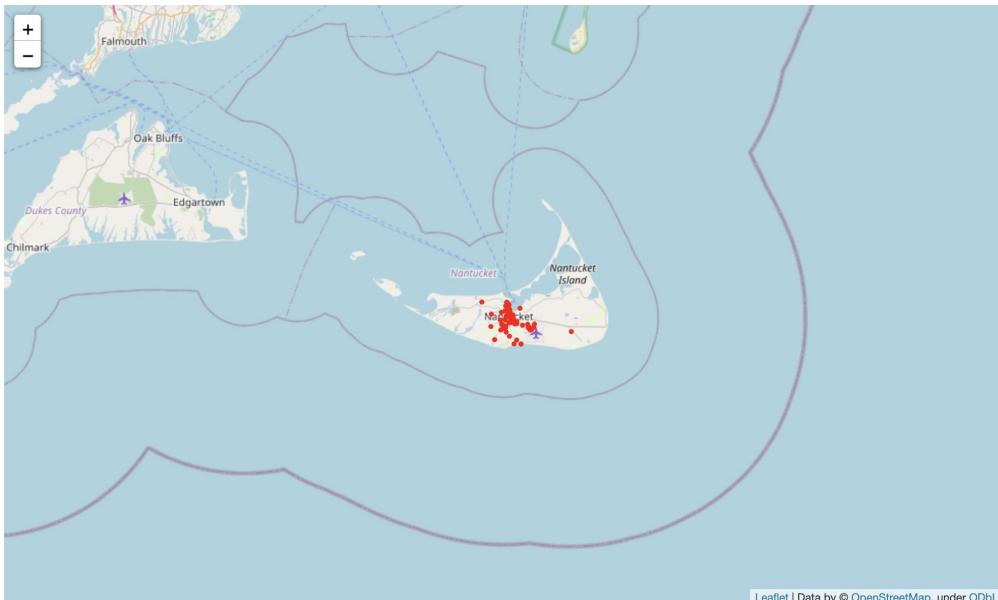
The number of blacks is greater than the number of whites in the gang's F-event data.

Female is considered a few group in gang related events, in contrast to male.



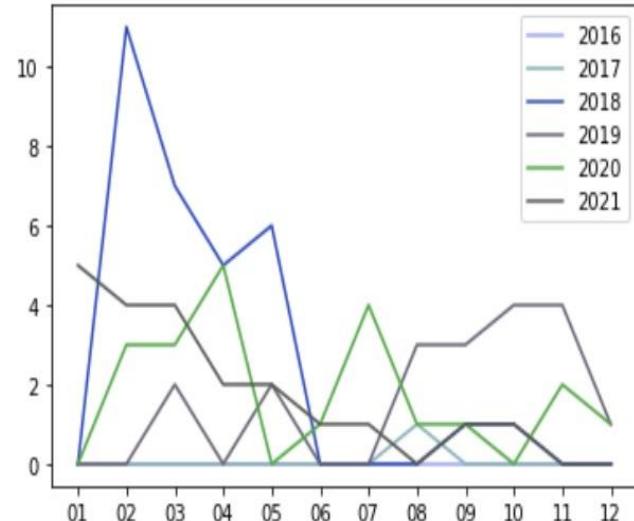
By mark out the address from the map, you can see that Nantucket location is very unique.

Nantucket



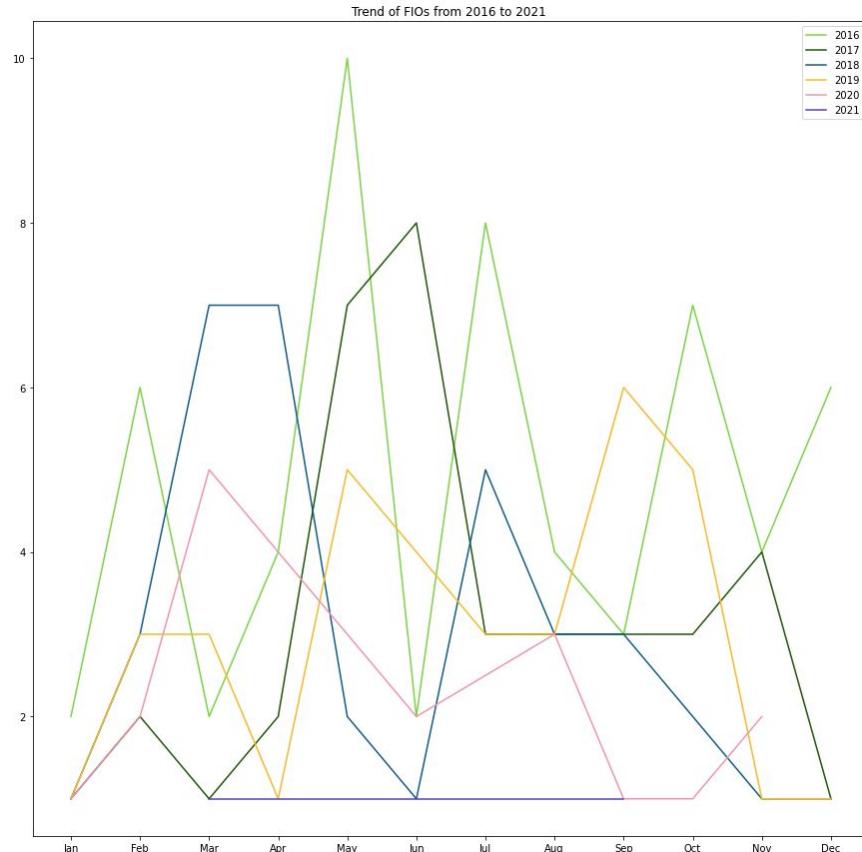
The number of cases is low, and some months in the table below do not have cases.

