



# Driving While Black

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# Background/Introduction:

- The Role of a Traffic Officer?
  - **Prevent potential loss of life** by focusing on the lifesaver offenses of speeding, seatbelts, using mobile phones while driving and driving under the influence.
  - Having a significant focus on **crime prevention** and **crime detection**.
  - Traffic stops are necessary considering everyone's safety on the road as well as pedestrians and in the **detection of contrabands such as drugs or weapons**.
- What is Stanford Open Policing Project?
  - On a typical day in the United States, police officers make more than **50,000 traffic stops**.
  - They are gathering, analyzing, and releasing records from millions of traffic stops by law enforcement agencies across the country.
  - **Goal:** to help researchers, journalists, and policymakers investigate and improve interactions between police and the public.



# My focus on Nashville, Tennessee

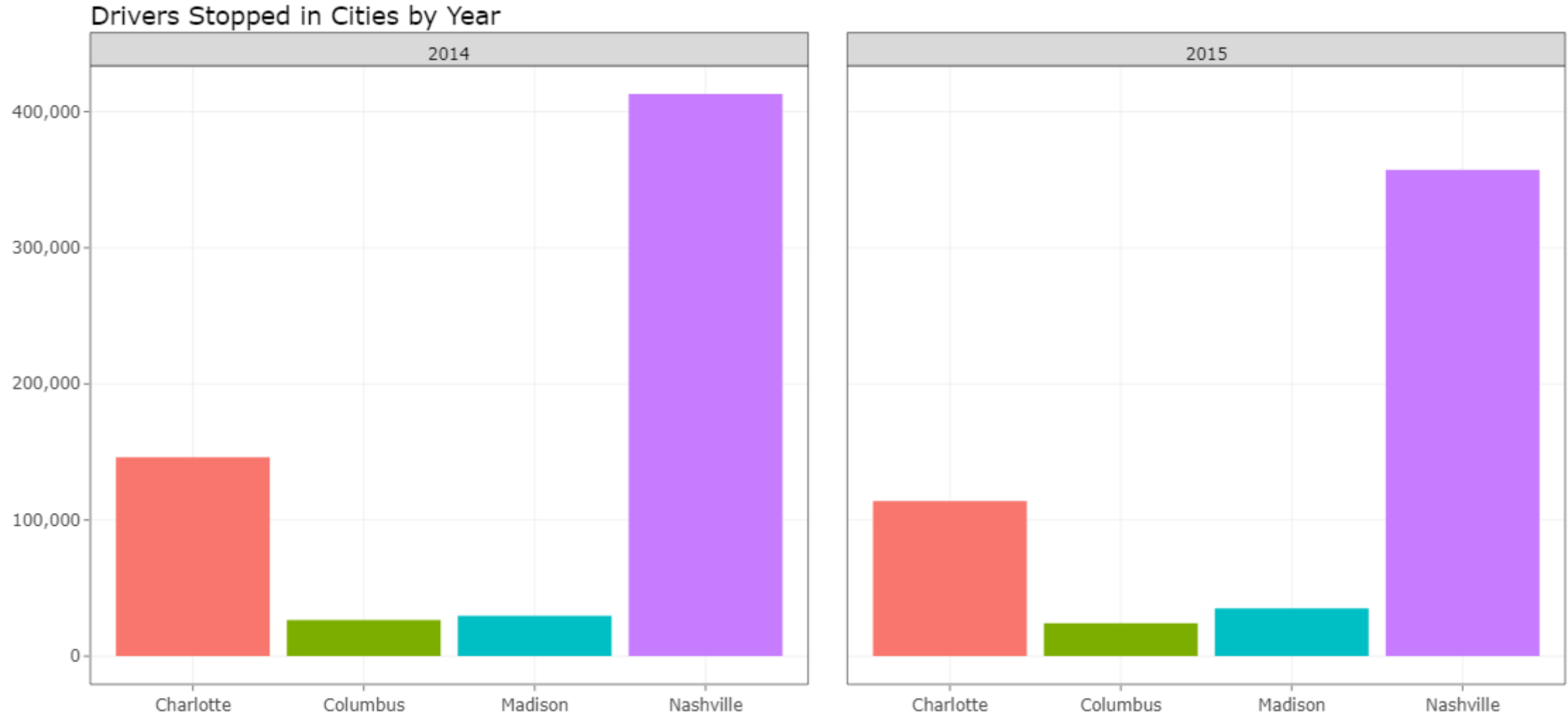
- This dataset has information on:
  - **Date** and **Time** of the Stop.
  - Information about the Officer (**Officer ID**).
  - **Race** and **Age** of the driver (subject).
  - Outcome of the Stop like **Citation, Arrest** or **Warning**.
  - **Search for Contraband** like **Drugs** or **Weapon** were performed on the driver or not.
  - **Latitude and Longitude** of the Stop and more.
- I chose this dataset as I found it interesting as it has a large number of variables, **42, both categorical and continuous** to explore and perform analysis on.
- The dataset is also large with **3,092,351 observations** with the date range of **Jan 2010 - Mar 2019**.
- All these things contribute to the dataset making it useful to find concrete, data-driven insights to **improve both the equity and efficacy of the MNPD's policing strategies**.

