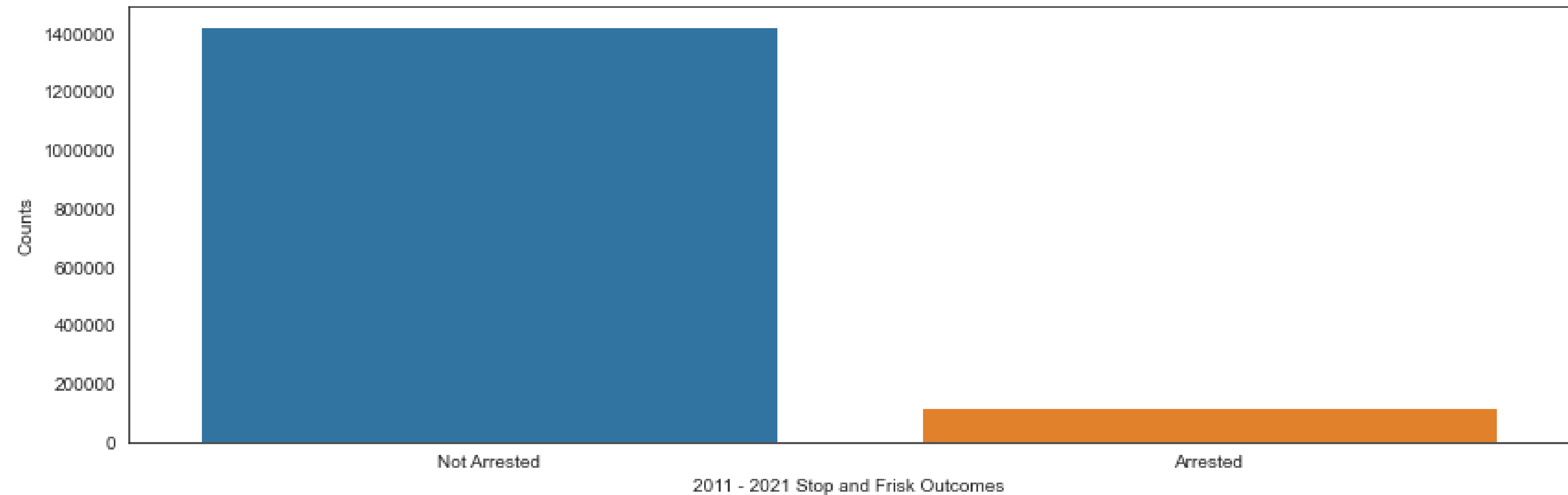




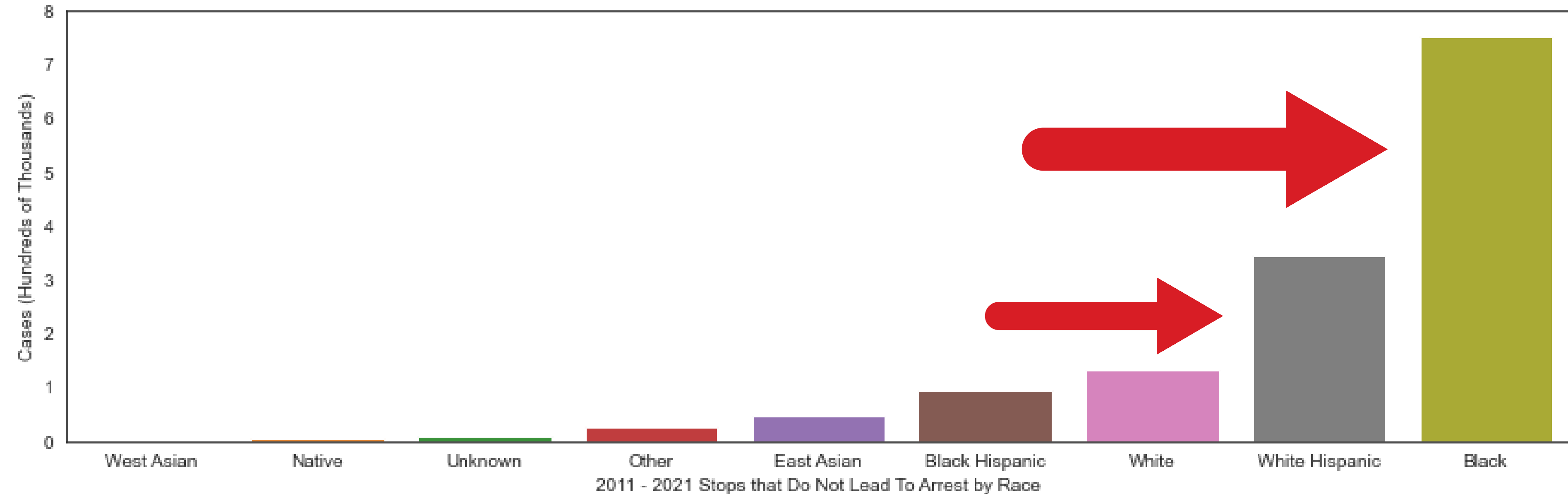
**CAN MACHINE
LEARNING
DECREASE
NEEDLESS STOP-
AND-FRISKS ?**

Louis Casanave, Flatiron School



92% of Stops in Last 10 Years **Did Not Lead to Arrest**
(one million four hundred twenty-five thousand eight hundred fifty-three stops)