Trend of FIOs from 2016 to 2021



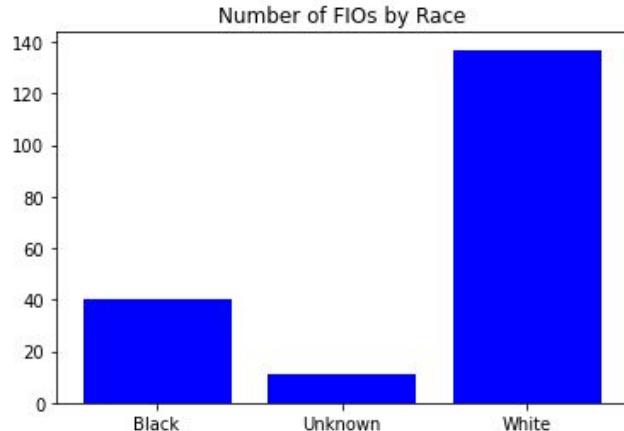
Waltham - trend of Fios since 2016

- This graph shows the overall number of Fios since 2016
- Most years follow a very similar structure of case number
- Potential pattern can be recognized for when cases occur verse when they are less likely to occur
- Cases are trending down since 2016

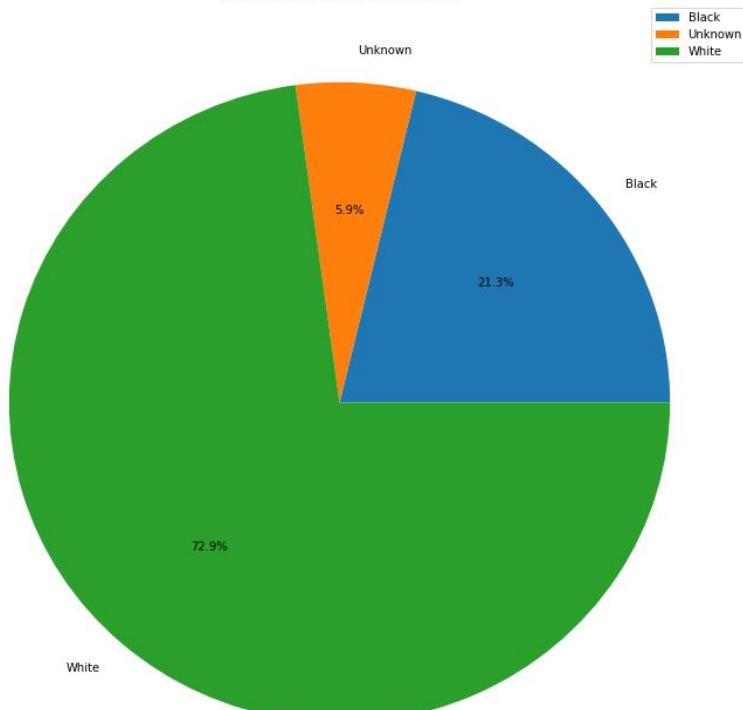


Waltham - Fios classified by race

- The bar graph shows the overall number of fios by race while the pie chart shows the Fios by percentage
- Again we see an unusually large amount of white Fio cases
- Would like to see census data to confirm trend



Percentage of FIOs based on Race



Limitations

- Lots of missing values (sometimes entire columns)
 - Several months missing (Chelsea)
 - Having to consider parts of datasets that do not have missing values to analyze
- Inconsistency (attributes not the same across tables)
- Dealing with non-standard data formats (PDFs, Word docs)
 - Braintree and Malden data are scanned PDFs, unable to be read
- Categorical attributes like Race have unclear values
- Waltham data is scattered across multiple docx and does not give any insight into age, gender, or ethnicity



Next Steps

- Consolidate all the individual municipality datasets into one to analyze:
 - FIO Trends
 - FIO and race/ethnicity relationships
 - Age insight

across multiple towns