Census Demographics	Percent
White	62.35%
Black	28.04%
Asian/Pacific Islander	3.52%
Hispanic	10.4%
Other	3.38%

**Table 1:** Racial Composition of Nashville



# Q:Is there evidence of Over-Policing by the MNPD?

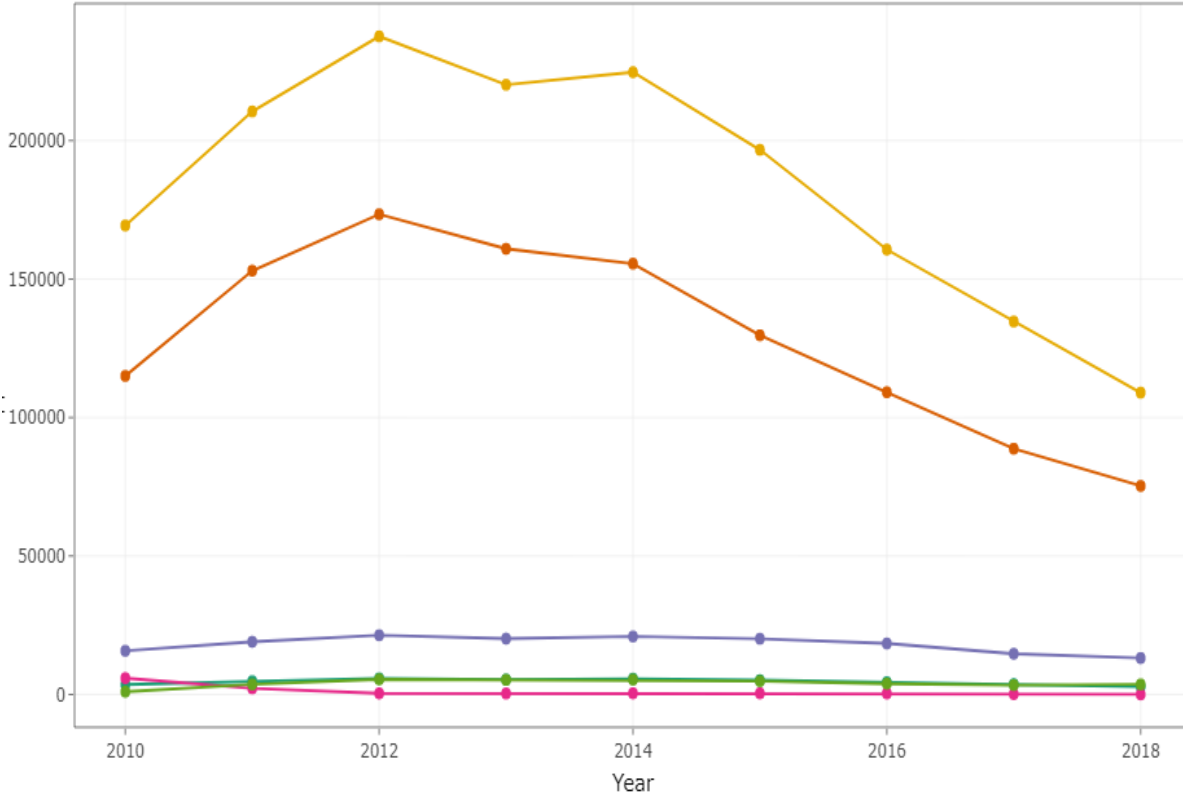


- In 2014 and 2015, MNPD conducted nearly 0.8 million traffic stops, a number 3 to 15 times greater than comparable cities.
- **Finding#1:** This gives us the required evidence of over-policing under the MNPD's stop and search regime. Also, a report suggests that increasing traffic stops has not successfully reduced crime in Nashville.