Stop-and-Frisks more common among **Black and Hispanic** people

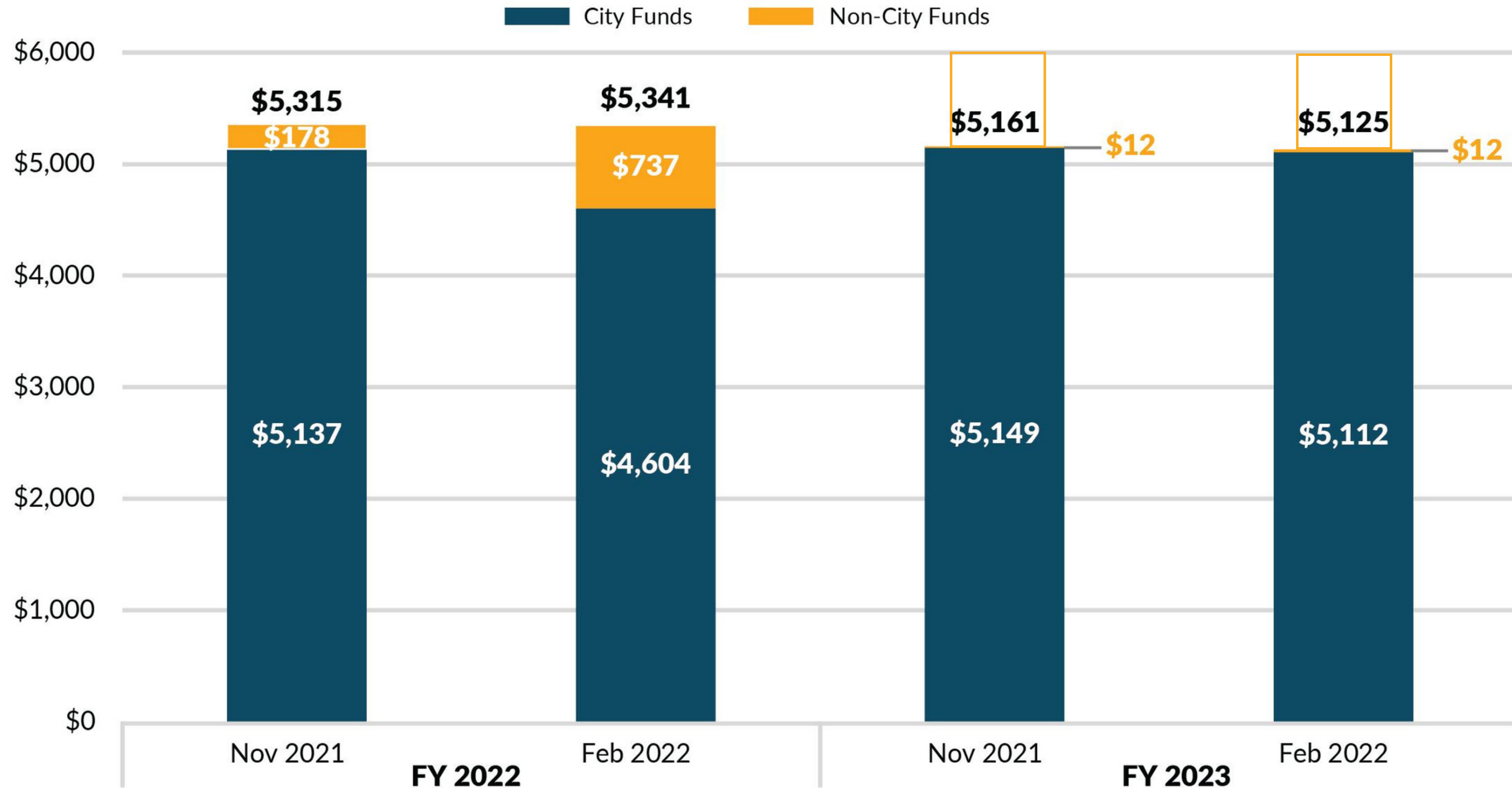




**Stop-and-Frisks are
publicly
unpopular**

(AP Photo/Seth
Wenig, File)

**Figure 1: New York Police Department Agency Operating Budget for FY 2022 and FY 2023,
November 2021 and February 2022 Financial Plans**
(dollars in millions)



Source: City of New York, Mayor's Office of Management and Budget, *Preliminary Fiscal Year 2023 Budget: Financial Plan Expense* (February 16, 2022), and *November 2021 Financial Plan Expense* (November 30, 2021).