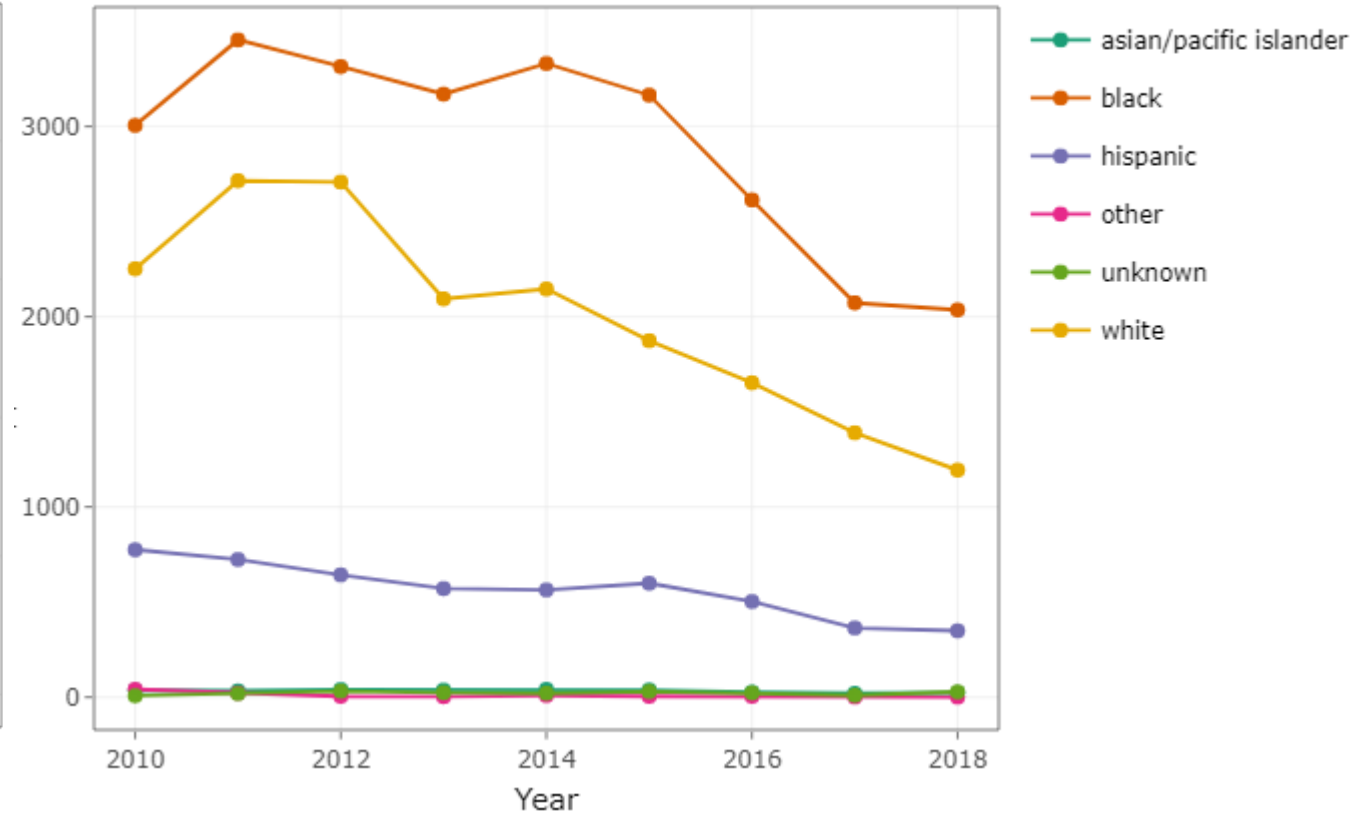


# Q: Is there a disproportionate rate of traffic stops and arrests?

Stopped Drivers from 2010-2018 according to Race



Arrested Drivers from 2010-2018 according to Race



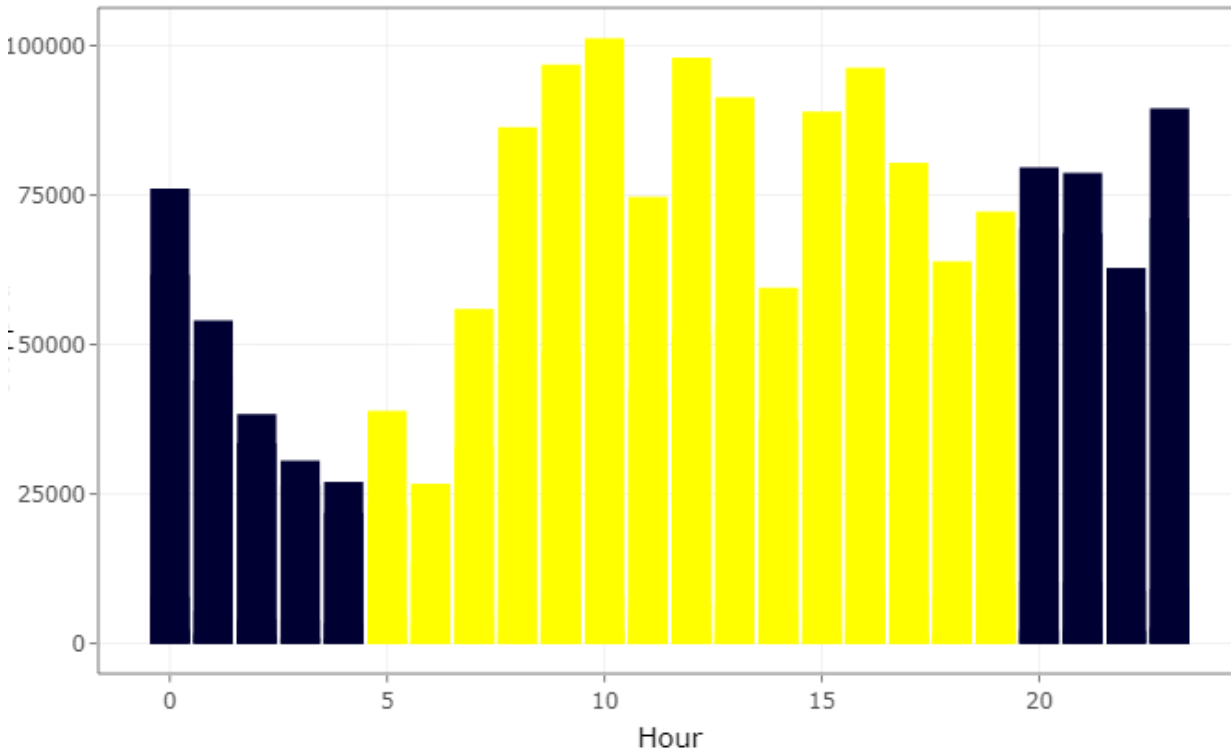
- White drivers in Nashville are stopped at a **1.43 times** higher than Black drivers.

- Black drivers in Nashville are arrested at **1.45 times** higher than white drivers.
- **Finding#2:** Across all years of arrests, black drivers are arrested at rates disproportionately higher than other drivers.

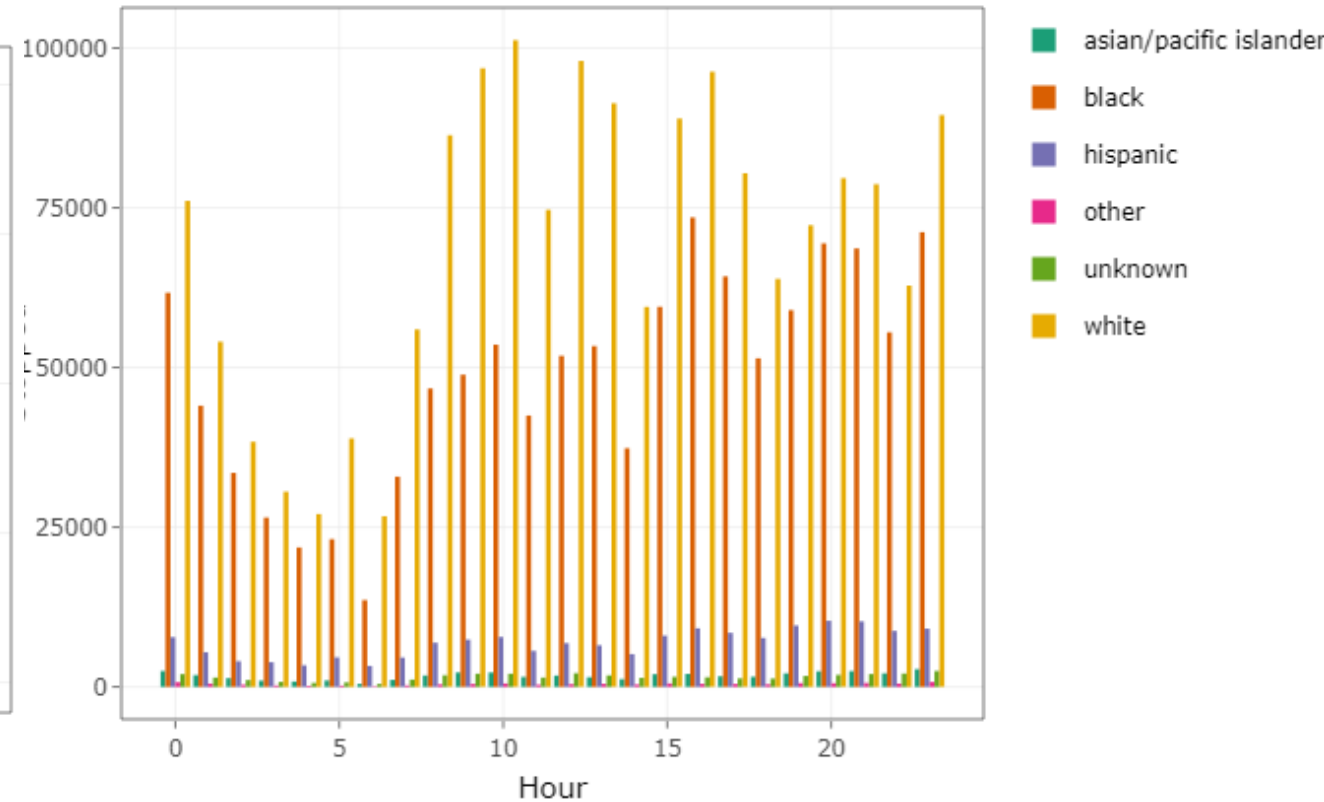


# Q: When do most stops occur during the night or day?

Stopped Drivers according to Time



Stopped Drivers according to Time and Race

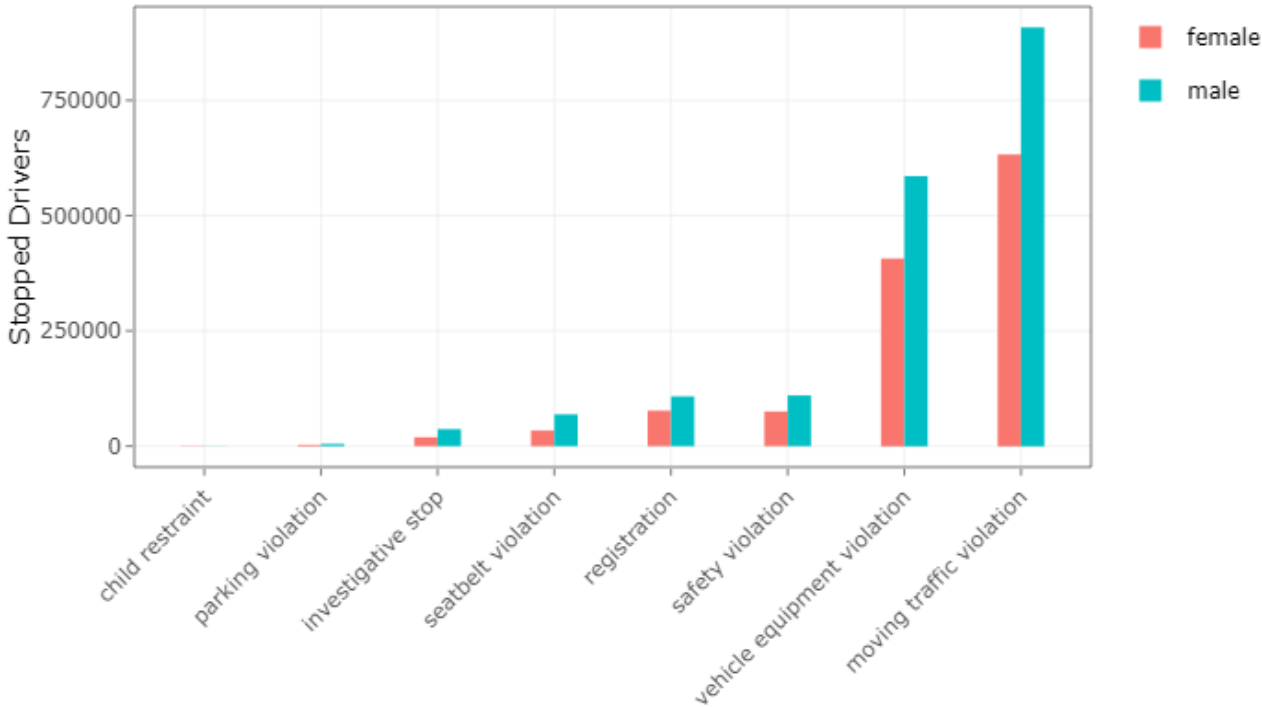


- Blacks are likely to be pulled over approximately the same as whites during when the sky was growing darker at around 7 p.m. and also before 7 a.m. local time!
- **Finding#3:** Most stops occurring during the day with the vast majority of which are concentrated in communities of color.