- **NYPD** has **83 million less** in the budget next year
- the **city is paying for more** of it

PROJECT GOALS: LESS STOPS

Save NYPD Time

Better Police Relations with (BIPOC) New Yorkers

Save Taxpayers Money

DELIVERABLES

Transparency: Make
Data Available for
Average New Yorker

DONE

Modeling: Time
Series Analysis

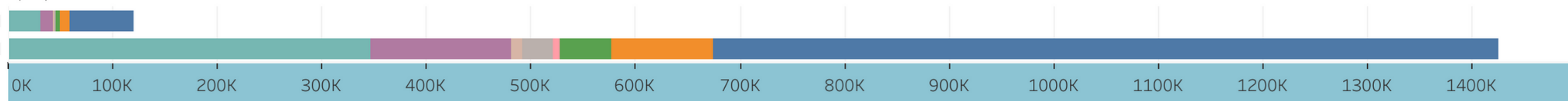
ONGOING

Date

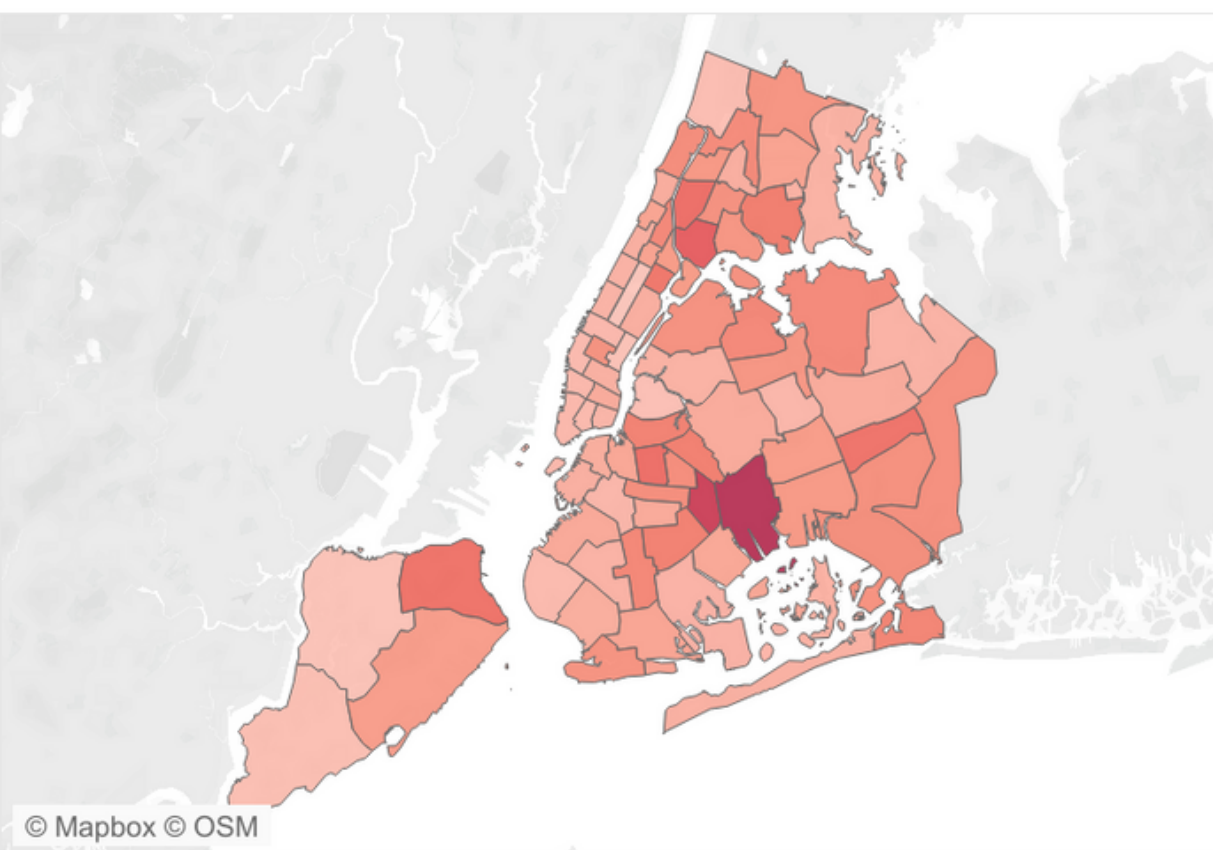
1/1/2011 to 12/31/2021

Arrested

Not Arrested

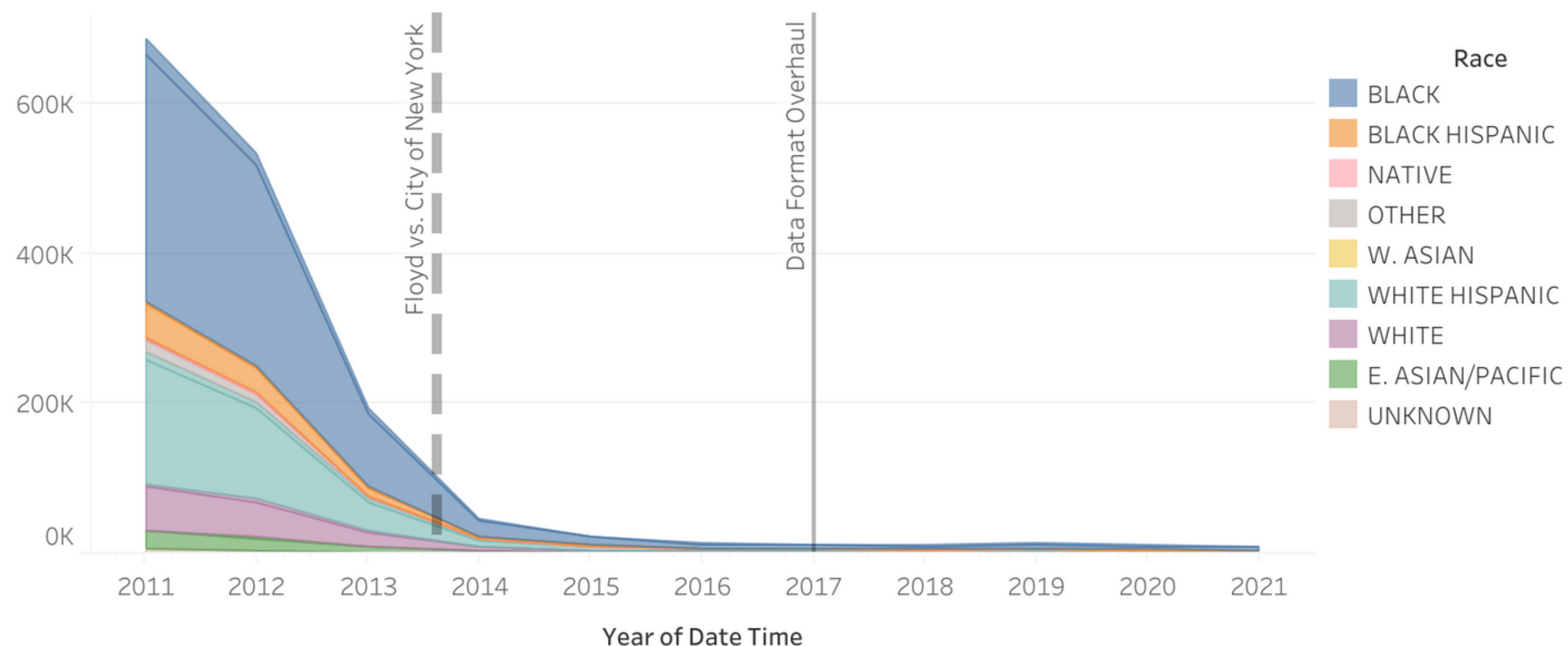


NYPD Precinct



Cases

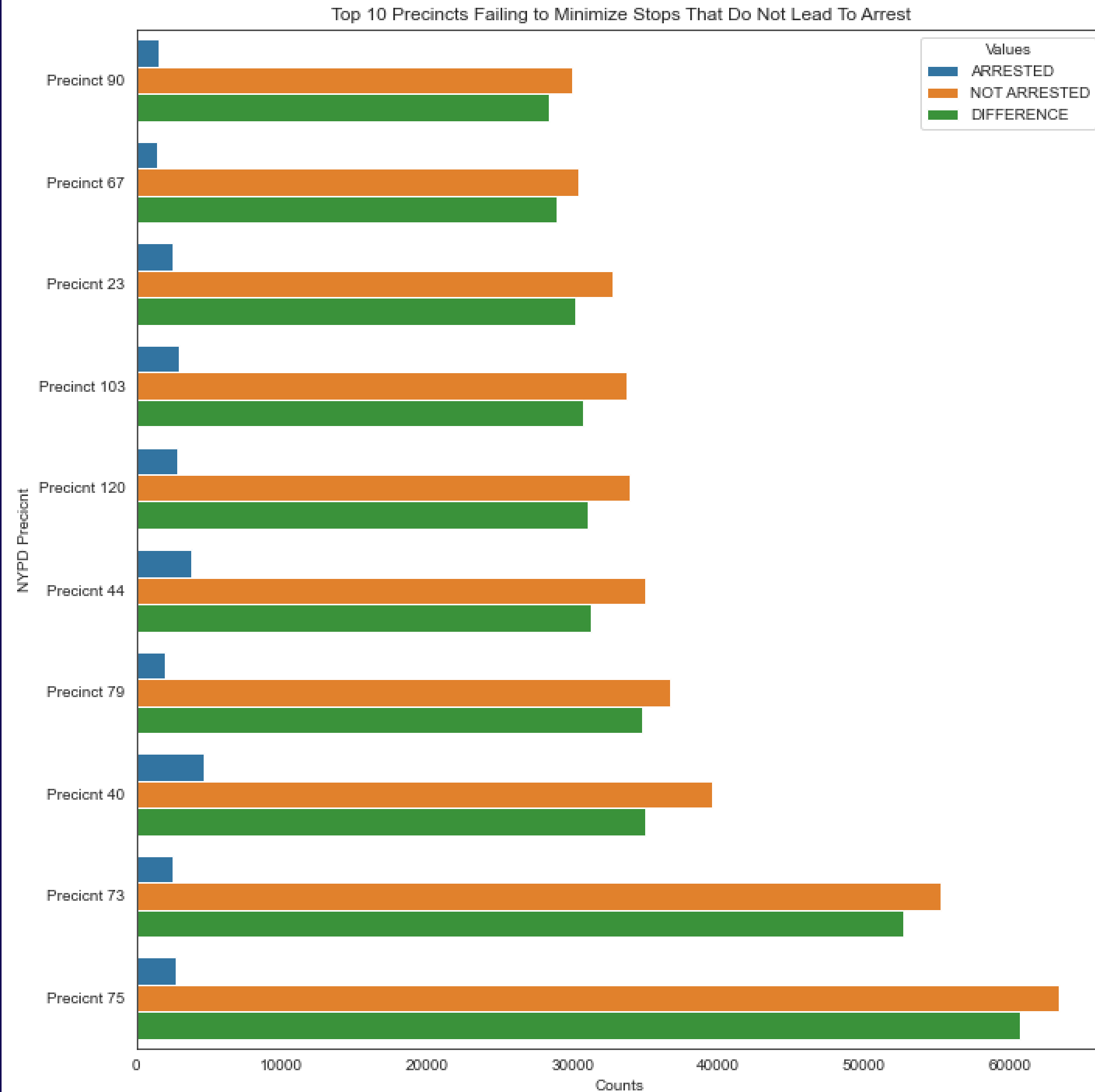