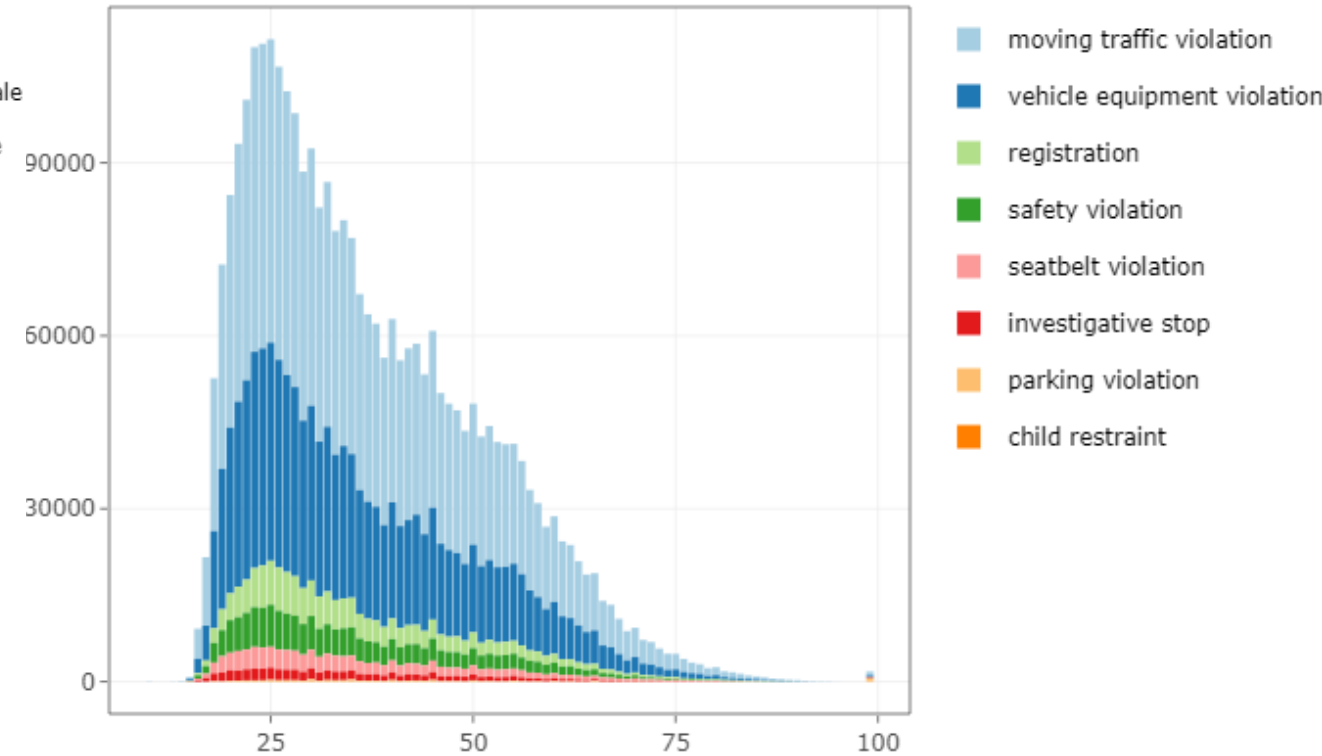
# Traffic Violations by Gender and Age

Top Violations according to Gender



- Males were significantly more likely to be stopped than females in each of the violations under consideration.
- **60%** of all traffic tickets in Nashville were issued to males from Jan 2010 - Mar 2019.
- **Finding#4:** Males are more likely to be stopped by the police. **Gender Bias in the Enforcement of Traffic.**

Top Violations according to Age Group

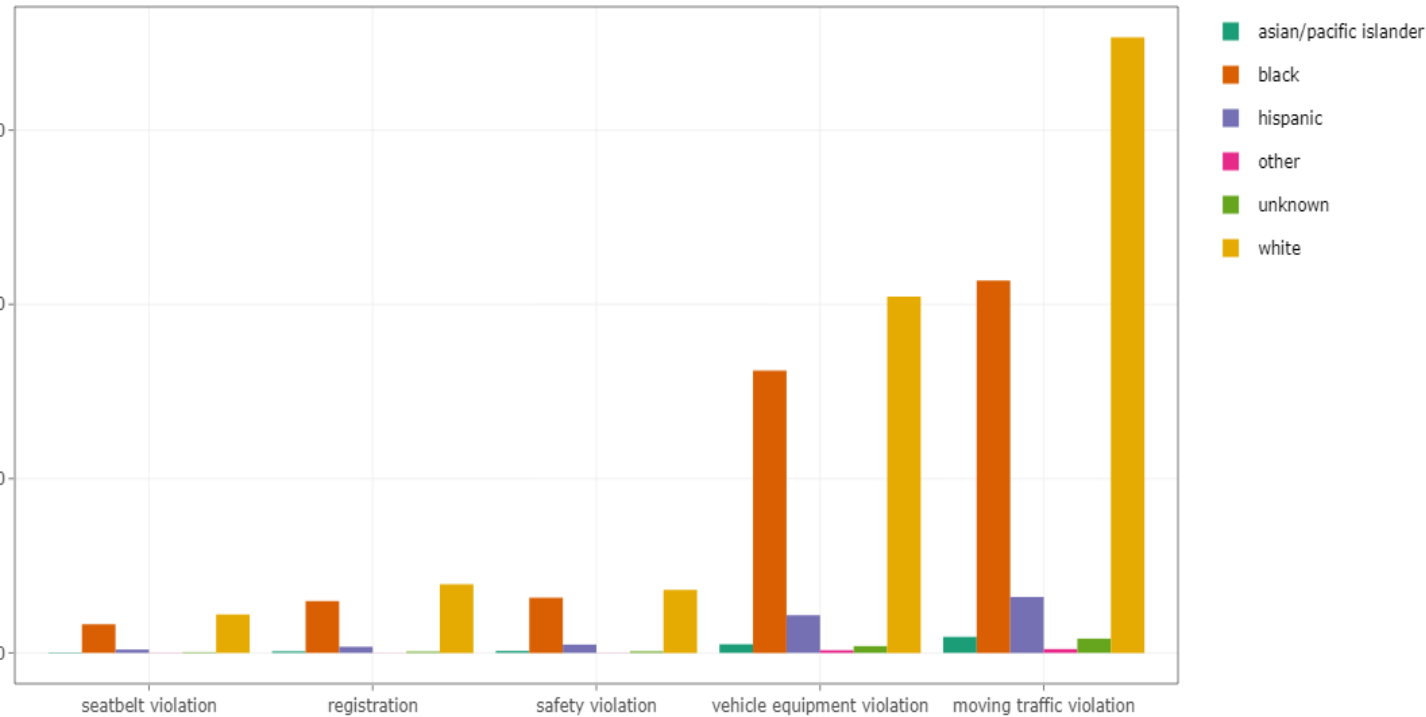


- Each distribution was very similar decreasing with drivers age.
- Moving traffic violation being the highest across each age group.
- Age 25, most violations occur at this age.
- **“Younger people cause more accidents than older people — unless they’re married,”** says Mike Barry from the Insurance Information Institute.