2,439 66,014



Data Analysis

1,545,827 STOPS
10 YEARS SINCE 2011
PRECINCT, RACE, OUTCOME

What Can Analysis Tell Us?



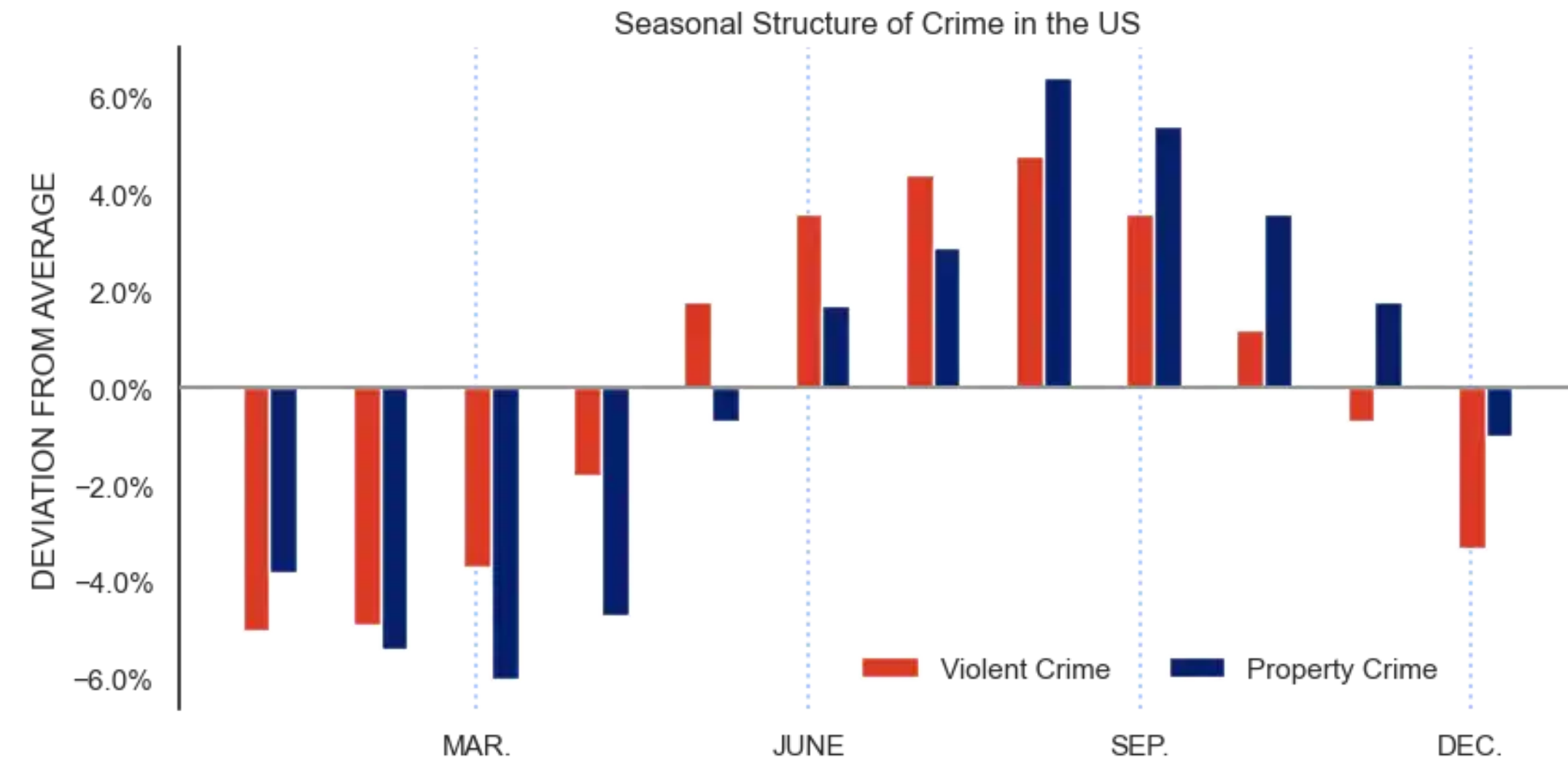
Data: Modeling

135,341 STOPS

7 YEARS

OUTCOME ONLY

SINCE FLOYD VS CITY OF NEW YORK



WHY TRY TIME SERIES MODELING?