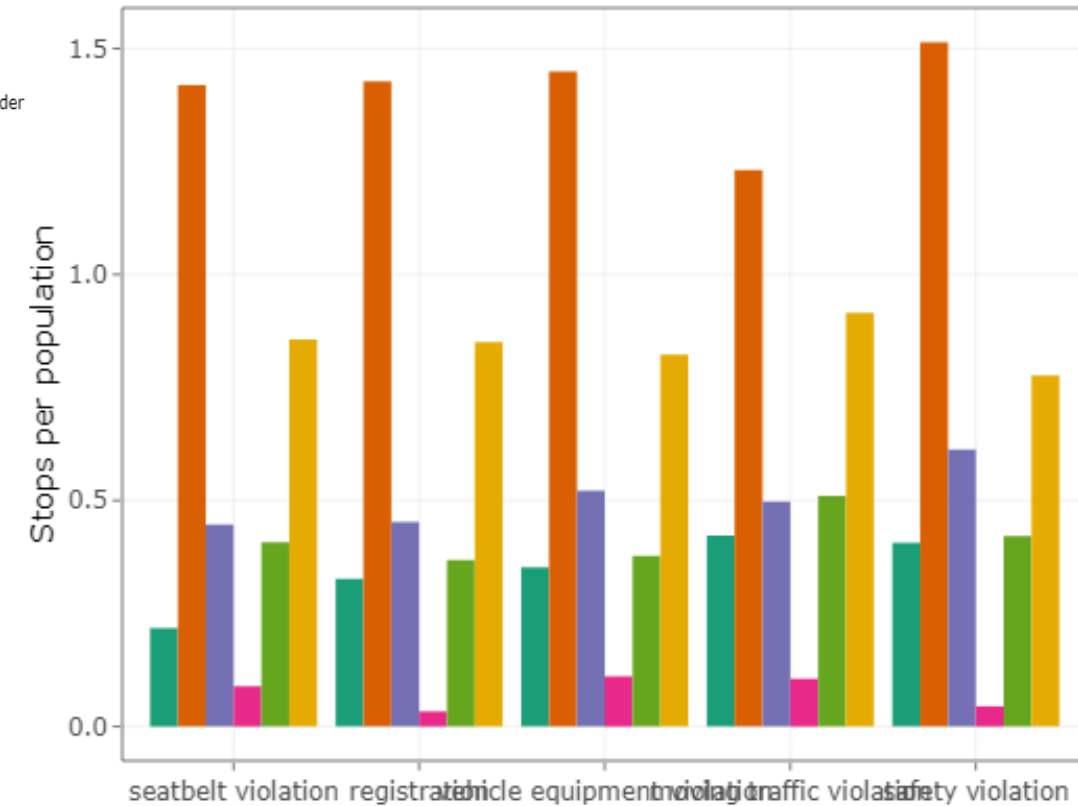
# Violation Rates by Race

Top Violations



Across all categories of violations, white drivers are stopped at rates higher than those of other races.

Top Violations per Population



In sum, Nashville's policing practices disproportionately impact black drivers in ways that raise serious questions about the legitimacy and legality of MNPd.