- Crime is **Seasonal**
- Time data is **demographic neutral**

MODELING GOALS

- Predict reoccurring times when stops do not lead to arrest
- Less stops during those times

MODELING METHODS

Naive Model

Last Month

Random Walk Model

Using Last Month

ARI Model

Using Last Month and Auto Regression

IMA Model

Using Last Month and Moving Average

SARIMA Model

Using Last month, Auto Regression,
Moving Average and Season

MODELING RESULTS

Naive Model

2% off

Random Walk Model

10% off

ARI Model

10% off

IMA Model

10% off*

SARIMA Model

10% off

What Can A **NAIVE** Model Tell Us?

1) **Last Month** is the best predictor for today

2) Need **LESS stops** during spikes

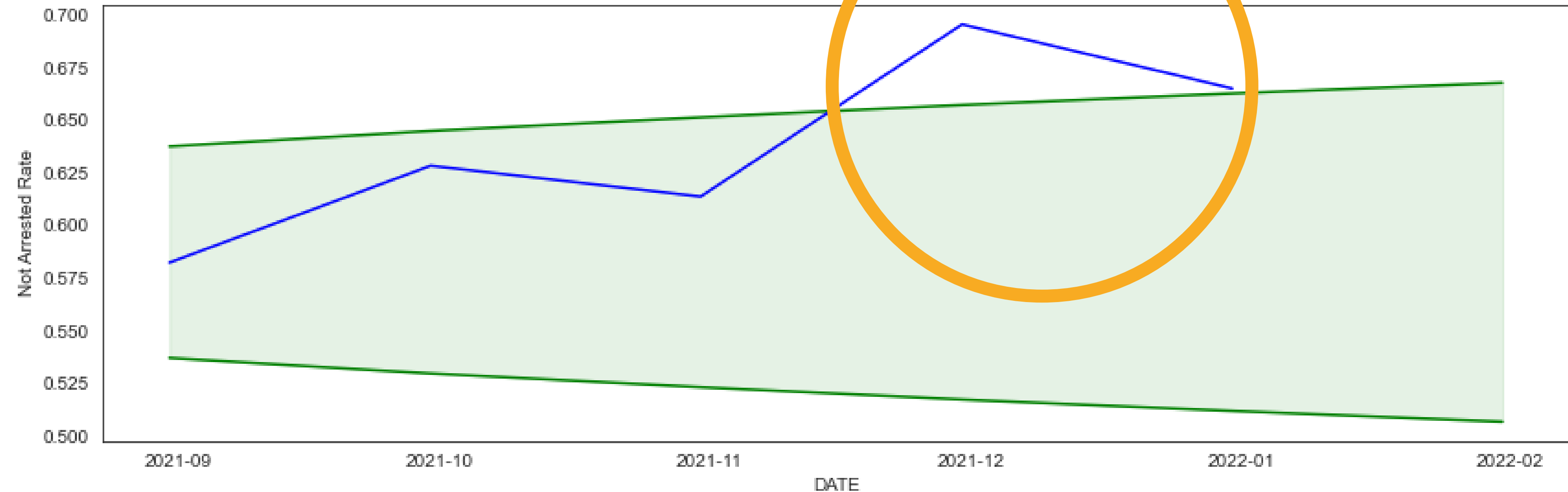
What Can An
IMA Model Tell
Us?

Use for **anomaly**
detection:

Alert when rates are
higher than **historic**
precedence

IMA MODEL IN ACTION

Successfully Identified 2021 December Spike
as an Outlier



Recommendations:

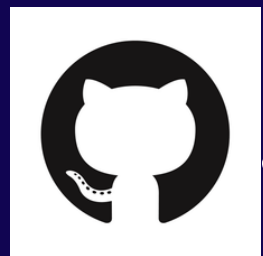
- More training for top 10 Precincts
- Use IMA Model to Detect Outliers
- Increase NYPD Responsiveness to change