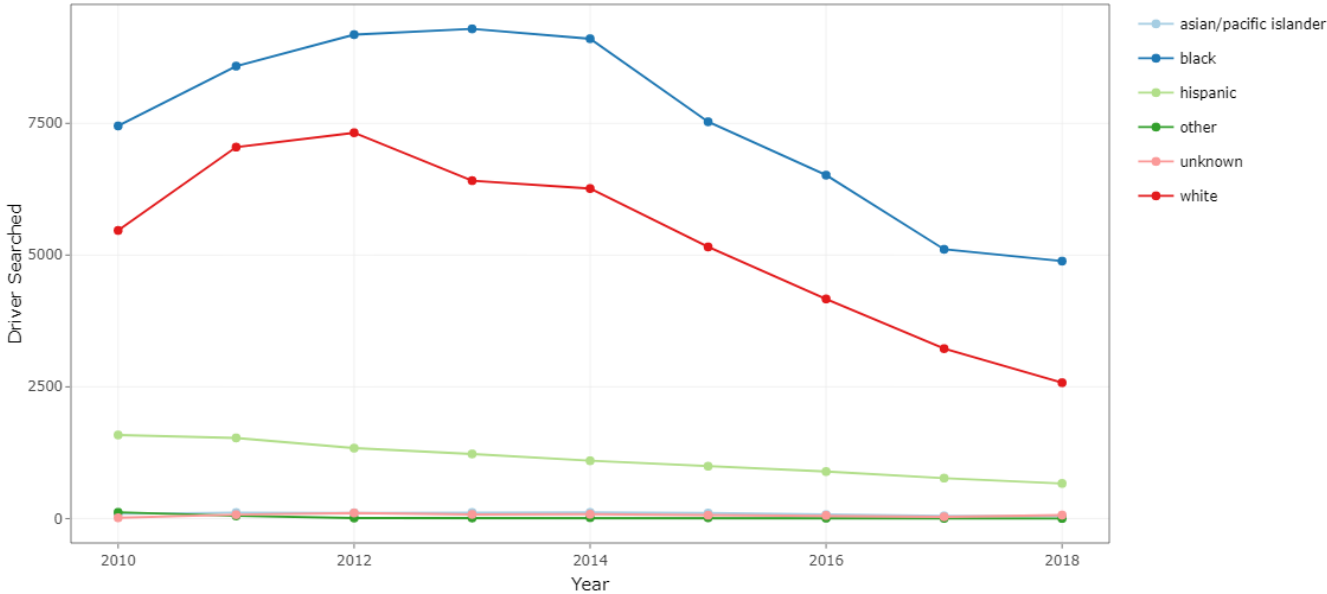




# Q: Does race affect who gets searched during a stop?

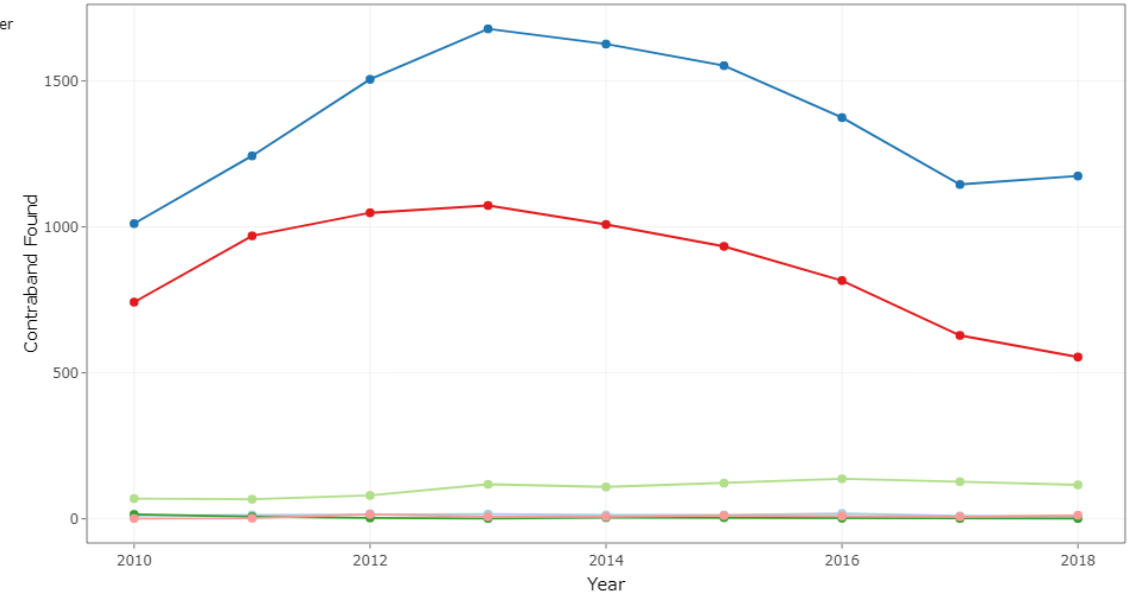
## Racial disparities In MNPD's Probable Cause Searches

Drivers Searched from 2010-2018 according to Race



- “Why aren’t the vehicles of white’s searched as often as black’s and does this result in biased results?”
- Every year, the total number of probable cause searches of black drivers exceeds the number of probable cause searches of white drivers, even though there are far more white drivers than black.

Contraband Found from 2010-2018 according to Race



- Does the Police target the minority thinking that only in their vehicles illegal material would be found?
- **Finding#5:** Under the MNPD’s traffic stop and search regime, racial disparity between searches of black and white drivers has grown substantially and rapidly.



# Future Goals:

- Using the Exploratory Analysis done and its interpretation, I aim to further explore search conducted, year, subject race as the predictors and contraband found as the response.
- Furthermore, explore Bayesian Models for the same.



# Logistic Regression- response in the form of success & failure

Call:

```
glm(formula = glm_data ~ year + subject_race, family = binomial,
     data = tn_contraband)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-4.7794	-0.9058	0.2049	0.8494	4.0233

Coefficients:

	Estimate	Std. Error	z value	Pr(> z )	
(Intercept)	-1.671e+02	5.789e+00	-28.865	< 2e-16	***
year	8.220e-02	2.874e-03	28.600	< 2e-16	***
subject_raceblack	2.736e-01	9.236e-02	2.963	0.00305	**
subject_racehispanic	-4.073e-01	9.680e-02	-4.208	2.58e-05	***
subject_raceother	3.833e-01	1.838e-01	2.085	0.03709	*
subject_raceunknown	-1.026e-01	1.444e-01	-0.711	0.47715	
subject_racewhite	2.425e-01	9.257e-02	2.619	0.00882	**

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Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 1532.8 on 59 degrees of freedom  
Residual deviance: 144.5 on 53 degrees of freedom  
AIC: 493.53

Interpretation

- It can be seen that only year, intercept (subject\_raceasian/pacific islander, taken as baseline), subject\_raceblack, subject\_racehispanic, subject\_raceother, subject\_racewhite out of all the predictors are significantly associated to the outcome.
- The intercept = -1.671e+02, which is interpreted as log odds of a driver with subject\_race as asian having contraband\_found when searched.
- The coefficient for year indicates that one unit increase in the year will increase the odds of contraband\_found by  $\exp(8.220e-02)$  1.08 times ie 8%.
- The coefficient for subject\_raceblack indicates increase the odds of contraband\_found by  $\exp(2.736e-01) = 30\%$  increase in subject\_raceblack compared to subject\_raceasian.
- Similarly for others...