Future Work

- Model More Variables
- Different Model Types
- More Accurate Predictions

THANK YOU FOR YOUR TIME

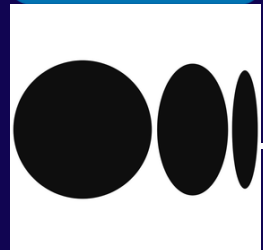
QUESTIONS



github.com/casanave



linkedin.com/in/louis-casanave-78057aa0/e



medium.com/@ls.casanave

Race Description

All

Suspect Sex

- ☒ FEMALE
- ☒ MALE

Physical Force Used

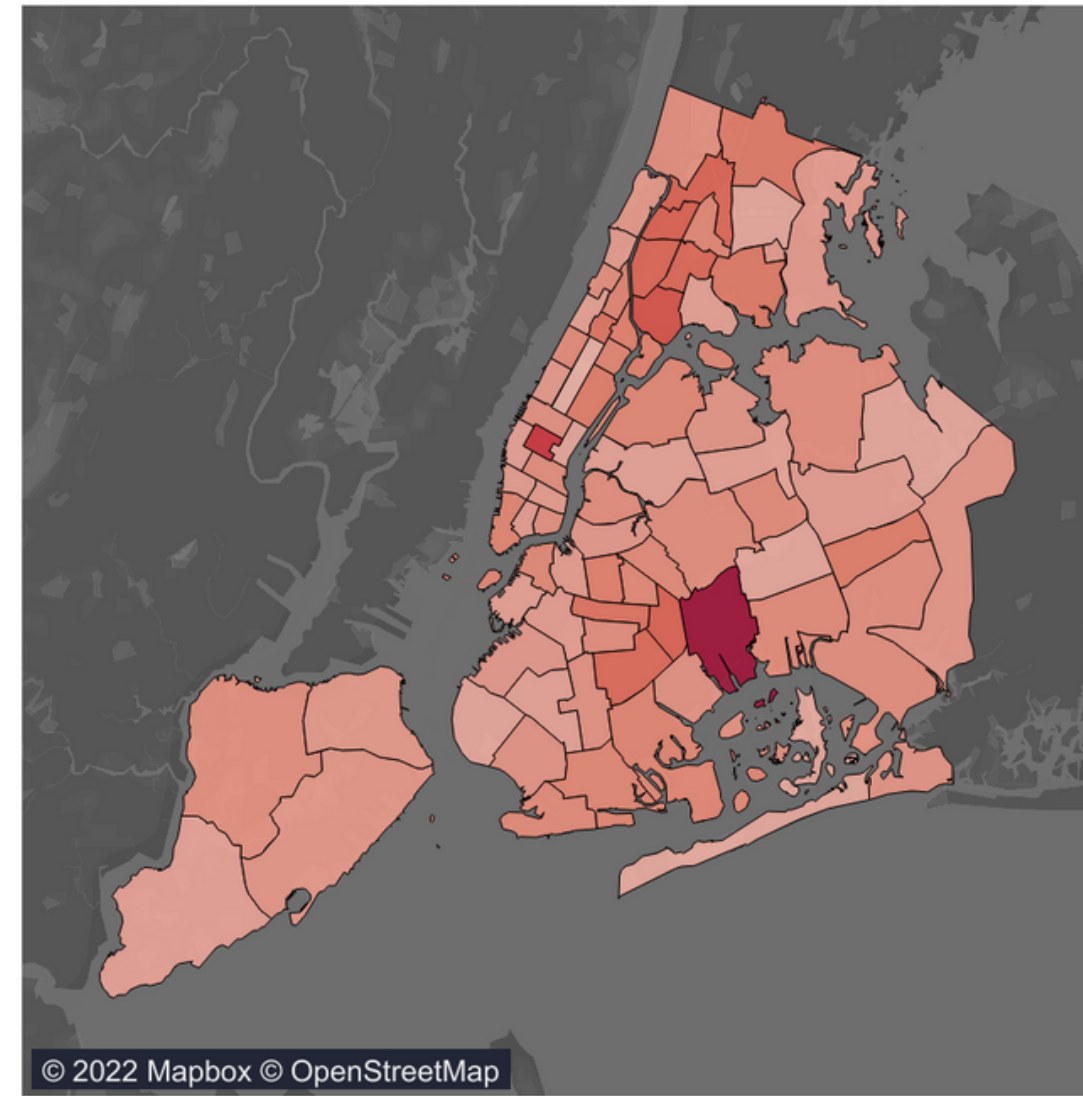
- ☒ UNKNOWN
- ☒ TRUE

Outcome

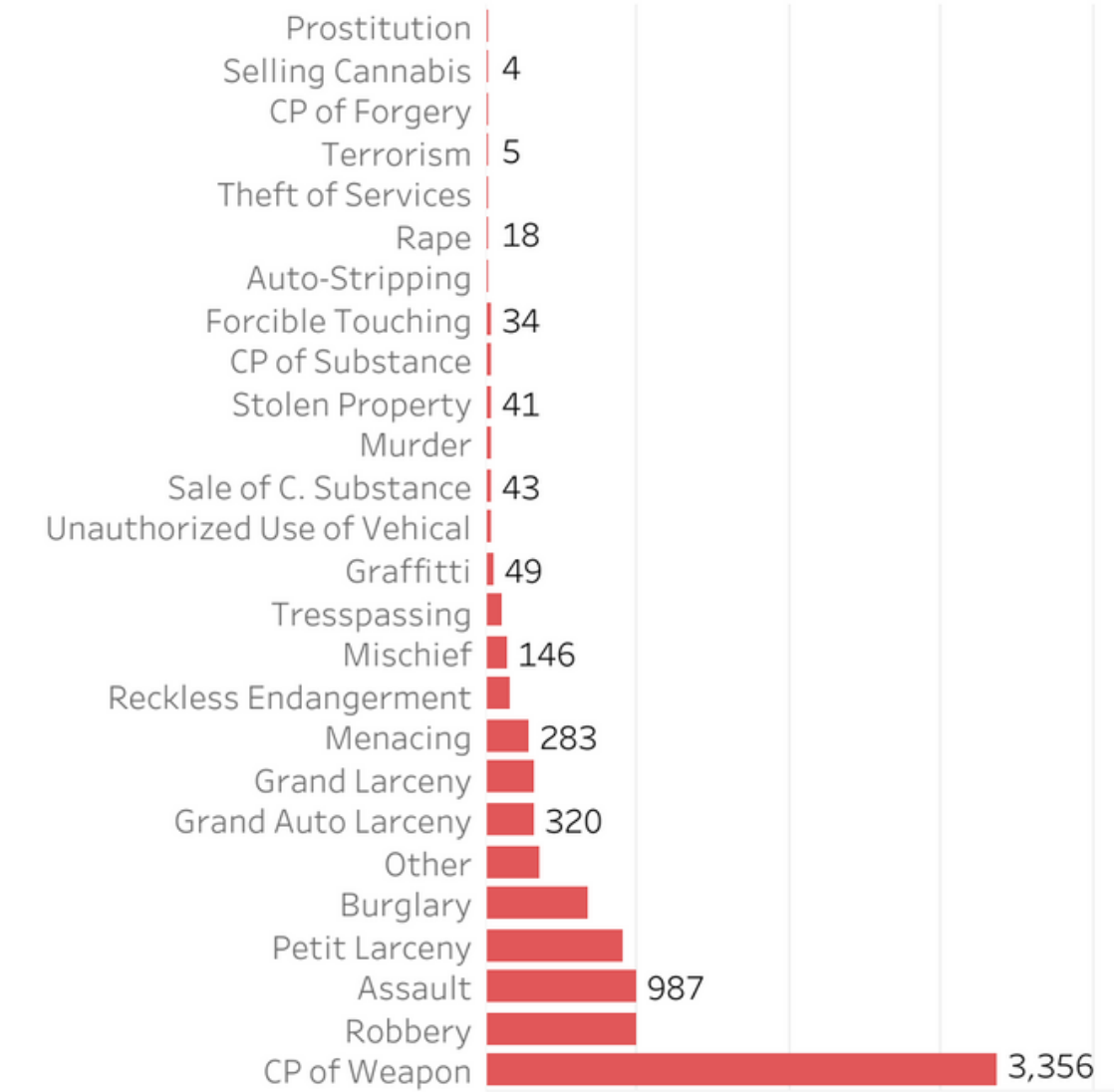
- ☒ ARRESTED
- ☒ NOT ARRESTED*

* 'Not Arrested' contains data for both Not Arrested and Unknown Outcomes

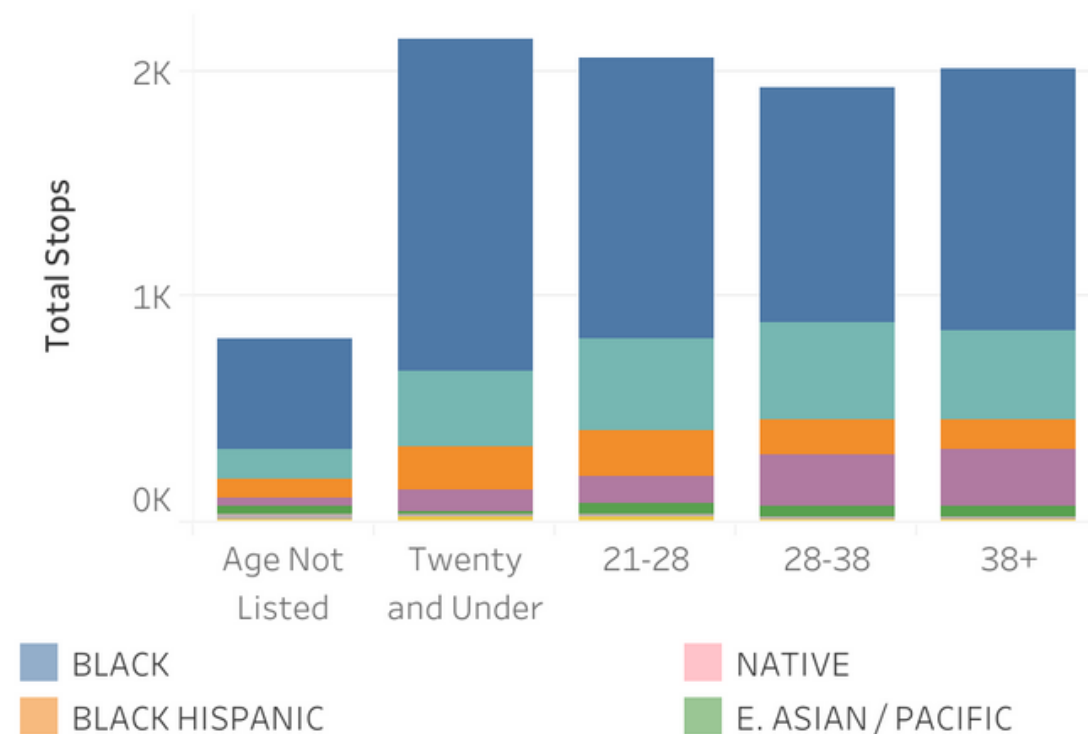
Outcome by Precinct



Suspected Crime of Stopped



Ages



Racial Disparity Over Time

